MAINTENANCE/OVERHAUL MANUAL

KX 170A/B-KX 175/B NAV/COMM TRANSCEIVER

KY 195/B COMMUNICATIONS TRANSCEIVER

MANUAL NUMBER	006-5053-06
REVISION NUMBER	6
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KING RADIO CORPORATION®
400 NORTH ROGERS ROAD OLATHE, KANSAS, U.S.A.

KING RADIO CORPORATION.
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KING RADIO MAINTENANCE MANUAL REVISION INSTRUCTIONS AND HISTORY

MANUAL KX 170A/B-KX 175B/KY 195B KPN 006-5053-06

REVISION 6, December, 1977

Where R&R appears in the action column, remove the page now in the maintenance manual and replace it with the enclosed page; otherwise, ADD or DESTROY pages as listed. Retain these instructions in the front of the maintenance manual as a Record of Revisions.

PAGE	ACTION	REASON FOR CHANGE
Cover	R & R	Updated transmitter and audio assembly and schematic to latest revision.
Rev. Hist.	ADD	
5-67A	ADD	
6-61	R & R	
6-62	R & R	

KING RADIO MAINTENANCE MANUAL REVISION INSTRUCTIONS AND HISTORY

MANUAL KX 170A/175 - KX 170B/175B - KY 195/195B

REVISION 5, July, 1976

Where R&R appears in the action column, remove the page now in the maintenance manual and replace it with the enclosed page; otherwise, ADD or DESTROY pages as listed. Retain these instructions in the front of the maintenance manual as a Record of Revisions.

PAGE	ACTION	REASON FOR CHANGE
Front	R & R	Revision No. changed
KX 175B -05 & 195B -04	ADD	Add behind Green Tab (KX 170BE/175BE - KY 195BE)

KING RADIO MAINTENANCE MANUAL REVISION INSTRUCTIONS AND HISTORY

MANUAL KX 170A/B - KX 175/B - KY 195/B

REVISION 4

Where R&R appears in the action column, remove the page now in the maintenance manual and replace it with the enclosed page; otherwise, ADD or DESTROY pages as listed. Retain these instructions in the front of the maintenance manual as a Record of Revisions.

PAGE	ACTION	REASON FOR CHANGE
Front	R&R	Revision No. Change
Rev. History	ADD	New Rev. Added. Place all History Pages between front page and Green Tab (KX 170A/KX 175).
Service Bulletin	ADD	Place new and old Service Bulletins behind Rev. History Pages. Mod. to Eliminate 400Hz Interference
Service Bulletin	ADD	Mod. to Eliminate Lock Up
Service Bulletin	ADD	Mod. to Narrow Bandpass Selectivity
Service Bulletin	ADD	Mod. to Eliminate VOR Error
Service Memo #157	ADD	Mod. to Eliminate VHF Comm Noise Squelch
Service Memo #158	ADD	Disc Capacitor Reliability
Service Memo #162	ADD	Transistor 007-0046-00 Substitution Information
Service Memo #177	ADD	Improved Faceplate Assembly
Service Memo #178	ADD	Discontinuance of Transistor KPN 007-0184-01
Red Tab	ADD	Place Behind Green Tab (KX 170A/KX 175)
Front Page KX 170A/175 KY 195	DESTROY	
Installation Manual	R&R	Remove Tabs and Text of First 3 Sections and Replace with New Install. Manual.
Blue Tab	ADD	Place Behind Installation Manual.
Front Page KX 170A/KX 175	ADD	Place Behind Blue Tab
Pages i thru viii	ADD	Place Behind Front Page
5-1	R&R	Change in Para. 5.2.1(k)
5-30	R&R	Flow Chart Updated
5-143	ADD	Schematic Updated
6-3 thru 6-5	R&R	B/M and Drawing Updated
6-11 thru 6-22	R&R	B/M and Drawing Updated
6-41 thru 6-50	R&R	B/M Updated
6-57 thru 6-60	R&R	B/M Updated
Red Tab	ADD	Place Behind Green Tab (KY 195)
Installation Manual	R&R	Remove Tabs and Text of First 3 Sections and Replace with New Install. Manual. Remove Table of Contents.
Blue Tab	ADD	Place Behind Install Manual
Front Page KY 195	ADD	Place Behind Blue Tab
i & ii	ADD	Place Behind Front Page
5-3 thru 5-4B	R&R	B/M Updated
		(KA 47)
19 thru 21	R&R	Drawing Updated
		(KX 170B/KX 175B)
Installation Manual	R&R	New Revision
i thru iv	R&R	Contents Revised
5-7/5-8	R&R	Change in Para. 5.2.1(j)
5-13/5-14	R&R	Change in Para. 5.2.5.8(c)

PAGE	ACTION	REASON FOR CHANGE
5-25	R&R	Flow Chart Revised
5-63A	ADD	Schematic and Drawing Revised
5-65	ADD	Schematic and Drawing Revised
5-67A	ADD	Schematic and Drawing Revised
5-69	ADD	Schematic and Drawing Revised
5-71	ADD	Schematic Revised
5-73	ADD	Schematic Revised
6-1 thru 6-28	R&R	B/M and Drawings Updated
6-31 thru 6-38	R&R	B/M and Drawings Updated
6-41 thru 6-50	R&R	B/M and Drawings Updated
6-57 thru 6-67	R&R	B/M and Drawings Updated

KING RADIO MAINTENANCE MANUAL REVISION INSTRUCTIONS AND HISTORY

MANUAL KX 170 A/B - KX 175/B - KY 195/B

REVISION 3 August 1973

Where R&R appears in the action column, remove the page now in the maintenance manual and replace it with the enclosed page; otherwise, ADD or DESTROY pages as listed. Retain these instructions in the front of the maintenance manual as a Record of Revisions.

PAGE	ACTION	REASON FOR CHANGE	
Front	R&R	Revision No. Change	
KX 170BE Tab	Destroy	Replaced with new tab at rear of manual	
KX 170BE Page	Destroy	Replaced by updated information	
KX 170BE KX 175BE KY 195BE Tab	Add	New Tab covering all "BE" Units (Place tab at rear of Manual)	
KX 170BE Page	Add	Revised Data	Add Pages behind KX 170BE/ KX 175BE/ KY 195BE Tab
KX 175BE Page	Add	New Data	
KY 195BE Page	Add	New Data	

KING RADIO MAINTENANCE MANUAL REVISION INSTRUCTIONS AND HISTORY

MANUAL KX 170A/KX 175/KY 195

REVISION LEVEL: 2, December, 1972

Where R&R appears in the action column, remove the page now in the maintenance manual and replace it with the enclosed page; otherwise, ADD or DESTROY pages as listed. Retain these instructions in the front of the maintenance manual as a Record of Revisions.

PAGE	ACTION	REASON FOR CHANGE
		THIS MANUAL IS A COMPLETE REPRINT. DESTROY OLD MANUAL. THE NEXT 2 PAGES INDICATE WHAT CHANGES HAVE BEEN MADE IN THE KX 170A/KX 175/KY 195 MANUAL (REVISION 2).

KING RADIO MAINTENANCE MANUAL REVISION INSTRUCTIONS AND HISTORY

MANUAL KX 170A/KX 175/KY 195

REVISION LEVEL: 2, December, 1972

Where R&R appears in the action column,remove the page now in the maintenance manual and replace it with the enclosed page; otherwise, ADD or DESTROY pages as listed. Retain these instructions in the front of the maintenance manual as a Record of Revisions.

PAGE	ACTION	REASON FOR CHANGE
Front Page	Add	(KX 170A/B-KX 175/B)(KY 195/B)
Front Page	R&R	To correspond with new revision
Warranty	R&R	To correspond with new revision
Record of Revision	Destroy	Manual Format Change
Service Bulletin Record	Destroy	Manual Format Change
Manual Rev. Instructions & History	Add	Manual Format Change
Service Bulletin & Memo	Add	Manual Format Change
vi	R&R	Page numbers (Section VI) changed
1-2	R&R	Word "OPTIONAL" added
1-9	R&R	Word change
1-12	R&R	Deletion of information
2-13	Add	Interconnect updated
2-13A	Add	Interconnect updated
2-15	Add	Interconnect updated
2-17	Add	Interconnect updated
4-19	R&R	Figure 4-12 changed
4-22	R&R	Figure 4-15 changed
4-23	R&R	Figure 4-17 changed
4-26	R&R	Figure 4-21 changed
4-27	R&R	Figure 4-22 changed
5-1	R&R	Test equipment updated
5-2	R&R	Information deleted
5-3	R&R	Information change
5-4	R&R	Information deleted
5-5	R&R	Information change
5-37	R&R	Table 5-7 updated
5-40	R&R	Table 5-8 updated
5-42	R&R	Table 5-9 updated
5-59	R&R	Schematic updated
5-91	R&R	Table 5-13 updated
5-95	R&R	Paragraph 5.7.4 updated
5-106	R&R	Paragraph d. updated
5-107	R&R	Table 5-14 updated
5-111	R&R	Paragraph 5.8.4 updated
5-113	R&R	Schematic updated

PAGE	ACTION	REASON FOR CHANGE
5-116	R&R	Photo updated
5-125	R&R	Schematic updated
5-139 thru 5-149	Add	Schematics updated
Section VI Tab	R&R	Contents updated
6-1 thru 6-10	R&R	Parts list updated
6-15 thru 6-24	R&R	Parts list updated
6-29 thru 6-36	R&R	Parts list updated
6-41 thru 6-75	R&R	Parts list updated
Section V Tab	R&R	Contents updated
Section V	R&R	Parts list updated, parts list revision record pages inserted, remove and replace entire section.
5	Add	Interconnect updated
7	Add	Schematic updated
11 thru 21	R&R	Parts list & Assembly drawings updated
Addendum	Add	New (KX 170B/KX 175B/KY 195B) Maintenance Manual

KING®

KX 170A/KX 175
NAVIGATION RECEIVER/ COMMUNICATIONS TRANSCEIVER

INSTALLATION MANUAL
006-0057-03

REV. 3 JANUARY, 1976

KING
KX 170A/KX 175
NAVIGATION RECEIVER/COMMUNICATIONS TRANSCEIVER

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SECTION II
INSTALLATION

SECTION III
OPERATION

HISTORY OF REVISIONS

Rev. 3, January, 1976

Page	Reason for Change
Front Page	Added
Table of Contents	Added
2-1	Paragraph 2.3(b) revised
2-6A	Antenna Cable Assembly added
2-13	Interconnect Updated
2-15	Interconnect Updated
2-17	Interconnect Updated
2-19	Added
2-21	Added

SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the King Radio Corporation Silver Crown KX 170A/KX 175, KI 201C and KI 211C and interconnect information for various NAV/COMM system options.

1.2 PURPOSE OF EQUIPMENT

The King KX 170A/KX 175 NAV/COMM combines in a single panel mounted unit a 360 channel VHF COMM Transceiver and an independent 200 channel VHF NAV receiver. The NAV Receiver supplies VOR/LOC information to navigational converters and provides frequency selection for remote mounted Distance Measuring Equipment and Glideslope Receivers.

The KI 201C VOR Indicator is designed to operate with VHF navigational equipment (such as the KX 170A) to provide OMNI (VOR) or LOCALIZER (LOC) information. The VHF navigational receiver receives and detects the omni or localizer information. The KI 201C converts this information to dc signals which drive the LEFT-RIGHT needle and the TO-OFF-FROM flag of the visual indicator.

The KI 211C ILS Indicator performs the same functions as the KI 201C. In addition, it contains a glideslope receiver and the visual indicator includes an UP-DOWN glideslope needle with an OFF warning flag.

1.3 DESIGN FEATURES

1.3.1 KX 170A/KX 175

A. Controls

1. On-Off switches are independent of volume control settings allowing the volume to remain at desired levels.

2. Separate NAV and COMM ON-OFF switches (KX 175 NAV and COMM are electrically independent).

3. Automatic squelch eliminates pilot responsibility for continuously monitoring squelch adjustments. Squelch threshold automatically adjusts to open on readable signals. Test position opens squelch to test COMM receiver sensitivity and to listen to extremely weak signals.

4. Ident-Voice switch filters station ident from receiver audio.

5. Frequency selector mechanism features human engineered concentric knobs, airline type drum readout, and blue-white or red back lighting. Glideslope and DME switching is provided.

B. Electronics

1. Varactor diode tuned filters eliminates use of mechanical tuning shafts and mechanisms.

2. Balanced mixers for superior intermodulation, cross modulation, and L. O. radiation performance provide true 1 + 1 operation.

3. Transistorized transmitter provides 5 watts minimum output power and long term reliability superior to tube designs.

4. The digital frequency synthesizers utilize state of the art integrated circuits to replace all but 6 crystals (KX 170A) and 7 crystals (KX 175), providing improved mean time between failure.

5. Crystal filter selectivity both NAV and COMM.

6. Carrier to noise squelch with carrier squelch back up functionally described above.

7. Tight AGC (typically 0. 5db from $10\mu v$ to $20,000\mu v$) minimizes audio level variations.

C. Construction

1. Modular construction for ease of maintenance.

2. Rack mounted, removable from the front panel.

3. Anti-theft locking mechanism. (Optional)

4. Provisions for identifying radios as COMM 1, NAV 1 and COMM 2, NAV 2 in dual installations.

1. 3. 2 KI 201C/KI 211C

A. Solid state

B. Wedge lighting (blue-white or red)

C. Autopilot couple capability.

D. Automatic switching from VOR to ILS mode.

E. Proven reliability of KI 201/211 series indicators.

G. Internal glideslope (KI 211C)

1.4 POWER REQUIREMENTS

The KX 170A/KX 175 requires 13. 75 volts for proper operation. Aircraft having electrical power plants producing 27. 5 volts require the installation of a voltage converter. The KA 39 Voltage Converter, designed to separately convert NAV and COMM 27. 5 volts to 13. 75 volts, may be conveniently remote mounted in the aircraft.

The KI 201C/211C may be operated from either a 27. 5 or 13. 75 volt aircraft supply voltage.

1.5 TECHNICAL CHARACTERISTICS

KX 170A TRANSCEIVER

SPECIFICATION	CHARACTERISTIC
GENERAL	
MOUNTING:	Panel mounted, no shock mounting required.
SIZE:	
KX 170A NAV/COMM	6. 312 × 2. 600 × 14. 15 inches w/connectors. (16. 03 × 6. 60 × 35. 94 centimeters.)

SPECIFICATION	CHARACTERISTIC
WEIGHT: KX 170A NAV/COMM	7.0 lbs excluding external connectors and harness.
POWER REQUIREMENTS:	13.75V (or 27.5V with KA 39)
COMM Receive	0.65 amps
COMM Transmit (Tone)	4.5 amps (2.8 amps unmodulated)
NAV Receiver	0.45 amps
Lamps	0.16 amps (13.75Vdc), 0.08 amps (27.5Vdc)
Max Total Current	5.1 amps (Transmit tone mod, NAV Rec. Lamps)
COMM TRANSCEIVER	
CRYSTAL CONTROLLED:	360 channels
FREQUENCY RANGE:	118.00 to 135.95MHz with 50kHz spacing
FREQUENCY STABILITY:	±0.005%
TRANSMITTER	
VHF POWER OUTPUT:	5 watts minimum, 50 ohm load
MODULATION:	85% modulation capability with 90% limiting provided
MICROPHONE:	Dynamic mike containing transistorized pre-amp or carbon (must provide at least 120mVrms into 500Ω load.
SIDETONE:	Adjustable up to 4mw into 500 ohm headphones
DUTY CYCLE:	1 minute on, 4 minutes off (20%)
RECEIVER	
SENSITIVITY:	1.5µv (soft) will provide a 6db minimum signal plus noise to noise ratio (1kHz, 30% mod)

SPECIFICATION	CHARACTERISTIC
SELECTIVITY:	Typical 6db at ±15kHz, 65db at ±50kHz
SPURIOUS RESPONSES:	Down at least 60db
SQUELCH:	Automatic squelch (carrier to noise) with manual disable and carrier squelch override.
AGC CHARACTERISTICS:	From 10μv to 20,000μv audio output will not vary more than 3db.
NAV RECEIVER	
CRYSTAL CONTROLLED:	200 channels.
FREQUENCY RANGE:	108.00 to 117.95MHz with 50kHz spacing.
SENSITIVITY: Navigation	1.5μv (soft) will provide a half-flag indication 1.0μv (soft) will provide a 6db $\frac{\text{signal + noise}}{\text{noise}}$ ratio.
SELECTIVITY:	Typical 6db at ±19kHz 50db at ±50kHz
SPURIOUS RESPONSES:	Down at least 60db
IDENT FILTER:	Tone rejection, 15db, minimum
AGC CHARACTERISTICS:	From 10μv to 20,000μv audio output will not vary more than 3db.
NAV RECEIVER ACCURACY:	Two sigma limit, ±1.5°
NAV OUTPUT:	With LOC adjusted for 0.35Vrms, VOR = 0.5Vrms (typical) into 20KΩ or greater load impedance.

SPECIFICATION	CHARACTERISTIC
DME CHANNELING:	

	M_0	M_1	M_2	M_3		K_0	K_1	K_2	K_3		50kHz
108	-	-	0	-	.0X	0	0	-	-	.X0	-
109	-	-	-	0	.1X	0	0	0	-	.X5	0
110	0	-	-	-	.2X	0	0	0	0		
111	0	0	-	-	.3X	-	0	0	0		
112	0	0	0	-	.4X	-	-	0	0		
113	-	0	0	0	.5X	0	-	-	0		
114	0	-	0	0	.6X	-	0	-	-		
115	-	0	-	0	.7X	-	-	0	-		
116	0	-	0	-	.8X	-	-	-	0		
117	0	0	-	0	.9X	0	-	-	-		

NOTE: (-) = OPEN, (0) = DME COMMON.

ILS ENERGIZE:	The ILS energize wire is connected to the ILS common wire when the MHz selector is in either the 108, 109, 110, or 111 position AND SIMULTANEOUSLY the kHz selector is in either the 0. 10, 0. 15, 0. 30, 0. 35, 0. 50, 0. 55, 0. 70, 0. 75, 0. 90 or 0. 95 position.

GLIDESLOPE CHANNELING:

	GS	GS	GS	GS		GS	GS	GS	GS	GS		GS
	108	109	110	111		0. 1	0. 3	0. 5	0. 7	0. 9		50kHz
108	0	-	-	-	.0X	-	-	-	-	-	.X0	-
109	-	0	-	-	.1X	1	-	-	-	-	.X5	0
110	-	-	0	-	.2X	-	-	-	-	-		
111	-	-	-	0	.3X	-	1	-	-	-		
112	-	-	-	-	.4X	-	-	-	-	-		
113	-	-	-	-	.5X	-	-	1	-	-		
114	-	-	-	-	.6X	-	-	-	-	-		
115	-	-	-	-	.7X	-	-	-	1	-		
116	-	-	-	-	.8X	-	-	-	-	-		
117	-	-	-	-	.9X	-	-	-	-	1		

NOTE: (0) = ILS common, (-) = open, (1) = either KN 70 A+ (KN 70 Installations) or KX 170A/KX 175 A+ with 1KΩ source resistance (KI 211C/KI 212 installations).

SPECIFICATION	CHARACTERISTIC
AUDIO	
AUXILARY AUDIO INPUTS:	Three (3) 500 ohms with 30db isolation between any two.
FREQUENCY RESPONSES:	Within 6db from 350Hz to 2500Hz.
HEADPHONE OUTPUT:	50mw into 500 ohm
SPEAKER OUTPUT:	4. 5Vrms into auxilary input produces 5 watts audio output.
KX 175 TRANSCEIVER	
TSO COMPLIANCE:	
COMM Transmit	C37b (DO-110, Class II)
COMM Receive	C38b (DO-109)
VOR	C40a (DO-114)
LOC	C36c (DO-131, Class C)
Environmental	DAPBAAXXXXXX
MOUNTING:	Panel mounted, no shock mounting required
SIZE:	6. 312 × 2. 600 × 14. 15 inches w/connectors. (16. 03 × 6. 60 × 35. 94 centimeters)
WEIGHT:	7. 0 lbs excluding external connectors and harness.
POWER REQUIREMENTS:	13. 75V (or 27. 5V with KA 39)
COMM Receive	0. 65 amps
COMM Transmit (Tone)	4. 5 amps (2. 8 amps unmodulated)
NAV Receive	0. 45 amps
Lamps	0. 16 amps (13. 75Vdc), 0. 08 amps (27. 5Vdc)
Max. total current	5. 1 amps (Transmit tone mod, NAV Rec, Lamps)

COMM TRANSCEIVER

CRYSTAL CONTROLLED:	360 channels
FREQUENCY RANGE:	118. 00 to 135. 95MHz with 50kHz spacing
FREQUENCY STABILITY:	±0. 005%

TRANSMITTER

VHF POWER OUTPUT:	5 watts minimum, 50 ohm load
MODULATION:	85% modulation capability with 90% limiting, less than 15% distortion at 80% mod.
MICROPHONE:	Carbon or dynamic mike containing transistorized pre-amp (must provide at least 120mv_{rms} into 500Ω load).
SIDETONE:	Adjustable up to 4mw into 500 ohm headphones
DUTY CYCLE:	1 minute on, 4 minutes off (20%)

RECEIVER

SENSITIVITY:	1. 5μv (soft) will provide a 6db minimum signal plus noise to noise ratio
SELECTIVITY:	Typical 6db at ±15kHz, 65db at ±50kHz
SPURIOUS RESPONSES:	Down at least 60db
SQUELCH:	Automatic squelch (carrier to noise) with manual disable and carrier squelch override.
AGC CHARACTERISTICS:	From 10μv to 20, 000μv audio output will not vary more than 3db.

NAV RECEIVER

CRYSTAL CONTROLLED:	200 channels.

SPECIFICATION	CHARACTERISTIC
FREQUENCY RANGE:	108.00 to 117.95MHz with 50kHz spacing.
SENSITIVITY:	
Navigation	1.5μv (soft) will provide a half-flag indication 1.0μv (soft) will provide a 6db $\frac{\text{signal + noise}}{\text{noise}}$
SELECTIVITY:	Typical 6db at ±19kHz 75db at ±50kHz
SPURIOUS RESPONSES:	Down at least 60db
IDENT FILTER:	Tone rejection, 15db, minimum
AGC CHARACTERISTICS:	From 10μv to 20,000μv audio output will not vary more than 3db
ACCURACY:	Two sigma limit, ±1.0°
NAV OUTPUT:	With LOC adjusted for 0.35Vrms, VOR = 0.5Vrms (typical) into 20KΩ or greater load impedance.

DME CHANNELING:

	M_0	M_1	M_2	M_3		K_0	K_1	K_2	K_3		50kHz
108	-	-	0	-	.0X	0	0	-	-	.X0	1
109	-	-	-	0	.1X	0	0	0	-	.X5	0
110	0	-	-	-	.2X	0	0	0	0		
111	0	0	-	-	.3X	-	0	0	0		
112	0	0	0	-	.4X	-	-	0	0		
113	-	0	0	0	.5X	0	-	-	0		
114	0	-	0	0	.6X	-	0	-	-		
115	-	0	-	0	.7X	-	-	0	-		
116	0	-	0	-	.8X	-	-	-	0		
117	0	0	-	0	.9X	0	-	-	-		

NOTE: (-) = OPEN, (0) = DME COMMON.

SPECIFICATION	CHARACTERISTIC
ILS ENERGIZE:	The ILS energize wire is connected to the ILS common wire when the MHz selector is in either the 108, 109, 110, or 111 position AND SIMULTANEOUSLY the kHz selector is in either the 0.10, 0. 15, 0. 30, 0. 35, 0. 50, 0. 55, 0. 70, 0. 75, 0. 90 or 0. 95 position.

GLIDESLOPE CHANNELING:

	GS 108	GS 109	GS 110	GS 111		GS 0. 1	GS 0. 3	GS 0. 5	GS 0. 7	GS 0. 9		GS 50kHz
108	0	-	-	-	. 0X	-	-	-	-	-	. X0	-
109	-	0	-	-	. 1X	1	-	-	-	-	. X5	0
110	-	-	0	-	. 2X	-	-	-	-	-		
111	-	-	-	0	. 3X	-	1	-	-	-		
112	-	-	-	-	. 4X	-	-	-	-	-		
113	-	-	-	-	. 5X	-	-	1	-	-		
114	-	-	-	-	. 6X	-	-	-	-	-		
115	-	-	-	-	. 7X	-	-	-	1	-		
116	-	-	-	-	. 8X	-	-	-	-	-		
117	-	-	-	-	. 9X	-	-	-	-	1		

NOTE: (0) = ILS common, (-) = open, (1) = either KN 70 A+ (KN 70 Installations) or KX 170A, KX 175 A+ with 1KΩ source resistance (KI 211C/KI 212 installations).

AUDIO

SPECIFICATION	CHARACTERISTIC
AUXILARY AUDIO INPUTS:	Three (3) 500 ohms with 30db isolation between any two.
FREQUENCY RESPONSES:	Within 6db from 350Hz to 2500Hz.
HEADPHONE OUTPUT:	50mw into 500 ohm
SPEAKER OUTPUT:	4. 5Vrms into auxilary input produces 5 watts audio output

KI 201C/KI 211C INDICATOR

SPECIFICATION	CHARACTERISTIC
GENERAL	
SIZE:	
KI 201C VOR Indicator:	3. 25 × 3. 25 × 8. 3 inches (8. 255 × 8. 255 × 21. 082 centimeters)
KI 211C ILS Indicator:	3. 25 × 3. 25 × 8. 3 inches (8. 255 × 8. 255 × 21. 082 centimeters)
WEIGHT:	
KI 201C VOR Indicator:	2. 5 lbs.
KI 211C ILS Indicator:	3. 0 lbs.
POWER REQUIREMENTS:	
KI 201C VOR Indicator:	100ma (day) 100ma (day) 220ma (night) 160ma (night)
KI 211C ILS Indicator:	200ma (day) 200ma (day) 320ma (night) 260ma (night)
VOR/LOC	
LOCALIZER CENTERING:	Within ±10% of standard deflection (± 1/2 needle width)
LOCALIZER SENSITIVITY:	4db tone ratio will give 4 dot scale deflection ± two needle widths
OMNI ACCURACY:	±2°
OMNI SENSITIVITY:	10° of course width gives full scale deflection
INPUT LEVELS:	LOC . 35Vrms
GLIDESLOPE	
SENSITIVITY:	20μv (soft) for half flag and 60% of standard deflection (1 dot)

SPECIFICATION	CHARACTERISTIC
CENTERING:	Within 10% of standard deflection (200μv to 30,000μv) (±1 needles width)
SPURIOUS RESPONSES:	At least 40db down.
SELECTIVITY:	150kHz minimum 6db bandwidth 600kHz maximum 40db bandwidth
EXTERNAL LOAD:	Will operate an external autopilot load.
KA 39 VOLTAGE CONVERTER	
SIZE:	3.500 × 2.000 × 5.500 inches (8.889 × 5.18 × 13.87 centimeters)
WEIGHT:	1.1 lbs. excluding harness
POWER:	

	A	B
Input Volts	27.5vdc	27.5vdc
Output Volts	13.75vdc (nominal)	13.75vdc (nominal)
Input Current continuous		
Input Current 40% duty		--------
Output Current continuous	1.5A	0.75A
Output Current 40% duty	5.0A	--------

1.6 UNITS AND ACCESSORIES SUPPLIED

A. King KX 170A NAV/COMM (069-1017-00)

B. King KX 175 NAV/COMM (069-1016-00)

C. King KX 170A/KX 175 Installation Kit (050-1142-00) includes:

030-0061-00	Connector, Antenna (TED 9-10-2)
030-1019-00	Clamp, Cable Hall
030-2101-04	Connector, 42 pin (Amphenol 26-190-42)
047-1743-01	Plate, Connector Mounting
047-1851-00	Cover, Connector Mounting Plate
057-1214-00	Decal, COMM 1

057-1214-01	Decal, COMM 2
057-1214-02	Decal, NAV 1
057-1214-03	Decal, NAV 2
088-0136-01	Filter, Red Lamp
089-2188-22	#4 ESNA Nut
089-5523-05	Screw, #4-40 × 5/16 Fil HP
089-5903-05	Screw, #4-40 × 5/16 PHP
089-5907-05	Screw, #6-32 × 5/16 PHP
089-6008-04	Screw, #4-40 × 1/4 FHP
089-8025-30	Flat Washer
089-8094-30	Flat Washer
090-0019-07	Ring, Retainer
092-5021-00	Rivet, Blind
155-2013-00	Installation Cable Assembly

1.7 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

A. Communication and navigation antenna and cables.

B. Headphones and speaker:

1. Headphones: Low impedance types, 300 to 1,000 ohms.

2. Speaker: Voice coil impedance 3 to 6 ohms nominal.

C. KA 39 Voltage Converter, 27.5V to 13.75V (required in 27.5V installation only).

D. Microphone: Low impedance carbon, or dynamic with transistor pre-amp, such as King KA 14.

E. VOR/LOC converter and indicator. Various King Options include:

1. KI 201C VOR Indicator (VOR/LOC only)

2. KI 211C ILS Indicator (VOR/LOC Glideslope)

3. (a) KN 71 VOR/LOC Converter, with KNI 520 Navigation Indicator
   (b) KN 71 VOR/LOC Converter, with KPI 550 Pictorial Navigation System

4. (a) KN 70 Glideslope Receiver - VOR/LOC Converter with KNI 520 Navigation Indicator

(b) KN 70 Glideslope Receiver - VOR/LOC Converter with KPI 550 Pictorial Navigation System

5. (a) KN 74 Area Navigation Computer with KI 212 CDI and Glideslope Receiver.

(b) KN 74 Area Navigation Computer with KN 70 Glideslope Receiver VOR/LOC Converter and KPI 550A Pictorial Navigation System.

1.8 LICENSE REQUIREMENTS

The Federal Communications Commission requires that the operator of the transmitter in this equipment holds a Restricted Radio Telephone Operator Permit, or higher class license. A permit may be obtained by a U. S. citizen from the nearest field office of the FCC; no examination is required.

This equipment has been type accepted by the FCC and entered on their list of type accepted equipments as King KX 170A/KX 175 and must be identified as King KX 170A or King KX 175.

—CAUTION—

The VHF transmitter in this equipment is guaranteed to meet Federal Communications Commission approval only when King crystals are used.

Use of other than King crystals is considered an unauthorized modification.

SECTION II

INSTALLATION

2.1 GENERAL

This section contains suggestions and factors to consider before installing the KX 170A/KX 175 NAV/COMM unit, KA 39 Voltage Converter (27.5V installations only), and KI 201C/KI 211C Indicator. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking each unit. Make a visual inspection of each unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place in the shipping container all packing materials for use in unit storage or reshipment. The KX 170A/KX 175 installation will conform to standards designated by the customer, installing agency and existing conditions as to unit location and type of installation.

2.3 KX 170A/KX 175 INSTALLATION

Listed below are factors and suggestions to consider before installing your KX 170A/KX 175 system. Close adherence to these suggestions will assure more satisfactory performance from your equipment.

(a) The KX 170A/KX 175 is mounted rigid in the aircraft panel. Mark and cut the mounting hole as shown in Figure 2-7. The purpose of the "behind aircraft panel mount cutout is to allow a margin of error in cutout size and prevent the mounting tray front edge from being visible. The mounting tray bottom lip should extend through the mounting hole flush with the instrument panel to insure proper plug pin engagement.

(b) Avoid mounting close to any high external heat source. If this is done, no blower or ram air cooling will be required. For blower or Ram Air cooling, see Figures 2-11 and 2-12.

(c) Remember to allow adequate space for installation of cables and connectors.

(d) Secure the mounting rack to instrument panel per Figure 2-7. The rear mounting bosses should be attached to the airframe by means of support brackets.

(e) Slide the KX 170A/KX 175 into the rack and secure by turning locking screw on the front panel.

—CAUTION—

Do not force locking tab screw.

(f) Each KX 170A/KX 175 installation kit contains a locking bar (KPN 047-1720-00), bracket (KPN 047-1721-00) and two rivets (KPN 092-5021-00). These may be installed at customer's option to provide a means of locking the radio to the instrument panel with a padlock located on the lower rear corner of the mounting tray.

Installation consists of riveting the bracket to the mounting tray as shown in Figure 2-7. After the radio installation is complete, the locking bar may be inserted and a small padlock affixed to deter theft.

(g) The installing agency will supply and fabricate all external cables. The plugs required are supplied by King Radio.

2.4 KA 39 INSTALLATION (For use in 27.5 volt installations only)

(a) Select the KA 39 location considering good thermal conductivity to the airframe, convenient cable routing, proximity to the KX 170A/KX 175 and separation from other heat sources.

(b) Refer to Figure 2-6 for the KA 39 mounting dimensions.

(c) Secure the KA 39 firmly in place.

(d) The installing agency will supply and fabricate external cables.

2.5 KI 201C/KI 211C INSTALLATION

(a) Carefully select the KI 201C/211C panel location for unobstructed vision, minimum parallax and adequate clearance for the instrument case and installation of cables and connectors.

(b) Refer to Figure 2-5 for the KI 201C/211C mounting dimensions.

(c) A standard 3 1/8" instrument hole is required.

(d) Secure the KI 201C/211C firmly in place.

(e) The installing agency will supply and fabricate the external cable. The plugs required are supplied by King Radio.

(f) Autopilot connection: The KI 201C/211C are capable of driving an autopilot load of 1KΩ. The deflection sensitivity of the KI 211C Glideslope should be readjusted. Potentiometer R465, located in the KI 211C unit, is used to compensate for the additional 1KΩ load. No adjustment is necessary if the autopilot is of the high impedance type (over 10KΩ). No adjustment is necessary in the KI 201C or KI 211C VOR/LOC with the addition of an autopilot load (1KΩ) because the comparator circuit has a very low output impedance. With the addition of a 1KΩ load the deflection sensitivity will change from 20° course width to approximately 22°

An omni error adjust potentiometer, R316, is accessible from the front of the indicator by removing the OBS knob. This is for final calibration of the omni system after installing in aircraft. The range of the error pot is approximately ±5°. It should be noted that this potentiometer does not affect localizer centering.

RG-188/U coaxial cable is recommended for the glideslope antenna interconnect. Refer to Figure 2-3 for connector assembly.

2.6 ANTENNA INSTALLATION

(a) Conventional 50 ohm horizontally polarized NAV and vertically polarized COMM antennas are required with the KX 170A/KX 175. Vertical bent whip antennas are not recommended. Wideband COMM antennas (KA 31 and KA 31A) provide efficient operation over the COMM band. Antennas should be installed per manufacturers recommendations. Additional recommendations are as follow:

COMM ANTENNA

1. Mount antenna on flat metal surface or install a ground plane at least 18 inches square.
2. The antenna should be well removed from any projections and the engine(s) and propeller.
3. NAV and COMM Antennas must be well separated to minimize COMM interference to NAV while transmitting.

NAV ANTENNA

1. The location should be well removed from other antenna, projections and engine(s). It should have a clear line of sight area if possible.

2. The antenna MUST BE mounted symmetrically with the centerline of the aircraft.

3. Avoid running other coaxial cables and wires with the NAV antenna cable.

(b) The antenna connectors on the KX 170A/KX 175 unit are identified on the rear die casting.

– NOTE –

With the KX 170A/KX 175 viewed from the rear the NAV antenna connector is on the right and the COMM antenna connector is on the left. This means that the NAV frequency selector and NAV antenna are on opposite sides of the radio. The COMM frequency selector and COMM antenna connector are also on opposite sides of the radio.

– CAUTION –

Review the above information carefully. Interchanged antenna connections will cause erroneous NAV operation and in some installations could introduce 7 watts of transmitter power into a NAV receiver causing damage to that unit.

(c) Refer to Figure 2-4 for a dual omni antenna installation if two navigation receivers are used. VOR antenna duplexers normally cause a 3db signal loss.

(d) Refer to Figure 2-2 for the COMM and NAV antenna cable connector assembly. Solder tack the snap on shield to the connector base at two points to insure that a good electrical ground is made.

2.7 CABLING

(a) The length and routing of the external cables must be carefully studied and planned prior to installation. Avoid sharp bends and placing cables too near the aircraft control cables.

(b) Fabricate the external cables in accordance with the installation drawing that fulfills the system requirement.

—NOTE—

> Use good quality stranded wire that will not support a flame and with at least 600 volt insulation. It is recommended that the mike audio line be in a shielded-twisted pair.

(c) Since other radio and navigation equipment will possibly utilize the same speaker circuits for muting, speaker selection and microphone switching must be devised by the installing agency. The KX 170A/KX 175 does not shunt the speaker line of other equipment when the off-on-test switch is turned "off".

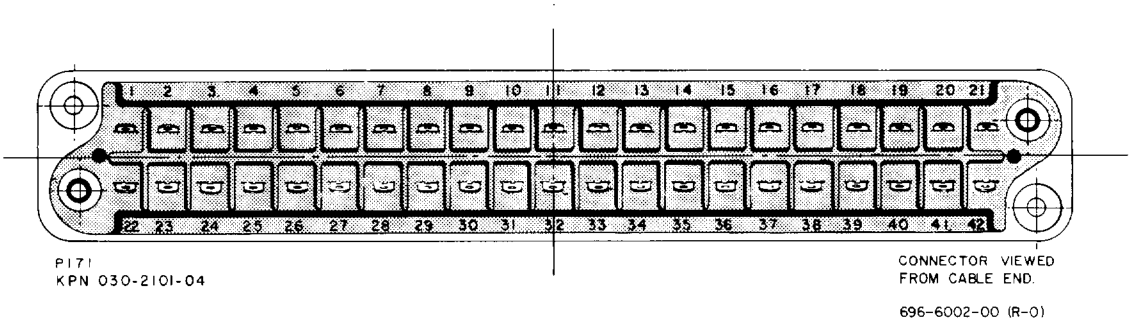
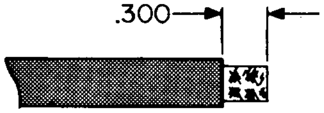
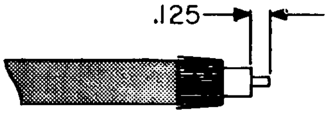


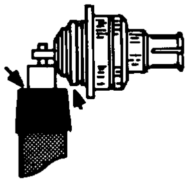
FIGURE 2-1 KX-170A/KX 175 CONNECTOR PIN LOCATIONS



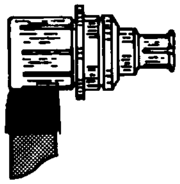
Trim coax cable outer insulation as shown.



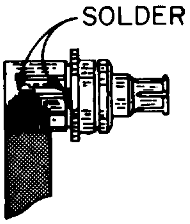
Fold braid back over outer cover of coax. Do not cross strands.



Solder center conductor to center pin of conductor. Make sure front end of braid (Point of fold) is even with bottom of connector. (Shown by arrows)



Slide connector cap, with clearance hole in position to clear dielectric, on to connector until it snaps in place.



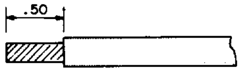
Push braid forward and flatten against connector cap and solder.
Solder tac connector cap to connector in at least two places to insure good electrical contact.

696-6003-00

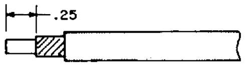
FIGURE 2-2 ANTENNA CABLE ASSEMBLY

CONNECTOR ASSEMBLY INSTRUCTIONS

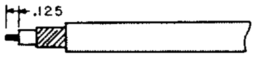
DOCUMENT 006-1058-00, OCT, 1972



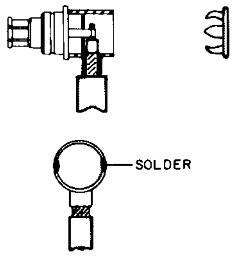
Trim coax outer insulation as shown.



Trim braid but not center conductor or insulation back 0.25".

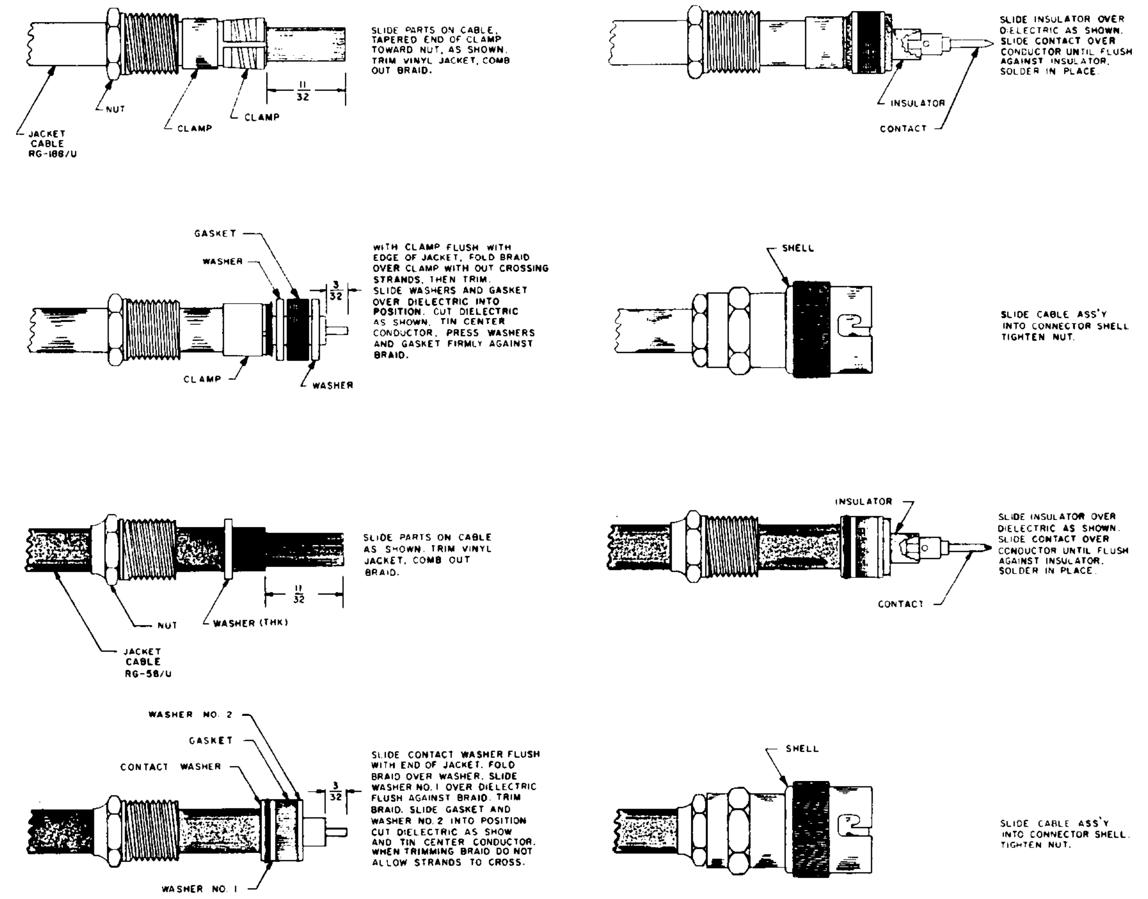


Strip insulation back 0.125".



Insert cable through side wall of connector and solder center conductor to center pin of connector. Heat the outside of the connector sleeve and at the same time apply solder between braid and sleeve. Continue to apply heat until the solder flows. Insert connector cap into end of fitting and tack solder in 2 places.

FIGURE 2-2A ANTENNA CABLE ASSEMBLY



SLIDE PARTS ON CABLE, TAPERED END OF CLAMP TOWARD NUT, AS SHOWN. TRIM VINYL JACKET, COMB OUT BRAID.

SLIDE INSULATOR OVER DIELECTRIC AS SHOWN. SLIDE CONTACT OVER CONDUCTOR UNTIL FLUSH AGAINST INSULATOR. SOLDER IN PLACE.

WITH CLAMP FLUSH WITH EDGE OF JACKET, FOLD BRAID OVER CLAMP WITH OUT CROSSING STRANDS, THEN TRIM. SLIDE WASHERS AND GASKET OVER DIELECTRIC INTO POSITION. CUT DIELECTRIC AS SHOWN. TIN CENTER CONDUCTOR. PRESS WASHERS AND GASKET FIRMLY AGAINST BRAID.

SLIDE CABLE ASS'Y INTO CONNECTOR SHELL TIGHTEN NUT.

SLIDE PARTS ON CABLE AS SHOWN. TRIM VINYL JACKET, COMB OUT BRAID.

SLIDE INSULATOR OVER DIELECTRIC AS SHOWN. SLIDE CONTACT OVER CONDUCTOR UNTIL FLUSH AGAINST INSULATOR. SOLDER IN PLACE.

SLIDE CONTACT WASHER FLUSH WITH END OF JACKET. FOLD BRAID OVER WASHER. SLIDE WASHER NO. 1 OVER DIELECTRIC FLUSH AGAINST BRAID. TRIM BRAID. SLIDE GASKET AND WASHER NO. 2 INTO POSITION CUT DIELECTRIC AS SHOW AND TIN CENTER CONDUCTOR. WHEN TRIMMING BRAID DO NOT ALLOW STRANDS TO CROSS.

SLIDE CABLE ASS'Y INTO CONNECTOR SHELL. TIGHTEN NUT.

696-6004-00

FIGURE 2-3 GLIDESLOPE ANTENNA CABLE CONNECTOR ASSEMBLY

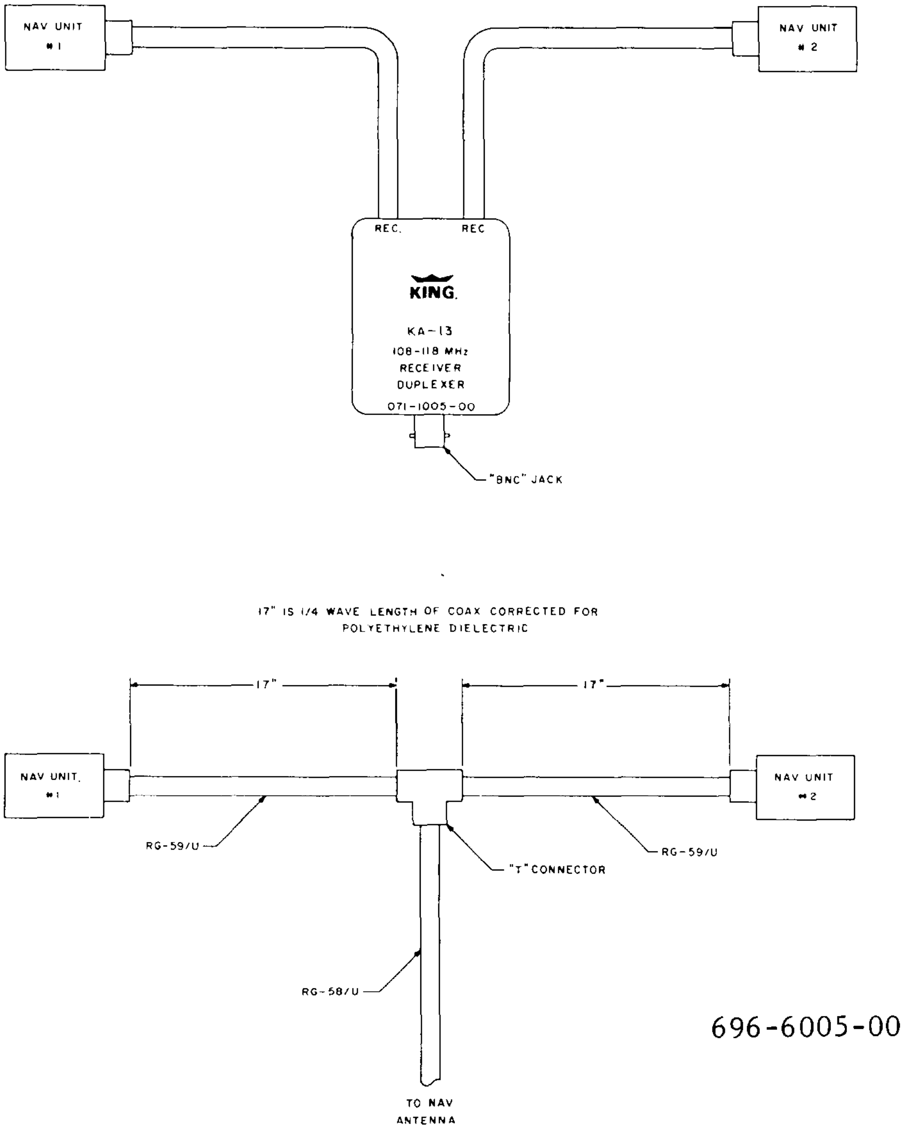
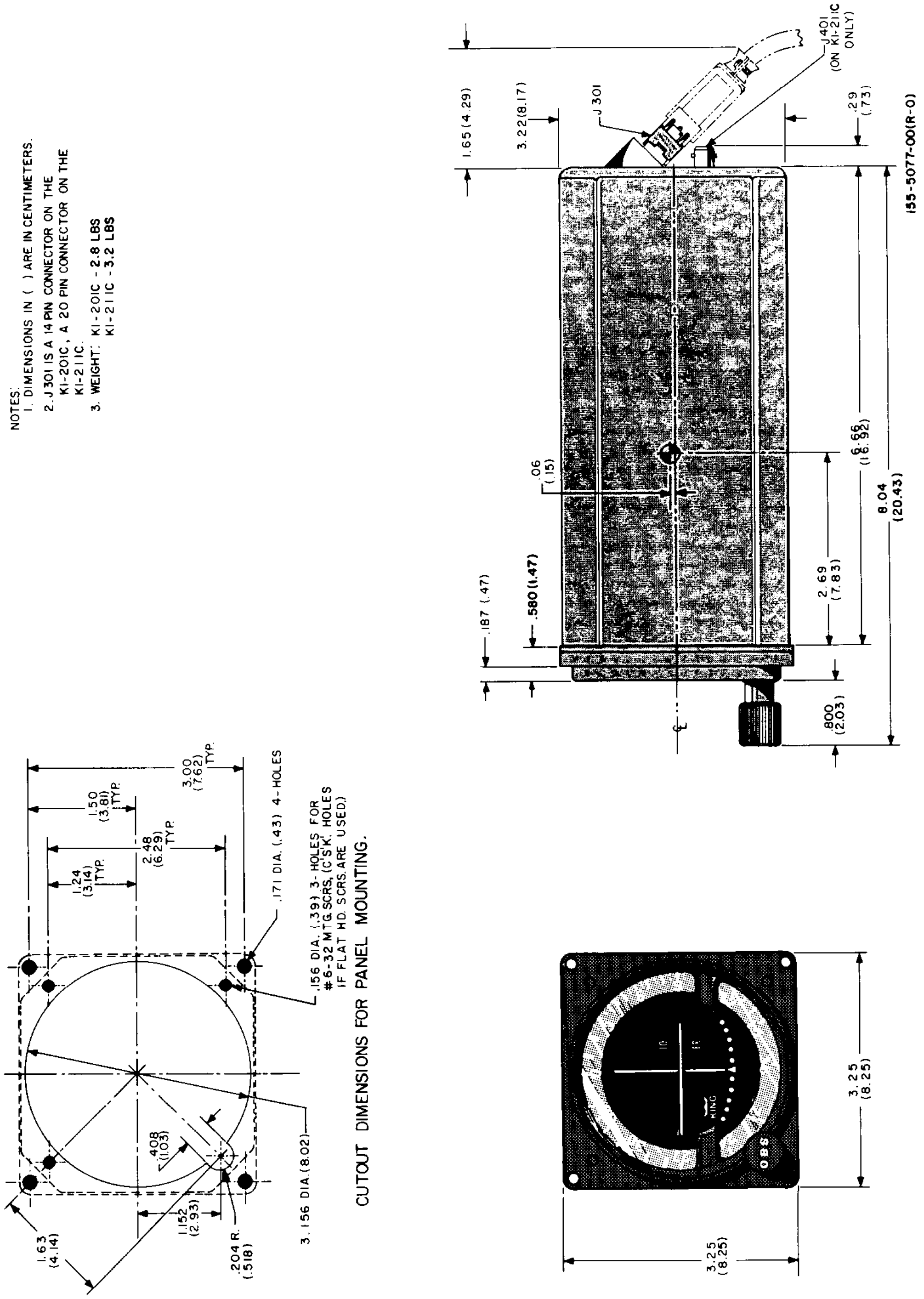


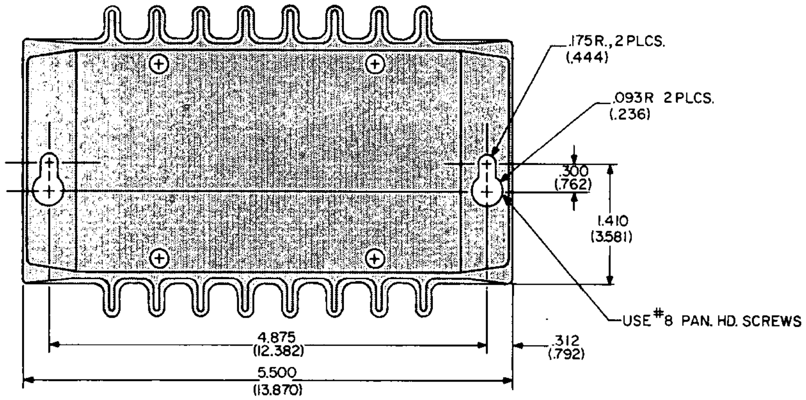
FIGURE 2-4 DUAL OMNI ANTENNA INSTALLATION



NOTES:
1. DIMENSIONS IN ( ) ARE IN CENTIMETERS.
2. J301 IS A 14 PIN CONNECTOR ON THE KI-201C, A 20 PIN CONNECTOR ON THE KI-211C.
3. WEIGHT: KI-201C - 2.8 LBS
KI-211C - 3.2 LBS

CUTOUT DIMENSIONS FOR PANEL MOUNTING.

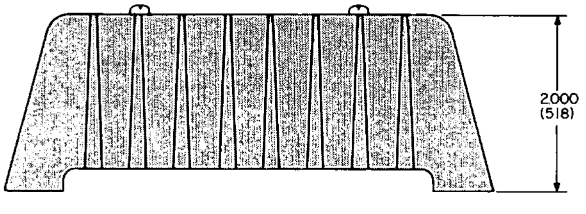
FIGURE 2-5 KI 201C/KI 211C
INDICATOR OUTLINE AND MOUNTING DRAWING



NOTES:
1. ALL DIMENSIONS IN PARENTHESIS ARE IN CENTIMETERS.
2. WEIGHT: 1.1 lbs
3. TERMINALS WILL TAKE 16 TO 22 AWG WIRE.
4. TERMINALS ARE #5-40 X 1/4 BD. HD. SCREWS.

WARNING

DO NOT MOUNT IN CLOSE PROXIMITY
TO HEATER DUCT OR OTHER SOURCES OF HEAT



155-5076-00 (R-)

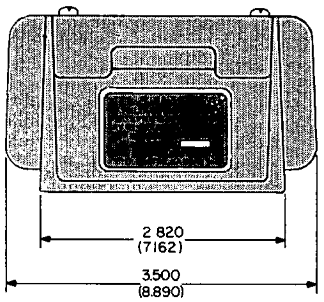
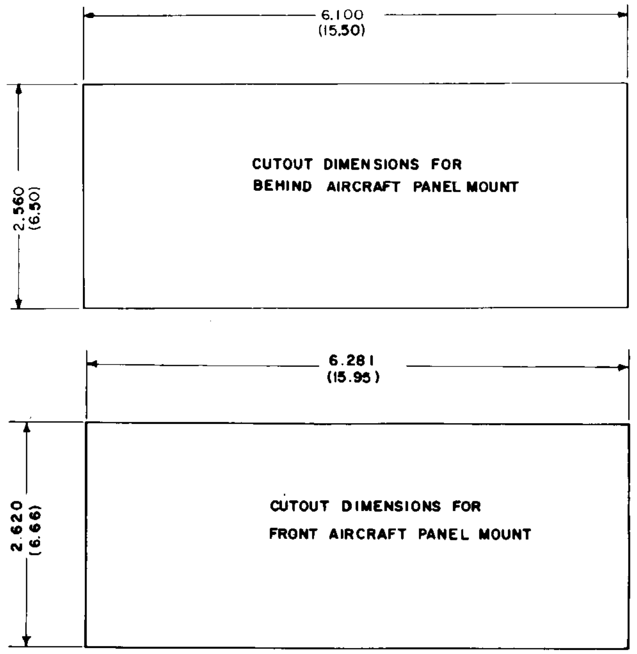
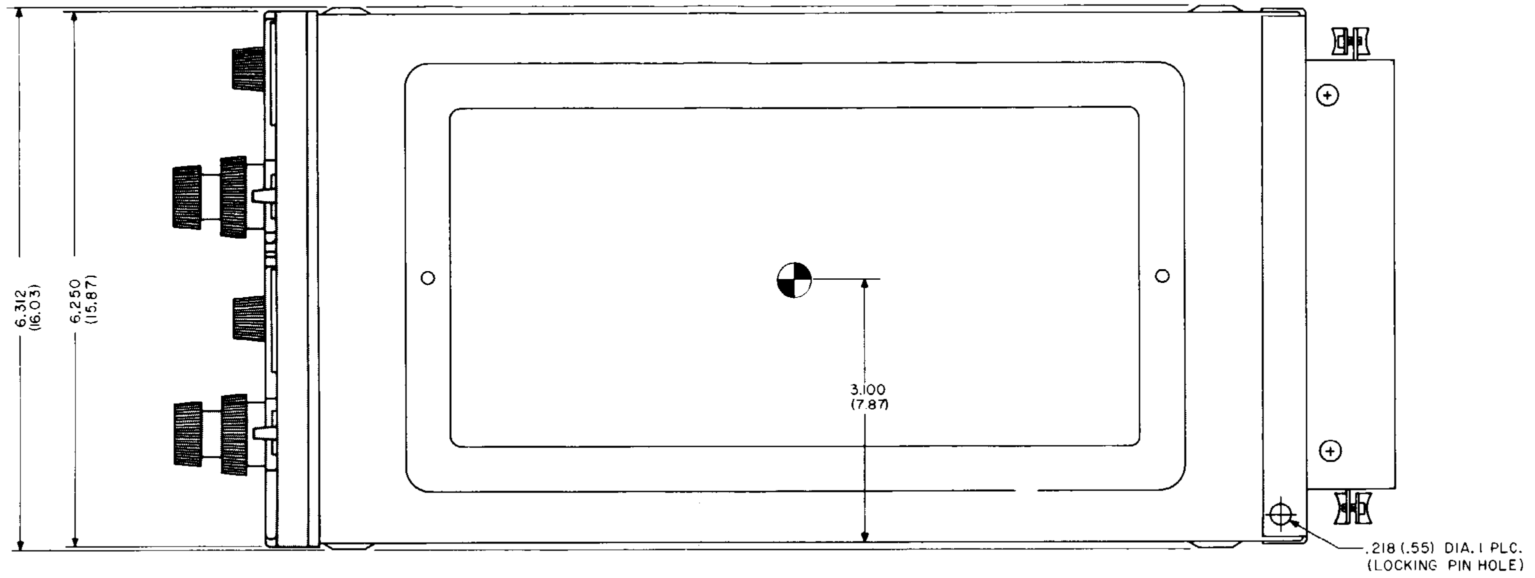
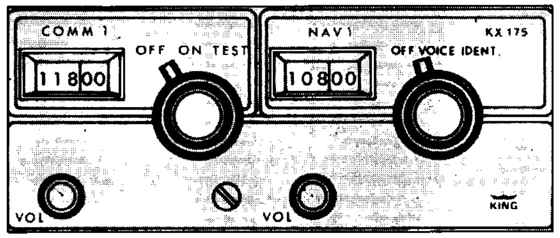
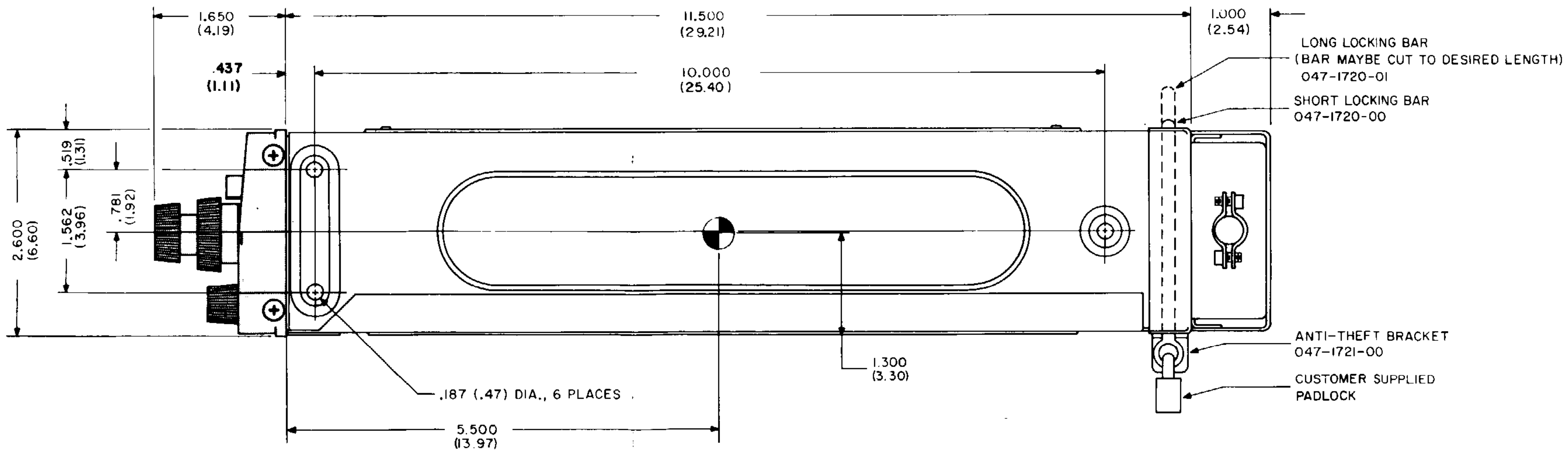


FIGURE 2-6 KA 39
VOLTAGE CONVERTER OUTLINE AND MOUNTING DRAWING









NOTES:
1. DIMENSIONS IN PARENTHESIS ARE IN CENTIMETERS
2. WEIGHT: 6.9LBS
3. IN INSTALLATIONS INVOLVING 2 OR MORE KING SILVER CROWN UNITS STACKED VERTICALLY, IT IS POSSIBLE TO SPOT WELD THE MOUNTING TRAYS TOGETHER PRIOR TO INSTALLATION, THUS PROVIDING A RIGID TRAY ASS'Y.
4. REAR CONNECTOR MTG. BOX MAY BE REMOVED FROM TRAY FOR WIRING CONVENIENCE.
5. ANTI THEFT MECHANISM MAY BE INSTALLED AT CUSTOMER OPTION. FASTEN ANGLE BRACKET(047-1721-00) TO MTG. TRAY WITH POP RIVETS (092-5021-00) SUPPLIED. USE SHORT LOCKING BAR FOR SINGLE INSTALLATIONS, LONG BAR FOR MULTIPLE INSTALLATION. CUSTOMER MAY USE ANY PADLOCK HAVING 3/16" DIA. HASP OR SMALLER.

FIGURE 2-7 KX 170A/175 OUTLINE AND MOUNTING DRAWING

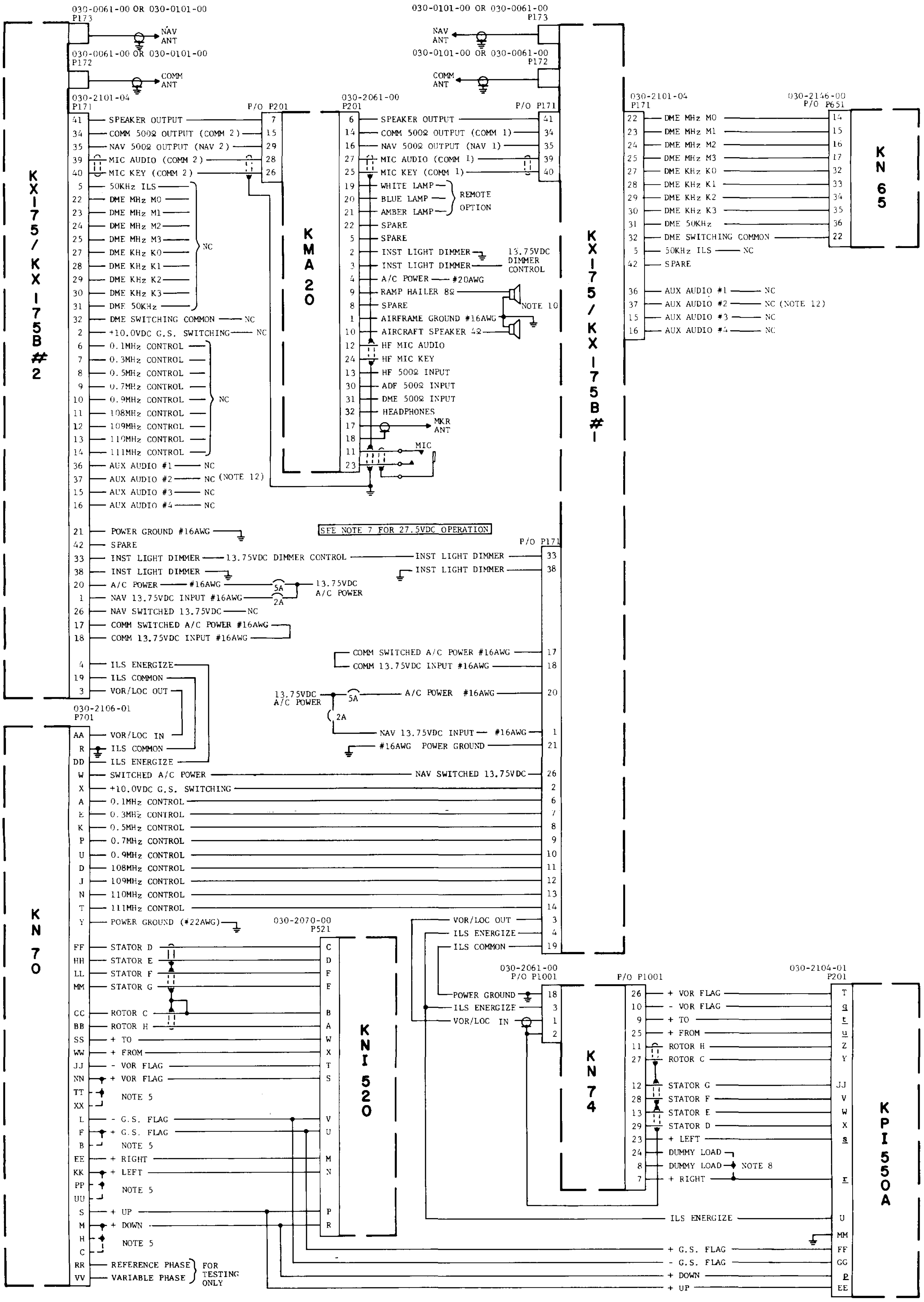


FIGURE 2-8 TSO'D SILVER CROWN SYSTEM INTERCONNECT
(Dwg. No. 155-1088-00 R-6)

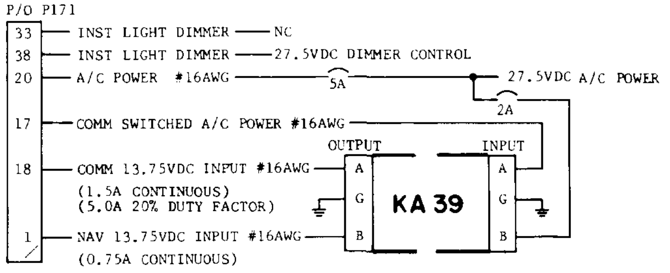
NOTES:

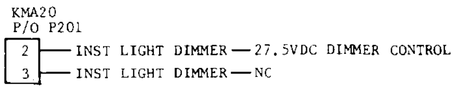
1. UNLESS NOTED, ALL WIRES #24AWG MINIMUM.
2. ALL ANTENNA COAX IS RG58A/U.
3. UNLESS OTHERWISE SPECIFIED, ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
4. THE KA47 MAY BE USED TO CONVERT KX175/KX175B DME SWITCHING OUTPUT TO CHANNEL 2 OUT OF 5CODE DME'S.
5. KN70 JUMPER PINS AS INDICATED FOR REQUIRED NUMBER OF EXTERNAL LOADS.

EXTERNAL LOADS	GLIDESLOPE		VOR/LOC	
	DEV	FLAG	DEV	FLAG
ONE	M H C	F B	KK PP UU	NN TT XX
TWO	M H	NONE	KK PP	NN TT
THREE	NONE		NONE	NONE

6. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.

7. 27.5VDC OPERATION





8. KN74 — FOR ONE INDICATOR JUMPER PINS 7, 8, AND 24.
FOR TWO INDICATORS JUMPER PINS 7 AND 8.
FOR THREE INDICATORS NO JUMPER REQUIRED.
9. KN65 DME INDICATOR (KI265) NOT SHOWN.
10. RAMP HAILER AND AIRCRAFT SPEAKER RETURN LEADS SHOULD BE CONNECTED TO PIN 1 AT KMA20.
11. EXTERNAL SWITCHING CAPABILITY: COMM - PIN 17 - NONE
NAV - PIN 26 - 300MA
12. AUXILIARY AUDIO #2 IS INTERCOM MIC INPUT ON KX175B.

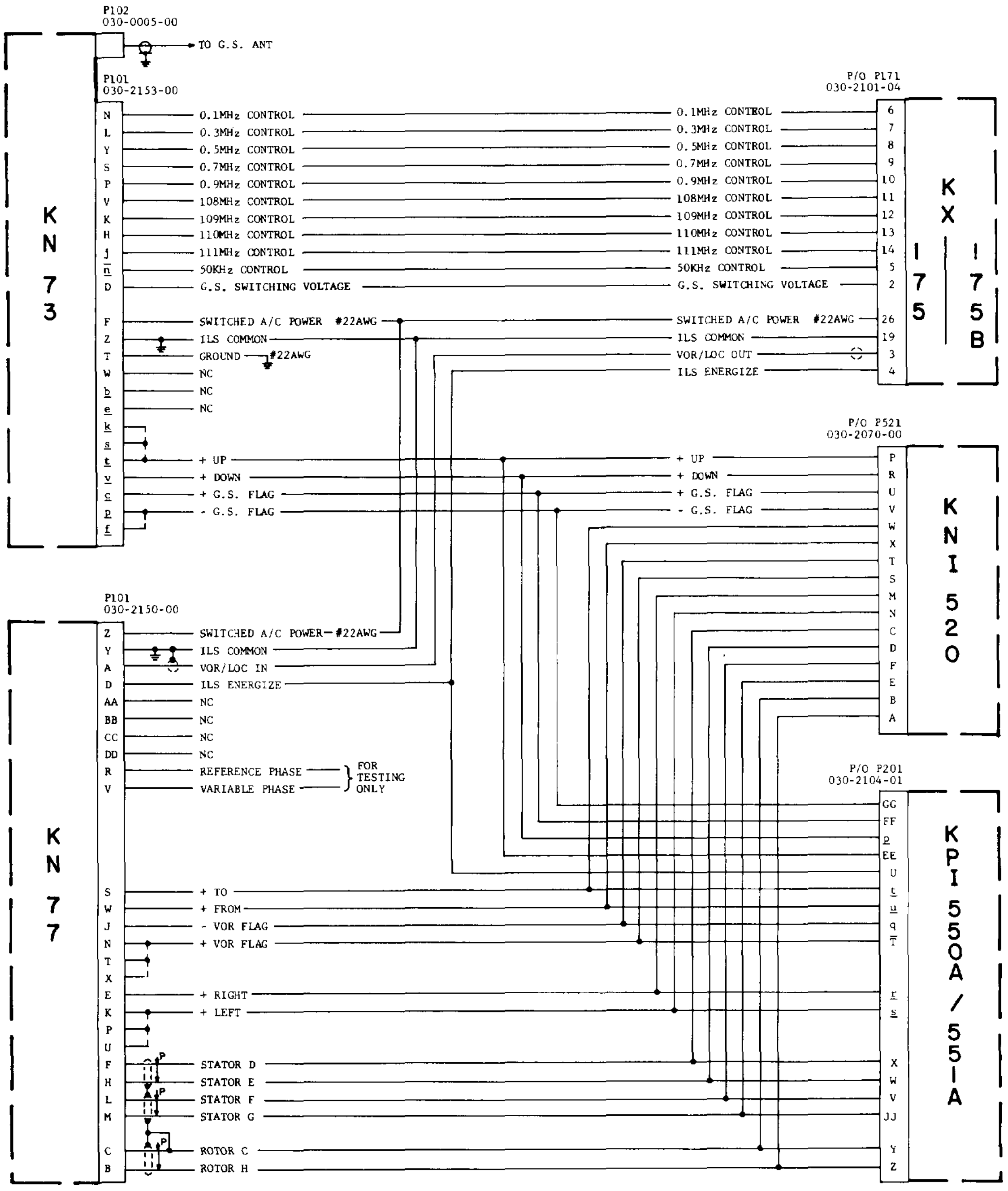


FIGURE 2-8A KN 73/KN 77 INTERCONNECT
(Dwg. No. 155-1117-00 R-3)

NOTES:

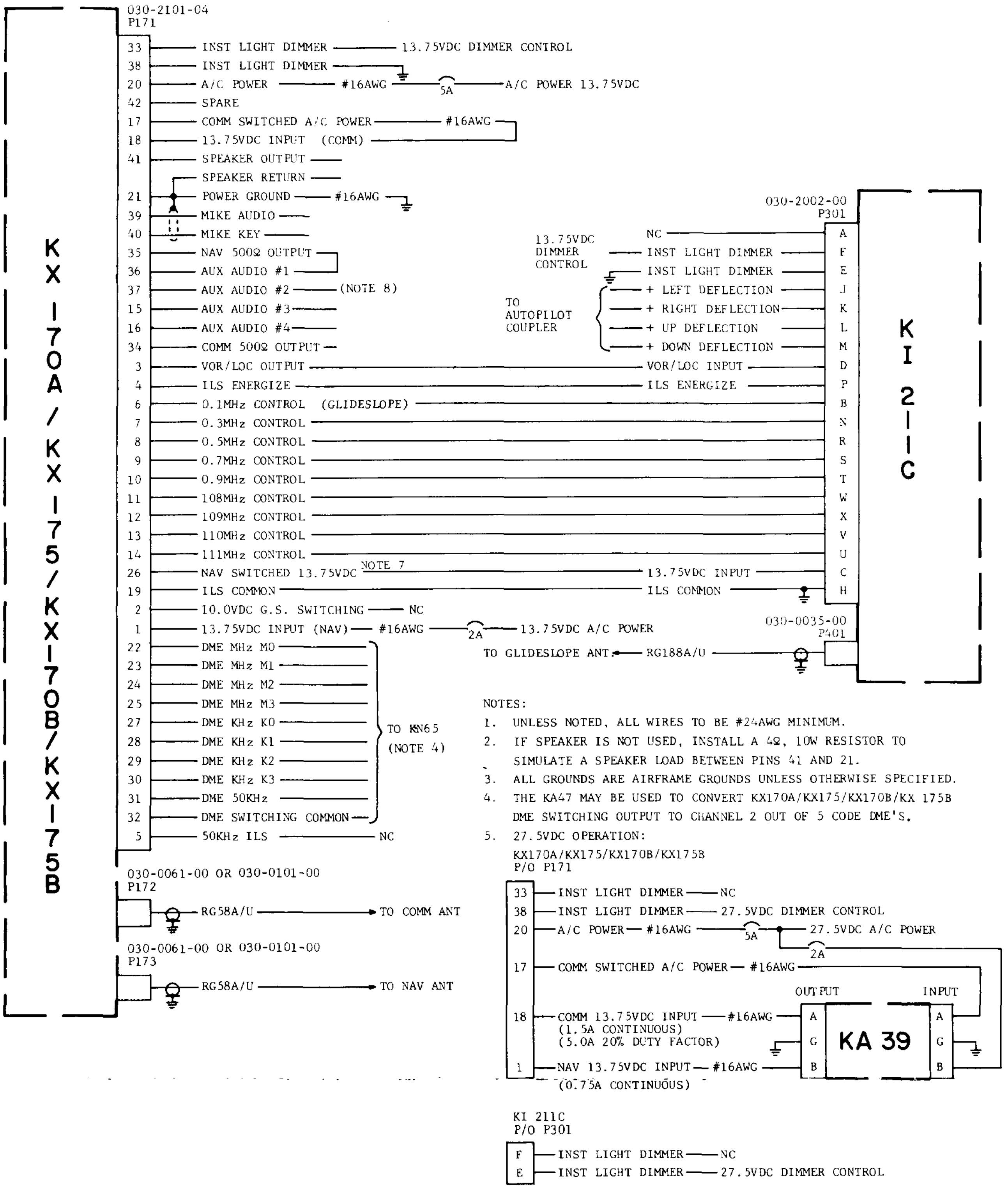
1. UNLESS NOTED, ALL WIRES TO BE #26AWG MINIMUM.
2. UNLESS NOTED, ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
3. JUMPER KN 77 PINS AS INDICATED FOR REQUIRED NUMBER OF EXTERNAL LOADS.

NUMBER OF EXTERNAL LOADS	VOR/LOC	
	DEV	FLAG
1	KPU	NTX
2	KP	NT
3	NONE	NONE

4. JUMPER KN 73 PINS AS INDICATED FOR REQUIRED NUMBER OF EXTERNAL LOADS.

NUMBER OF EXTERNAL LOADS	GLIDESLOPE	
	DEV	FLAG
1	tks	f p
2	t k	NONE
3	NONE	☒

5. RESOLVER PINS SHOWN CONNECTED TO BOTH KNI 520 AND KPI 550A ARE FOR REFERENCE ONLY. IN ACTUAL INSTALLATION ONLY ONE RESOLVER WILL BE WIRED TO KN 77.



NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. IF SPEAKER IS NOT USED, INSTALL A 4Ω, 10W RESISTOR TO SIMULATE A SPEAKER LOAD BETWEEN PINS 41 AND 21.
3. ALL GROUNDS ARE AIRFRAME GROUNDS UNLESS OTHERWISE SPECIFIED.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX175/KX170B/KX 175B DME SWITCHING OUTPUT TO CHANNEL 2 OUT OF 5 CODE DME'S.
5. 27.5VDC OPERATION:
6. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
7. EXTERNAL SWITCHING CAPABILITY:

COMM	PIN 17	NONE
NAV	PIN 26	300ma

8. AUX. AUDIO #2 (PIN 37) IS INTERCOM MIC INPUT ON KX170B/KX175B AND KY195B ONLY. ONE POSSIBLE INTERCONNECT IS SHOWN BELOW.

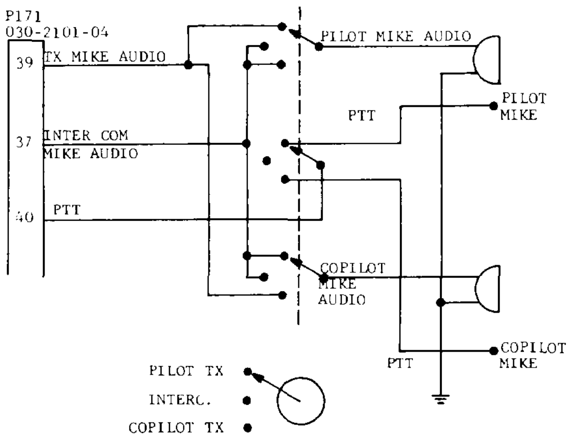
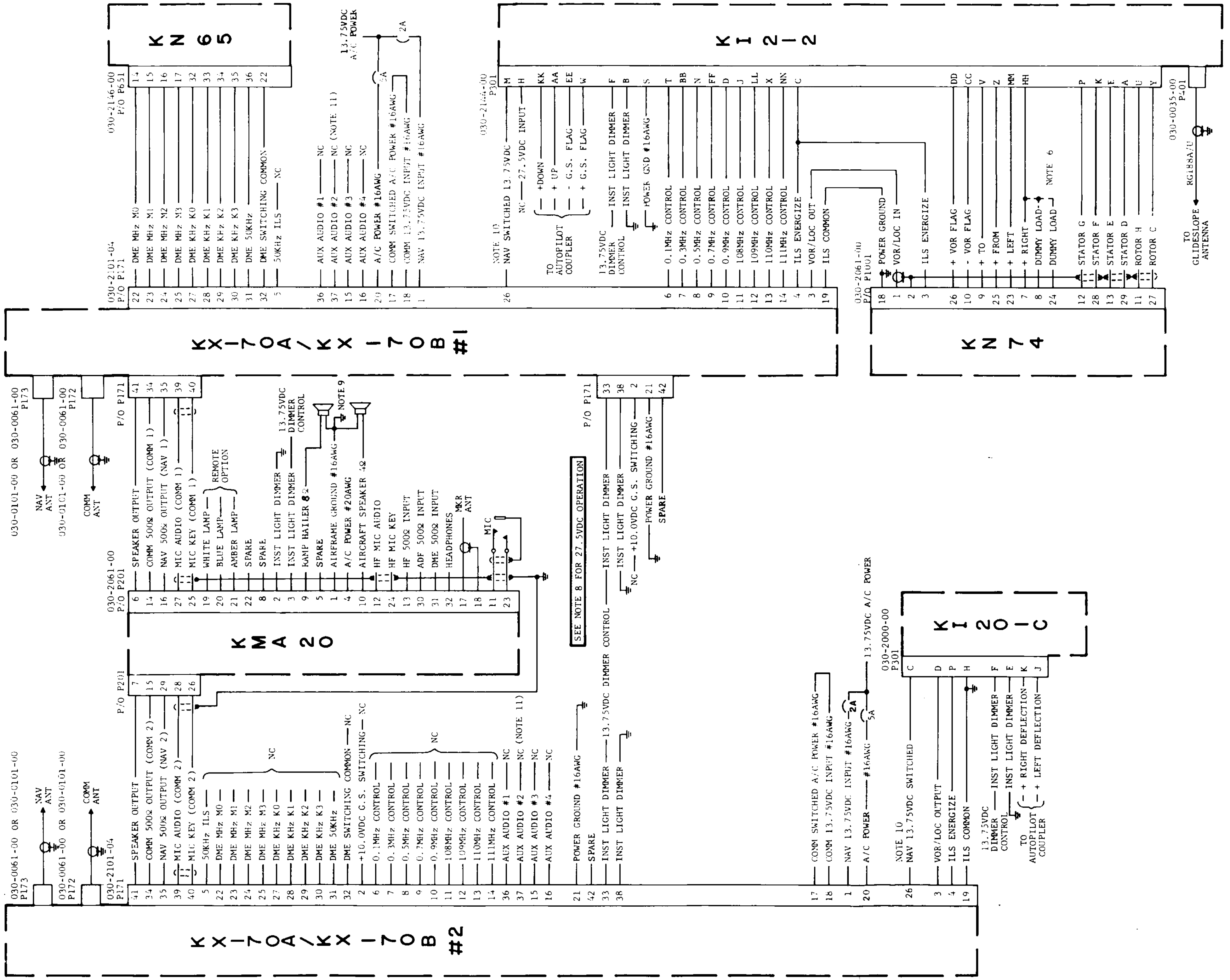
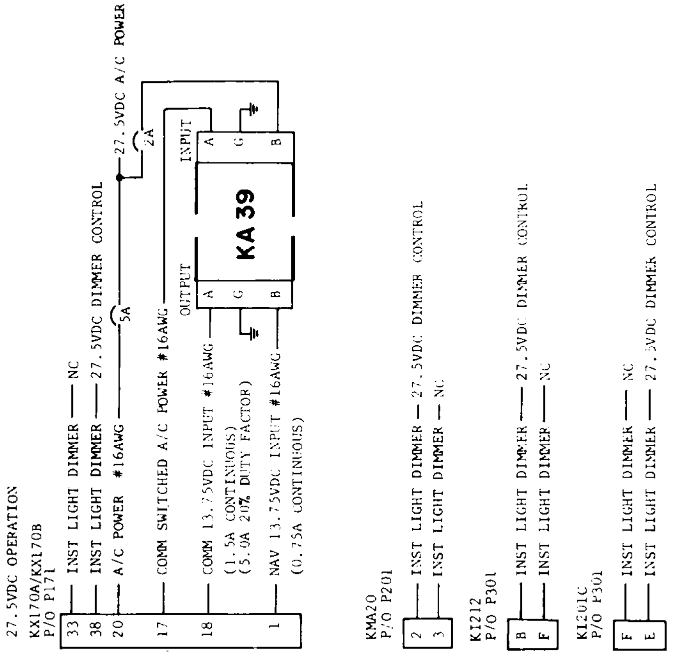


FIGURE 2-9 KX 170A/175/170B/175B INTERCONNECT
(Dwg. No. 155-1089-00 R-5)



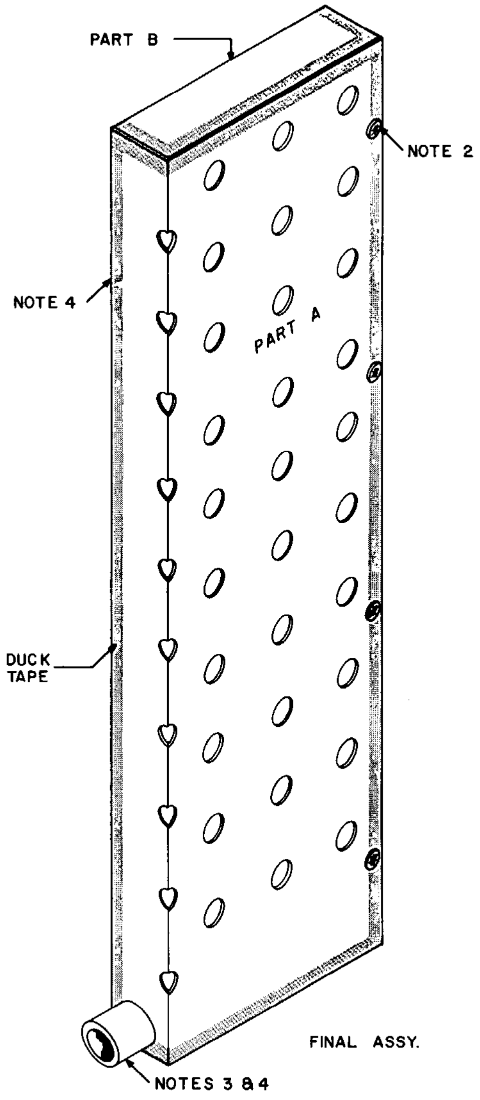
NOTES:

1. UNLESS NOTED, ALL WIRES #24AWG MINIMUM.
2. UNLESS NOTED, ALL ANTENNA COAX IS RG58A/U.
3. UNLESS SPECIFIED, ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX170B DME SWITCHING OUTPUT TO CHANNEL 2 OUT OF 5 CODE DME'S.
5. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
6. KN74: FOR ONE INDICATOR JUMPER PINS 7, 8, AND 24.
   FOR TWO INDICATORS JUMPER PINS 7 AND 8.
   FOR THREE INDICATORS NO JUMPER REQUIRED.
7. KN65 DME INDICATOR (KI265) NOT SHOWN.
8. 27.5VDC OPERATION



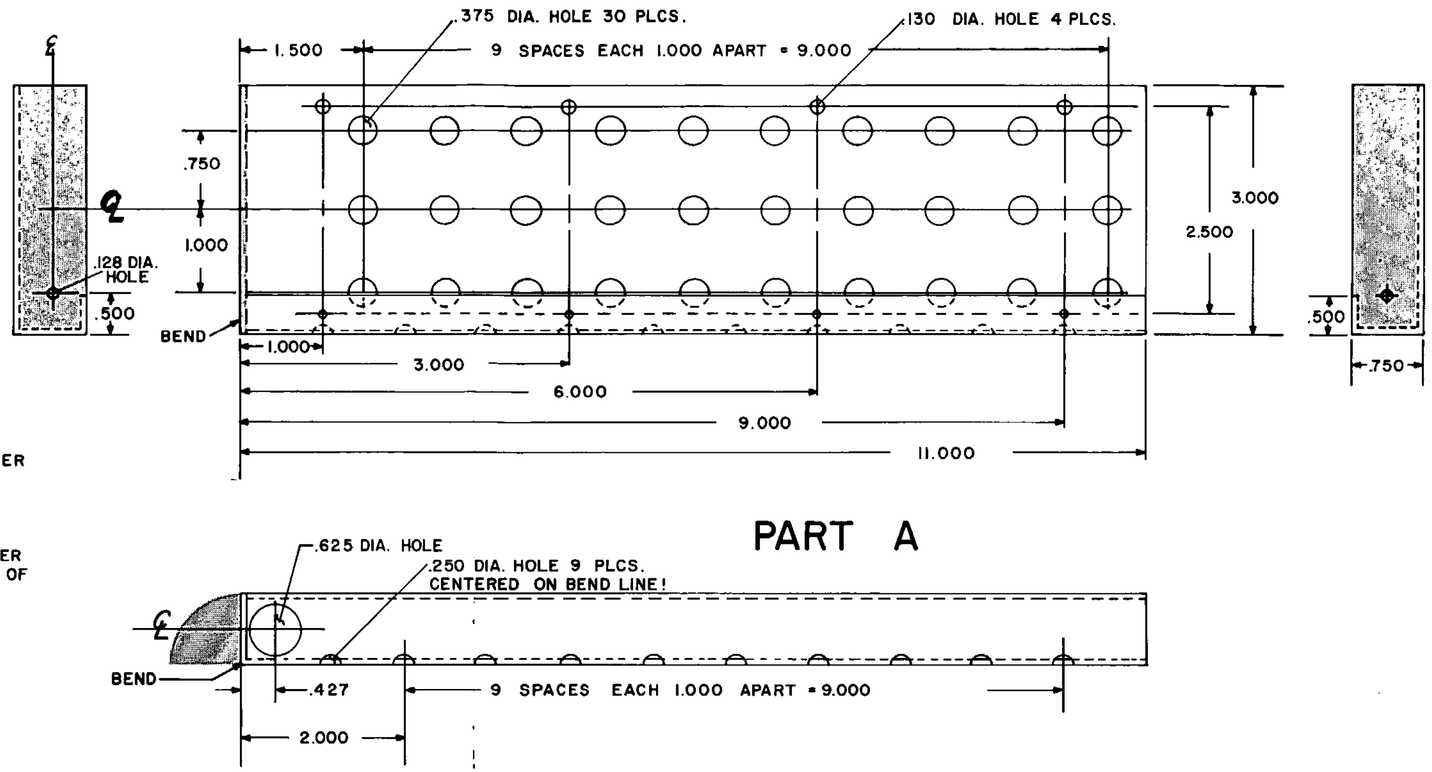
9. RAMP HAILER AND AIRCRAFT SPEAKER RETURN LEADS SHOULD BE CONNECTED TO PIN 1 AT KMA20.
10. EXTERNAL SWITCHING CAPABILITY: COMM - PIN 17 - NONE
    NAV - PIN 26 - 300MA
11. AUXILIARY AUDIO #2 IS INTERCOM MIC INPUT ON KX170B.

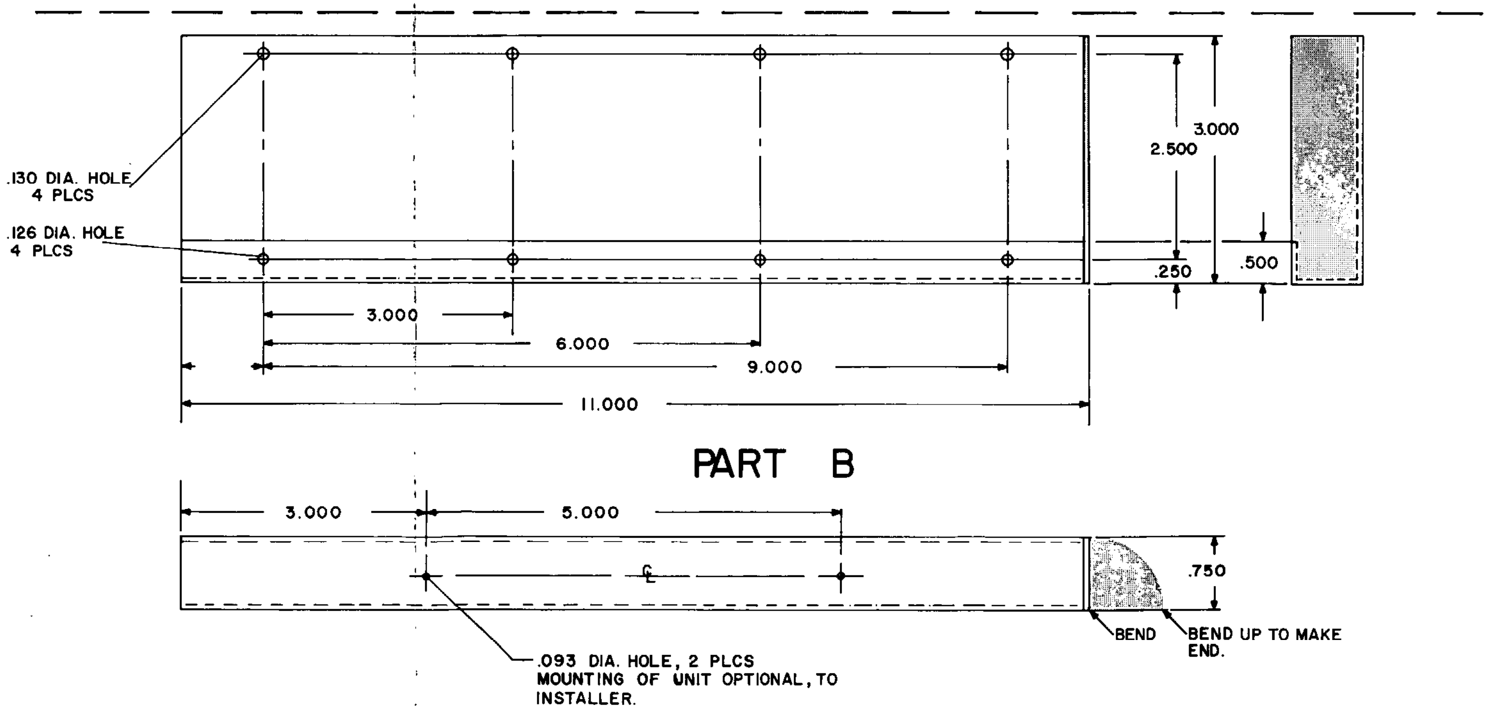
FIGURE 2-10 NON-TSO'D SILVER CROWN SYSTEM INTERCONNECT
(Dwg. No. 155-1090-00 R-8)



NOTES:

1. MAKE ONE OF EACH PART SHOWN.
2. POP RIVET TOGETHER 8 PLCS.
3. POP RIVET RAM AIR TUBE TO DIFFUSER HOUSING.
4. DUCK TAPE ALL SEAMS OF DIFFUSER. AND SEAL IN TUBE.
5. THE LENGTH OF DIFFUSER, AND NUMBER OF HOLES. DEPENDS ON THE HEIGHT OF RADIO STACK OR AIRCRAFT PANEL.
6. SEE SHEET 2 FOR SUGGESTED INSTALLATION.





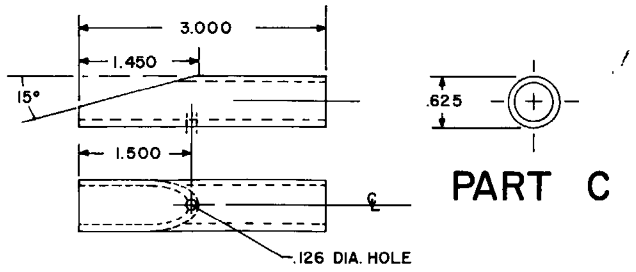


FIGURE 2-11 COOLING DIFFUSER FOR RADIO STACKS

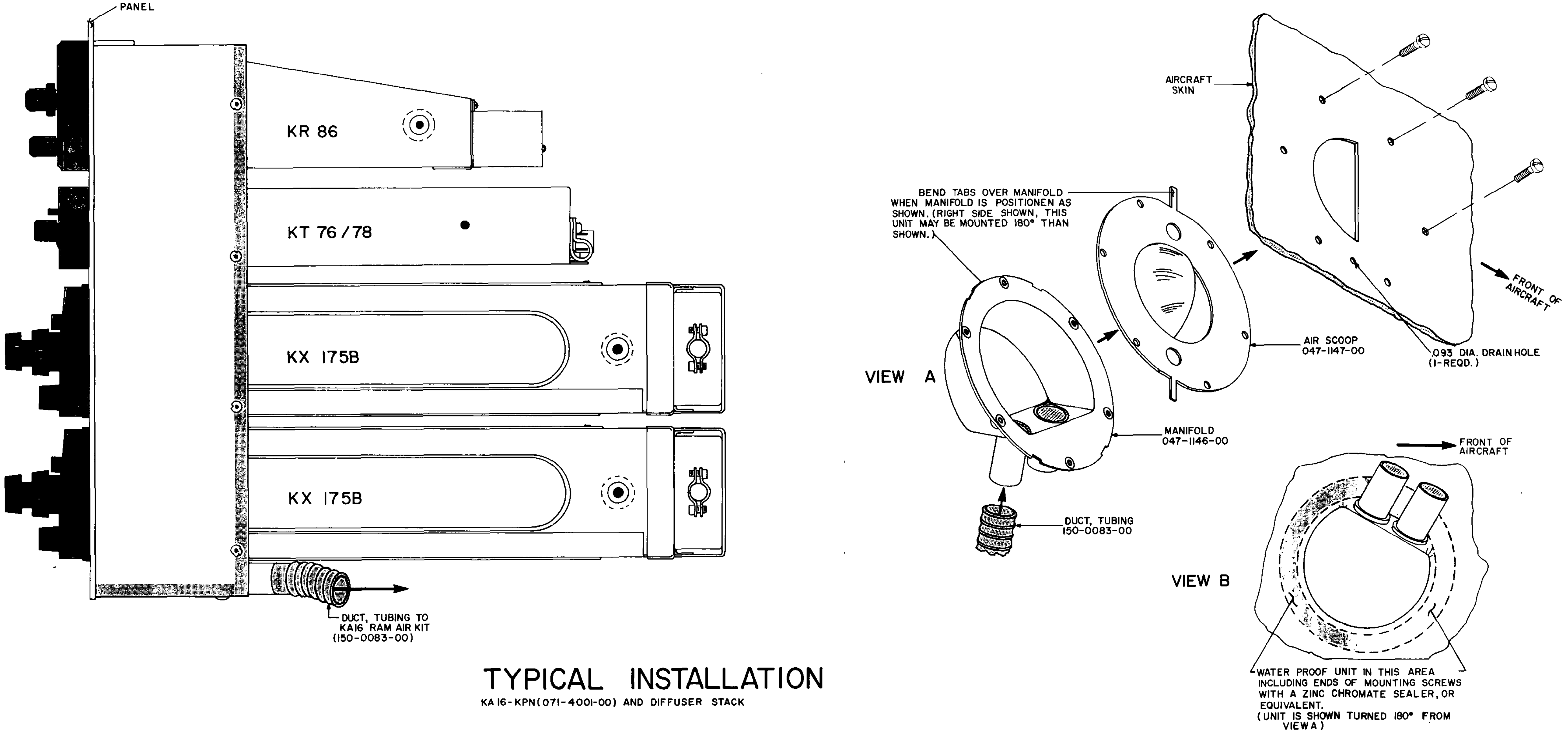


FIGURE 2-12 KR 16 RAM AIR KIT AND DIFFUSER INSTALLATION

SECTION III

OPERATION

3.1 GENERAL

All controls required to operate the KX 170A/KX 175 and the KI 201C/211C are located on the unit front panels.

3.2 KX 170A/KX 175 NAV/COMM CONTROLS

3.2.1 COMM ON-OFF TEST CONTROL

The ON-OFF-TEST control is located directly above the COMM channel selector. Power is supplied to the COMM when this control is either in the ON or TEST position. The TEST position is used to defeat the COMM automatic squelch for both test purposes and listening to extremely weak signals.

3.2.2 COMM VOLUME CONTROL

The Volume (VOL) control, located on the lower left side of the KX 170A/KX 175 is used to adjust the transceiver audio volume. The KX 170A/KX 175 system power ON/OFF switch is independent of this control, allowing the COMM volume to remain at a desired preset level.

3.2.3 COMM FREQUENCY SELECTOR

The two concentric knobs under the COMM frequency window are used to dial COMM frequencies. The larger knob selects MHz and the smaller knob selects kHz. The transceiver is inoperable in the two unused MHz positions between 118MHz and 135MHz. Clockwise rotation selects higher frequencies. The dial mechanism has no stops, permitting continuous rotation.

3.2.4 NAV OFF-VOICE-IDENT CONTROL

The OFF-VOICE-IDENT control is located directly above the NAV channel selector. Power is supplied to the NAV when this control is either in VOICE or IDENT position. NAV operation is independent of COMM. With the switch on IDENT, the ground station voice and identification tone are coupled to the aircraft speaker and/or headphone circuitry. With the switch on VOICE the identification tone is eliminated, permitting the pilot to monitor the VOR ground station for voice transmissions without receiving the VOR ident tone.

3.2.5 NAV VOLUME CONTROL

The navigation receiver volume (VOL) control, on the right side of the KX 170A/ KX 175, is used to control the level of the audio and/or identification tone output from the navigation receiver. This control is also independent of the system power switch allowing the NAV volume to remain at a desired preset level.

3.2.6 NAV FREQUENCY SELECTOR CONTROLS

The two concentric knobs under the NAV frequency window are used to dial NAV frequencies. The larger knob selects MHz and the smaller knob kHz. Clockwise rotation selects higher frequencies. Remote DME, Glideslope, and ILS channeling are also performed by this control.

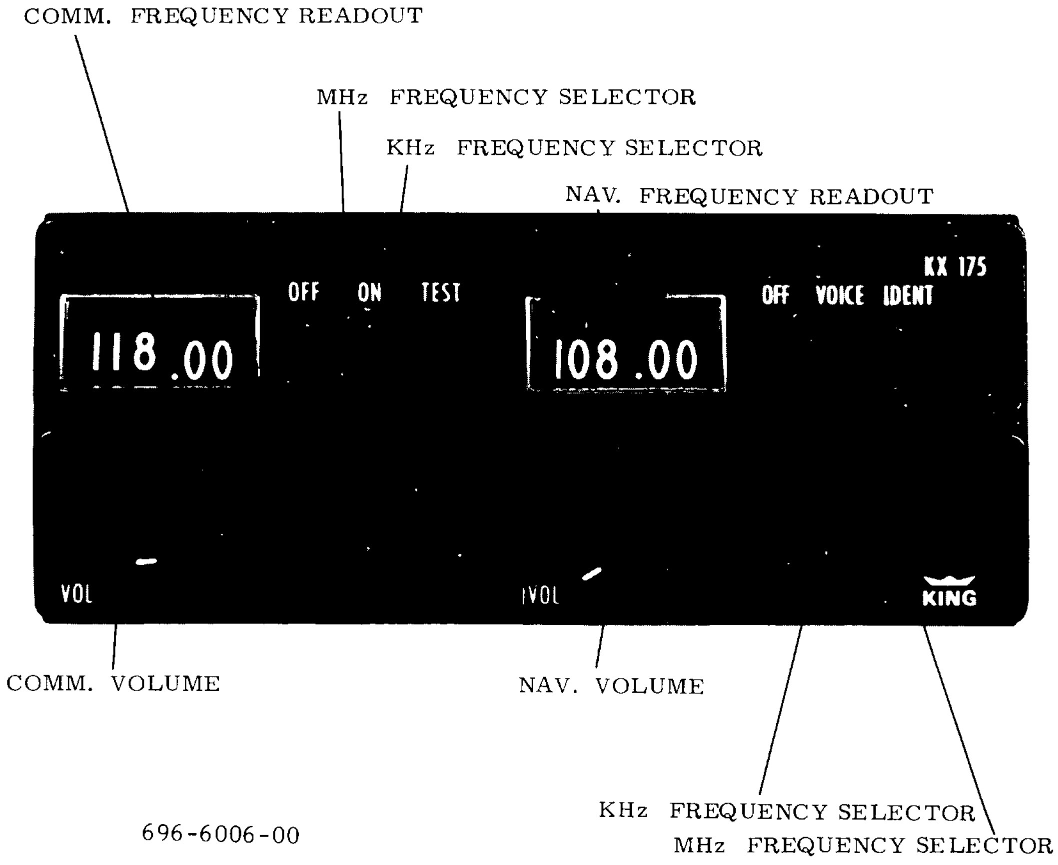


FIGURE 3-1 KX 170A/175 CONTROL FUNCTIONS

3.3 KI 201C/KI 211C INDICATOR CONTROL AND FUNCTION

3. 3. 1 OMNI BEARING SELECTOR (OBS)

The Omni Bearing Selector knob rotates the azimuth card on which the desired course is selected. The course selected serves as a reference for all VOR indications.

3. 3. 2 VOR/LOC DEVIATION INDICATOR

The VOR/LOC deviation needle indicates the direction and amount of deviation from the selected VOR course or localizer path. The angular deviation is toward the proper flight path in normal operation.

The VOR/LOC warning flag is fully visible when the VOR or LOC signal is unreliable.

The VOR TO/FROM flag indicates the direction "to" or "from" the VOR station.

3. 3. 3 GLIDESLOPE DEVIATION INDICATOR (KI 211C)

The glideslope deviation needle indicates the direction and amount of deflection from the glide path. The deflection is toward the direction of flight required to maintain the proper decent path. The glideslope warning flag is visible when the glideslope signal is unreliable or the receiver has malfunctioned.

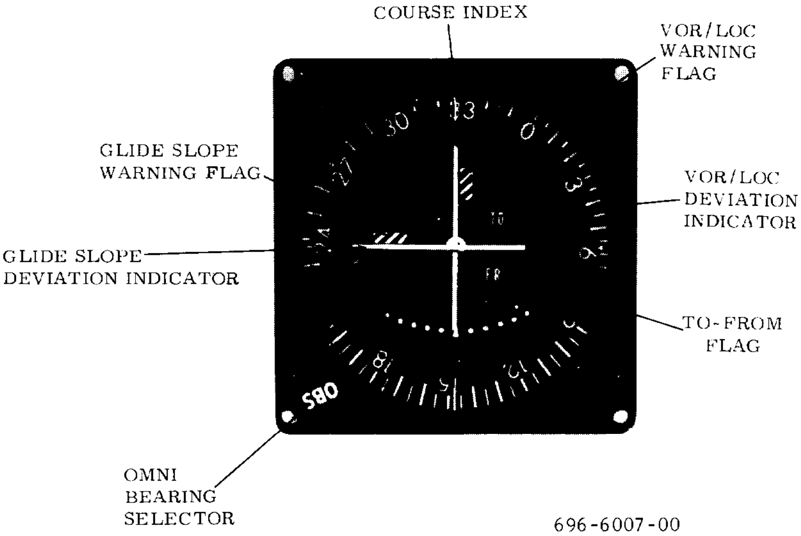


FIGURE 3-2 KI 201/211C CONTROL FUNCTIONS

3.4 KI 201C/KI 211C OPERATION

3.4.1 VOR OPERATION

Select the desired VOR station frequency with the NAV frequency controls. The NAV receiver volume control can then be adjusted to positively identify the station or listen to FSS reports.

To intercept a selected VOR radial (from the station) and fly outbound, turn the OBS control to set the desired radial under the top indicator index. Maneuver the aircraft to fly the selected radial magnetic heading plus a 45° intercept angle which will provide a sufficient intercept angle. The intercept angle should be reduced as the deviation needle approaches an on course condition (center) to prevent excessive course bracketing.

To determine the bearing and fly "to" a selected VOR station, turn the OBS control until the "To-From" flag indicates "To" and the deviation needle is centered. Read the "to" bearing under the top indicator index and maneuver the aircraft to approximately fly the magnetic course "to" the station. If the deviation needle moves to the right, the aircraft course must be adjusted 5 or 10 degrees to the right. Similarly, if the deviation needle, goes to the left, the aircraft course must be adjusted to the left. Maintaining a centered deviation needle will provide automatic course compensation for wind drift.

While flying a selected VOR course often times it can be noted that the deviation needle moves erratically about the center or moves a few degrees to one side and eventually returns to center. This action is refered to as VOR scalloping or course bends. Scalloping is generally caused by irregularities in terrain and metal objects located near the VOR station. Scalloping is more noticable at lower altitudes and in any case should be ignored.

Aircraft position can be easily determined by consecutively selecting two VOR stations and determining the "from" radial. By projecting appropriate radial lines from the VOR station the aircraft location may be identified as the intersection of the two radial lines.

3.4.2 KI 201C/KI 211C LOCALIZER OPERATION

Localizer circuits are automatically energized when an ILS frequency is selected on the KX 170A/KX 175 NAV receiver. By adjusting the NAV volume level the localizer station can be identified and in some cases ATIS information received. The localizer flag should disappear from view indicating the signal is reliable.

Maneuver the aircraft to fly an on course centered needle. While flying a front course approach or out bound on the back course approach, magnetic heading corrections are made toward the needle deflection. Similarly, while flying the back course approach or outbound on the front course approach, corrections are made away from the needle deflection.

The localizer course width is narrow compared to VOR course width and requires much smaller course corrections to center the deviation needle. When intercepting the localizer course, the aircraft turn into the localizer course should be started when the needle moves off the meter stop.

A helpful quick reference reminder of the localizer course is to set the course on the Omni bearing readout.

3.4.3 KI 211C GLIDESLOPE OPERATION

The glideslope (horizontal) needle provides the pilot vertical steering information during ILS approaches. The glideslope circuitry is energized when the associated localizer frequency is selected on the navigation receiver, observe that the glideslope warning flag is concealed. The glideslope needle deflects toward the direction the pilot must fly to remain on the glideslope. If the glideslope needle deflects upward the aircraft is below the glideslope and must climb to center the needle. If the needle deflects downward the aircraft is above the glide path and must descent to remain on the glide path. When the needle is centered the aircraft is on the glide path.

3.5 POST-INSTALLATION CHECKOUT

An operational performance flight test is recommended after the installation is completed to insure satisfactory performance of the equipment in its normal environment.

To check the communications transceiver, maintain an appropriate altitude and contact a ground station facility at a range of at least fifty nautical miles. Contact a ground station close in. Place the squelch knob in the test position and listed for any unusual electrical noise which would reduce the COMM receiver sensitivity by increasing the squelch threshold. If possible, verify the communications capability on both the HIGH and LOW ends of the VHF COMM band.

To check the VOR/ILS System select a VOR frequency within a forty nautical mile range. Listen to the VOR audio and insure that no electrical interference such as magneto noise is present. Check the tone identifier filter operation. Fly inbound or outbound on a selected VOR radial and check for proper LEFT-RIGHT and TO-FROM indications. Check the VOR accuracy.

–NOTE–

At low altitudes VOR ground station scalloping may be present.

Flight test the ILS operation by flying a simulated ILS approach. Check localizer LEFT-RIGHT deflection and, if applicable, glideslope deflection. Check the localizer accuracy in relation to the ILS runway. Check the glideslope accuracy in relation to the published ILS approach altitude.

MAINTENANCE/OVERHAUL MANUAL

KX 170A/KX 175 NAV/COMM TRANSCEIVER

KING RADIO CORPORATION®
400 NORTH ROGERS ROAD
OLATHE, KANSAS, U.S.A.

KING
KX 170A/KX 175
NAVIGATION RECEIVER/
COMMUNICATIONS TRANSCEIVER

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KX 170A/KX 175
NAVIGATION RECEIVER/
COMMUNICATIONS TRANSCEIVER

The information in this maintenance manual does not profess to include all the details of design, production, or variations of the equipment, or to cover all the possible contingencies which may arise during operation, installation, or maintenance. Should special problems arise or further information be desired, please contact the KING Customer Service Department.

KING

KX 170A/KX 175
NAVIGATION RECEIVER/
COMMUNICATIONS TRANSCEIVER

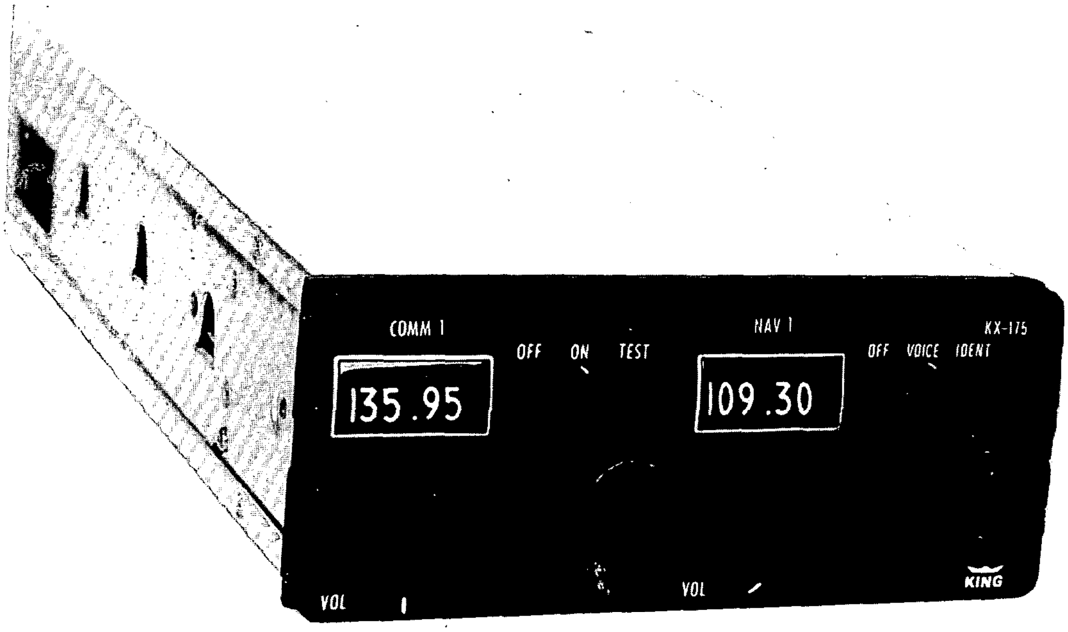


FIGURE 1-1 KX 170A/KX 175

SECTION IV

THEORY OF OPERATION

4.1 GENERAL

The KX 170A/KX 175 unit incorporates a 200 channel navigation receiver, a 360 channel communications transceiver and a 5 watt audio system. The KI 201C is an OMNI/LOC converter and indicator. The KI 211C includes the KI 201C capability plus a 20 channel glideslope receiver with indicator. The KA 39 is a dual series regulator, separately converting 27.5VDC to 13.75VDC for the COMM and NAV.

For discussion purposes, the KX 170A/KX 175 system is split into subsystems and treated on the basis of block diagram theory and detailed circuit theory. Subsystems are defined as Frequency Synthesizers (COMM and NAV), COMM Transceiver, NAV Receiver and KA 39 Voltage Converter.

4.2 FREQUENCY SYNTHESIZERS

4.2.1 SMO BLOCK DIAGRAM

4.2.1.1 Simplified Block Diagram.

The KX 170A/KX 175 uses a stabilized master oscillator (SMO) for frequency generation. A feedback loop is used to slave a voltage controlled oscillator (VCO) to the selected multiple frequency of a crystal controlled reference oscillator. The simplified block diagram of Figure 4-1 illustrates the principle of operation of the COMM SMO and NAV SMO.

The VCO output frequency is divided by two, mixed with the High Frequency Crystal Oscillator, divided by N, and compared in frequency and phase with the Low Frequency Crystal Oscillator. The filtered error signal biases the VCO. The error signal is a high voltage when the VCO frequency is low and a low voltage when the VCO frequency is above the desired frequency. According to the VCO transfer function (Figure 4-2b) this error signal drives the VCO toward the selected frequency. When the VCO gets within ±400KHz of the desired frequency, the loop captures the VCO and pulls it into phase lock (f_{VCO} =f selected). In this condition the loop establishes an error signal that is a 25KHz square wave. The low pass filter recovers the dc component and biases the VCO to maintain the selected output frequency. The square wave duty factor, and thus the filtered D-C VCO bias voltage, varies according to the selected VCO frequency. Transfer functions of the various blocks are illustrated in Figure 4-2.

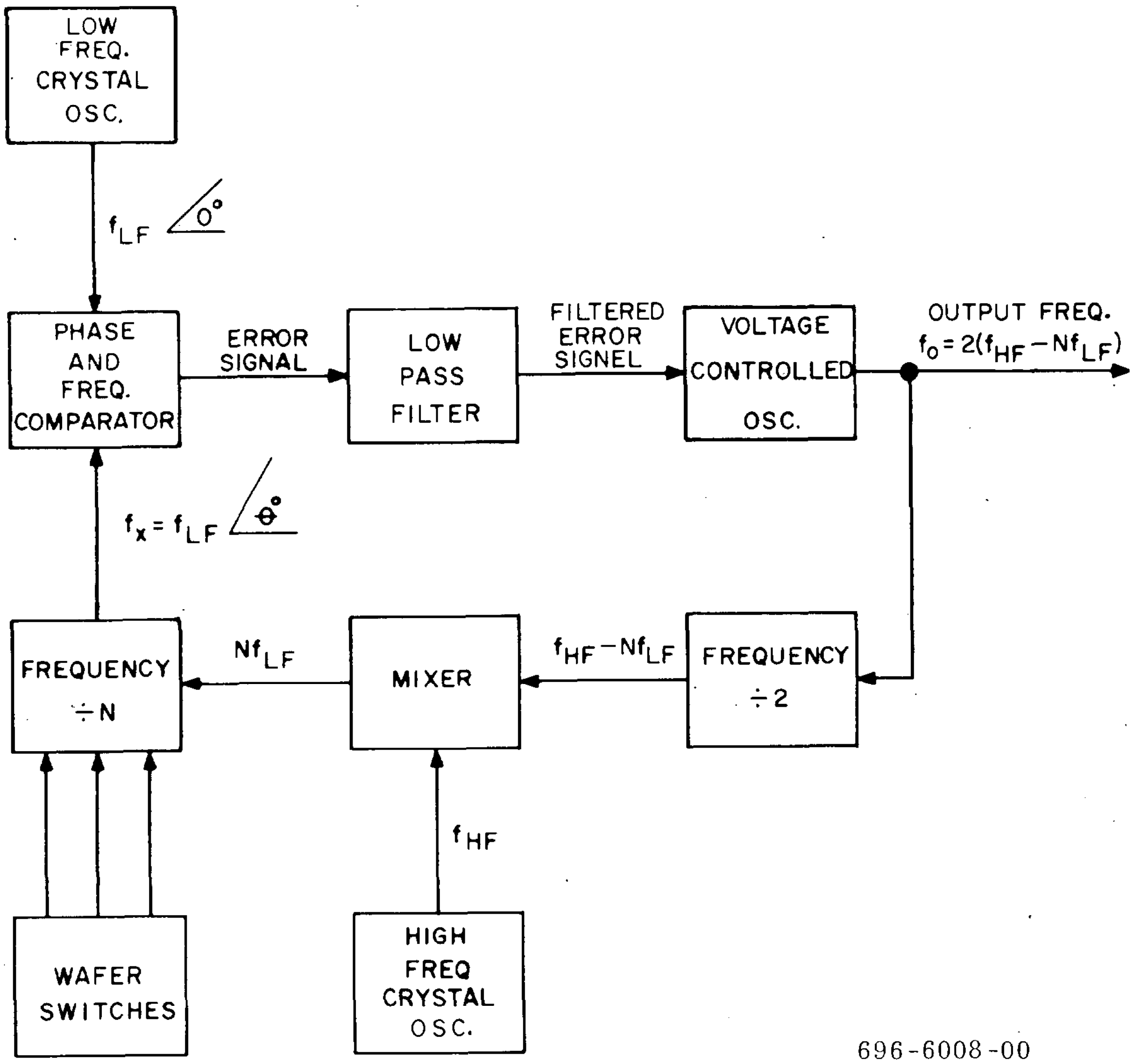
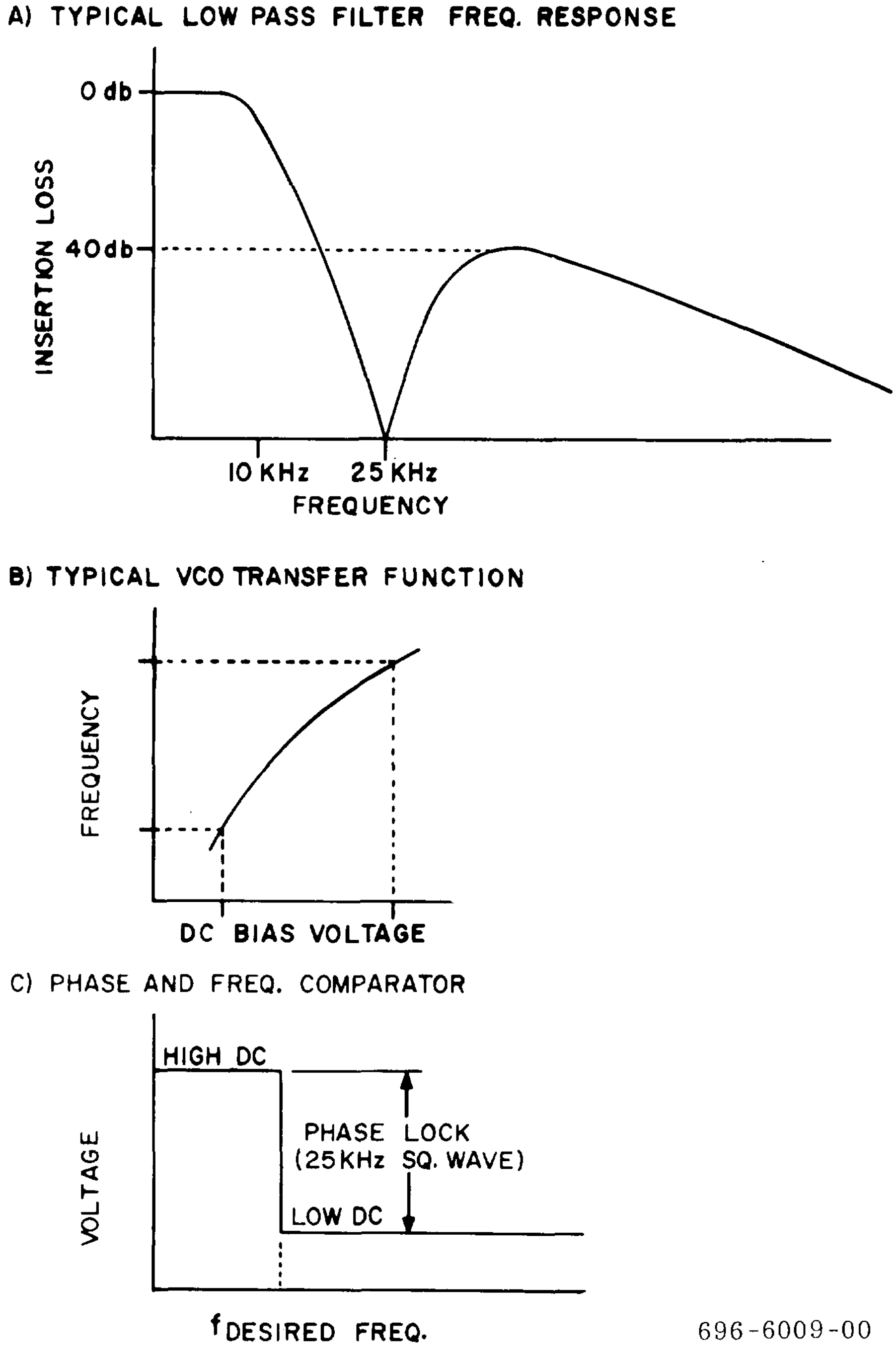


FIGURE 4-1 KX 170A/KX 175 SIMPLIFIED SMO BLOCK DIAGRAM



696-6009-00

FIGURE 4-2 TYPICAL LOOP TRANSFER FUNCTIONS

4.2.1.2 NAV SMO Block Diagram.

The NAV SMO is a 200 channel frequency synthesizer covering the band from 92.8125 - 102.7625MHz in 50KHz steps. The block diagram is the red shaded portion of Figure 5-48. The basic frequencies appearing in the NAV SMO are tabulated in Table 4-2 and also appear on the block diagram.

The VCO converts a dc bias voltage to a VHF frequency. The buffer amplifiers isolate the VCO from reverse conducted electrical interference signals and provide 10mw output levels for mixer injection. The Implicit Divide by Two circuit halves the VCO frequency. A mixer is used to heterodyne the halved VCO frequency and the High Frequency Reference Oscillator. The Mixer Low Pass Filter passes the difference frequency and filters any spurious mixer products. In the Squaring Amplifier the analog difference frequency is amplified and clipped to provide a 4.5V square wave. The Programmable Divider generates one output pulse for every N input pulses. Selection of the divide ratio, N, is determined by the wafer switch coding. The 400KHz Reference Oscillator is divided by 16 in the Phase and Frequency Comparator block to obtain a 25KHz reference. This block also compares the Programmable Counter output in frequency and phase with the 25KHz reference frequency and generates an appropriate feedback signal to slew the loop until this variable frequency is locked to the 25KHz reference. The Voltage Translator shifts the level of the error voltage from the Phase and Frequency Comparator. The VCO Low Pass Filter is used to recover the D-C component of the phase detected, variable duty cycle, 25KHz square wave and to provide steady state and dynamic loop stabilization. The formula for the synthesized frequency is: $f_{VCO} = 2\ (53.93125 - .025N)$ MHz where N may be any number from 102 to 301.

4.2.1.3 COMM SMO Block Diagram.

The COMM SMO is a 360 channel, frequency synthesizer covering the band of frequencies from 118.00 to 135.95MHz in 50KHz steps. The block diagram is the red shaded portion of figure 5-49. The basic frequencies appearing in the COMM SMO are tabulated in Table 4-2 and also appear on the block diagram.

Basic theory of the NAV SMO (Section 4.2.1.2) applies to the COMM SMO. In order to obtain 360 channels and transmit-receive sidestep transitions, the COMM band is split into two 9MHz Bands (118.00 - 126.95MHz and 127.00 - 135.95MHz). Requirements for T/R switching are summarized in Table 4-1.

	Selected Band	Selected Band
	118.00-126.95MHz	127.00-135.95MHz
Transmit	VCO=118.00-126.95MHz	VCO=127.00-135.95MHz
Receive	VCO=127.00-135.95MHz	VCO=118.00-126.95MHz

TABLE 4-1 T-R SWITCHING REQUIREMENTS

	NAV	COMM	
		SMO HIGH BAND	SMO LOW BAND
Selected Channel (50KHz steps)	108.00 - 117.95MHz	118.00 - 126.95 R MHz 127.00 - 135.95 T	127.00 - 135.95 R MHz 118.00 - 126.95 T
VCO Frequency (50KHz steps)	92.8125 - 102.7625MHz	127.00 - 135.95MHz	118.00 - 126.95MHz
Implicit ÷ 2 Freq (25KHz steps	46.40625 - 51.38125MHz.	63.500 - 67.975MHz	59.000 - 63.475MHz
H. F. REF Frequency	53.93125MHz	71.025MHz	66.525MHz
Mix Output Frequency	7.525 - 2.550MHz	7.525 - 3.050MHz	7.525- 3.050MHz
Divide Ratio	301 - 102	301 - 122	301 - 122
L. F. REF Frequency	$\frac{400\text{KHz}}{16} = 25\text{KHz}$	$\frac{400\text{KHz}}{16} = 25\text{KHz}$	$\frac{400\text{KHz}}{16} = 25\text{KHz}$
Approx. VCO Bias	2.95 - 7.20 Volts	2.50 - 7.00 Volts	2.50 - 7.00 Volts
Approx. Receiver tuning voltage.	2.95 - 7.20 Volts	2.95 - 7.80	
1st I. F. Frequency	15.1875MHz	9.0000MHz	
2nd I. F. Frequency	1.1857MHz	861.2500KHz	
2nd L. O. Frequency	14.0018MHz	8.13875MHz	

TABLE 4-2 FREQUENCIES APPEARING IN THE KX 170A/KX 175

The phase locked loop synthesizes 180 channels in each 9MHz band and is switched between high and low bands with the High Reference Oscillator crystals and the VCO band switch. This system provides 360 channels with a 180 digit counter and fast T-R transitions without requiring special coding of the Programmable Divider. Note that the receiver uses a combination of high and low side injection and that the first I-F frequency is restricted to 9.0MHz.

The Out of Lock Disable block turns off the receiver buffer and transmitter buffer when the SMO is out of lock or is the receive condition. The VCO is disabled in the two unused MHz positions of the frequency selector.

Formulas for the synthesized frequencies are:

(Low band) $f_{VCO} = 2\ (66.525 - .025N)$ MHz

(High band) $f_{VCO} = 2\ (71.025 - .025N)$ MHz

where N is any selected number from 122 to 301.

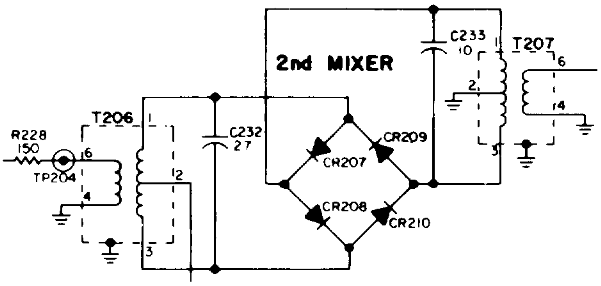
4.2.2 SMO Circuit Theory

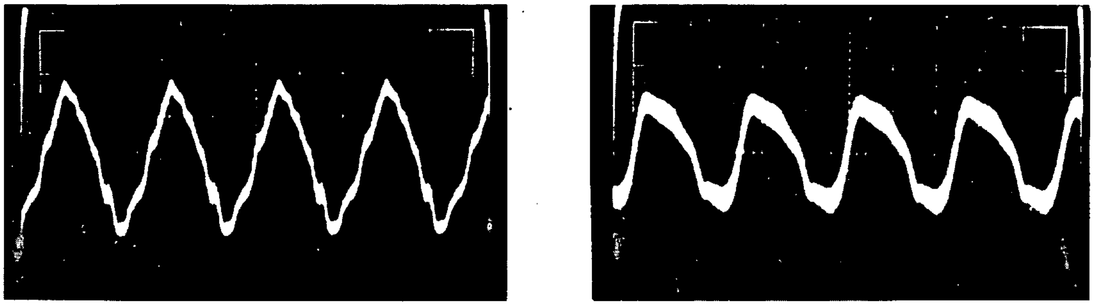
4.2.2.1 Circuit Theory

Elements Common to NAV and COMM SMOS. Due to the similarity in function, the Mixer Low Pass Filter, Squaring Amplifier, Programmable Divider, Phase and Frequency Comparator, Square Wave Voltage Translator, and VCO Low Pass Filter circuitry is of common design in the NAV SMO and COMM SMO. The differences in counter divide ratios are handled in the COMM and NAV wafer switching. The similarity of design makes possible trouble shooting methods employing comparison techniques. This is discussed in detail in Section V. In the following discussion, NAV schematic reference numbers appear without brackets and COMM schematic reference numbers appear with brackets.

BALANCED MIXER

The balanced mixer configuration was chosen to minimize spurious generation and to provide isolation between the digital circuitry, the VCO, and the high reference oscillator. The balanced mixer consists of transformers, T206 (T304), T207 (T306), diode quad CR207 (CR309) thru CR210 (CR312) and capacitors C232 (C364) and C233 (C365). Bifilar wound helical transformers and low capacitance, low noise, hot carrier, mixer diodes are used to maintain mixer balance.



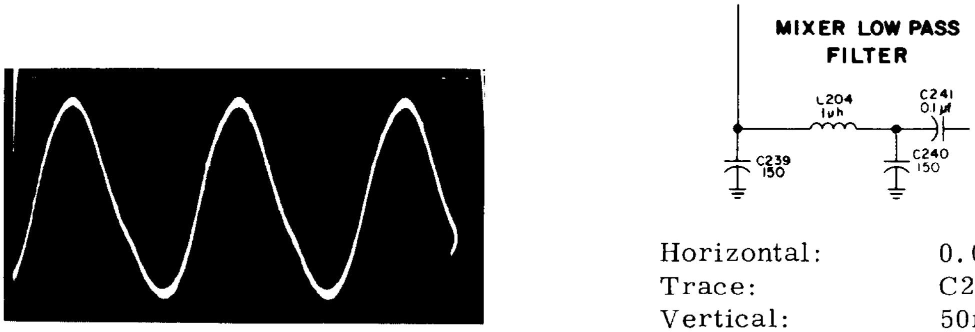


Horizontal:	20nsec/DIV	Horizontal:	20nsec/DIV
Trace:	TP204	Trace:	Pin 6 T207
Vertical:	200mv/DIV	Vertical:	100mv/DIV
Selected Freq.:	112.50MHz	Selected Freq.:	112.500MHz
Actual Freq.:	48.65625MHz	Actual Freq.:	53.93125MHz

FIGURE 4-3 BALANCED MIXER 696-6010-00

MIXER LOW PASS FILTER

Capacitors C239 (C375), C240 (C376) and inductor L204 (L305) comprise a basic pi-section low pass filter, which is used to remove high frequency mixer products.



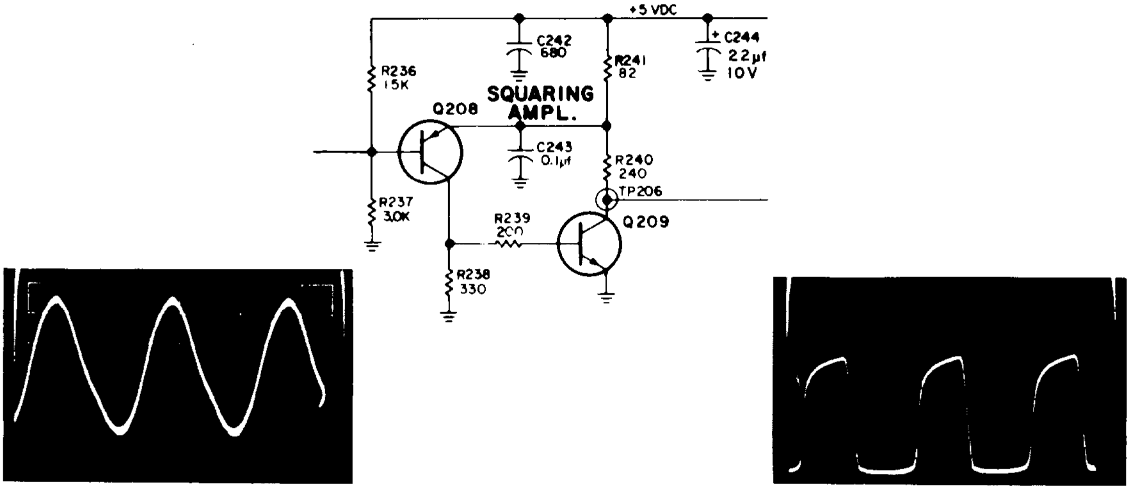
Horizontal: 0.05µsec/DIV
Trace: C241
Vertical: 50mV/DIV
Selected Freq.: 112.50MHz

FIGURE 4-4 MIXER LOW PASS FILTER

696-6011-00

SQUARING AMPLIFIER

Transistors Q208 (Q312) and Q209 (Q313) are used in a complementary configuration to provide wide band amplification and clipping. The output waveform is a 4 volt square wave as indicated in Figure 4-5.



Horizontal: 0.05µsec/DIV
Trace: Base Q208
Vertical: 50mv/DIV
Selected Freq.: 112.50MHz
Actual Freq: 5.275MHz

Horizontal: 0.05µsec/DIV
Trace: TP206
Vertical: 1V/DIV
Selected Freq.: 112.50MHz
Actual Freq: 5.275MHz

696-6012-00

FIGURE 4-5 SQUARING AMPLIFIER

400KHz REFERENCE

The low frequency reference oscillator and its waveform are illustrated in Figure 4-6. Transistors Q210 (Q315) and Q211 (Q316) are connected as an astable multivibrator. Crystal Y202 (Y303 KX 175 only) acts as a series resonant element controlling the oscillation of the multivibrator. The 400KHz low frequency reference signal is applied to both the COMM and NAV phase and frequency discriminator circuits.

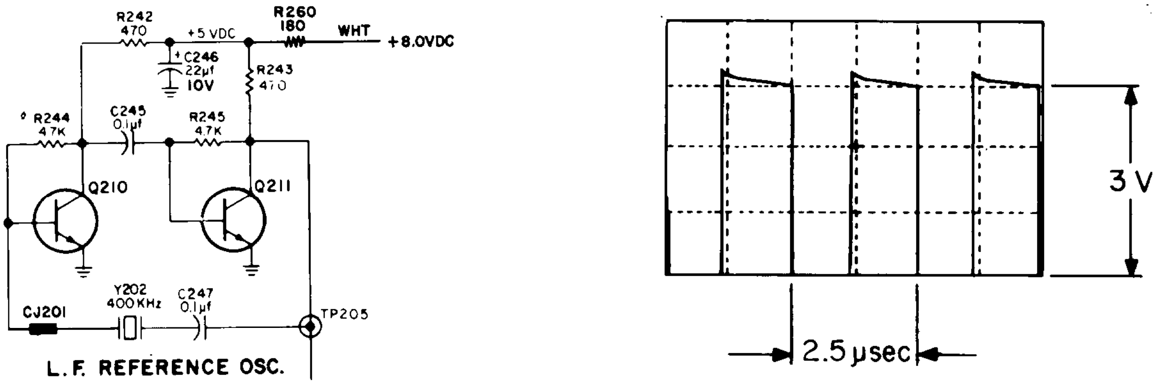


FIGURE 4-6 400KHz REFERENCE OSCILLATOR

DIGITAL CIRCUITRY

A. LOGIC REVIEW

Two types of logic circuitry are used in the KX 170A, KX 175, these are, Resistor-Transistor Logic (RTL) and Transistor-Transistor Logic (TTL). Typical gate schematics are shown in Figure 4-7. Typical supply voltages are 3.6 volts for RTL and 5.0 volts for TTL. Basic gates and JK Flip Flop are defined symbolically and functionally in Figure 4-8. In the KX 170A / KX 175 the Nand gates are TTL, the Nor gates are RTL, and the J-K flip-flops are TTL.

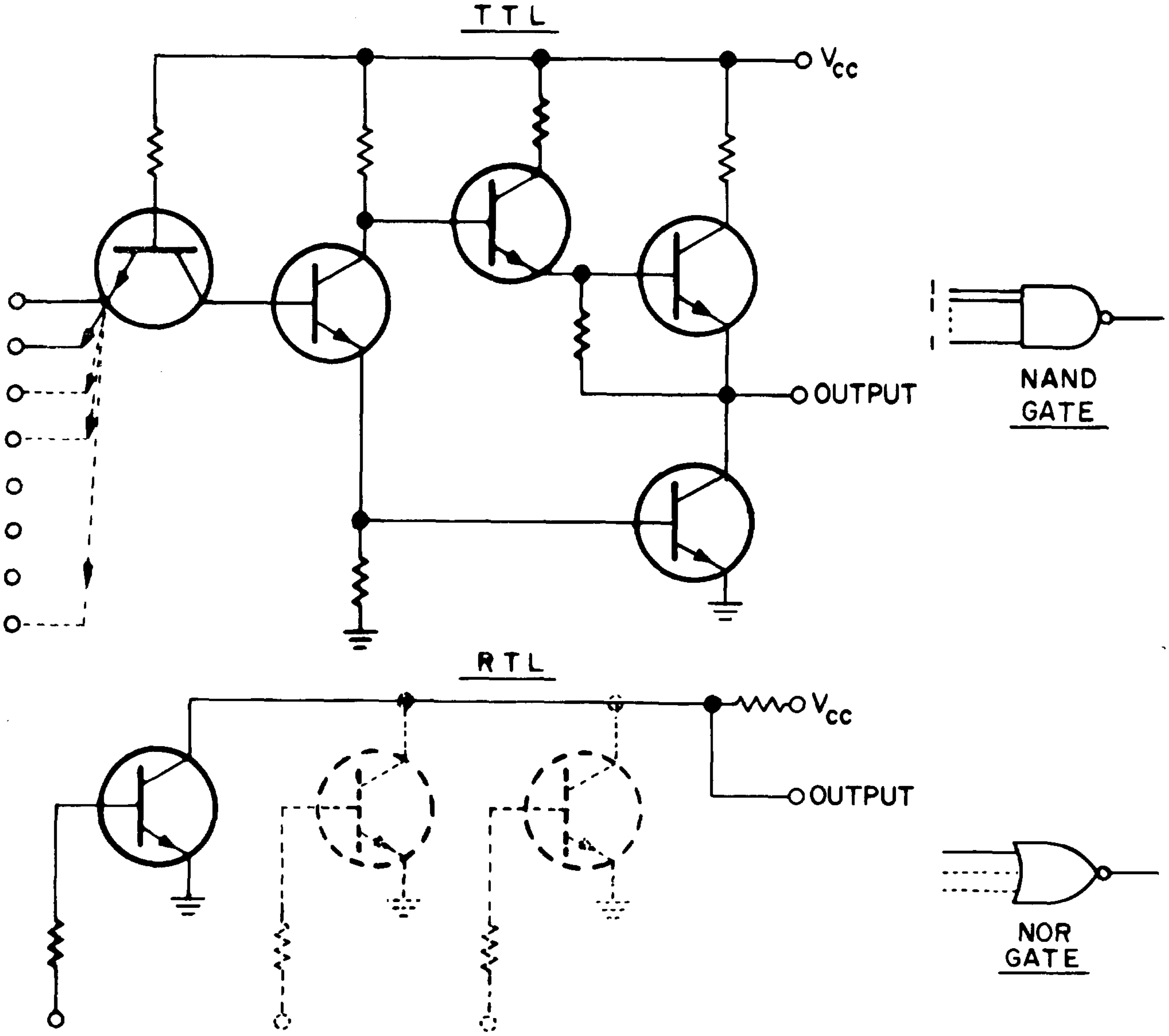


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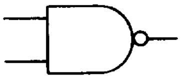
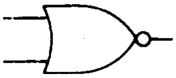
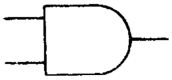
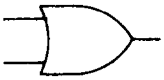
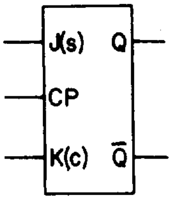
FIGURE 4-7 TYPICAL GATE CIRCUITS

I. GATES

		Inputs	Outputs
A.	NAND	All high (1)	Low (0)
		Any low (0)	High (1)
B.	NOR	All low (0)	High (1)
		Any high (1)	Low (0)
C.	AND	All high (1)	High (1)
		Any low (0)	Low (0)
D.	OR	All low (0)	Low (0)
		Any high (1)	High (1)

II. CLOCKED J-K FLIP FLOPS

RTL		TTL			
S	C	J	K	$\bar{K}$	Q after next clock pulse
1	1	0	0	1	Output unchanged
0	1	0	1	0	0
0	0	1	1	0	Output changes state
1	0	1	0	1	1



RTL Change of state caused by clock pulse negative transition.
TTL Change of state caused by clock pulse positive transition (KX 170A/KX 175 flip-flops).

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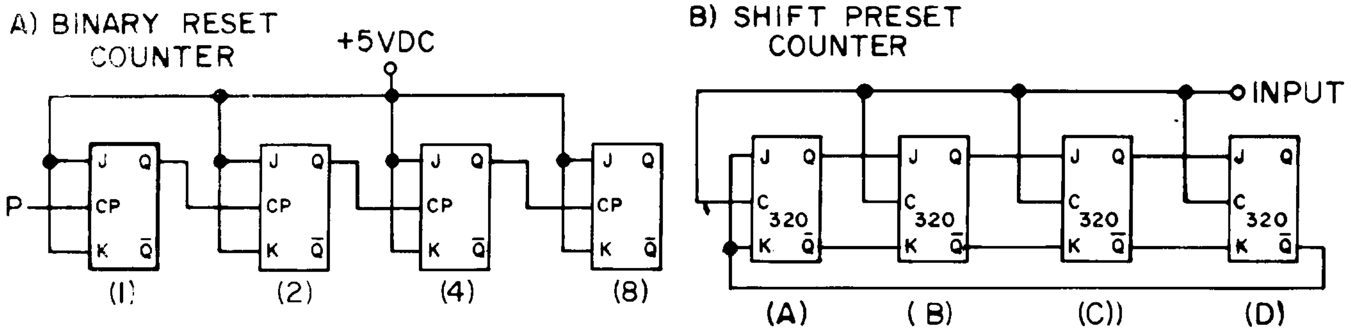
FIGURE 4-8 BASIC LOGIC FUNCTIONS

In a J-K flip-flop, output changes are initiated by the clock pulse according to the state of the J-K inputs at the time of the clock pulse transition.

B. COUNTER REVIEW

The function of the counter is to provide one output pulse for every N input pulses. This means F (out) = F(in)/N. In a programmable counter N may be selected from any one of several choices. Programmable counters are divided into two classifications; reset counters and preset counters. The reset counter uses the principle that when the counter reaches a selected load state it sets to a fixed reset state and then recycles. The preset counter reaches a fixed load state, sets to a selected preset state and recycles.

Counters are further specified on the basis of the count method employed. The most common method used is to establish a decimal weighted code for each flip-flop and to gate the respective outputs accordingly. Refer to Figure 4-9a. Typical of this method would be a binary counter. The KX 170A/KX 175 incorporates a shift-counter. In this system, the information is shifted from left to right through the register giving a cyclical code. A typical shift counter is shown in Figure 4-9b.



WEIGHTED CODE		1	2	4	8
RESET STATE	0	0	0	0	0
SELECTED LOAD STATES	1	1	0	0	0
	2	0	1	0	0
	3	1	1	0	0
	4	0	0	1	0
	5	1	0	1	0
	6	0	1	1	0
	7	1	1	1	0
	8	0	0	0	1
	9	1	0	0	1
	10	0	1	0	1
	11	1	1	0	1
	12	0	0	1	1
	13	1	0	1	1
	14	0	1	1	1
	15	1	1	1	1

WEIGHTED CODE		A	B	C	D
SELECTED PRESET STATES	0	0	0	0	0
	1	1	0	0	0
	2	0	1	0	0
	3	1	0	1	0
	4	0	1	0	1
	5	0	0	1	0
	6	1	0	0	1
	7	1	1	0	0
	8	0	1	1	0
	9	1	0	1	1
	10	1	1	0	1
	11	1	1	1	0
	12	0	1	1	1
	13	0	0	1	1
LOAD STATE	14	0	0	0	1

FIGURE 4-9 RESET AND PRESET COUNTERS

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C. PROGRAMMABLE DIVIDER

The Programmable Divider consists of three synchronous, cascaded, counter blocks; divide by 2 (50KHz selection), divide by 10 (100KHz selection), and divide by 15 (MHz selection) which provides a total of 300 states (2x10x 15). Since one input pulse is used to strobe preset information into the registers, the counter has a total of 301 available states (2x10x15)+1. Each input pulse steps the counter to the next state. To divide by N, the counter is preset N states away from the load state. After N input pulses, the load state is reached, an output pulse is generated, the counter is preset, and the count cycle is repeated. The division ratios are 301-102 (NAV) and 301-122 (COMM). The charts relating preset state and selected channel for NAV and COMM SMOS appear as Tables 4-3 and 4-4.

N_1	MHz PRESET	M_0	M_1	M_2	M_3	N_2	KHz PRESET	K_{00}	K_0	K_1	K_2	K_3
280	108	1	1	1	0	20	.00	1	1	1	1	0
260	109	0	1	1	1	19	.05	0	1	1	1	0
240	110	0	0	1	1	18	.10	1	0	1	1	1
220	111	0	0	0	1	17	.15	0	0	1	1	1
200	112	0	0	0	0	16	.20	1	0	0	1	1
180	113	1	0	0	0	15	.25	0	0	0	1	1
160	114	0	1	0	0	14	.30	1	0	0	0	1
140	115	1	0	1	0	13	.35	0	0	0	0	1
120	116	0	1	0	1	12	.40	1	0	0	0	0
100	117	0	0	1	0	11	.45	0	0	0	0	0
80		1	0	0	1	10	.50	1	1	0	0	0
60		1	1	0	0	9	.55	0	1	0	0	0
40		0	1	1	0	8	.60	1	1	1	0	0
20		1	0	1	1	7	.65	0	1	1	0	0
						6	.70	1	0	1	1	0
(Load State)		1	1	0	1	5	.75	0	0	1	1	0
						4	.80	1	1	0	1	1
						3	.85	0	1	0	1	1
						2	.90	1	1	1	0	1
						1(Load State)	.95	0	1	1	0	1

Selected Frequency Division (N) = $N_1 + N_2 + 1$

TABLE 4-3 NAV PROGRAMMABLE COUNTER CODING

N_1	MHz PRESET	M_0	M_1	M_2	M_3	N_2	KHz PRESET	K_{00}	K_0	K_1	K_2	K_3
280	118, 127	1	1	1	0	20	.00	1	1	1	1	0
260	119, 128	0	1	1	1	19	.05	0	1	1	1	0
240	120, 129	0	0	1	1	18	.10	1	0	1	1	1
220	121, 130	0	0	0	1	17	.15	0	0	1	1	1
200	122, 131	0	0	0	0	16	.20	1	0	0	1	1
180	123, 132	1	0	0	0	15	.25	0	0	0	1	1
160	124, 133	0	1	0	0	14	.30	1	0	0	0	1
140	125, 134	1	0	1	0	13	.35	0	0	0	0	1
120	126, 135	0	1	0	1	12	.40	1	0	0	0	0
100		0	0	1	0	11	.45	0	0	0	0	0
80		1	0	0	1	10	.50	1	1	0	0	0
60		1	1	0	0	9	.55	0	1	0	0	0
40		0	1	1	0	8	.60	1	1	1	0	0
20		1	0	1	1	7	.65	0	1	1	0	0
(Load State)		1	1	0	1	6	.70	1	0	1	1	0
						5	.75	0	0	1	1	0
						4	.80	1	1	0	1	1
						3	.85	0	1	0	1	1
						2	.90	1	1	1	0	1
						1(Load State)	.95	0	1	1	0	1

Selected Frequency Division (N) = $N_1 + N_2 + 1$

TABLE 4-4 COMM PROGRAMMABLE COUNTER CODING

Figures 5-50 and 5-51 show the integrated circuits in the relationship that they appear on the NAV SMO and COMM SMO printed circuit boards. The Counter Timing Diagram appears in Figure 5-32. Figure 4-13 presents the digital circuitry symbolically. The black line portion is the programmable divider. J-K flip-flop 1 I201 (I301) performs the divide by 2 function. During normal operation, the J-K inputs, Pins 3, 5, and 15 are high and Pin 4, the $\overline{K}$ input, is low. Reference to the truth table of Figure 4-8, reveals that in this mode of operation, the J-K flip-flop toggles on every positive transition of the clock pulse. Each time the Q_1 output (Pin 6) goes positive, the clock pulse line of the 9300 I206 (I306) is clocked.

Flip-flop 2 presets flip-flop 1 when the counter reaches the load state. During normal operation the J_2 inputs, Pin 13 and 14 are high, the $\overline{K}_2$ input, Pin 12, is high, and flip-flop 2 remains with Q_2 high, regardless of the K_{00} input to pin 11. When the load state is reached, pin 6 of the 9004 I204 (I304) goes negative. If the preset input, pin 11 is high, the preset clock-pulse will drive Q_2 low. If the preset input, pin 11, has been low the next pulse would leave Q_2 high. If pin 10 (Q_2) remains high then the K input to flip-flop 1 remains high and flip-flop 1 continues to act as a toggle flip-flop. However, if pin 10 goes low, flip-flop 1 automatically shifts a high state to the Q_1 output at pin 6. The divide by 2 function and the preset waveform are illustrated in Figure 5-32.

The 9300 is a synchronous, 4 flip-flop shift register. Serial entry is available through the J-$\overline{K}$ inputs during positive clock transitions. Parallel entry is through P_0, P_1, P_2, and P_3 inputs when simultaneously: the Parallel Enable (PE) port is low and the clock pulse (Cp) makes a positive transition. Outputs Q_0, Q_1, Q_2, Q_3, $\overline{Q}_3$ and an asynchronous master reset (MR) are externally available. The 9300 internal logic is shown in Figure 4-10.

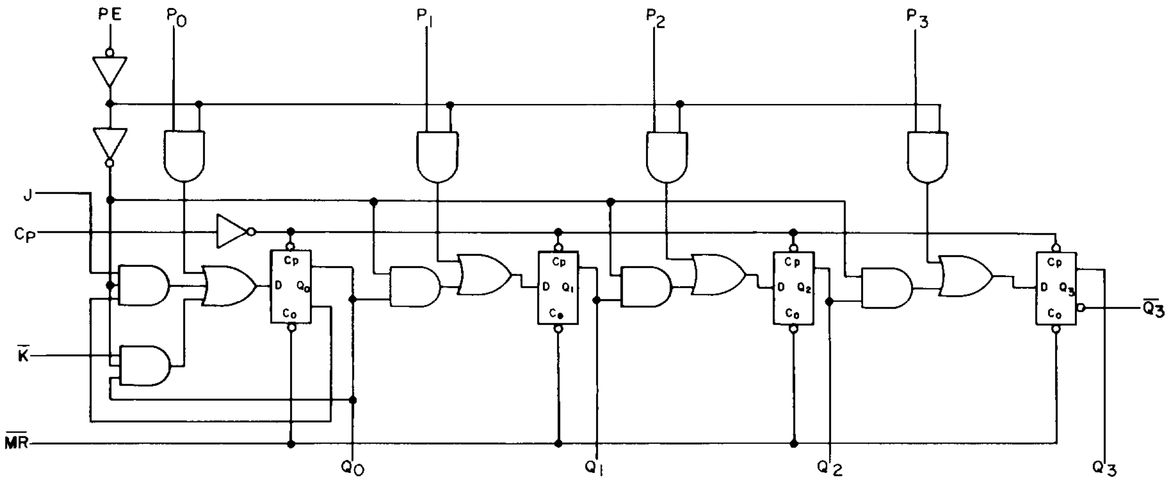

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FIGURE 4-10 9300 LOGIC

Two input nand Gate D I203 (I303) and the KHz 9300 I206 (I306) are connected to provide a 10 state shift counter. The 9004, Section B of I204 (I304), is used to monitor $\overline{Q}_1$ of flip-flop 1 and Q_0, Q_1 and Q_3 of the KHz 9300. When the 4 inputs are high, the output goes low. The next clock pulse toggles flip-flop 1 causing the output of the 4 input nand gate to go high providing the clock pulse to the MHz 9300 I202 (I302) . The 9004 provides 1 output pulse for every 20 input pulses to flip-flop 1. See Figure 5-32.

The J and $\overline{K}$ gates on the MHz 9300 are wired to provide a 15 state counter. Section A of the 9004, I204 (I304), monitors the inverted clock pulse and Q_0, Q_1, and Q_3 of the MHz 9300. The counter load state occurs when all of these inputs are high. In the load state the 9004 output goes to a low voltage, providing a parallel enable to the 9020 and the 9300's. The next clock pulse transition strobes in the preset information.

Note that the 9300 has a persistent all one state. This means that if for any reason Q_0, Q_1, Q_2, and Q_3 all have ones, the 9300 will continue to shift ones to the input. This undesirable mode of operation could cause the ÷10 or ÷15 counters to latch in the all ones state. If this situation occurs in either 9300, the associated 9004 gate output pulses with every clock pulse to quickly toggle to the load state. When the load state is reached, the preset information is strobed into the 9300's and flip-flop 1, correcting the persistent all one state in the 9300. Normal operation ensues.

D. PHASE AND FREQUENCY COMPARATOR

Schematics 5-50 and 5-51 show the integrated circuits in the relationship that they appear on the NAV SMO and COMM SMO printed circuit boards. The Phase and Frequency Comparator Timing Diagram appears in Figure 5-33. The red line portion of Figure 4-13 presents the Phase and Frequency Comparator symbolically.

The 400KHz low reference oscillator square wave is divided by the 9989 I205 (I305) to provide a 25KHz reference. Two input nor gates B and C in MC817P #2 I208(I308) are interconnected as a set-reset flip-flop. This flip-flop is used to provide phase comparison of the programmable counter output pulse and the 25KHz reference pulse. When the loop is properly phase locked, there is a one for one pulse relationship between the 25KHz reference and the programmable divider 25KHz output, and their relative phase is constant. A positive going pulse at Pin 6 of I208 (I308) causes Pin 5 to go negative and resets the flip-flop. A positive going pulse from the counter to Pin 9 causes Pin 5 to go positive and sets the flip-flop. The output of the flip-flop during phase lock conditions is a square wave with a duty cycle proportional to the relative phase of the two pulse trains.

When the system is out of lock, the programmable counter output frequency need not equal 25KHz. More pulses are received at one port of the set-reset flip-flop than the other. If a pulse is received at one set-reset port, and the associated frequency divider counts to a load state again before a pulse appears at the other set-reset port, the divider latches and waits for the desired pulse on the second port. When a pulse is finally received at the second port, the counter unlatches from its load state and immediately pulses the first port. This type of operation results in a set-reset flip-flop output that is nearly all high or all low depending on whether the counter is below or above the desired frequency. See Figures 4-11 and 5-33.

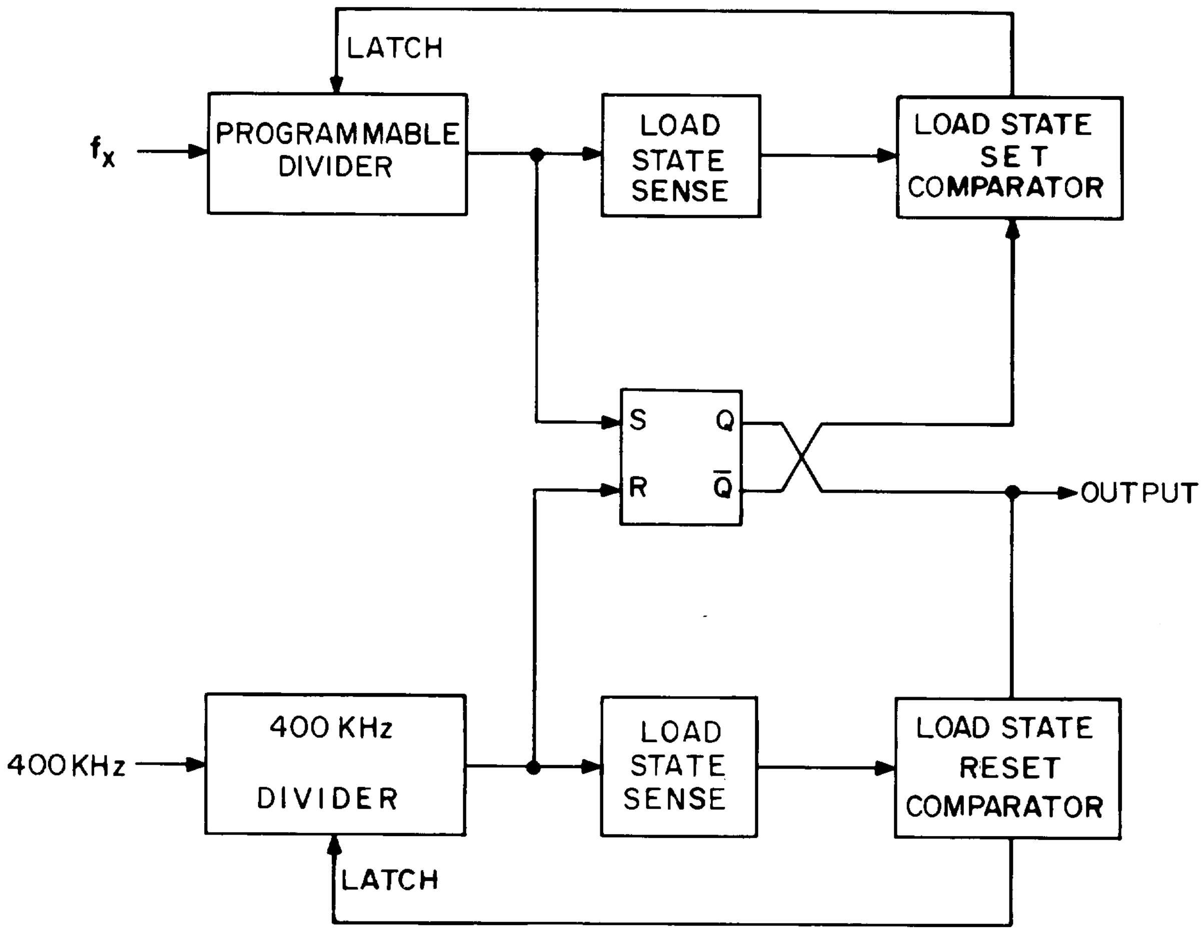

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FIGURE 4-11 BASIC PHASE AND FREQUENCY COMPARATOR SYSTEM

The programmable counter latches when pin 14 of I201 (I-301) goes negative. Gates B and C in I203 (I303) and B in I207 (I307) are used to sense coincidence of the counter load state and the flip-flop set state.

The divide by 16 I205 (I305) latches when pin 1 of gate A in I207 (I307) goes positive. Gates C and D of I207 (I307) and A of I208 (I308) are used to sense the divide by 16 load state and the flip-flop reset state coincidence.

The basic transfer function of the Phase and Frequency Comparator is illustrated in Figure 4-2C and 5-33. If power is turned on or channels are changed the appropriate high or low voltage is generated to sweep the VCO toward the selected channel frequency, whereupon the VCO is captured by the reference frequency with phase sensitive detector action.

E. OUT OF LOCK TX DISABLE

When Q307 is biased off, the Transmit Buffer, Q306, and Receiver Buffer, Q303, are disabled. During proper phase lock operation, the base of Q307 is high, saturating the transistor and enabling the Transmit and Receive Buffers.

If the loop fails to lock, the frequency discriminator supplies a latch signal to either the Programmable Frequency Divider or the 400KHz divide by 16. The latch signal causes either pin 12 or 13 of I308 to go positive, causing the gate output, pin 14, to go to ground. Failure modes occur that could cause pulsations to occur on the gate output at pin 14. Capacitor C564 holds the low voltage peaks at pin 14, turning Q307 off and disabling the Transmit and Receive Buffers.

F. VOLTAGE TRANSLATION CIRCUIT

Transistors Q204 (Q308) and Q205 (Q309) are used to amplify the set-reset flip-flop output and to provide voltage translation to obtain the proper voltage for the VCO bias.

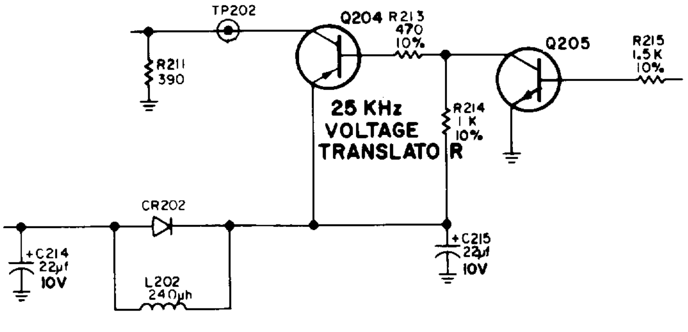


FIGURE 4-12 VOLTAGE TRANSLATOR CIRCUIT (NAV)
(Dwg. No. 696-6019-00)

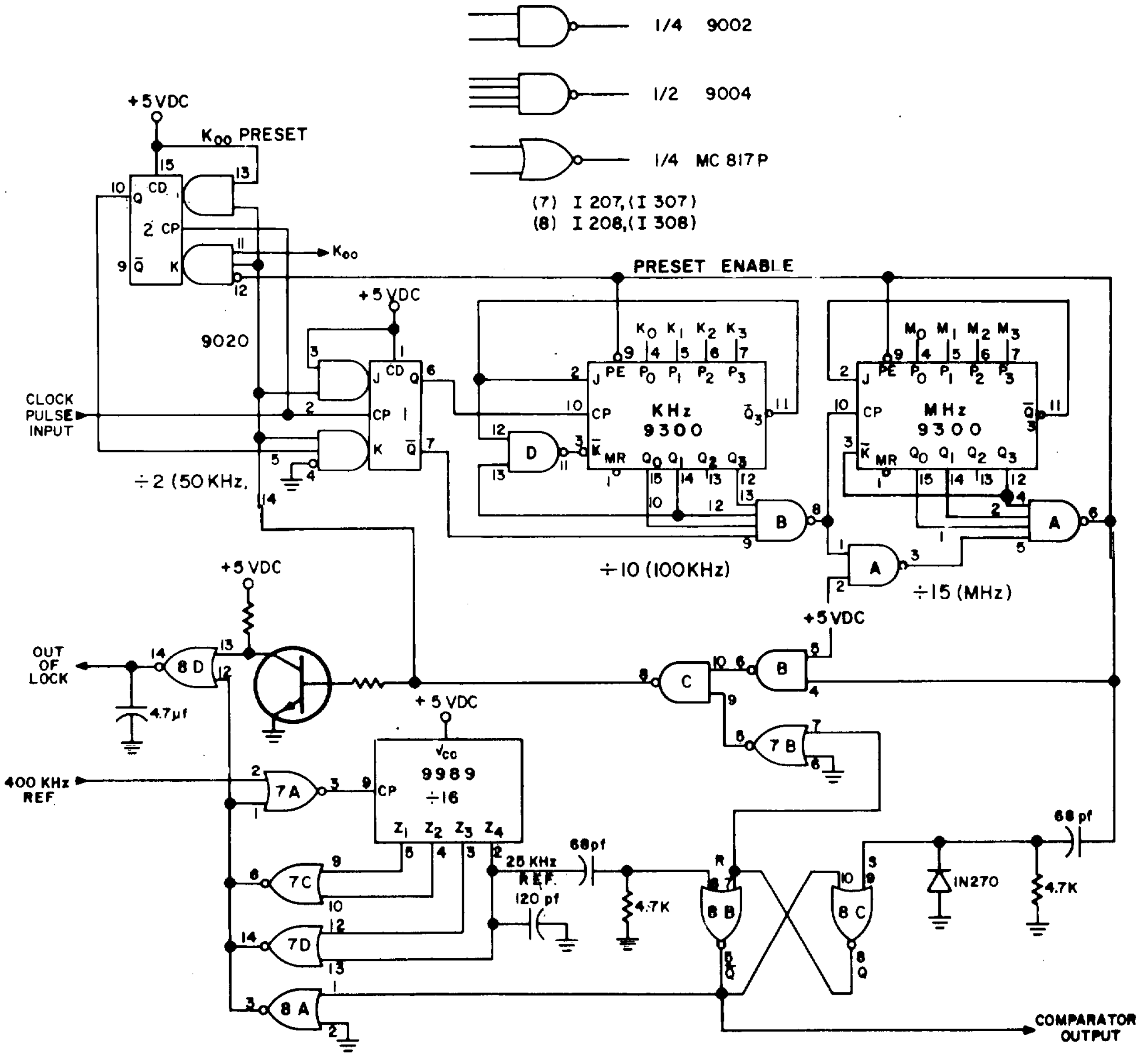
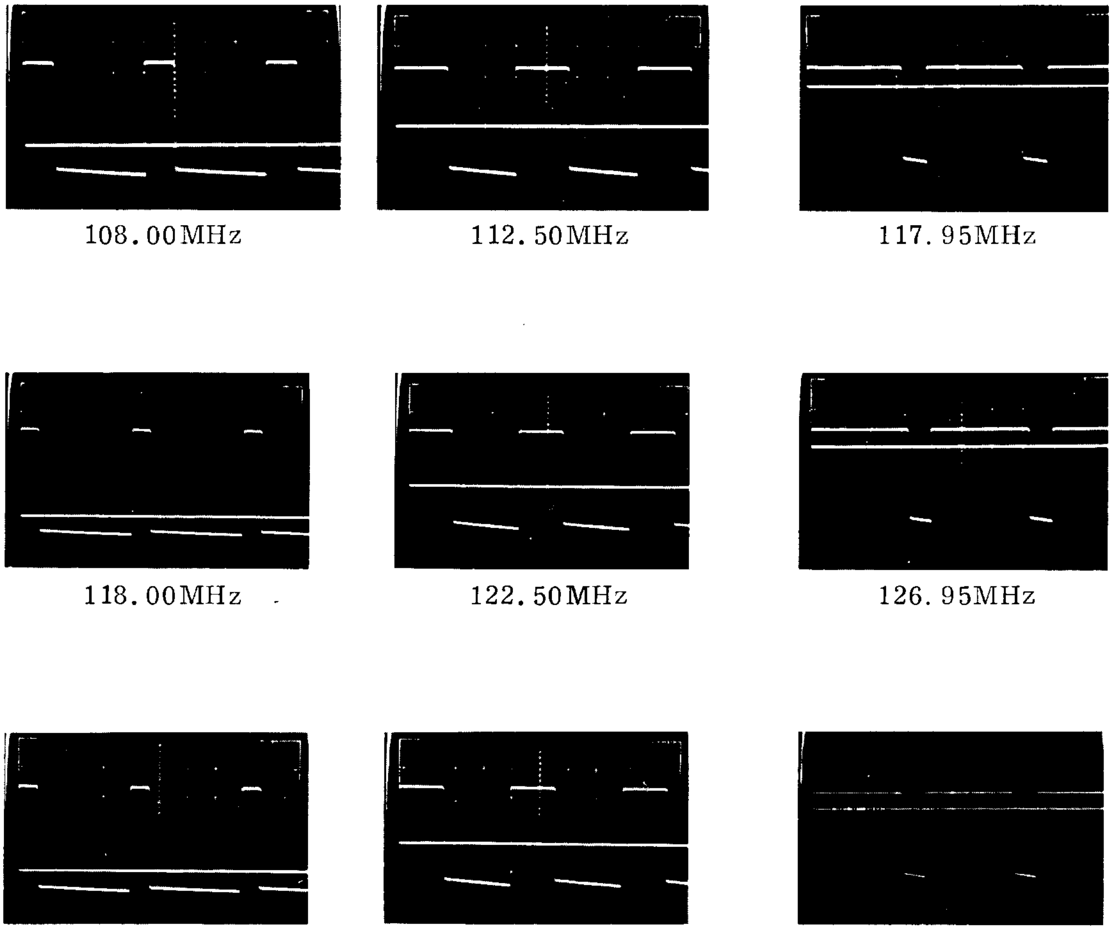


FIGURE 4-13 SIMPLIFIED PROGRAMMABLE DIVIDER PHASE AND FREQUENCY COMPARATOR



108.00MHz 112.50MHz 117.95MHz

118.00MHz 122.50MHz 126.95MHz

127.00MHz 131.50MHz 135.95MHz

Low Pass Filter Input (Square wave) and Filtered Output (D-C)
Base Line 0 Volts
Vertical 2 Volts/DIV
Horizontal 10μsec/DIV

696-6021-00

FIGURE 4-14 TYPICAL WAVEFORMS
VCO LOW PASS FILTER

G. VCO LOW PASS FILTER

The filter includes an elliptic low pass section to recover D-C voltage from the 25KHz square wave and a lead-lag section to provide loop stability. See Figure 4-14 and 4-15.

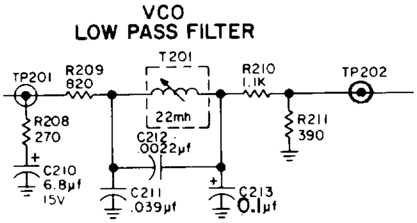


FIGURE 4-15 VCO LOW PASS FILTER
(Dwg. No. 696-6022-00)

4.2.2.2 Circuit Theory - SMO RF Circuits

VOLTAGE CONTROLLED OSCILLATORS

The VCO is an inductively tuned, Colpitts oscillator. See Figure 4-16.

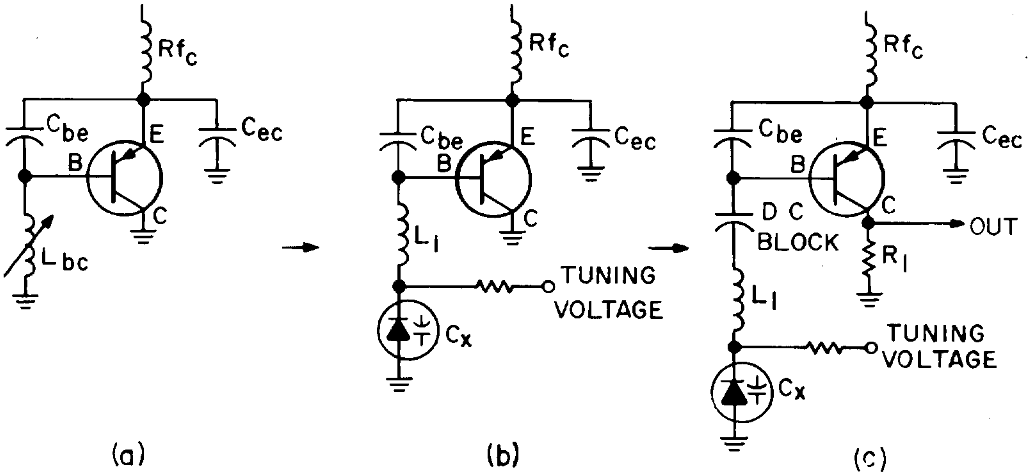


FIGURE 4-16 BASIC VCO PRINCIPLES
(Dwg. No. 696-6023-00)

A parallel tuned circuit is formed in (a) by L_{bc} and the series combination of C_{be} and C_{ec}. Regeneration is provided by positive feedback from the emitter to base. Tuning is accomplished by varying the inductance of L_{bc}. Since $w L_{bc} = wL_1 - \frac{1}{wC_X}$ in (b), tuning may be done by varying the bias on C_X. R_1 in (c) is used as an oscillator pickoff point. Refer to Figures 4-17 and 4-18 for circuitry.

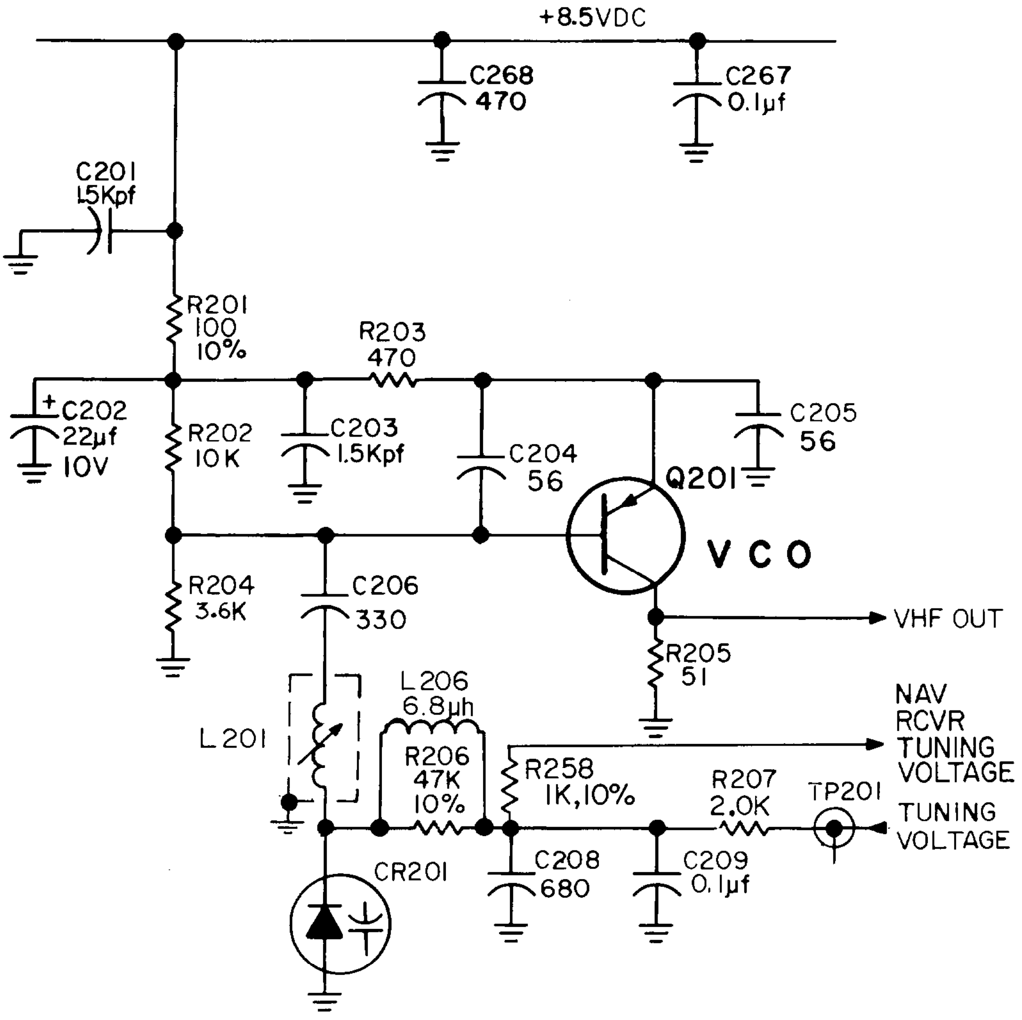


FIGURE 4-17 NAV VCO
(Dwg. No. 696-6024-00)

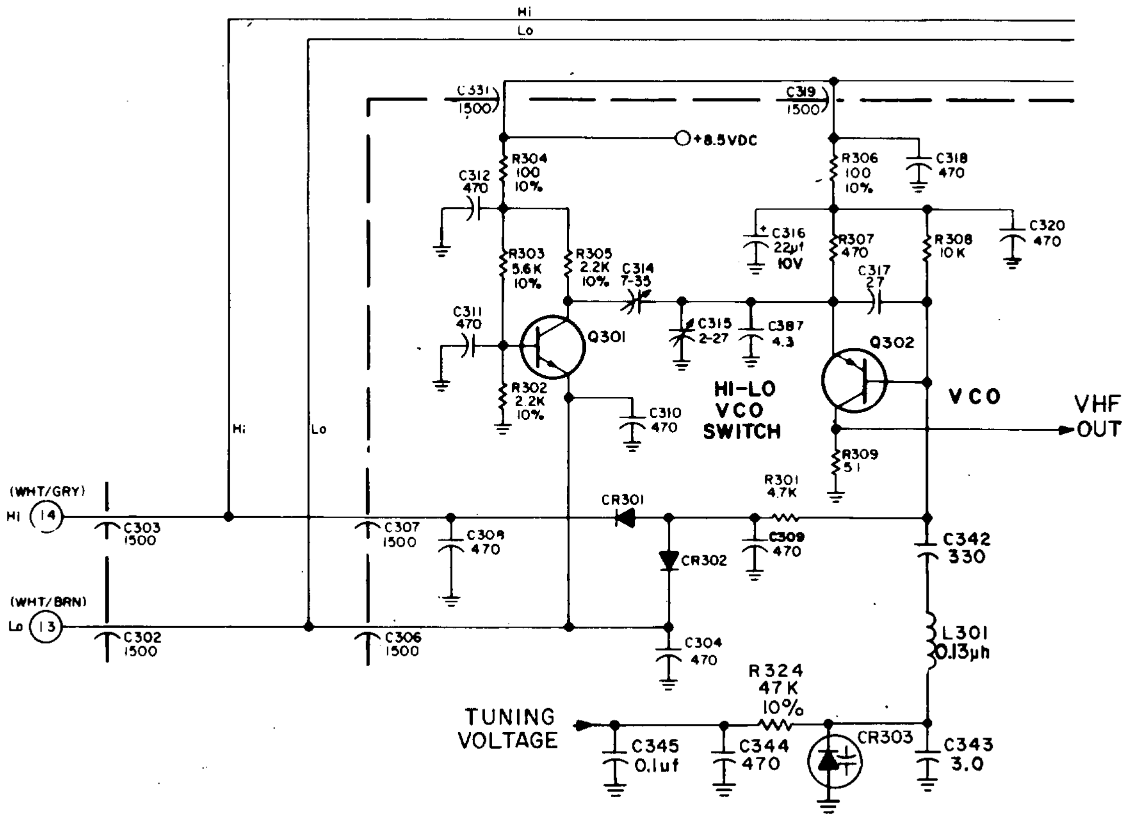


FIGURE 4-18 COMM VCO

The COMM VCO is switched from the high band (127. 00 - 135. 95MHz) to the low band (118. 00 - 126. 95MHz) by switching in trimmer capacitor C314. The bias ground returns (cathodes of CR301 and CR302) are opened to disable the COMM VCO in the two unused MHz positions. L201, (C314) and (C315) provide an alignment adjustment for the NAV and COMM VCO's.

BUFFER AMPLIFIERS

The buffers are class A, broadband amplifier stages. NAV buffer stages include Q202 and Q203. COMM buffer stages include Q303, Q304 and Q306. The COMM transmitter buffer stage Q306 is disabled during receive by Q305 and during SMO failure by Q307.

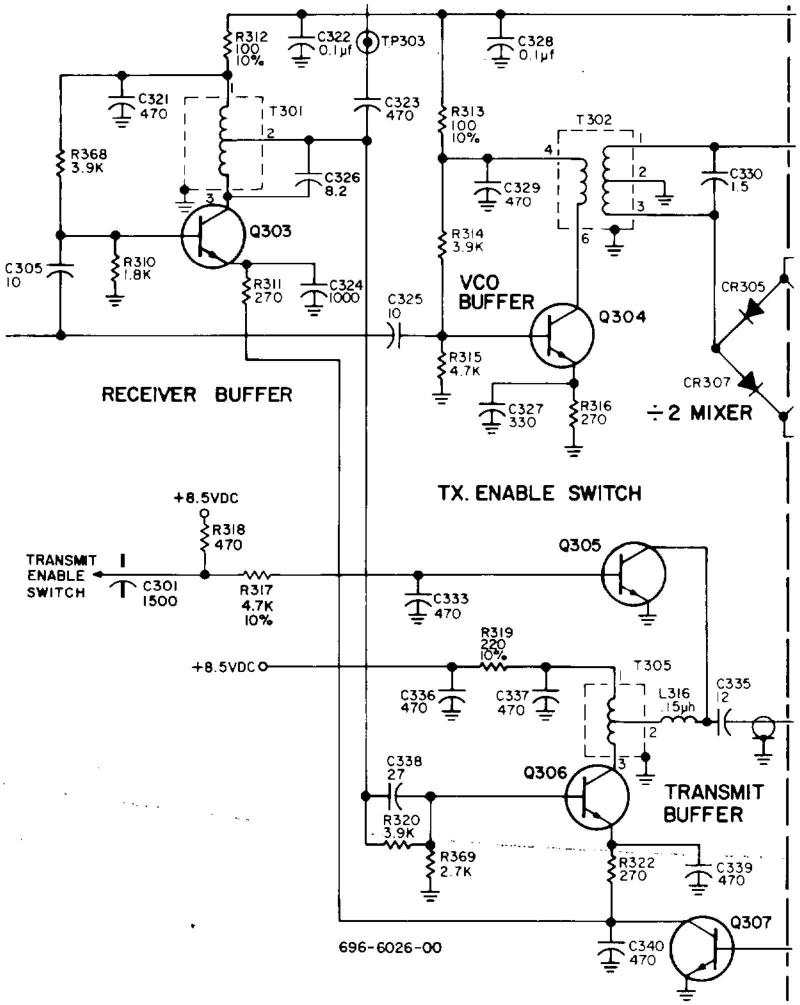
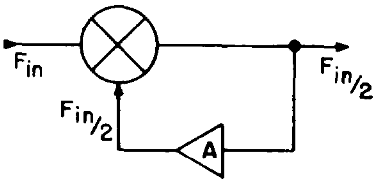


FIGURE 4-19 COMM SMO BUFFER AMPLIFIERS

IMPLICIT DIVIDE BY 2

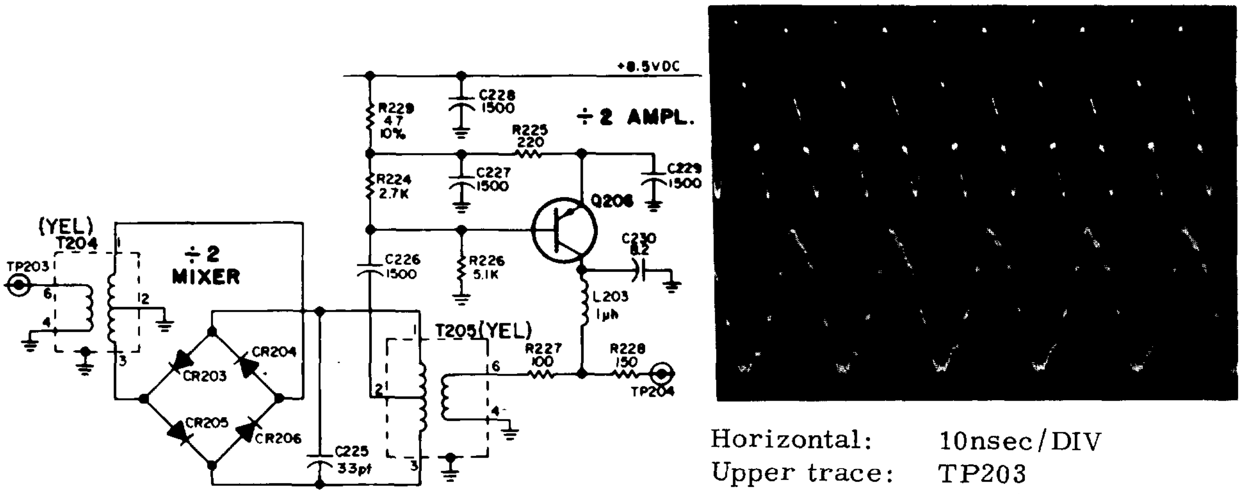
This circuit includes a mixer and an amplifier connected as shown. Regeneration occurs if the gain of the amplifier is greater than the insertion loss of the mixer. The only stable condition occurs when $f_{out} = 1/2_{in}$. A balanced mixer configuration is used to provide isolation. The amplifier is a low Q tuned amplifier. The implicit divide by two block diagram is shown in Figure 4-20.



$$F_{out} = F_{in} - F_{out}$$

$$F_{in} = 2\ F_{out}$$

FIGURE 4-20 IMPLICIT DIVIDE BY 2 DIAGRAM
(Dwg. No. 696-6027-00)



Horizontal:	10nsec/DIV
Upper trace:	TP203
Vertical:	0.5V/DIV
Lower trace:	TP204
Vertical:	0.2V/DIV
Selected freq:	108.65MHz

FIGURE 4-21 NAV IMPLICIT DIVIDE BY 2 CIRCUIT
(Dwg. No. 696-6028-00)

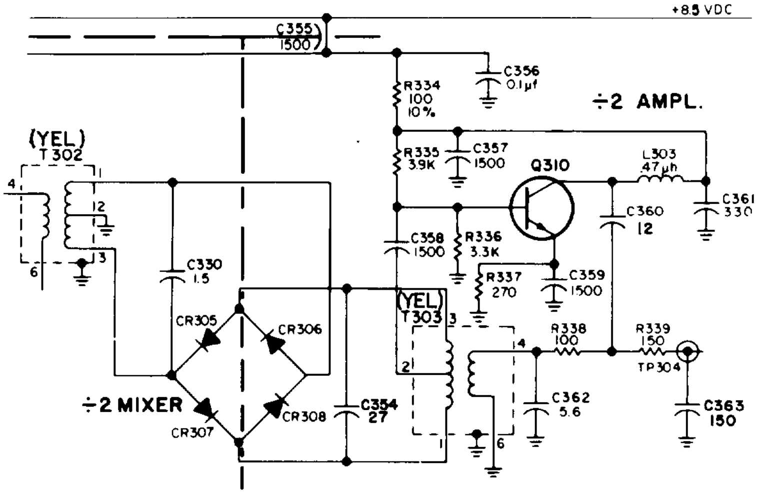
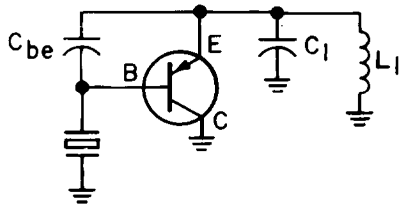


FIGURE 4-22 COMM IMPLICIT DIVIDE BY 2 CIRCUIT
(Dwg. No. 696-6029-00)

REFERENCE OSCILLATOR

A Colpitts oscillator configuration is used. The crystal forms a parallel tuned circuit with the series combination of C_{be} and C_{ec}. C_{be} provides regenerative feedback to the base.



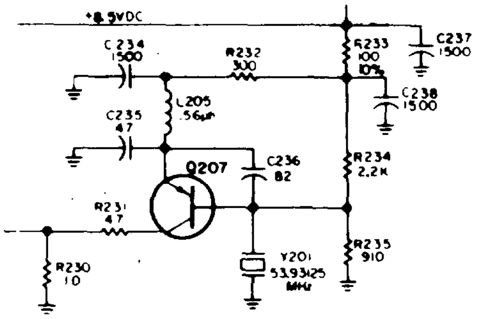
$$\frac{1}{WC_{ec}} = \frac{1}{WC_1} - WL_1$$

FIGURE 4-23 SIMPLIFIED COLPITTS OSCILLATOR
(Dwg. No. 696-6030-00)

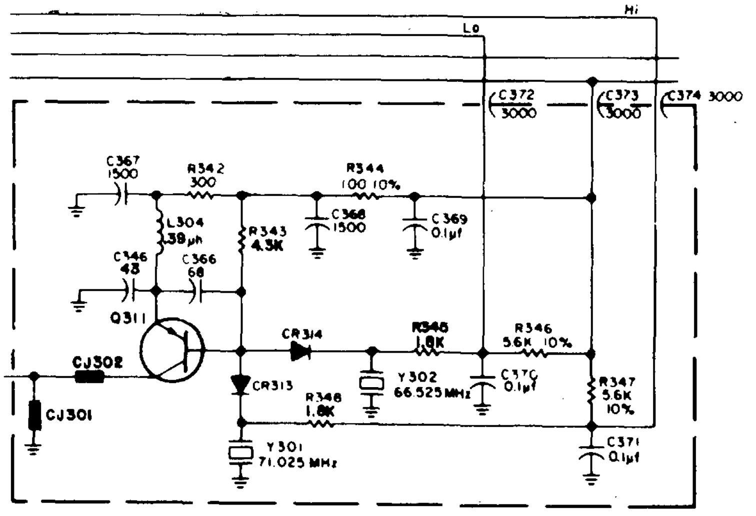
The parallel combination of $X_{C\,ec}$-X_{L1} is selected to be capacitive at the desired crystal overtone frequency and inductive at lower frequencies to suppress oscillations at the fundamental and lower overtone frequencies.

In the COMM High Reference Oscillator the 71.025MHz crystal is selected for high SMO band (127.00 - 135.95MHz) and 66.525MHz is selected for low SMO band (118.00-126.95-MHz) operation. See Table 4-2 for corresponding receive and transmit frequencies.

a) NAV HIGH REF. OSC.



b) COMM HIGH REF. OSC.



696-6031-00

FIGURE 4-24 HIGH REFERENCE OSCILLATORS

4.3 COMM TRANSCEIVER

4.3.1 BLOCK DIAGRAM THEORY (Figure 5-49)

The KX 170A/KX 175 COMM receiver section is a dual conversion, superheterodyne receiver with a 9.0MHz first I-F and a 861.25KHz second I-F frequency. 360 channels are synthesized at the first mixer. Low side injection is used for channels 127.00 - 135.95MHz and high side for 118.00 - 126.95MHz.

The received antenna signal is coupled to the preselector through a diode T/R switch. A 2-pole, varactor tuned, R-F filter couples the antenna to the R-F stage. A second varactor tuned filter couples the amplified R-F signal to the 1st mixer and supplies additional image and 1/2 I-F spurious rejection. The amplified R-F signal is mixed with the synthesized injection frequency in a balanced mixer. A two pole crystal filter couples the difference frequency to the second mixer and provides image and 1/2 I-F selectivity. The 8.13875 MHz crystal controlled 2nd local oscillator develops injection for the 2nd mixer. The 2nd I-F contains two integrated circuit (I-C) amplifiers with three double-tuned interstage networks for additional receiver selectivity. An active detector/noise limiter provides audio gain, rate noise limiting, and 90% AM clipping of noise spikes. A two stage AGC amplifier is used to AGC the R-F stage, and the 1st I-C amplifier in the 2nd I-F strip.

The receiver is approximately 6db into AGC with no input signal. This eliminates conventional gain threshold effects and establishes a constant "Signal plus noise" at the detector output. The detector noise bandwidth is approximately 15KHz. A noise filter passes white noise containing frequency components above 7KHz. The filtered noise is amplified and used to operate a squelch gate. When detected white noise drops below a preset threshold, the squelch gate opens. If a detected audio tone falls within the filter passband, it is treated as noise and blocks the squelch. A carrier squelch overcomes this problem by opening the squelch gate when the AGC exceeds a predetermined voltage. Receiver Audio passes through the volume control, an audio amplifier and is coupled to the audio summing junction.

The summing junction accepts four auxilary audio inputs including NAV. A diode switch mutes the summing junction and connects the mike element to the audio power amplifier during transmit. Headphone/sidetone is capacitively coupled from the audio drive amplifier to the phone jack and is still operable with a blown fuse and shorted audio output or R-F power transistors. The push-pull audio amplifier supplied 6 watts to the balanced primary of the output transistor. The secondary includes separate speaker and modulation windings.

The transmitter is a solid state, 4 stage, broadband, 30db gain, R-F power amplifier. Collector modulation is applied to the driver and final stages. The low pass filter provides harmonic spurious rejection. COMM SMO band switching, speaker/modulator, headphone/sidetone and antenna connections are controlled with a T/R relay. A series regulator supplies 8.5 volts to R-F/audio circuitry, and a zener regulator maintains 5.0 volts to digital circuitry used in the frequency synthesizers.

4.3.2 COMM TRANSCEIVER CIRCUIT THEORY

4.3.2.1 PRESELECTOR (Figure 5-52)

The R-F input signal is coupled to Q411 through the top coupled, two pole filter. Varactor diodes CR416 and CR417 tune the filter in 2MHz steps according to the bias voltage received from the MHz tuning wafer. Variable inductors L407 and L409 provide filter alignment. Inductive coupling (L408) is used to maintain a fairly constant coefficient of coupling over the band. Fixed capacitance is designed into the tanks to absorb transistor capacitance. The filtered R-F signal is amplified by R-F Amplifier, Q411. Forward AGC voltage is applied to the base. The amplified R-F signal is further filtered by CR418, CR419, L411 and L413 and coupled to balanced mixer transformer, T412. The COMM frequency synthesizer develops 10mw of Local Oscillator power across the primary of T413. Capacitor C482 matches the characteristic impedance of the crystal filter.

4.3.2.2 FIRST I-F FILTER (Figure 5-52)

The difference frequency (9MHz) is coupled through the two pole crystal filter (FL403) and applied to the base of the 2nd mixer, Q413. Tuned circuits, T414 and T415 provide reactive tuning of the crystal filter.

4.3.2.3 SECOND LOCAL OSCILLATOR (Figure 5-52)

The second Local Oscillator (Q409) is a Pierçe oscillator. Crystal Y402 forms a parallel resonant circuit with the series combination of C463 and C460. The tap between C463 and C460 provides 180° phase inversion of the collector feedback signal to provide regeneration.

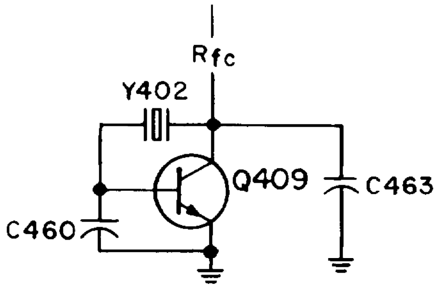


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FIGURE 4-25 SIMPLIFIED PIERCE OSCILLATOR

4.3.2.4 Second Mixer. (Figure 5-52)

The 1st I-F and the 2nd Local Oscillator signals are injected on the base of the second mixer, Q413. The difference frequency appears at the collector.

4.3.2.5 Second I-F (Figure 5-52)

The three top coupled, double tuned filters, consisting of T416-421 and C484, C487 and C491 provide receiver selectivity. Load resistors across T416-421 swamp variations in active device impedances to provide uniform band pass characteristics. Integrated circuits I404 and I405 are differential amplifiers with constant current sources, internal biasing and decoupling resistors. See Figure 4-26. A positive voltage applied to R474 causes a differential unbalance and AGC action in I404. In addition diode CR425 is providing a variable resistance, shunt path to ground through C490. Resistor R473 is used to minimize "deQing" of T417 with AGC action.

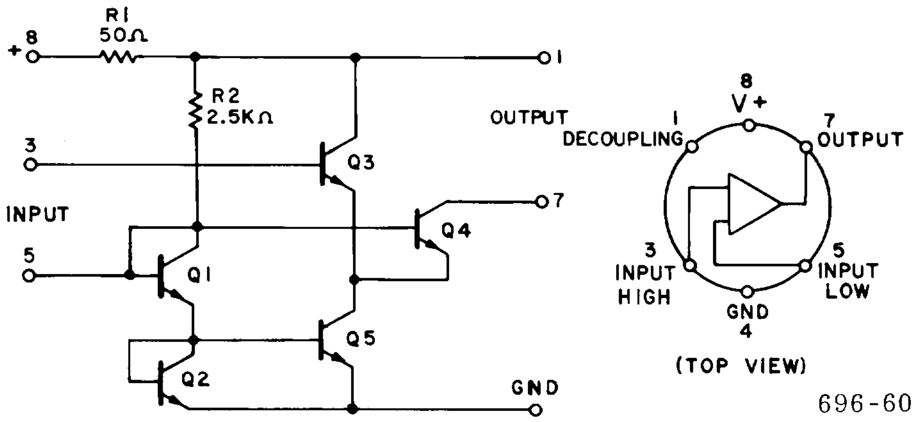

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FIGURE 4-26 SECOND I-F INTEGRATED CIRCUIT SCHEMATIC

4.3.2.6 Detector/Noise Limiter (Figure 5-52)

CR426 and R481 develop a trickle bias for collector detection transistor, Q414. Emitter feedback resistor, R482, provides a high base impedance to minimize the loading of T421. Detected audio voltage gain is determined by the ratio of the effective collector resistance and R482. C496 establishes the collector time constant in conjunction with the parallel collector resistance.

Noise limiter action occurs when CR427 is back biased. Detected audio is attenuated by R489 and R490. Resistors R488 and R492 establish a forward bias current through CR427. The charge storage of C498 establishes a D-C reference. Positive noise peaks back bias CR427 when the cathode rises to within 0.6 volts of the D-C reference. R492 and C499 establish a time constant that restricts the rate of change of voltage at the anode of CR427. The rate limiting effect rounds off the leading edges of fast rise time noise spikes. C499 couples the audio signal to the squelch gate.

4.3.2.7 AGC Amplifier (Figures 4-27, 5-52)

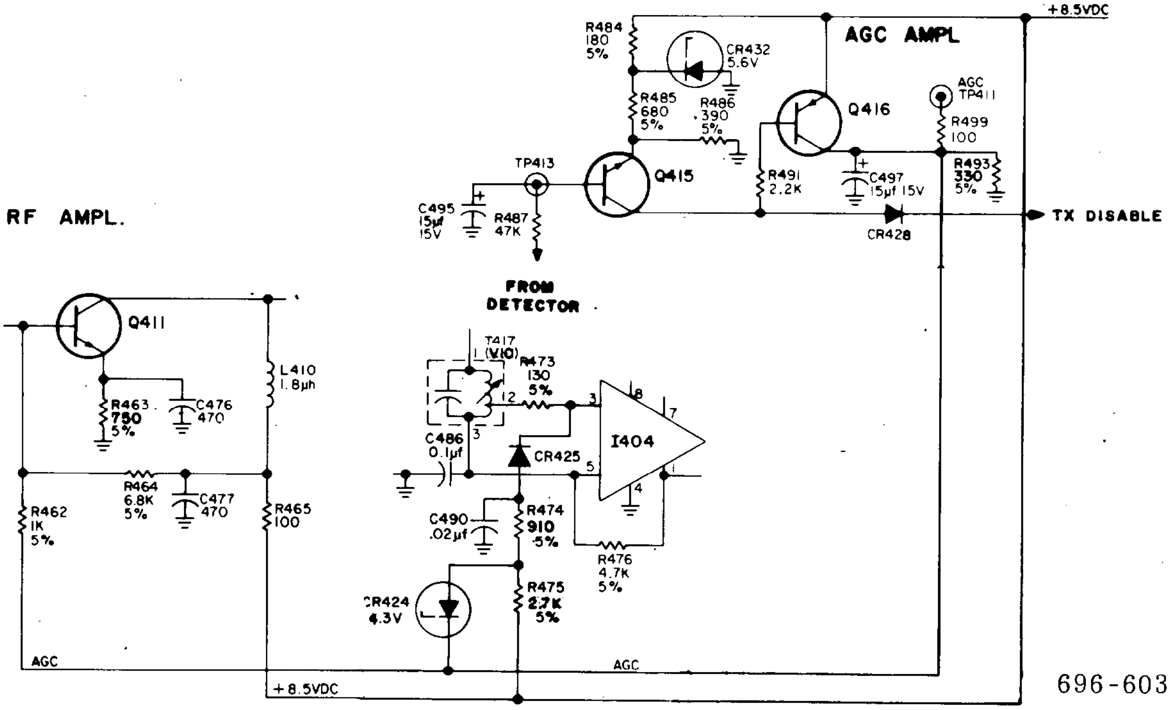

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FIGURE 4-27 COMM AGC SYSTEM

During radio turn on, the voltage at TP411 is approximately 1 volt and is established by the R-F, and I-F bias currents flowing through R493 to ground. R487 and C495 filter the detector output and apply the resultant D-C to the base of Q415. Q415 compares the AGC threshold reference voltage generated by R484, CR432, R485, and R486 with the filtered detector signal. Q415 and Q416 jointly provide AGC amplification; C497 provides additional AGC filtering. Zener diode, CR424, provides R-F AGC delay to assure proper receiver quieting.

4.3.2.8 Noise AMP and Filter. (Figure 5-52)

C501, C502, C503, R500, L414 and the input impedance of Q419 form an elliptic high pass filter that rejects frequencies below 7KHz. Q419 amplifies the noise. R504 and RT501 provide temperature compensation. R483, the Carrier/Noise Squelch Adjust, controls the amount of filtered noise at the tie point of R504 and RT501.

4.3.2.9 Carrier to Noise Squelch Gate (Figure 5-52)

Q420 and CR429 develop 7.5VDC across C508 when the peak to peak voltage of the white noise exceeds the sum of the forward voltages of the junctions of Q420 and CR429 (approximately 1.3V p-p). On positive voltage swings, Q420, charges C508. On negative swings, CR429 clamps C507 against the new voltage on C508. Each positive noise peak is integrated, increasing the D-C voltage across C508 until Q420 saturates at an emitter voltage of approximately 7.5 volts. When the noise falls below the squelch threshold, R506 discharges C508 causing squelch gate diode CR431 to pass audio signals.

4.3.2.10 Carrier Squelch. (Figure 5-52)

Q417 and Q418 form a differential amplifier for comparison of the AGC voltage with the carrier squelch adjustment. When the AGC voltage exceeds the reference voltage, the collector of Q418 goes negative, forward biasing squelch diode CR431.

4.3.2.11 Squelch Test. (Figure 5-52)

The test switch grounds the cathode of CR430 causing the squelch gate diode, CR431, to pass received signals.

4.3.2.12 Audio Preamp/Volume Control. (Figure 5-52)

Audio passes from the squelch gate to the volume control located on the front panel, and back to class A audio amplifier, Q410. The amplifier audio is connected to summing junction resistor R703.

4.3.2.13 Summing Junction T/R Diode Switch. (Figure 5-53)

Resistor R703-707 and R722 provide a summing junction. In the receive condition, CR701 is reverse biased and CR702 is forward biased, passing audio to the audio predriver stage, Q701. When the mike is keyed, the T/R relay grounds R721, which mutes CR702 audio and forward biases CR701 applying mike audio to Q701.

4.3.2.14 Audio Power Amplifier. (Figure 5-53)

Transistors Q701-706 are connected in a conventional audio power amplifier configuration. Headphone sidetone is coupled from the collector of Q702 through C709. Headphone sidetone is obtained by connecting resistor R719 in series and variable resistor R726 in shunt with the headphone during transmit. Failure of the fuse F701 makes the T/R relay (K701), the transmitter (Q601-604) and the push-pull audio amplifier (Q703-Q706) inoperable. Headphone audio remains functional.

4.3.2.15 Transmitter. (Figure 5-53)

The inputs to the VHF power amplifier are, the R-F output from the buffer amplifier in the COMM/SMO and audio from the audio modulator. When the microphone switch is depressed, a CW signal is coupled through C602 to the base of Q601. Q601 output from transformer T601 is coupled through C605 to the base of Q602, the pre-driver amplifier. The output of Q602 consists of the tuned circuit of T602, C609, and C610 and couples to the base of the driver amplifier Q603.

The driver amplifier Q603, has dual emitters which are R-F by-passed by C611 and C612. The output tuned circuit T603, C618 and C619 drives the final amplifier. R613 is used to de-Q transformer T603. Transformer T604 and capacitor C622 match the transmitter to the low pass filter through capacitor, C623.

RF Amplifiers Q601 and Q602 are supplied a filtered voltage from the radio D-C power source.

The resistor and diode combination of R608, R615, CR601 and CR602 provides full modulation to Q604 and upward modulation only to Q603.

4.3.2.16 Low Pass Filter. (Figure 5-53)

The low pass filter is a 3 section elliptical filter made up of sections FL601, FL602, and FL603. Its purpose is to greatly reduce the harmonic output signals from the power amplifier. The filter output couples directly to the antenna jack J172.

The resistor and diode combination used in the first two sections provide T-R switching. In the receive condition the relay K701 supplies a positive D-C voltage to diodes CR603 and CR604 through resistors R616 and R617. The capacitors C625 and C626 are VHF bypasses, and choke L604 provides a D-C voltage return. Received signals pass through the 3rd filter section FL603, diode CR604, and then to the receiver. Diode CR603 acts to minimize the insertion loss of the T/R switch. In the transmit condition, the D-C voltage is removed from the resistor, diode combination by relay K701 and the R-F power from the transmitter reverse biases diodes CR603 and CR604 due to self-rectification.

4.3.2.17 Input Power Line Filter

The 13.75V input power line is filtered by an L section low pass filter network, using a series inductor L701 with shunt capacitors C711 and C712 (See Figure 4-28).. The R-F Transmitter, Audio Driver and Audio Output derive power from the filtered 13.75VDC buss. The COMM voltage regulator input is also obtained from this filtered supply.

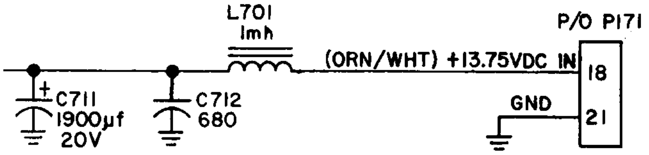

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FIGURE 4-28 INPUT POWER LINE FILTER

4.3.2.18 COMM Voltage Regulator. Fig. 4-29

Transistors Q102 and Q105 form a series regulator element. Transistor Q104 compares the attenuated output voltage at the wiper of pot R132 with the reference voltage at the cathode of zener diode CR103. Additionally Q104 amplifies the error signal and provides negative feedback to the base of Q105.

4.3.2.19 NAV Voltage Regulator. Fig. 4-29

Transistors Q101 and Q103 are connected to form a series pass element. Zener diode CR102, provides reference voltage to the series pass element.

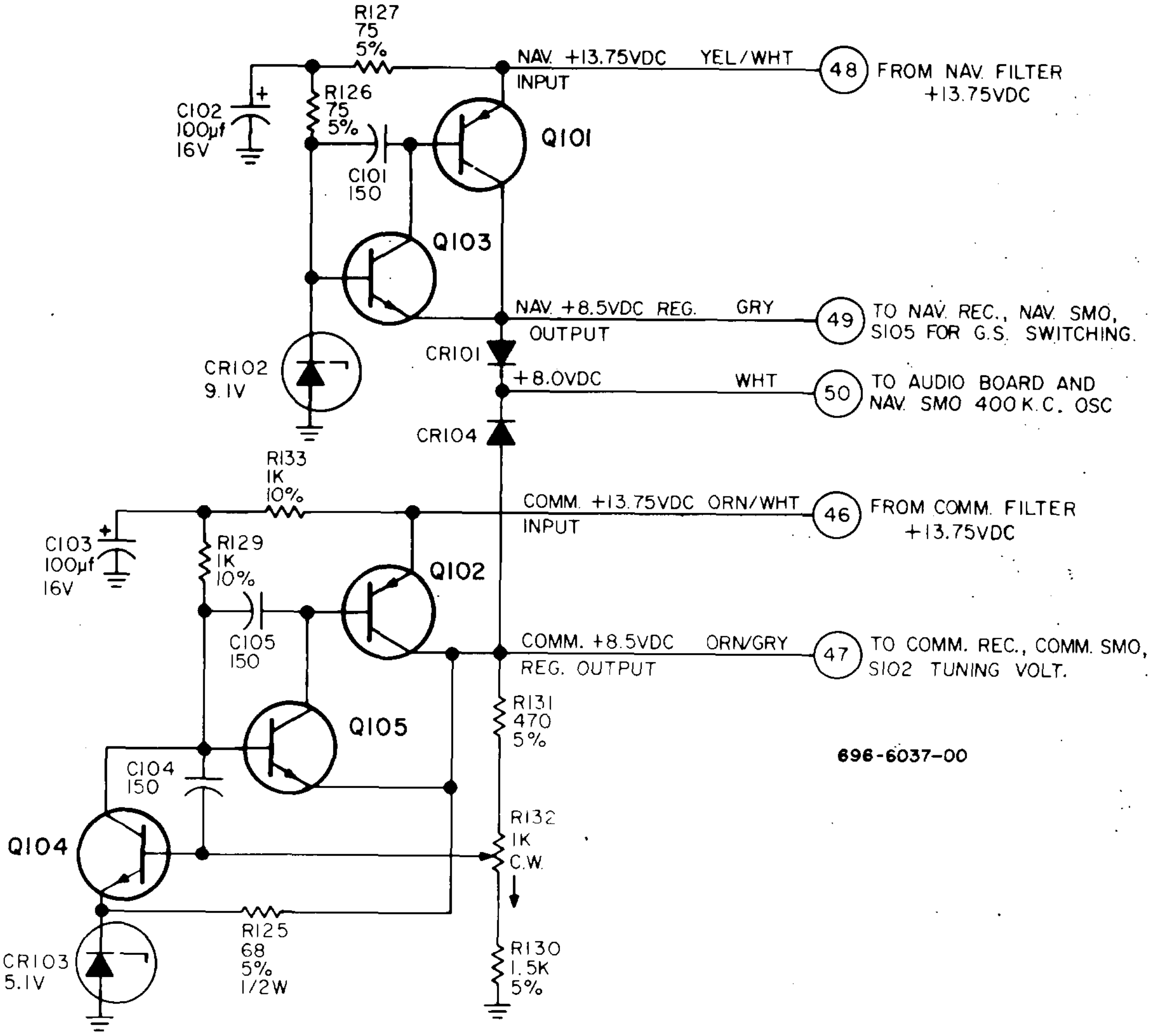

FIGURE 4-29 REGULATOR SCHEMATICS

4.4 NAV RECEIVER

4.4.1 BLOCK DIAGRAM THEORY (Figure 5-48)

The KX 170A/KX 175 NAV receiver section is a dual conversion, superheterodyne receiver with a 15.1875MHz first I-F and a 1.1857MHz second I-F frequency. The 200 channels are synthesized at the first mixer and low side injection is used for all channels.

A 2 pole, varactor tuned, R-F filter couples the antenna to the R-F stage . A single pole, varactor tuned filter, couples the amplified R-F signal to the 1st mixer and supplies additional image and 1/2 I-F spurious rejection. The amplified R-F signal is mixed with the synthesized injection frequency in a balanced mixer.

A crystal filter couples the difference frequency to the second mixer and provides image and 1/2 I-F selectivity. The 14.0018MHz, crystal controlled, 2nd Local Oscillator develops injection for the 2nd mixer. . The 2nd I-F contains two I-C amplifiers with three double tuned interstage networks for receiver selectivity. An active detector provides audio gain. An emitter follower couples the detector signal to the noise limiter and the AGC amplifier. The noise limiter clips noise peaks corresponding to greater than 90% AM modulation and provides rate limiting. A two stage, AGC amplifier is used to AGC the R-F stage, and the 2nd I-F strip.

The receiver is approximately 6db into AGC with no input signal. This eliminates conventional receiver gain threshold effects. The audio signal from the rate noise limiter passes through a panel switch controlled 1020Hz ident filter, the volume control and then to an I-C audio amplifier providing a 50mw 600 ohm output.

4.4.2 NAV RECEIVER CIRCUIT THEORY

4.4.2.1 Preselector (Figure 5-52)

The R-F input signal is coupled to the R-F amplifier Q401, through a capacitor coupled two pole filter. Variable inductors, L401 and L403 provide filter alignment. Varactor diodes CR401 and CR402 tune the filter continuously according to the bias voltage received from the NAV VCO. The filtered R-F signal is amplified by R-F amplifier, Q401, and gain is controlled by applying forward AGC voltage to the base. The amplified R-F signal is filtered by L405 and CR403, tuned by the bias voltage from the NAV SMO, and coupled to the balanced mixer transformer, T401. The NAV frequency synthesizer develops 10mw of Local Oscillator power across the primary of mixer transformer T402.

4.4.2.2 First I-F Filter (Figure 5-52)

The difference frequency 15.1875MHz generated by the balanced mixer, CR404-407, T401, and T402 is matched to the crystal filter through C415. The crystal filter output is capacitively coupled (C417) to the base of the second mixer Q403.

4.4.2.3 Second Local Oscillator (Q408) is a Pierce oscillator. (Figure 5-52)

Crystal Y401 forms a parallel resonant circuit with the series combination of C448 and C447. The tap between C448 and C447 provides 180° phase inversion of the collector feedback signal to provide regeneration. (See Figure 4-27)

4.4.2.4 Second Mixer (Figure 5-52)

The 1st I. F. and the 2nd Local Oscillator signals are injected on the base of the second mixer, Q403. The difference frequency appears at the collector.

4.4.2.5 Second I. F. (Figure 5-52)

The three capacitor coupled, double tuned filters consisting of T405 - 410 and C419, C424 and C428 provide receiver selectivity. Load resistors across T405-410 swamp variations in active device impedances to provide uniform band pass characteristics. Integrated circuits I401 and I402 are differential amplifiers with a constant current source, internal biasing and a decoupling resistor. See Figure 4-28. A positive voltage applied to R414 causes a differential unbalance and AGC action in I401. In addition diode CR409 is forward biased, providing an AGC'd shunt path to ground through C422. Resistor R413 is used to minimize "de Q ing" of T406 with AGC action.

4.4.2.6 DETECTOR/NOISE LIMITER. (Figure 5-52)

CR410and R421 developa trickle bias for collector detection transistor, Q404. Emitter feedback resistor, R424, provides a high base impedance to minimize loading of T410. Voltage gain of the detected audio is determined by the ratio of the effective collector resistance and R424. C437 establishes the collector time constant in conjunction with the parallel collector resistance. Emitter follower, Q405, serves to minimize the loading effect of the noise limiter on the detector (Q404) output.

Noise Limiter action occurs when CR411 is reverse biased. Detected audio is attenuated by R428 and R427. Resistors R429 and R430, and diode CR412, establish a bias current through CR411. The charge storage of C440 establishes a DC reference. Positive noise peaks back bias CR411 when the cathode rises to within 0.6 volts of the DC reference. R429, C439 and C438 establish a time constant that restricts the rate of change of voltage at the anode of CR411. The rate limiting effect rounds off the corners of fast rise time noise spikes. C439 couples the audio signal to the ident filter.

4.4.2.7 VOR/LOC OUTPUT (Figure 5-52)

The VOR/LOC signal is available at the collector of detection transistor Q404. R425 is provided to set the VOR/LOC output level that is coupled through C443 to the rear connector of the KX 170A/KX 175.

4.4.2.8 AGC AMPLIFIER (Figures 5-52, 4-30)

During radio turn on, the voltage at TP406 is approximately 1 volt and is established by the R-F, and I-F bias currents flowing through R437 to ground. R431 and R432 with C444 and C441 filters the detector output and applies the resultant D-C to the base of Q406. Q406 compares the AGC threshold reference voltage at the junction of RT502 and R434 with the filtered detector signal.

Q406 and Q407 jointly provide AGC amplification. C442 provides additional filtering. A trade off is made between AGC response time and AGC line filtering of the 30Hz component of the detector signal. The AGC amplifier/filter network shifts the 30Hz residue 180° from the detected 30Hz, which minimizes phase distortion of the 30Hz AM component of the VOR signal.

Zener diode CR408 initially conducts in the forward direction applying full AGC to the I-F. As signal level increases, CR408 is biased off applying full AGC to the RF stage. A further increase of the RF signal causes the diode to conduct in the reverse direction applying AGC to both the R-F and I-F stages.

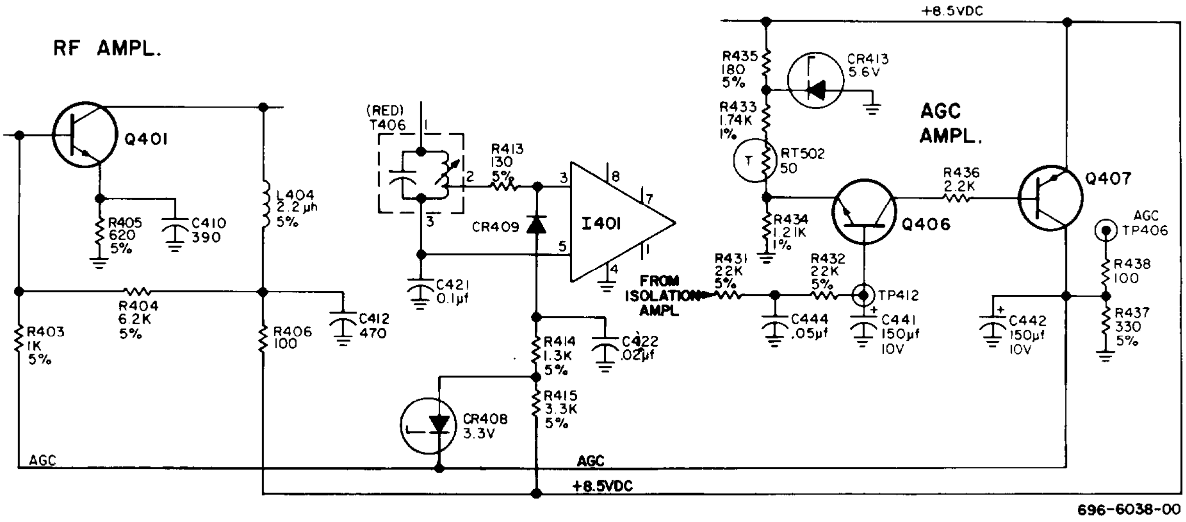

FIGURE 4-30 NAV AGC SYSTEM

4.4.2.9 IDENT FILTER/VOLUME CONTROL. (Figure 5-52)

C439 couples the audio signal to the Ident Filter. The 1020 Hz tone filter L703 and C716 are switched in or out by the front panel Ident Switch. The audio signal passes from the Ident Filter to the volume control on the front panel and back to the I-C audio amplifier I403. Components R448, R449, L406 and C454-C457, form an elliptic low pass filter providing a sharp frequency rolloff above 3KHz. R450 and C458 develop negative feedback to stabilize gain and minimize broadband output noise. Transformer T411 transforms the output impedance of audio amplifier I403 to 500 ohms and this audio output is provided at the rear connector of the KX 170A/KX 175. The voltage supply for I403 is stabilized by zener diode CR414 and filtered by C452.

4.5 KA 39 VOLTAGE CONVERTER (Figure 5-56)

The KA 39 consists of dual series regulators, converting 27.5VDC to 13.75VDC. The "A" regulator provides COMM excitation, while the "B" regulator provides NAV excitation. Zener diodes CR101 and CR104 provide reference voltages to the darlington series pass elements Q102 - Q101 and Q104 - Q103 respectively. Diodes CR102 and CR103 offer transient and reverse power application protection.

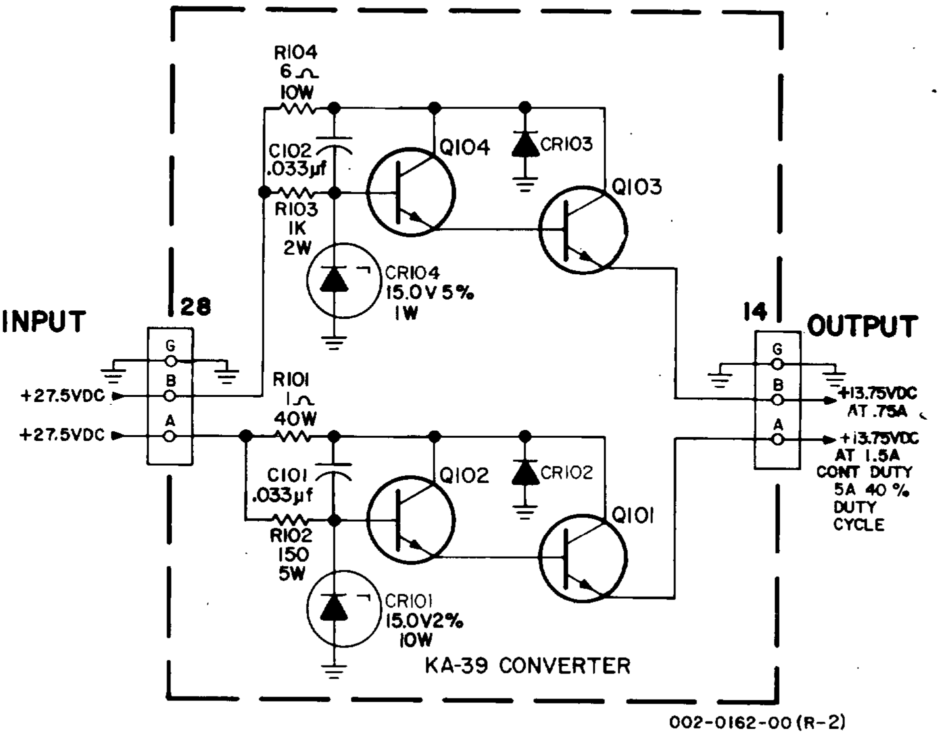

FIGURE 4-31 KA39 VOLTAGE CONVERTER SCHEMATIC DIAGRAM

SECTION V

MAINTENANCE

5.1 TEST EQUIPMENT

The following test equipment, or equivalent, is required to properly align and test the KX 170A/KX 175 system. All test equipment must be properly calibrated before alignment and tests are started.

a. Major Power Supply: Electro Model NFB (Filtered)

b. Auxilary Power Supply: Heath Model IP-20

c. Digital Voltmeter: Eldorado 1820A

d. VTVM: Heath Model IM-13

e. Audio Wattmeter With Load: Eico Model 261

f. VHF Wattmeter With 50Ω Load: Bird Termaline Model 611

g. Frequency Counter: ELDORADO Model 1615 with option C.

h. VHF Signal Generator: Boonton Model 211A

i. HF Signal Generator: Hewlett Packard Model 606A

j. Audio Oscillator: Hewlett Packard Model 200CD

k. VOR/LOC Signal Generator: Collins Model 479S-3

l. Oscilloscope: (30MHz Dual Trace Minimum) Tektronix Model 454 Recommended

m. VHF AM Detector: (See Figure 5-9)

n. KX 170A/KX 175 Bench Test Set (See Figure 5-11)

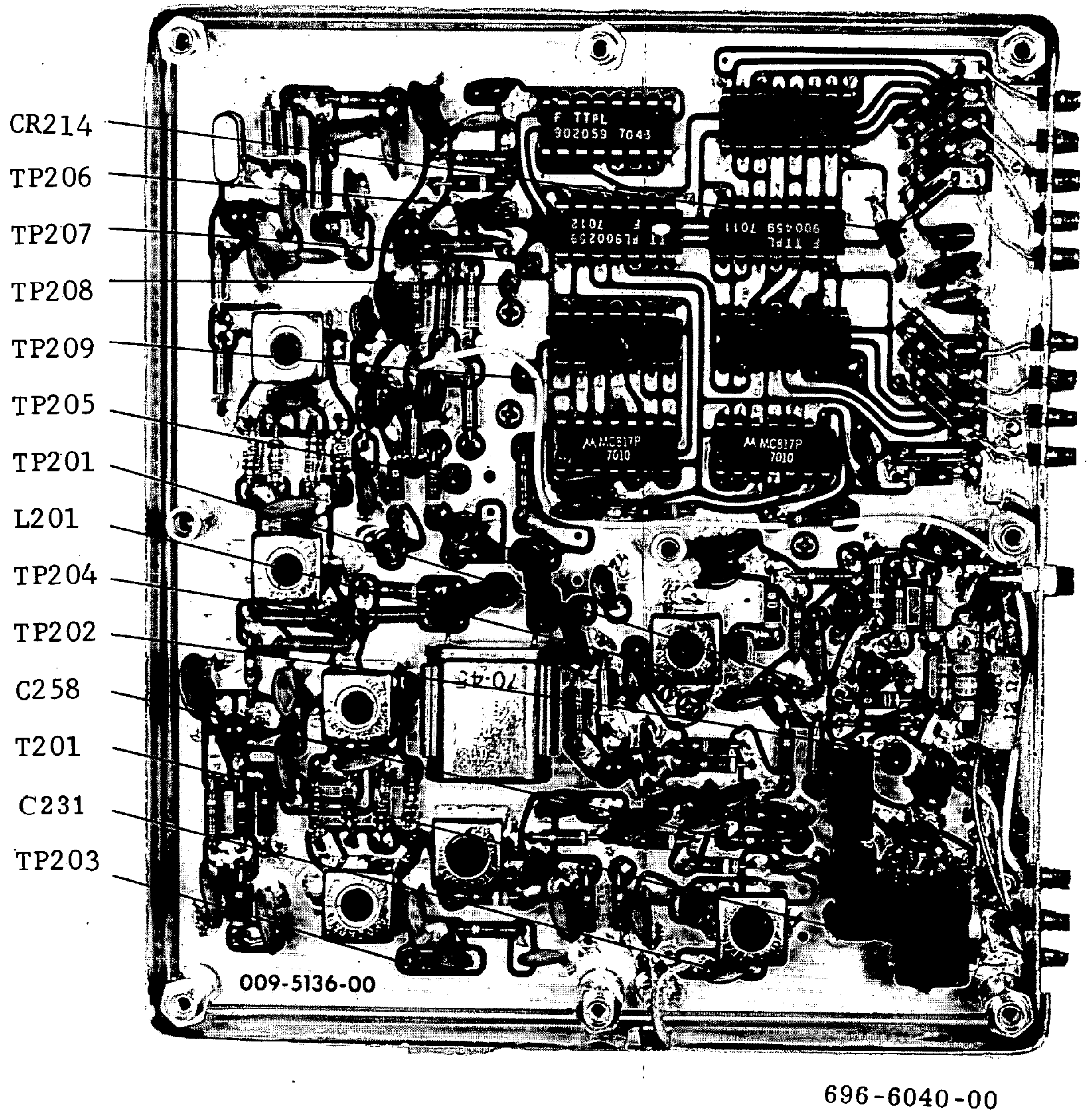

FIGURE 5-1 NAV SMO TEST POINT AND ALIGNMENT LOCATIONS

5.2 ALIGNMENT AND TEST PROCEDURE

5.2.1 NAV SMO ALIGNMENT AND TEST (Figures 5-1, 5-3)

a. Remove the dust covers.

b. Remove three screws on each side of the COMM SMO tray and one screw at the front. Pivot the COMM SMO up and over the front of the radio.

c. Remove two screws in center area of NAV SMO cover and remove cover.

d. Connect a digital voltmeter to CR214 (5.1V Zener Diode)

e. Apply 13.75 volts to NAV Receiver (switch power on NAV only) and observe voltage at CR214, if greater than 5.75 volts, switch power off to avoid I.C. damage. If OK proceed to next step.

f. Connect a digital voltmeter to the anode lead of CR101 at NAV Voltage Regulator and observe an 8.5 ±.5 volts indication on voltmeter.

g. NAV Receiver power requirements are 13.75 volts input at .45 amp with no modulated RF signal present.

h. Set the NAV frequency selector to 117.950MHz.

i. Connect a digital voltmeter to TP 201 and adjust L201 for 7.200 VDC tuning (VCO) voltage.

j. Do not attempt field alignment of the 25KHz filter T201.

k. (Optional) NAV SMO frequency stability and tuning (VCO) voltage may be observed simultaneously by connecting a frequency counter to the coax side of C231 10 pf disc capacitor) and connecting a digital voltmeter to the tuning voltage line (red wire at C258 feed thru capacitor).

Channel the NAV frequency selector through the following frequencies, comparing the frequency and tuning (VCO) voltage with Table 5-1.

Channel	SMO Frequency	Tuning (VCO) Voltage Typical
108.00	92.8125 MHz	2.84 VDC
109.00	93.8125 MHz	3.15 VDC
110.00	94.8125 MHz	3.49 VDC
111.00	95.8125 MHz	3.85 VDC
112.00	96.8125 MHz	4.24 VDC
113.00	97.8125 MHz	4.66 VDC
114.00	98.8125 MHz	5.11 VDC
115.00	99.8125 MHz	5.59 VDC
116.00	100.8125 MHz	6.10 VDC
117.00	101.8125 MHz	6.66 VDC
117.95	102.7625 MHz	7.20 VDC

TABLE 5-1 NAV CHANNEL-SMO FREQUENCY-VCO TUNING VOLTAGE

1. Replace NAV SMO cover and install the two screws previously removed.

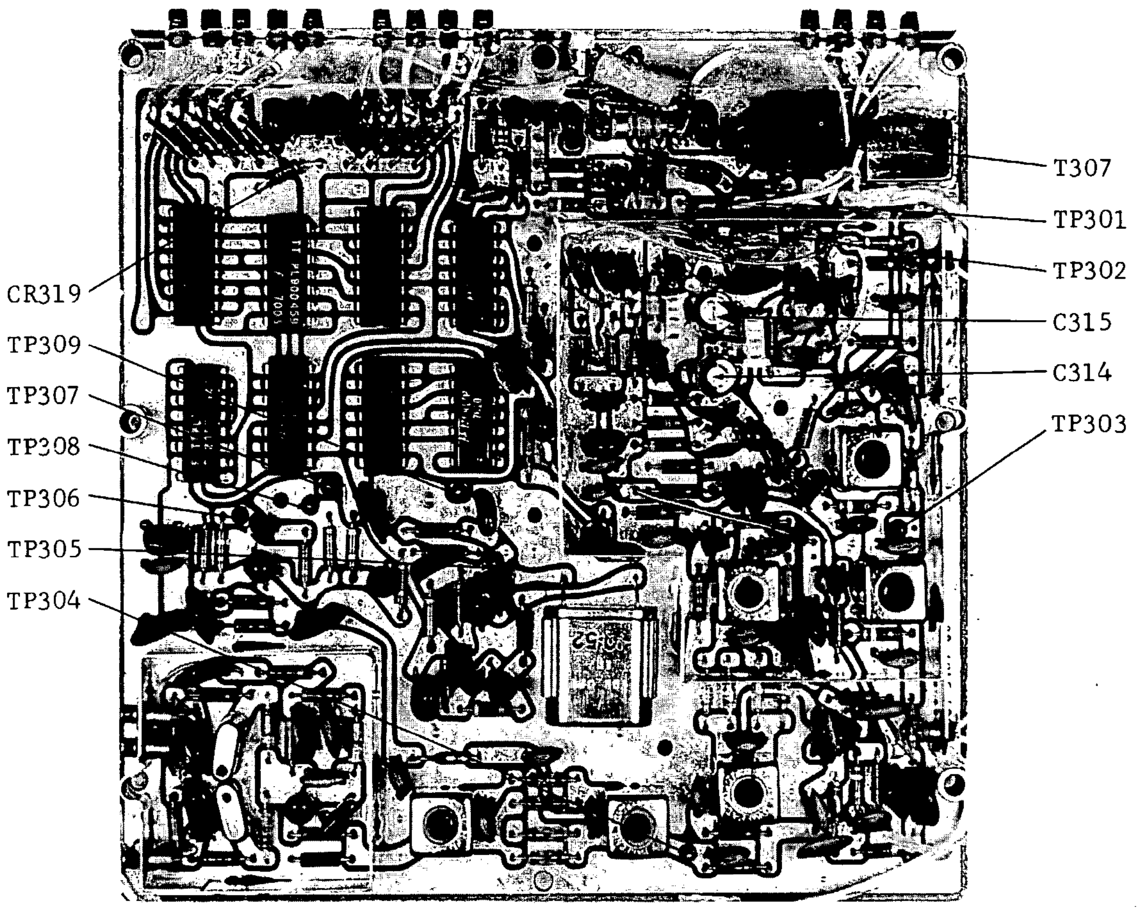

FIGURE 5-2 COMM SMO TEST POINT AND ALIGNMENT LOCATIONS

5.2.2 COMM SMO ALIGNMENT AND TEST (Figures 5-2, 5-3)

a. Remove the two screws and top cover from the COMM SMO.

b. Temporarily remount COMM SMO with a screw in center at each side.

c. Connect a digital voltmeter at CR319 (5.1V zener diode)

d. Apply 13.75 volts to COMM Receiver (switch power on COMM only) and observe voltage at CR319, if greater than 5.75 volts, switch power off to avoid I.C. damage. If OK proceed to next step.

e. Connect a digital voltmeter to the anode lead of CR104 at COMM Voltage Regulator and adjust R132 for 8.500 VDC.

f. Recheck voltage at CR319 for 5.1 ± .5V, if out of tolerance switch power off and check.

g. COMM Receiver power requirements are 13.75 volts input at .65 amp with no modulated RF signal present.

h. Connect a digital voltmeter to TP301.

i. Set the COMM frequency selector to 126.95MHz and adjust C315 for 7.00 VDC VCO tuning voltage at TP301.

j. Set the COMM frequency selector to 135.95MHz and adjust C314 for 7.00 VDC VCO tuning voltage at TP301.

k. Recheck previous adjustments "i" and "j".

l. Do not attempt field alignment of the 25KHz Filter T307.

m. (Optional) COMM SMO frequency stability and VCO voltage may be observed simultaneously by connecting a frequency counter to TP303 and connecting a digital voltmeter to TP301.

Channel the COMM frequency selector through the following frequencies, comparing the frequency and VCO voltage with Table 5-2.

Channel	Receive SMO Frequency	VCO Voltage Typical
118.00	127.00 MHz	2.58 VDC
119.00	128.00 MHz	2.93 VDC
120.00	129.00 MHz	3.30 VDC
121.00	130.00 MHz	3.71 VDC
122.00	131.00 MHz	4.16 VDC
123.00	132.00 MHz	4.66 VDC
124.00	133.00 MHz	5.18 VDC
125.00	134.00 MHz	5.77 VDC
126.00	135.00 MHz	6.38 VDC
126.95	135.95 MHz	7.00 VDC
127.00	118.00 MHz	2.58 VDC
128.00	119.00 MHz	2.93 VDC
129.00	120.00 MHz	3.30 VDC
130.00	121.00 MH	3.71 VDC
131.00	122.00 MHz	4.16 VDC
132.00	123.00 MHz	4.66 VDC
133.00	124.00 MHz	5.18 VDC
134.00	125.00 MHz	5.77 VDC
135.00	126.00 MHz	6.38 VDC
135.95	126.95 MHz	7.00 VDC

TABLE 5-2 COMM CHANNEL-RECEIVE SMO FREQUENCY - VCO TUNING VOLTAGE

n. Remove the temporary mounting screws and position COMM SMO cover in place with the two screws previously removed.

o. Mount the COMM SMO tray with three screws on each side and one screw at the front.

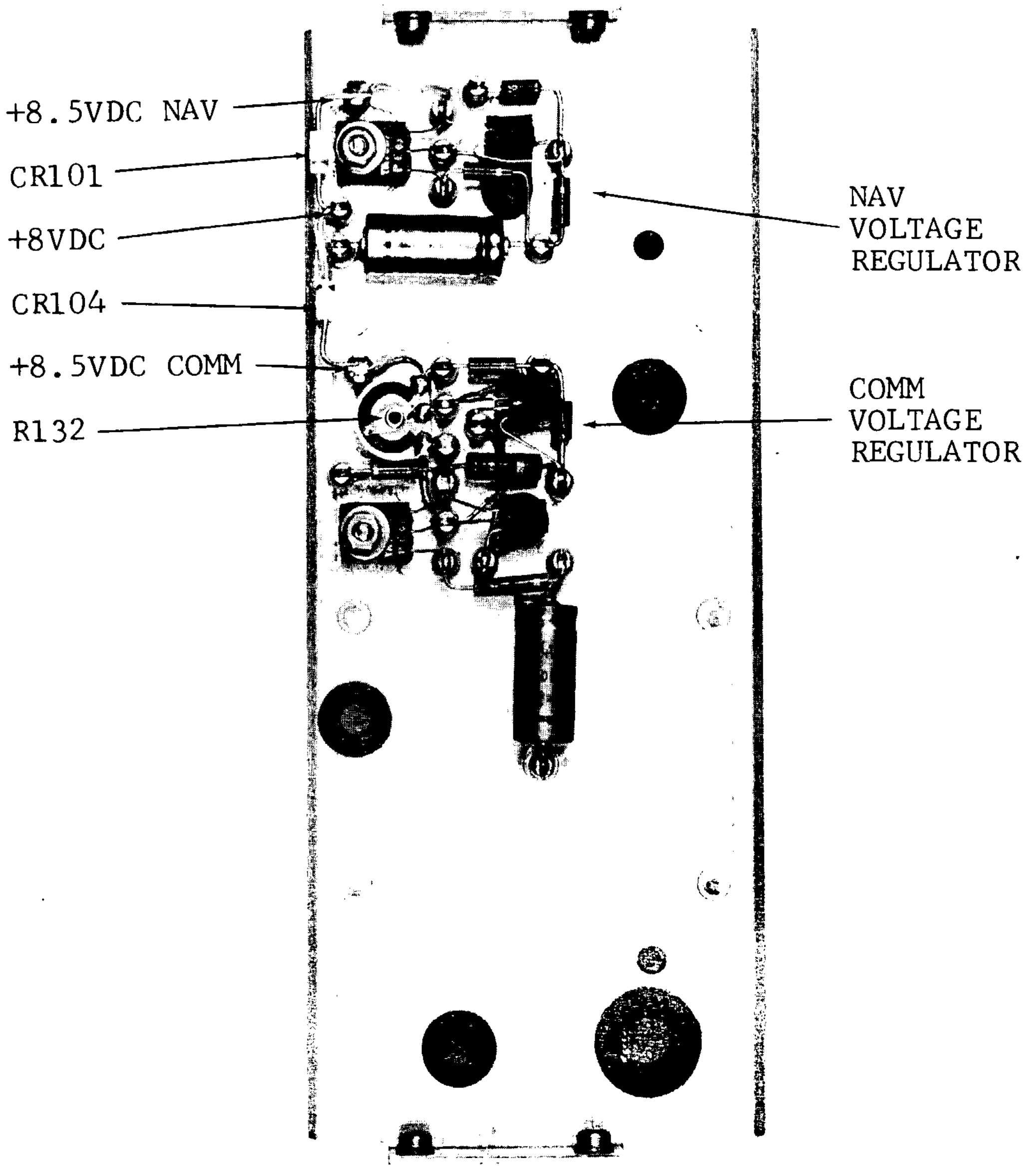

FIGURE 5-3 NAV AND COMM VOLTAGE REGULATORS

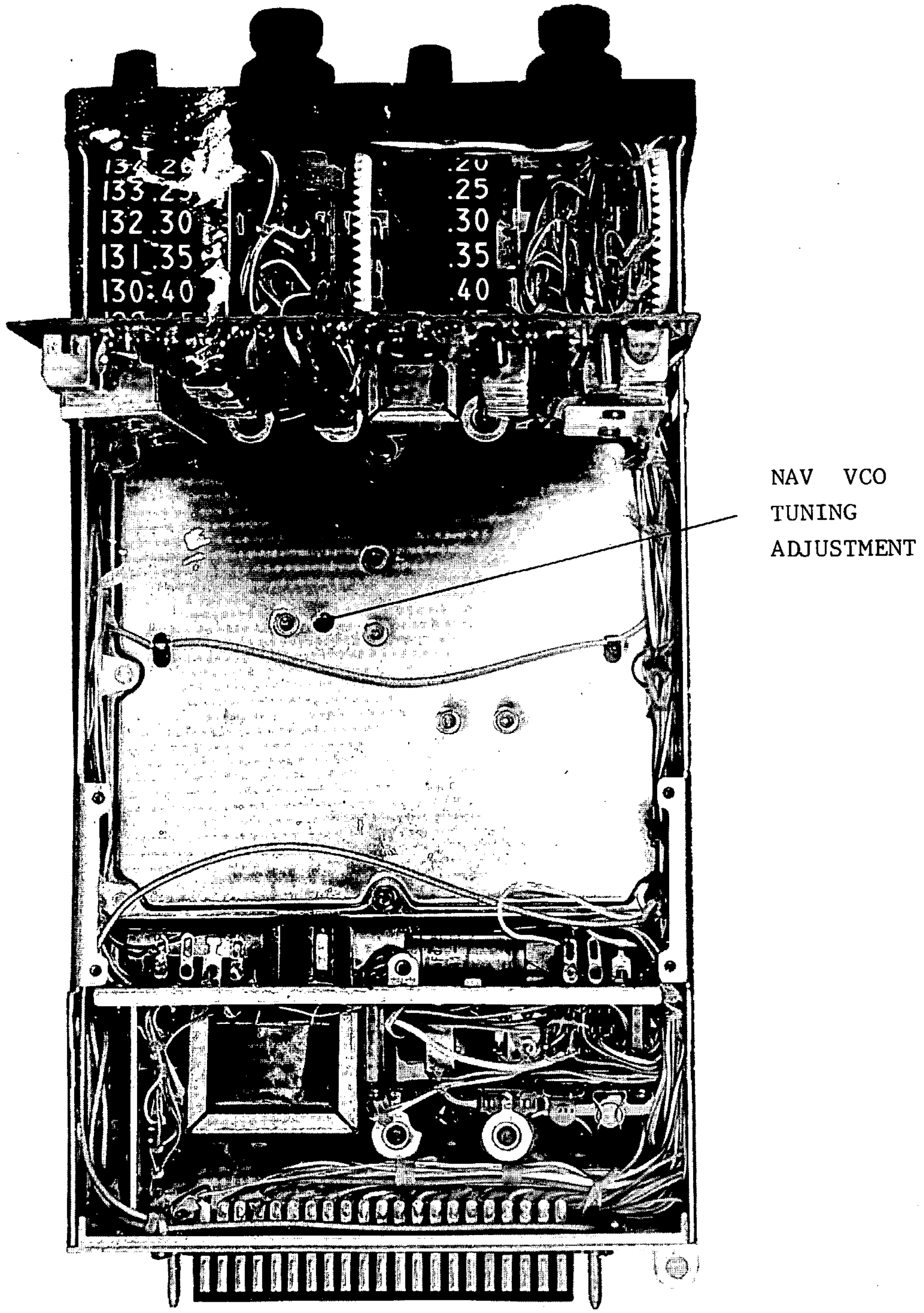

FIGURE 5-4 NAV VCO TUNING ADJUSTMENT LOCATION

5.2.3 NAV/COMM RECEIVER PRELIMINARY ALIGNMENT TEST

a. Remove the receiver board retaining screws (5 places) noting the position of the ground lug. Loosen the two hinge pivot screws, pivot the board 90° and retighten the hinge pivot screws.

b. Set channel selector to 117.95 MHz and connect a digital voltmeter to the NAV receiver tuning voltage test point (TP401 of Figure 5-6B) and observe 7.20 VDC. If correct verify the tuning voltage versus channel frequency of Table 5-3. If not 7.20 VDC. L201 may be adjusted through access hole in bottom of NAV SMO tray (Figure 5-4). Refer to 5.2.1 for adjustment procedure.

c. Connect a frequency counter to point "X" of Figure 5-6A and verify the SMO frequency versus channel frequency of Table 5-3.

Channel	SMO Frequency	Receiver Tuning Voltage Typical
108.00	92.8125 MHz	2.84 VDC
109.00	93.8125 MHz	3.15 VDC
110.00	94.8125 MHz	3.49 VDC
111.00	95.8125 MHz	3.85 VDC
112.00	96.8125 MHz	4.24 VDC
113.00	97.8125 MHz	4.66 VDC
114.00	98.8125 MHz	5.11 VDC
115.00	99.8125 MHz	5.59 VDC
116.00	100.8125 MHz	6.10 VDC
117.00	101.8125 MHz	6.66 VDC
117.95	102.7625 MHz	7.20 VDC

TABLE 5-3 NAV CHANNEL-SMO FREQUENCY-RECEIVER TUNING VOLTAGE

d. Connect a digital voltmeter to the COMM receiver tuning voltage test point (TP408 of Figure 5-6B) and verify the tuning voltage versus channel frequency of Table 5-4.

e. Connect a frequency counter to point "Y" of Figure 5-6A and verify the SMO frequency versus channel frequency of Table 5-4.

Channel	SMO Frequency	Tuning Voltage Typical
118.00	127.00 MHz	2.94 VDC
119.00	128.00 MHz	2.94 VDC
120.00	129.00 MHz	3.34 VDC
121.00	130.00 MHz	3.34 VDC
122.00	131.00 MHz	3.80 VDC
123.00	132.00 MHz	3.80 VDC
124.00	133.00 MHz	4.31 VDC
125.00	134.00 MHz	4.31 VDC
126.00	135.00 MHz	4.87 VDC
126.95	135.95 MHz	4.87 VDC
127.00	118.00 MHz	4.87 VDC
128.00	119.00 MHz	5.50 VDC
129.00	120.00 MHz	5.50 VDC
130.00	121.00 MHz	6.20 VDC
131.00	122.00 MHz	6.20 VDC
132.00	123.00 MHz	6.99 VDC
133.00	124.00 MHz	6.99 VDC
134.00	125.00 MHz	7.86 VDC
135.00	126.00 MHz	7.86 VDC
135.95	126.95 MHz	7.86 VDC

TABLE 5-4 COMM CHANNEL-RECEIVE SMO FREQUENCY - TUNING VOLTAGE

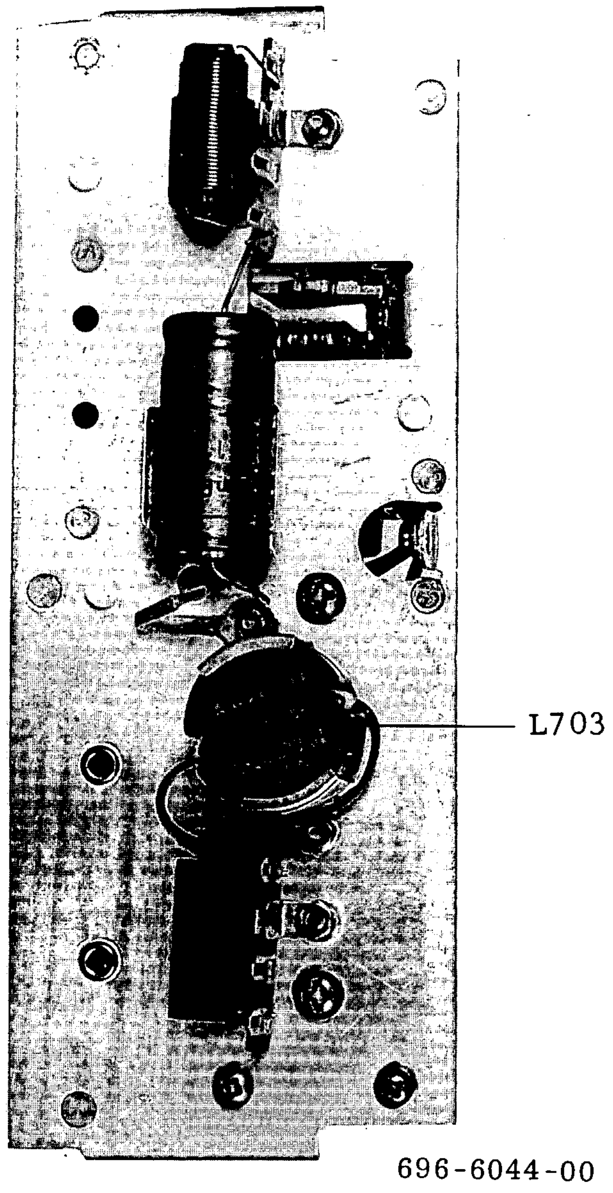

FIGURE 5-5 NAV IDENT FILTER ADJUSTMENT LOCATION

5.2.4 NAV RECEIVER ALIGNMENT (KX 170A/KX 175)

—NOTE—

DO NOT attempt to align the NAV Receiver without first reading the alignment procedure in full.

5.2.4.1 PRELIMINARY PROCEDURE

a. Test points and alignment references may be located on Figures 5-5, 5-6A and 5-6B.

b. Apply 13.75 VDC to unit and place the NAV "OFF-VOICE-IDENT" switch in the "IDENT" position.

c. Set the NAV frequency selector to 108.00MHz.

d. Connect a digital voltmeter to TP406 (NAV AGC test point).

e. Set the RF signal generator output for 10μv hard at a frequency of 108.00 MHz (use frequency counter) and connect to NAV antenna input connector.

5.2.4.2 ALIGNMENT PROCEDURE

a. Preliminary - If receiver is badly out of alignment, peak all tuning adjustments (2nd IF, 1st IF and RF).

b. Loading and tuning is necessary to obtain desired bandpass characteristics.

5.2.4.3 2nd I. F. ALIGNMENT

a. Load point N (T409) with 3.3KΩ and peak (T410)

b. Load point M (T410) with 3.3KΩ and peak (T409)

c. Load point P (T407) with 3.3KΩ and peak (T408)

d. Load point O (T408) with 3.3KΩ and peak (T407)

e. Load point R (T405) with 3.3KΩ and peak (T406)

f. Load point Q (T406) with 3.3KΩ and peak (T405)

5.2.4.4 1st I. F. ALIGNMENT (KX 170A Only)

a. Load point T (T403) to ground with 3.3K and peak (T404).

b. Load point S (T404) to ground with 3.3K and peak (T403).

1st I. F. ALIGNMENT (KX 175 Only)

Repetitively peak (T403) and (T404) until no further improvement. (No load used)

5.2.4.5 PRESELECTOR ALIGNMENT

a. Load point W (L401) to ground with 220Ω and repetitively peak (L403) and (L405) until no further improvement.

b. Load point V (L403) to ground with 220Ω and peak (L401).

5.2.4.6 AUDIO FILTER L406 ADJUSTMENT

a. RF input, 30% externally modulated with 6.48KHz audio signal. (Use frequency counter).

b. Adjust L406 for minimum audio output.

5.2.4.7 IDENT FILTER L703 ADJUSTMENT (See Figure 5-5)

a. Set the NAV "OFF-VOICE-IDENT" switch in the "VOICE" position. RF input, 30% externally modulated with 1020Hz audio signal. (Use frequency counter).

b. Adjust L703 for minimum audio output.

5.2.4.8 VOR/LOC OUTPUT LEVEL ADJUSTMENT R425 (See Notes)

a. Modulate the VHF generator with a Standard LOC Modulation Signal from the VOR/LOC generator.

b. Connect an RMS A-C voltmeter at TP407 (VOR/LOC output).

c. VOR/LOC output must be loaded with a KI 201C or KI 211C Indicator.

d. Adjust R425 for 0.35 volt RMS LOC output at TP407 (VOR/LOC output).

5.2.5 COMM RECEIVER ALIGNMENT (KX 170A/KX 175)

–NOTE–

Do Not attempt to align the COMM Receiver without first reading the alignment procedure in full ! Do Not depress the mike button when signal generator is connected to the antenna connector !

5.2.5.1 PRELIMINARY PROCEDURE

a. Test points and alignment references may be located on Figures 5-6A and 5-6B.

b. Apply 13.75 VDC to unit and place the "OFF-ON-TEST" switch in the "TEST" position (squelch open).

c. Set the COMM frequency selector to 127.00 MHz.

d. Connect a digital voltmeter to TP411 (COMM AGC test point).

e. Set the RF signal generator output for 20 μv hard at a frequency of 127.00MHz (use frequency counter) and connect to COMM antenna input connector.

5.2.5.2 ALIGNMENT PROCEDURE

a. Preliminary-If receiver is badly out of alignment, peak all tuning adjustments (2nd IF, 1st IF and RF).

b. Loading and tuning is necessary to obtain desired bandpass characteristics.

5.2.5.3 2nd I. F. ALIGNMENT

a. Load point B (T420) with 3.3KΩ and peak (T421).

b. Load point A (T421) with 3.3KΩ and peak (T420).

c. Load point D (T418) with 3.3KΩ and peak (T419).

d. Load point C (T419) with 3.3KΩ and peak (T418).

e. Load point F (T416) with 3.3KΩ and peak (T417).

f. Load point E (T417) with 3.3KΩ and peak (T416).

5.2.5.4 1st I. F. ALIGNMENT

a. Load point H (T414) to ground with 220Ω and peak (T415).

b. Load point G (T415) to ground with 220Ω and peak (T414).

5.2.5.5 PRESELECTOR ALIGNMENT

a. Load point J (L411) to ground with 220Ω and peak (L413).

b. Load point I (L413) to ground with 220Ω and peak (L411).

c. Load point L (L407) to ground with 220Ω and peak (L409).

d. Load point K (L409) to ground with 220Ω and peak (L407).

5.2.5.6 NOISE AMPLIFIER L414 ADJUSTMENT

a. Signal Generator R-F, 85% externally modulated with a 10.0 KHz audio signal.

b. Connect oscilloscope probe at collector of noise amplifier Q419.

c. Adjust L414 for maximum amplitude and, or maximum clipping observed on oscilloscope.

5.2.5.7 CARRIER/NOISE SQUELCH ADJUST R483

a. Set the COMM "OFF-ON-TEST" switch to the "ON" position (squelch operative).

b. Set the COMM Frequency selector to 118.00 MHz.

c. Set the RF signal generator to 118.00 MHz, modulated 30% with a 1000Hz audio signal, to 3 hard μv output.

d. Adjust R483 to the squelch threshold.

5.2.5.8 CARRIER SQUELCH ADJUST R495

a. The COMM "OFF-ON-TEST" switch remains in the "ON" position.

b. Set the COMM Frequency selector to 126.70 MHz.

c. Set the R-F signal generator to 126.70 MHz, 85% externally modulated with a 10.0 KHz audio signal, to 15 hard μv output.

d. Adjust R495 to the squelch threshold.

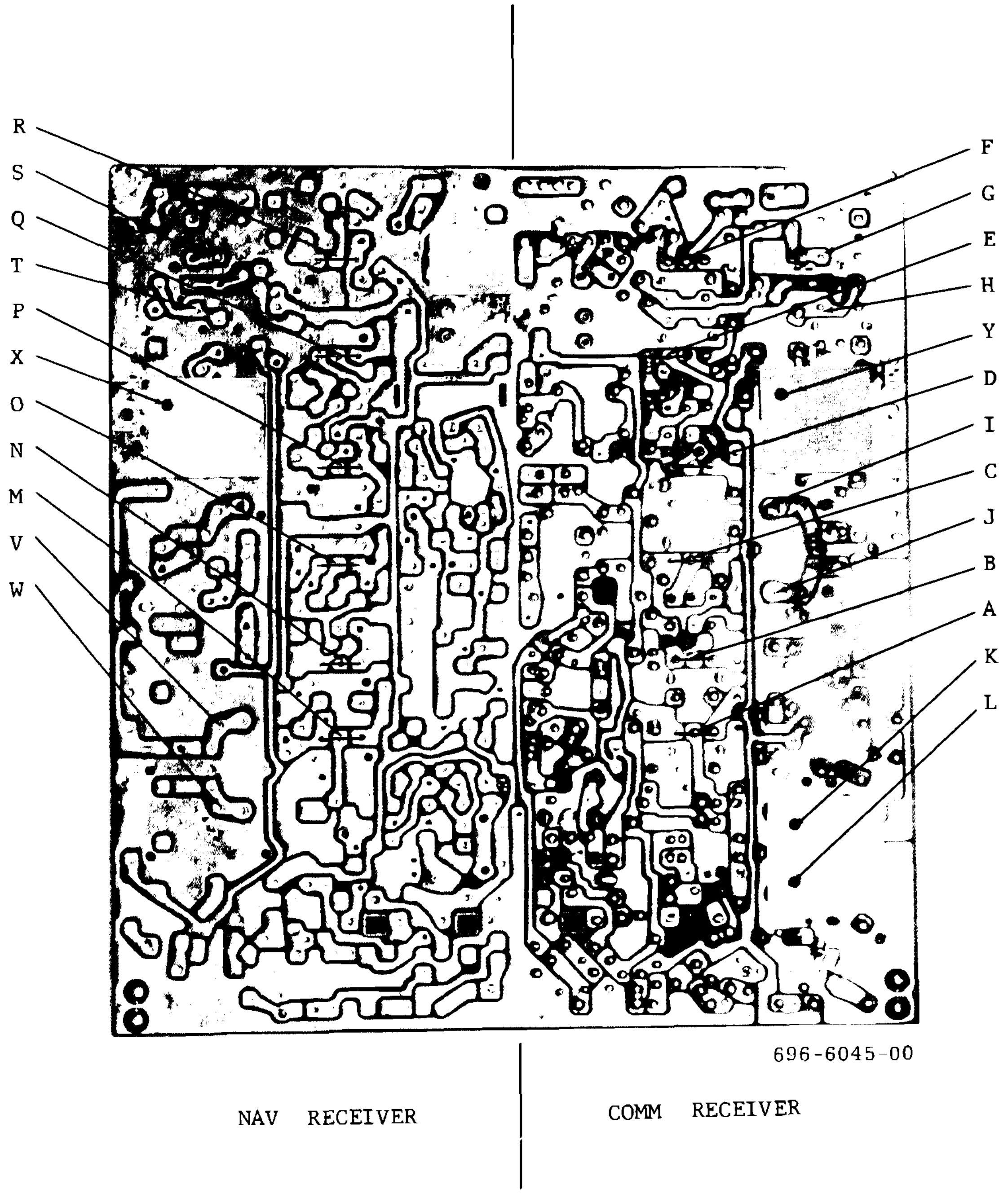

FIGURE 5-6A RECEIVER ALIGNMENT LOADING POINTS

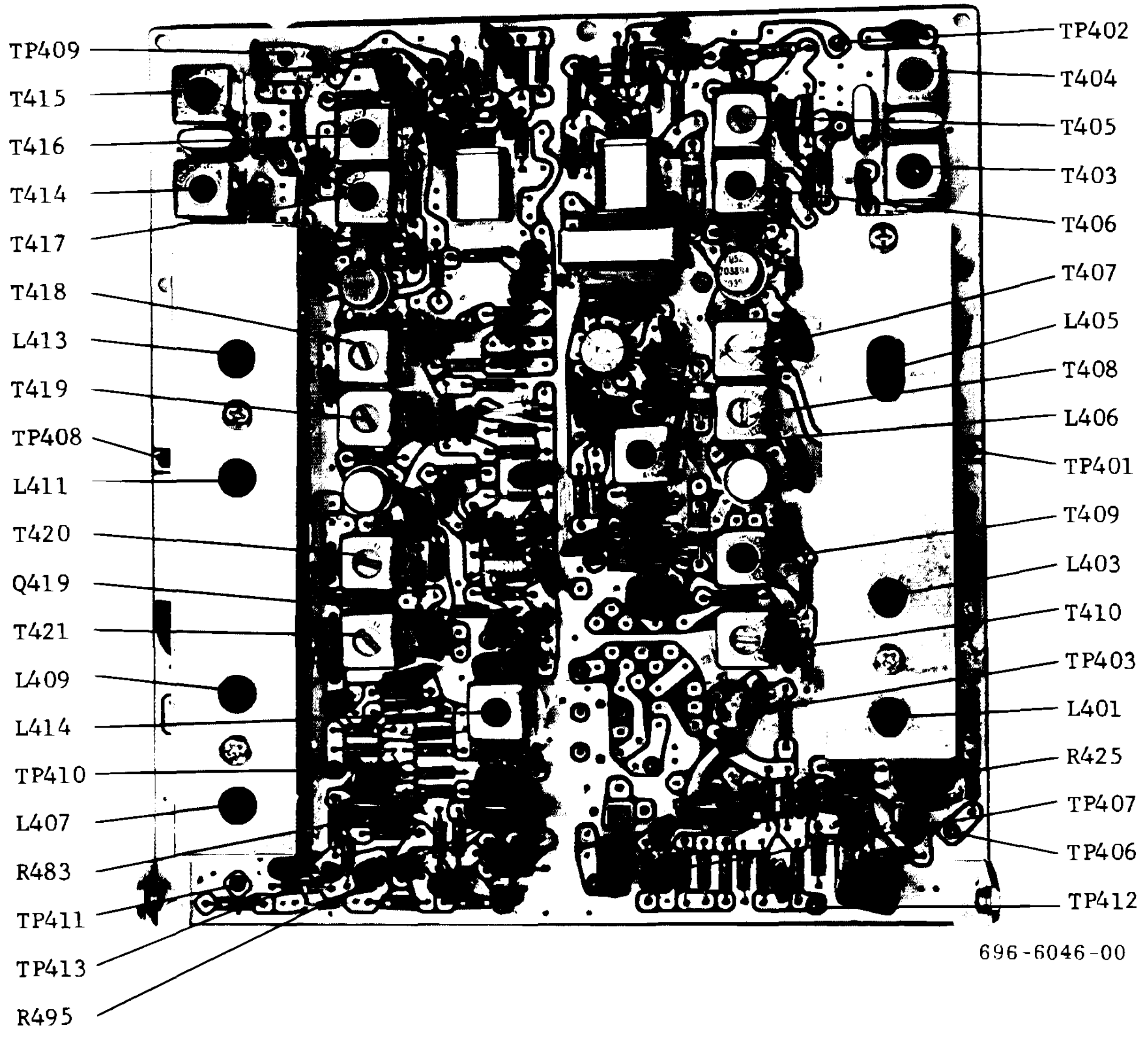

FIGURE 5-6B RECEIVER TEST POINT AND ALIGNMENT LOCATIONS

5.2.6 TRANSMITTER ALIGNMENT

5.2.6.1 TRANSMITTER POWER AMPLIFIER ALIGNMENT (Figure 5-7A)

a. Remove the top dust cover (4 screws).

b. Remove the transmitter cover (4 screws).

c. Connect the bench test set for COMM transmitter tests (Figure 5-11) and apply 13.75 volts.

d. Set the COMM frequency selector to 126.70MHz and depress the microphone key.

e. Using a nonmetallic tuning tool, adjust trimmer capacitors C610, C619 and C622 for maximum CW power.

f. Check the output power at the band edges (118.00, 135.95MHz) for symmetrical roll-off.

g. Repeak C622 as necessary to equalize the power at the band edges.

5.2.6.2 MICROPHONE GAIN ADJUST R709 (Figure 5-7B)

a. Obtain a Standard Modulation Signal for mike audio input. (See Note)

b. Simultaneously key the transmitter, apply a Standard Modulation Signal and observe the detector waveform on the oscilloscope.

c. Adjust the mike gain control (R709) so that modulation peaks are on the threshold of clipping. (See Figure 5-8)

5.2.6.3 COMM Transmitter Power requirements are 13.75 volts input at 2.8 amp unmodulated and 4.5 amps tone modulated.

5.2.6.4 SIDETONE LEVEL ADJUST R726 (See Figure 5-7B)

a. Simultaneously key the transmitter and apply a Standard Modulation Signal. (See Note)

b. Adjust the sidetone level control, R726 for 1.0 milliwatt undistorted output, across a 600 ohm load at COMM 500 ohm output.

5.2.7 NOTES: Standard Signals

1. A standard omni signal is an R. F. carrier amplitude modulated simultaneously with (a) 30% by a 9960Hz subcarrier which is, in turn, frequency modulated at a deviation ratio of 16 by a 30Hz reference phase signal, (b) 30% by a 30Hz variable phase signal which can be varied in phase with respect to the reference phase signal and (c) 15% by an optional Ident tone signal.

2. A standard localizer test signal is an R. F. carrier amplitude modulated simultaneously with (a) 90 ± .3% and 150 ± .3%Hz signals so that the sum of their separate modulation percentages equals 40 ±2%, and (b) an optional 1020Hz, 15% Ident tone.

3. All Navigation Receiver measurements (both Omni and Localizer) are to be made only after the VOR/LOC output level of the KX 170A/KX 175 has been properly set. With the KX 170A/KX 175 connected to either a KI 201C or KI 211C and a standard LOC signal of 1000μv (hard) applied and the receiver adjusted for 0.35 VRMS LOC output. This output level is correct for both omni and localizer operation.

4. A transmitter standard modulation signal is a 1KHz tone with 0.4 VRMS open circuit voltage as illustrated in the test circuit. (Figure 5-7C)

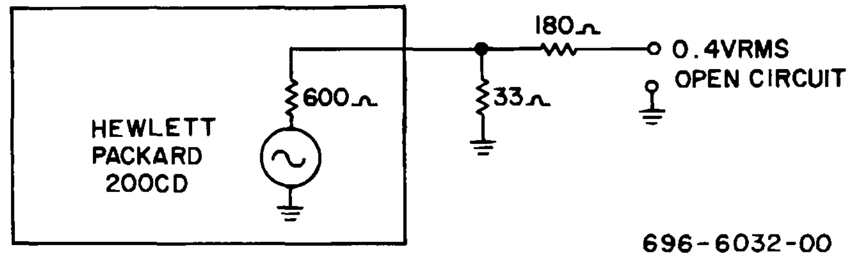

FIGURE 5-7C TEST CIRCUIT

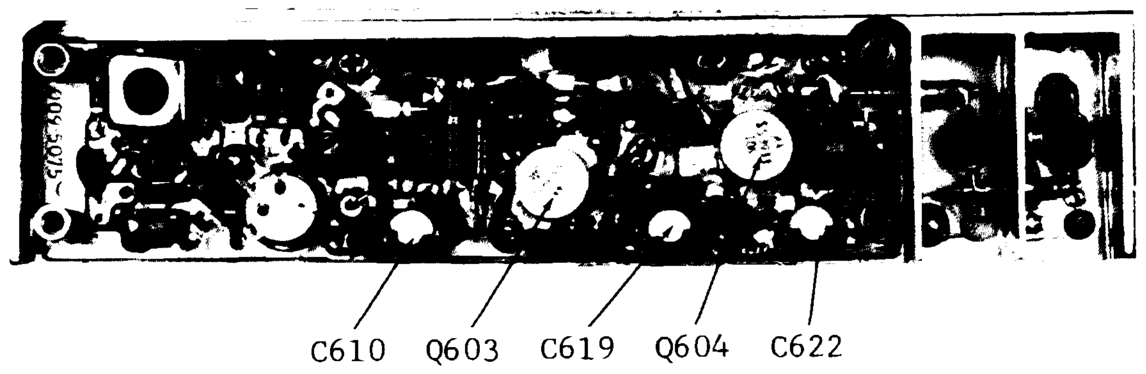

FIGURE 5-7A

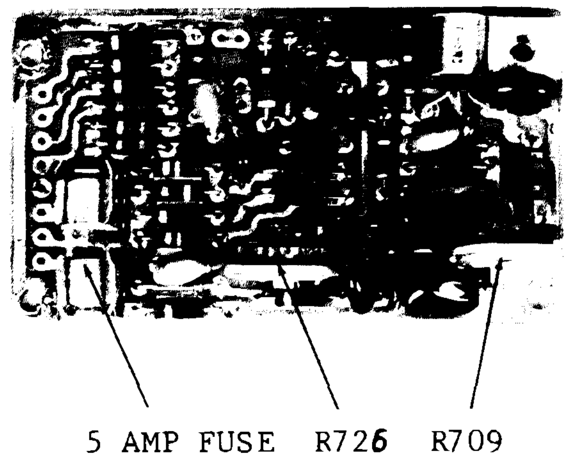

FIGURE 5-7B

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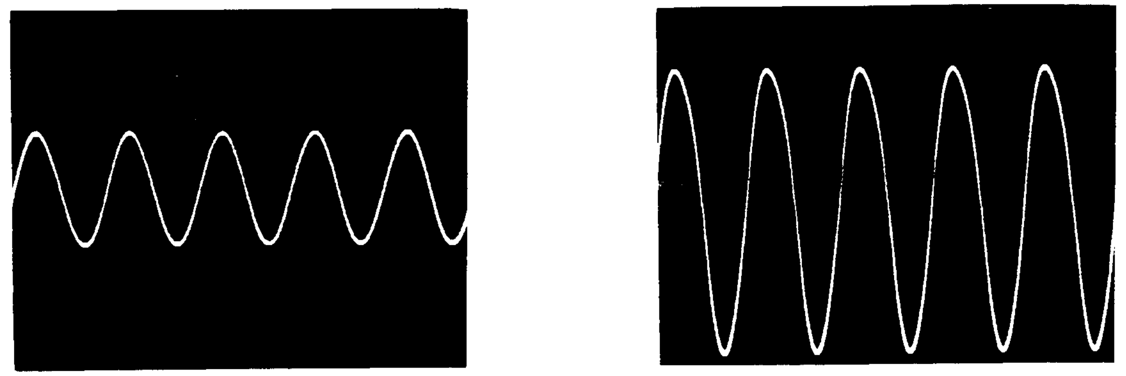
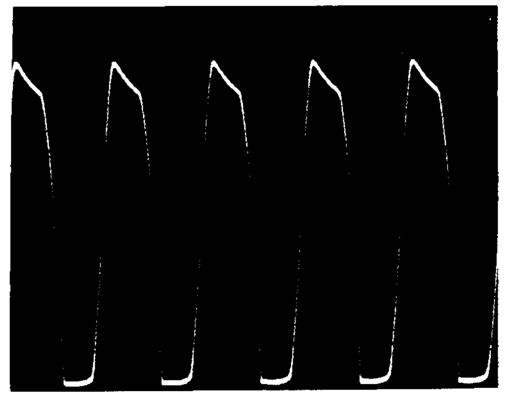
FIGURE 5-7 TRANSMITTER ALIGNMENT AND AUDIO BOARD ADJUSTMENT LOCATIONS



a) Under Modulation

b) Proper Modulation Level



c) Excessive Modulation Level

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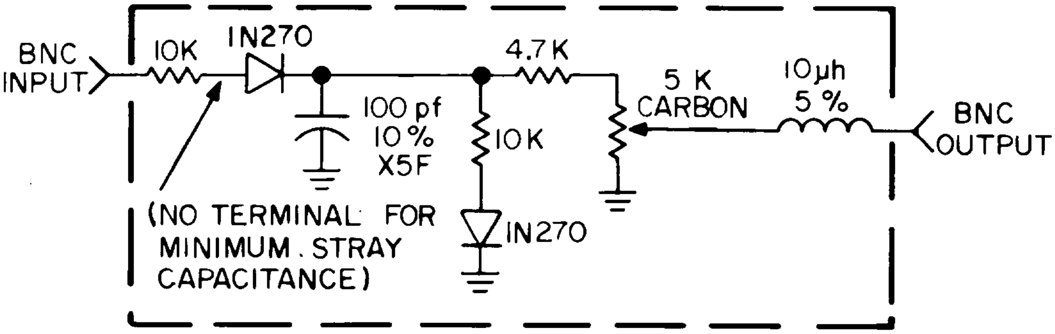
FIGURE 5-8 MICROPHONE GAIN ADJUST DETECTOR WAVEFORMS



1. ALL LEADS SHOULD BE SHORT AS POSSIBLE.
2. DETECTOR SHOULD BE HOUSED IN SMALL SHIELDED MINIBOX.
3. ALL RESISTORS ARE 1/4W, 5% CARBON.

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FIGURE 5-9 DETECTOR SCHEMATIC DIAGRAM

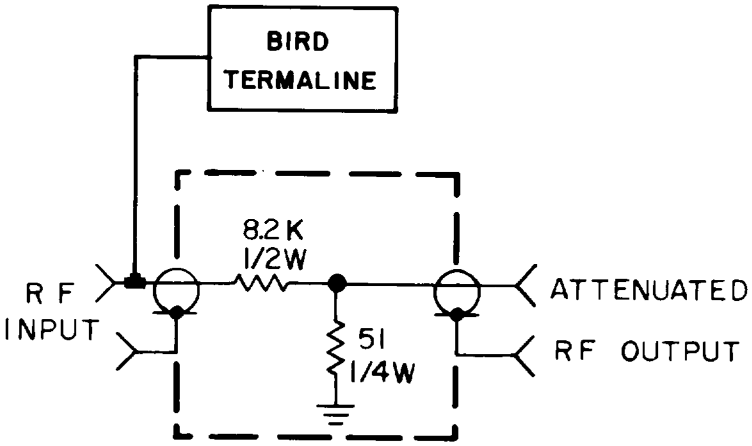

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FIGURE 5-10 RF ATTENUATOR SCHEMATIC DIAGRAM

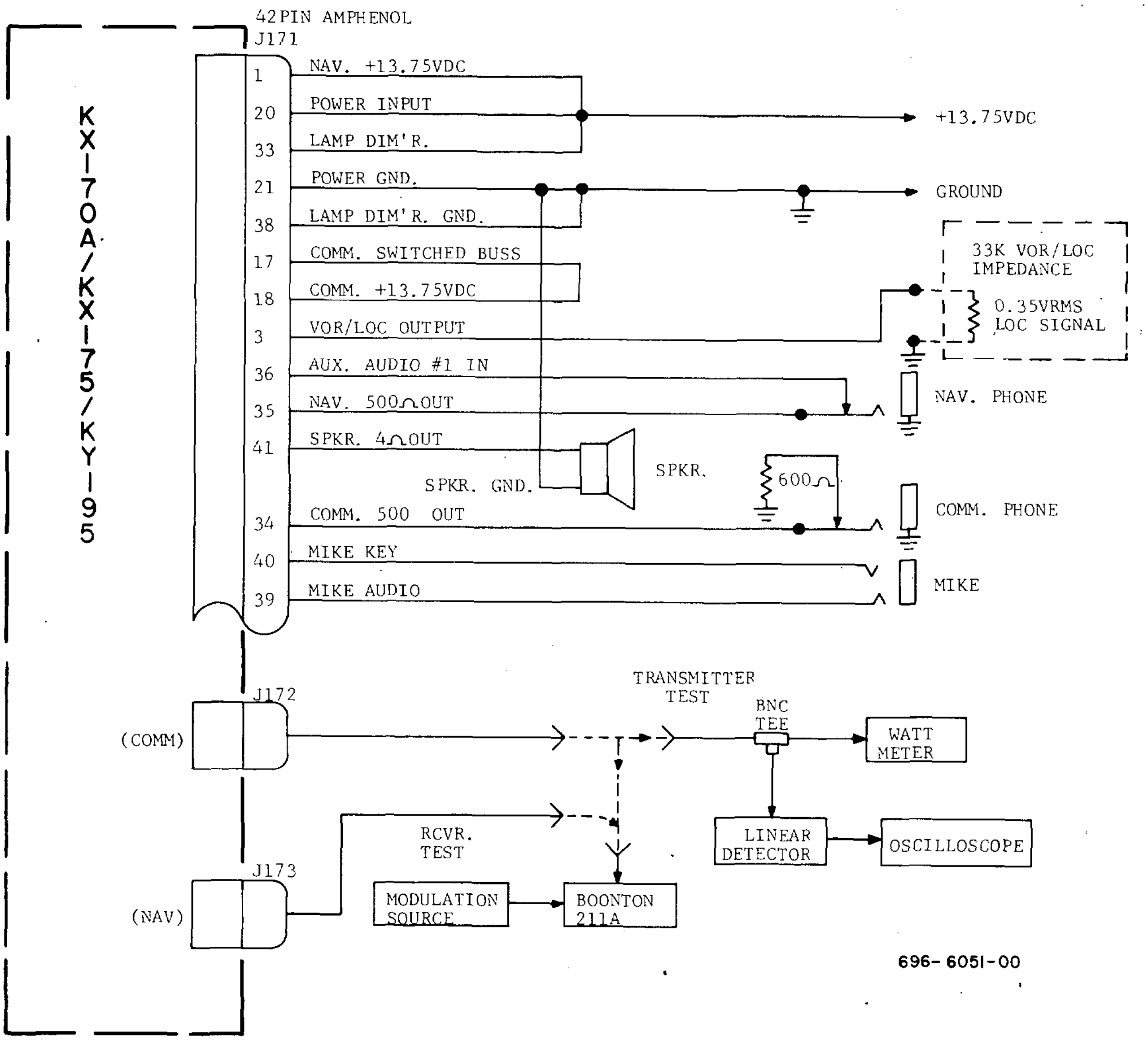

FIGURE 5-11 KX 170A/KX 175 BENCH TEST SETUP

5.2.8 KX 170A/KX 175 & Test Data

(Refer to the Installation Manual for Technical Characteristics)

COMMUNICATIONS TRANSCEIVER

Serial No. ________

Date ________

Preliminary Visual Inspection:

a. Hardware: ________ (ok)   b. Paperwork ________ (ok)

Input Voltage: ______ VDC

1. Receiver Sensitivity:

a. s+n/n:
118.00MHz ________ db   134.00MHz ________ db
119.95MHz ________ db   135.95MHz ________ db
126.70MHz ________ db

b. Quieting: ________ db (frequency = 126. 7)

2. AGC Characteristics: ________ db (frequency = 126. 7)

3. Selectivity:

a. 6db Bandwidth: 126.70MHz: Above ________ KHz Below ________ KHz

62. 5db Bandwidth: 126.70MHz: AGC reference voltage ________ VDC

126.75MHz: ________ db   126.65MHz ________ db

4. Manual Gain Control: ________ mw max. ________ watts min.

Transmitter Frequency Stability:

118.00 ________ KHz
118.05 ________ KHz
119.10 ________ KHz
120.15 ________ KHz
121.20 ________ KHz
122.25 ________ KHz
123.30 ________ KHz

125.35 ________ KHz
125.40 ________ KHz
126.45 ________ KHz
127.50 ________ KHz
128.55 ________ KHz
129.60 ________ KHz
130.65 ________ KHz

131.70 ________ KHz
132.75 ________ KHz
133.80 ________ KHz
134.85 ________ KHz
135.90 ________ KHz
135.95 ________ KHz

5. Headphone Audio:__________mw

6. Squelch: a. Carrier/Noise Squelch set for__________μv
b. Carrier/Squelch set for__________μv
c. Squelch Test__________(ok)

7. Aux. Audio: #1__________watts min.
#2__________watts min.
#3__________watts min.
#4__________watts min.

Transmitter:

1. Power Out:

118.00MHz__________watts 126.45MHz__________watts 135.90MHz____watts

Low Voltage:

118.00MHz________watts 126.45MHz__________watts 135.90MHz______watts

2. Modulation: Capabilities

a. Microphone: Input__________VRMS

b. 118.00MHz__________% 126.50MHz__________%
127.50MHz__________% 135.95MHz__________%

c. Sidetone: ________mw min. __________mw max. (2.2.7)
________mw final adjust

Hardware__________ok
Paperwork__________ok
Glyptol__________ok
Test Stamp__________ok

3. Transmitter Frequency Stability:

118.00__________KHz
118.05__________KHz
119.10__________KHz
120.15__________KHz
121.20__________KHz
122.25__________KHz
123.30__________KHz
124.35__________KHz
125.40__________KHz
126.45__________KHz
127.50__________KHz
128.55__________KHz
129.60__________KHz
130.65__________KHz
131.70__________KHz
132.75__________KHz
133.80__________KHz
134.85__________KHz
135.90__________KHz
135.95__________KHz

NAVIGATION RECEIVER

Preliminary Visual Inspection

a. Hardware__________(ok)   b. Paperwork__________(ok)

Input voltage____________VDC

OMNI

1. SMO Test: All channels checked________(ok)

   108.00__________MHz (frequency)   117.95____________MHz (frequency)
   (92.1825MHz ±2KHz)   (102.7625MHz ±2KHz)

2. LOC Input Level: Set for____________VRMS

3. AGC Characteristic: ____________μa.

4. Course Accuracy: A__________0, B__________0.

5. Sensitivity: 117.95MHz__________μv.

LOCALIZER

1. Sensitivity: 108.10MHz__________μv.

2. Centering Accuracy: A___________, B____________needles width

3. Low Voltage Characteristic: ____________needles width

AUDIO

1. Sensitivity:

   108.10MHz_____________db   117.95MHz___________db

2. Quieting:

3. AGC Characteristic:

4. Audio Output:
   ____________watts min. undistorted   ____________mw max. fully CCW

4.1 Headphone Output: ____________mw.

5. Ident/Voice: ____________db tone ratio

6. Selectivity:

6db Bandwidth 112.50MHz reference, +__________KHz -__________KHz
Bandwidth at 112.50MHz reference AGC Ref. Voltage
112.55MHz_________db 112.45MHz__________db

MECHANICAL:

1. Numeral Alignment: ____________(ok)

2. DME Switching: MHz____________(ok) kHz ____________(ok)

3. Glideslope Switching: MHz____________(ok) kHz ____________(ok)

4. ILS Energize: ____________(ok)

5. 50KHz ILS: ____________(ok)

6. Pilot Lamps: ____________(ok)

Hardware_________(ok)
Paperwork________(ok)
Glyptol__________(ok)
Test Stamp________(ok)

KX 170A/KX 175 TEMPERATURE SPECIFICATIONS

Temperature requirements -30 minutes stabilization period at +55° C and -20° C. At -20° C the unit shall be allowed to run for 15 minutes before data is taken.

Test data at +55° C and -20° C

1. Transmitter Power Out (4 watts min.)

A. 118.0 MHz -20° C__________watts +55° C________watts
B. 126.5 MHz -20° C__________watts +55° C________watts
C. 135.95MHz -20° C__________watts +55° C________watts

2. Crystal Frequency .005%

A. 135.0MHz 134.99325 -20° C__________ +55° C_________
135.00675
B. 126.0MHz 125.99370 -20° C__________ +55° C_________
126.00630

3. Modulation (90%) min

A. 126.5MHz -20° C__________% +55° C_________%

4. Nav Sensitivity (6db min.)

A. 108.0 MHz -20° C__________db +55° C_________db
B. 111.35MHz -20° C__________db +55° C_________db
C. 117.95MHz -20° C__________db +55° C_________db

5. Comm Sensitivity (6db min)

A. 108.0 MHz -20° C__________db +55° C_________db
B. 126.70MHz -20° C__________db +55° C_________db
C. 135.95MHz -20° C__________db +55° C_________db

6. Comm SMO Lockup

A. All MHz and KHz -20° C__________db +55° C_________(ok)

7. Squelch min. 1μv, Max 5μv

A. 126.70MHz -20°C__________db +55°C_________μv

5.3 GENERAL MAINTENANCE

Maintenance information contained in this section includes inspection procedures, cleaning, semiconductor replacement, and troubleshooting procedures.

5.3.1 VISUAL INSPECTION

The following visual inspection procedures should be performed during the course of maintenance operations.

a. Inspect all wiring and coax cables for damaged insulation and proper termination (broken strands and solder joint).

b. Check connectors cable connections, making sure they are free from corrosion and are properly secured.

c. Check all components for evidence of overheating, discoloration, bulges or cracked housing.

d. Check all components for evidence of vibration, lead breakage and broken or insecure mounting.

e. Inspect relay and switch contacts for pits or arcing.

5.3.2 CLEANING

a. Using a clean lint-free cloth lightly moistened with an approved cleaning solvent remove the foreign matter from the equipment case and unit front panels. Wipe dry using a clean, dry, lint-free cloth.

b. Using a hand controlled dry air jet (not more than 15 psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.

c. Clean electrical contacts with a burnishing tool or cloth lightly moistened with an approved contact cleaner.

d. Clean the receptacles and plugs with a hand controlled dry air jet (not more than 25 psi) and a clean lint-free cloth lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

5.3.3 SEMICONDUCTOR REPLACEMENT

It is recommended that semiconductors not be tested or replaced until unsatisfactory performance is observed.

5.3.4 SEMICONDUCTOR MAINTENANCE

5.3.4.1 GENERAL

Due to the wide utilization of semiconductors in this electronic equipment, somewhat different techniques are necessary in maintenance procedures. In solid state circuits the impedance and resistances encountered are of much lower values than those encountered in vacuum-tube circuits. Therefore, a few ohms discrepancy can greatly affect the performance of the equipment. Also, coupling and filter capacitors are of larger values and usually are of the tantalum type. Hence, when measuring resistances, an instrument very accurate in the low resistance ranges must be used, and when measuring values of capacitors, an instrument accurate in the high ranges must be employed. Capacitor polarity must be observed when measuring resistance. More accurate measurements can be obtained if the semiconductors are removed or disconnected from the circuit.

–NOTE–

> A reverse voltage in excess of .5VDC on any solid slug tantalum (King Family 096-1030-) will cause a catistrophic failure. Therefore, any time trouble is located, be sure that all tantalum capacitors in the immedieate area have not had excess reverse voltage.

5.3.4.2 SEMICONDUCTOR TEST EQUIPMENT

a. Damage to semiconductors by test equipment is usually the result of accidentally applying too much current or voltage to the elements. Common causes of damage from test equipment are discussed in the following paragraphs.

b. Transformerless Power Supplies. Test equipment with transformerless power supplies is one source of high current. However, this type of test equipment can be used by employing an isolation transformer in the AC power line.

c. Line Filter. It is still possible to damage semiconductors from line current, even though the test equipment has a power transformer in the power supply, if the test equipment is provided with a line filter. This filter may function as a voltage divider and apply half voltage to the semiconductor. To eliminate this condition, connect a ground wire from the chassis of the test equipment to the chassis of the equipment under test before making any other connections.

d. Low-Sensitivity Multimeters. Another cause of semiconductor damage is a multimeter that requires excessive current to provide adequate indications. Multimeters with sensitivities of less than 20,000-ohms-per-volt should not be used on semiconductors. A multimeter with low sensitivity will draw too much current through many types of small semiconductors, causing damage. When in doubt as to the amount of current supplied by a multimeter, check the multimeter circuits on all scales with an external, low-resistance multimeter connected in series with the multimeter leads. If more than one milliampere is drawn by the multimeter on any range, this range cannot be safely used on small semiconductors.

e. Power Supply. When using a battery-type power supply, always use fresh batteries of the proper value. Make certain that the polarity of the power supply is correct for the equipment under test. Do not use power supplies having poor voltage regulation.

5.3.5 SEMICONDUCTOR VOLTAGE AND RESISTANCE MEASUREMENTS

5.3.5.1 TRANSISTORS

When measuring voltage or resistances in circuits containing semiconductor devices, remember that these components are polarity and voltage conscious. Since the values of capacitors used in semiconductor circuits are usually large (especially in audio, servo, or power circuits) time is required to charge these capacitors when an ohmeter is connected to a circuit in which they appear. Thus, any reading obtained is subjected to error if sufficient time is not allowed for the capacitor to fully charge. When in doubt it may be best in some cases to isolate the components in question and measure them individually.

5.3.5.2 TESTING OF TRANSISTORS

a. A transistor checker should be used to properly evaluate transistors. If a transistor testor is not available, a good multimeter may be used. Make sure that the multimeter meets the requirements outlined in preceding paragraph (d). Always check the value of the bias resistors in series with the various transistor elements. A transistor is very sensitive to improper bias voltage; therefore, a short or open circuit in the bias resistance may damage the transistor. For this reason, do not troubleshoot by shorting the various points in the circuit to ground and listening for clicks.

—CAUTION—

If a transistor is found to be defective, make certain that the circuit is in good operating order before installing a replacement transistor. If a short or a defective bias resistance exists in the circuit, putting in another transistor will most likely result in burning out the new component. Do not depend upon fuses to protect transistors.

b. PNP Transistor. To check a PNP transistor, connect the positive lead of the multimeter to the base of the transistor and the negative lead to the emitter. Generally, a resistance reading of 50,000 ohms or more should be obtained. Reconnect the multimeter with the negative lead to the base. With the positive lead connected to the emitter a resistance value of 500 ohms or less should be obtained. When the positive lead is connected to the collector a value of 500 ohms or less should be likewise obtained.

c. NPN Transistor. Similar tests made on an NPN transistor should produce the following results: With the negative lead of the multimeter connected to the base of the transistor the value of resistance between the base and the collector should be high. With the positive lead of the multimeter connected to the base, the value of resistance between the base and the emitter or base and the collector should be low. If these results are not obtained, the transistor is probably defective and should be replaced.

5.3.5.3 REPLACING TRANSISTORS

a. Never remove or replace a plug-in semiconductor with the supply voltage turned on. Transients thus produced may damage the semiconductor or others remaining in the circuit. If a semiconductor is to be evaluated in an external test circuit, be sure that no more voltage is applied to the semiconductor than normally is used in the circuit from which it came.

b. Use only a low heat soldering iron when installing or removing soldered-in-parts. Use care in the handling of printed circuit boards. When removing a part from a printed circuit board, first unbend the crimped leads. Use only the necessary amount of heat to unsolder the part. Clear excess solder from mounting eyelets, making sure that mounting holes are clear before installing new parts. When removing a transformer or other part having a multiple number of leads, straighten (unbend) all leads first and then heat leads one at a time, working around the part, until the part can be gently 'rocked out'.

c. When installing or removing a soldered-in semiconductor grasp the lead to which heat is applied between the solder joint and the semiconductor with long-nosed pliers. This will dissipate some of the heat that would otherwise conduct into the semiconductor from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be made quickly. Excessive heat will permanently damage a semiconductor.

d. When soldering is required to remove a component from a semiconductor socket, remove the semiconductor to prevent damage to the semiconductor.

e. In some cases, power transistors are mounted on heat-sinks that are designed to dissipate heat away from them. In some power circuits, the transistor must also be insulated from ground. Often, this insulating is accomplished by means of insulating washers made of fiber and mica. When replacing transistors mounted in this manner, be sure that the insulating washers are replaced in proper order. Before installing the mica washers, treat them with a film of silicone grease. This treatment helps in the transfer of heat. After the transistor is mounted, and before making any connections, check from the case of the transistor to ground with a multimeter to see that the insulation is effective.

5.3.5.4 DIGITAL INTEGRATED CIRCUITS

Precision voltage measurements are not needed in testing digital I. C.'s other than to see that the voltage is a HI level or a LO level. An oscilloscope with a calibrated vertical and horizontal axis is normally used in order to measure voltages of short duration or to measure the relationship of two voltage pulses.

5.3.5.5 TESTING OF DIGITAL INTEGRATED CIRCUITS

a. A Truth Table of the logic element under question is the primary tool to be used. When checking input and output levels of a logic element under question it should be remembered that an input or output may not agree with its truth table not because it has malfunctioned but because some other component connected to the same point has shorted to ground or to V_{cc}. This is not uncommon when an output of one element is connected to an input or output of another. It may be necessary to isolate the gate under question by unsoldering the necessary I. C. pins. A majority of digital I. C. failures can be grouped into three categories.

(1) Input(s) or output shorted to ground pin of I. C.
(2) Input(s) or output shorted to V_{cc} pin of I. C.
(3) Open input(s) or output.

An input or output shorted to ground would be a constant LO and an input or output shorted to V_{CC} would be a constant HI. An open input would not cause any change in the output state. An open output would be less than 0.5VDC.

b. Other failures common in digital I. C.'s are:

(4) Ground pin open.
(5) V_{CC} pin open.
(6) Inputs shorted together.

An open ground pin would not allow a LO on the output.
An open V_{CC} pin would not allow a HI on the output.
(Remember to isolate the device from other components connected to it). Two or more inputs shorted together can be checked by grounding one of the inputs under question. If the other input also goes to ground they are probably shorted.

5.3.5.6 REPLACING INTEGRATED CIRCUITS

If an I. C. is known to be defective, the easiest way to remove it is to cut off each of its pins, remove the case, and then unsolder the remaining pins from the integrated circuit card one by one. This is preferable over removing the I. C. intact because attempts to remove the I.C. intact may result in damage to the printed circuit board. If it is desired to remove an I.C. intact, a soldering iron with a special tip may be used that will heat all the pins on the backside of the card at the same time. After removal the holes of the card should be cleaned of solder so that the replacement I.C. may be installed. Note the marking identation of the I.C. before removal, and replace the new one with the same orientation as the one removed.

–CAUTION–

If an I. C. is found to be defective, verify that there is no greater than V_{CC} +10% on any of the I.C. holes on the board or a ground on an I.C. hole that should not be grounded, before installing a replacement I.C.

Never remove or replace a plug in I.C. with the supply voltage turned on. Transients thus produced may damage the I.C. or others remaining in the circuit. If an I.C. is to be evaluated in an external test circuit, be sure no more voltage is applied to the I.C. than normally is used in the circuit from which it came.

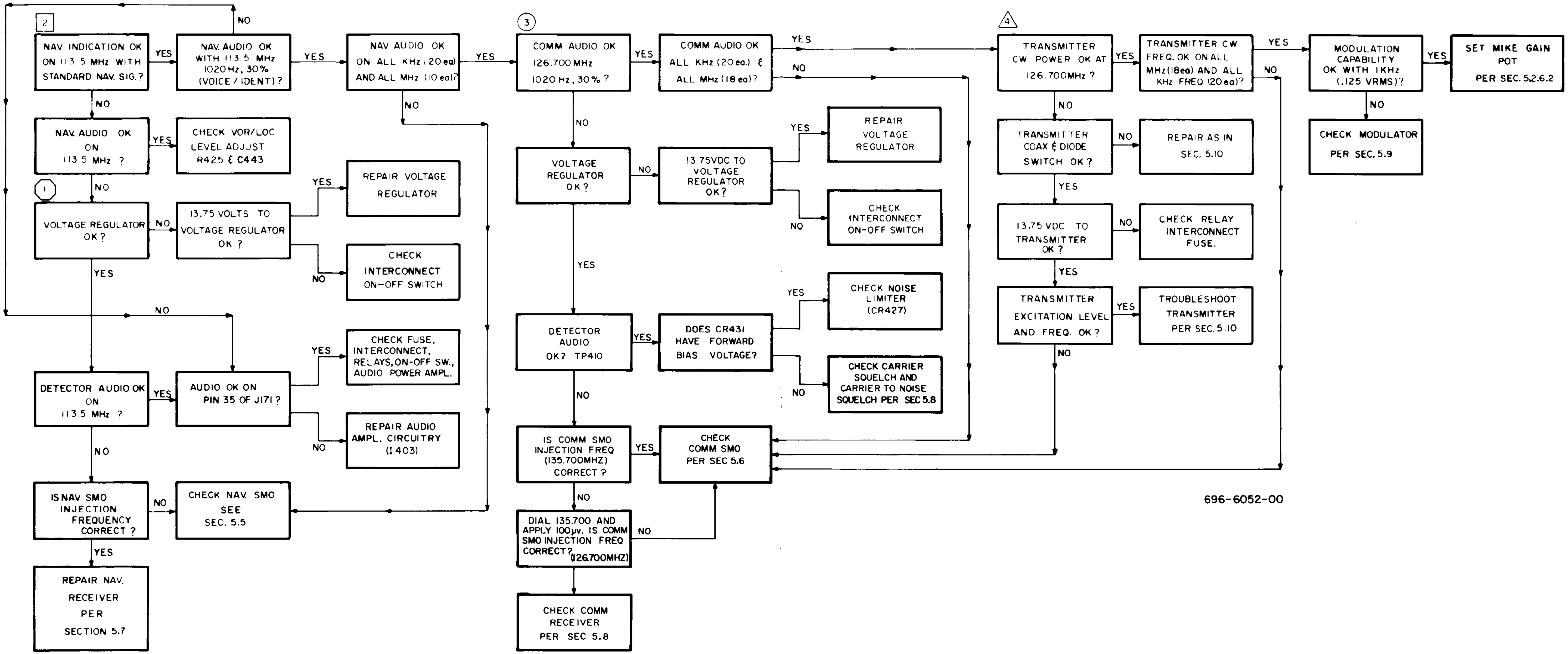

FIGURE 5-12 TROUBLESHOOTING FLOW CHART

5.4 TROUBLESHOOTING THE KX 170A/KX 175

Figure 5-12 is a troubleshooting flow chart designed to aid the technician in sectionalizing or localizing sources of trouble. NAV and COMM block diagrams Figure 5-48 and 5-49 appearing at the end of Section 5 may also aid in localizing the malfunction. The troubleshooting charts (Table 5-5 thru 5-9) are given as a quick guide in pinpointing probable problem areas along with their associated remedies. A list of possible SMO malfunctions is given in the Preliminary Evaluation section of the respective SMO discussions (NAV SMO, Section 5. 5, COMM SMO, Section 5. 6).

Individual circuit tracing and isolation of a defective component is most easily accomplished by use of the individual troubleshooting sections, along with appropriate schematic diagrams appearing at the end of Section 5.

TABLE 5-5 NAV SMO TROUBLE CHART

INDICATION	PROBABLE CAUSE	REMEDY
Low or no output from Receiver Buffer	Voltage Regulated Supply (8. 5 and 5. 0 volts) component failure.	Check Q101, Q103 and CR214 voltages and associated components.
	Receiver Buffer component failure.	Check Q202 voltages and associated components.
Correct output on lower frequencies only.	VCO adjusted incorrectly.	Check VCO adjustment L201. See Alignment Procedure.
Frequency incorrect on some positions of NAV MHz and KHz frequency control.	Switching wafer defective.	Check switch wafer S107 rear for MHz error. See Table 4-3.
		Check switch wafer S105 for KHz error. See Table 4-3.
	Programmable Divider component failure	Check I201, I202, I203, I204 and I206. A comparison can be made between the COMM and NAV SMO's using a signal generator to drive the Squaring Amplifier and an oscilloscope as a signal tracer. See Troubleshooting Procedure.
Frequency error and/or jitter in Receiver Buffer output.	Phase and Frequency comparator component failure.	Check I205, I207 and I208 voltages and associated components.
		Check output at R215 with an oscilloscope and observe waveform when switching NAV MHz frequency control.

TABLE 5-5 NAV SMO TROUBLE CHART (Cont)

INDICATION	PROBABLE CAUSE	REMEDY
Frequency error in Receiver Buffer output.	Low Reference Oscillator 400KHz component failure.	Check Q210 and Q211 voltages and associated components. Check Y202 frequency at TP205
	High Reference Oscillator 53. 93125MHz component failure.	Check Q207 voltages and associated components. Check Y201 frequency at junction of R230 and R231.
	Divide by 2 Mixer and amplifier component failure.	Check Q206 voltages and associated components. Check for frequency input at TP203 and for divide by 2 frequency output at TP204
	Squaring Amplifier component failure.	Check Q208 and Q209 voltages and associated components. Use an oscilloscope and check for an essentially square wave output at TP206.
	Voltage Translator component failure.	Check Q204 and Q205 voltages and associated components. Connect oscilloscope to TP202 and observe waveforms when switching NAV MHz frequency control.
	VCO Low Pass Filter component failure.	Check at TP201 for a dc voltage change as the NAV MHz frequency control is switched.

TABLE 5-6 COMM SMO TROUBLE CHART

INDICATION	PROBABLE CAUSE	REMEDY
Low or no output from Receiver Buffer	Voltage Regulated Supply (8. 5 and 5. 0 volts) component failure.	Check Q102, Q105, Q104 and CR319 voltages and associated components.
	Receiver Buffer component failure.	Check Q303 voltage and associated components.
Receiver Buffer output but no Transmit Buffer output in Transmit condition.	Transmit Buffer component failure.	Check Q306 voltages and associated components.
	Transmit Enable Switch component failure.	Check Q305 voltages and associated components.
	Out of Lock Disable	Check Q307 and input to R323 with an oscilloscope.
Transmit Buffer output in Receive condition.	Transmit Enable Transistor open.	Check Q305 voltages.
Receiver Buffer and/or Transmit Buffer, frequency incorrect from 118. 00 to 126. 95MHz but OK from 127. 00 to 135MHz or vice versa.	COMM MHz HI-LO switch wafer.	Check switch wafer S103.
	Transmit-Receive Relay	Check relay K701.
	High Reference Crystals	Check Y301 and Y302 and associated components.
		Check switching diodes CR313 and CR314 bias voltages.
	HI-LO VCO Switch	Check switching diodes CR301 and CR302 bias voltages.

TABLE 5-6 COMM SMO TROUBLE CHART (Cont)

INDICATION	PROBABLE CAUSE	REMEDY
	VCO adjusted incorrectly.	Check VCO adjustments C314 and C315. See Alignment Procedure.
Frequency incorrect on some positions of COMM MHz and/or KHz frequency control.	Switching Wafer defective.	Check switch wafer S103 and S104 for MHz error. Check switch wafer S101 for KHz error. See Table 4-4.
	Programmable Divider component failure.	Check I301, I302, I303, I304 and I306. A comparison can be made between the COMM and NAV SMO's, using a signal generator to drive the Squaring Amplifier and an oscilloscope as a signal tracer. See Troubleshooting Procedure.
Stable frequency error in Receiver and Transmit Buffer output.	Low Reference Oscillator 400KHz, (in NAV SMO KX 170A) (in COMM SMO KX 175).	Check for 400KHz input to TP305 (from NAV SMO KX 170A) (Q315 and Q316 voltages and associated components KX 175).
	High Reference Oscillator component failure.	Check Q311 voltages and associated components. Check output at junction of CJ301 and CJ302.
Frequency error and/or jitter in Receiver and Transmitter Buffer output.	Phase and Frequency Comparator component failure.	Check I305, I307 and I308 voltages and associated components. Check output at R323 with an oscilloscope and observe waveform when switching COMM MHz frequency control.

TABLE 5-6 COMM SMO TROUBLE CHART (Cont.)

INDICATION	PROBABLE CAUSE	REMEDY
Frequency error and/or jitter in Receiver and Transmitter Buffer output.	Low Reference Oscillator 400KHz (in NAV SMO KX 170A) (in COMM SMO KX 175)	Check for 400KHz input to TP305.
	High Reference Oscillator component failure.	Check Q311 voltages and associated components. Check output at junction of CJ301 and CJ302.
	Divide by 2 Mixer and Amplifier component failure.	Check Q310 voltages and associated components. Check for frequency input at Q304 collector and for divide by 2 frequency output at TP304.
	Squaring Amplifier component failure.	Check Q312 and Q313 voltages and associated components. Use an oscilloscope and check for an essentially square wave output at TP306.
	Voltage Translator component failure.	Check Q308 and Q309 voltages and associated components. Connect oscilloscope to TP302 and observe waveform when switching COMM MHz frequency control.
	VCO Low Pass Filter component failure.	Check at TP301 for a dc voltage change as the COMM MHz frequency control is switched.

TABLE 5-7 NAV RECEIVER TROUBLE CHART

INDICATION	PROBABLE CAUSE	REMEDY
No reception	"OFF-ON" switch	Check switch S112
	8.5vdc regulator	Check Q101 and Q103 voltages and associated components.
	5.0vdc regulator	Check CR214
	Receiver board components.	Check voltages and components.
	NAV SMO no local oscillator output or wrong frequency.	Check voltages and low frequency reference oscillator Q210, Q211 and high frequency reference oscillator Q207 frequencies.
		Check VCO adjustment L201. See Alignment Procedure.
	NAV Receiver, second local oscillator.	Check Q408 voltages and Y401 frequency.
Headphone output but low or no speaker output.	Fuse blown	Check fuse F701 (KX 170A/KX 175 Only)
	COMM Speaker "OFF-ON" switch in "OFF" position or defective.	Check switch S110.
	Transmit-Receive relay	Check relay K701
	Audio board component failure.	Check CR701, CR702, Q701, Q702 voltages and associated component.
	Audio Output transistor	Check Q703, Q704, Q705 and Q706

TABLE 5-7 NAV RECEIVER TROUBLE CHART (CONT)

INDICATION	PROBABLE CAUSE	REMEDY
Receiver sensitivity weak	Defective component in R-F or I-F amplifier circuits or alignment	Check voltage and components. See Alignment Procedure.
	Low SMO signal to 1st mixer.	Check NAV SMO
Audio weak or distorted	Audio amplifier on receiver board	Check I403 voltages and associated components.
	Audio board component failure	Check CR701, CR702, Q701, Q702 voltages and associated components.
	Audio output transistors	Check Q703, Q704, Q705 and Q706.
AGC circuit inoperative Indicator error on strong signals	AGC transistors	Check Q406, Q407, CR413 and associated components
AGC motorboating	AGC capacitors open	Check C441 and C442
No attenuation of VOR ident signal with "Voice/Ident" switch in "Voice" position.	Voice/Ident switch	Check switch S111
	Ident filter	Check L703 and C716
		L703 not adjusted to 1020 KHz. See Alignment Procedure.
No VOR/LOC signal output	VOR/LOC level adjustment control or output coupling capacitor open	Check adjustment of R425. See Alignment Procedure.
		Check C443

TABLE 5-8 COMM RECEIVER TROUBLE CHART

INDICATION	PROBABLE CAUSE	REMEDY
No reception	"OFF-ON" switch	Check switch S110
	8. 5vdc regulator	Check Q102, Q105 and Q104 voltages and associated components.
	5. 0vdc regulator	Check CR319
	Receiver board component failure.	Check voltages and components.
	COMM SMO 400KHz reference oscillator	Check Q315, Q316, Y303 and associated components
	COMM SMO no local oscillator output or wrong frequency	Check voltages, reference frequencies and VCO adjustments C314 and C315. See Alignment Procedure.
	Audio board component failure.	Check CR701, CR702, Q701, Q702 voltages and associated components.
	COMM Receiver second local oscillator	Check Q409 voltages and Y402 frequency.
No reception from 118. 00 to 126. 95MHz but OK from 127. 00 to 135. 95MHz or vice versa.	COMM SMO High Frequency crystals	Check CR313 and CR314 bias voltages. Check Y301 and Y302 and associated components.
	COMM SMO HI-LO VCO switch	Check CR301 and CR302 bias voltages and VCO adjustments C314 and C315. See Alignment Procedure.
	COMM MHz HI-LO switch wafer	Check switch wafer S103
	Transmit-Receiver relay	Check relay K701

TABLE 5-8 COMM RECEIVER TROUBLE CHART (Cont)

INDICATION	PROBABLE CAUSE	REMEDY
Headphone output but low or no speaker output	Fuse blown	Check fuse F701 (KX 170A/KX 175 Only)
	COMM speaker "OFF-ON" switch	Check switch S110
	Transmit-Receive relay	Check relay K701
	Audio output transistors	Check Q703, Q704, Q705 and Q706.
Receiver sensitivity weak	Defective component in R-F or I-F amplifier circuits or alignment	Check voltages and components. See Alignment Procedure.
	Low SMO signal to 1st mixer	Check COMM SMO
Audio weak or distorted	Audio output transistors.	Check Q703, Q704, Q705 and Q706 and bias.
AGC circuit inoperative, distortion on strong signals.	AGC transistors	Check Q415 and Q416, CR432 voltages and associated components.
Carrier Squelch	Squelch "Test" switch.	Check S109
	Carrier squelch control set incorrectly	Check and adjust R495. See Adjustment Procedure.
	Carrier squelch transistor and squelch gate diode.	Check Q417, Q418 and CR431 voltages and associated components.
Carrier/Noise Squelch	Squelch "Test" switch	Check S109
	Carrier/Noise squelch control (set incorrectly)	Check and adjust R483. See Adjustment Procedure.
	Noise Amplifier transistor Carrier/Noise transistor and squelch gate diode	Check Q419, Q420 and CR431 voltages and associated components.

TABLE 5-9 COMM TRANSMITTER TROUBLE CHART

INDICATION	PROBABLE CAUSE	REMEDY
No transmitter CW output	No excitation from COMM SMO	Check transmit buffer, Q306, transmit disable Q307 voltages and associated components.
	Transmitter component failure	Trace R-F signal with oscilloscope probe from input thru Q601, Q602, Q603 and Q604.
	Supply voltage or D-C bias incorrect	Remove RF excitation from transmitter by setting COMM MHz frequency control at unmarked positions between 118. 00 to 135. 00MHz. Check D-C bias on Q601, Q602 and Q603.
	Diode T-R switch shorted	Check diode CR603
No transmitter CW output from 118. 00 to 126. 95MHz but OK from 127. 00 to 135. 95MHz or vice versa	COMM SMO high frequency reference crystals	Check CR313 and CR314 bias voltages
	COMM SMO HI-LO VCO switch	Check Y301 and Y302 bias voltages and VCO adjustments C314 and C315. See alignment procedure.
	COMM MHz HI-LO switch wafer	Check switch wafer S103
	Transmit-Receive Relay	Check relay K701
Low CW output	Transmitter component failure	Check R-F signal and gain with oscilloscope probe from input thru Q601, Q602, Q603, Q604 and low pass filter output.

TABLE 5-9 COMM TRANSMITTER TROUBLE CHART (Cont)

INDICATION	PROBABLE CAUSE	REMEDY
Low CW output (cont)	Transmitter misalignment	Align transmitter. See Alignment Procedure
Low or no modulation	Mike gain control	Check and adjust R709. See Adjustment Procedure.
	No mike current	Check mike bias as Pin #39 on rear connector J171
	Audio board component failure	Check CR701 and CR702 bias Q701 and Q702 voltages and associated components
	Audio output transistor	Check Q703, Q704, Q705 and Q706 and bias
	Transmit-Receive relay	Check relay K701
Low or no sidetone	Output coupling capacitor open	Check C709 (C717 in KX 170B KX 175B)
	Sidetone level control	Check and adjust R726. See adjustment procedure.
	Transmit-Receive relay	Check relay K701

5.5 TROUBLESHOOTING THE NAV SMO

The NAV SMO synthesizes 200 frequencies, providing a power level of 10mw into a 50Ω load. The relationship of channel frequency to synthesized frequency is illustrated in Table 5-10. Theory of operation is presented in Section 4. 2.

Selected Channel (MHz)	Synthesized Frequency (MHz)
108. 00	92. 8125
108. 05	92. 8625
108. 10	92. 9125
108. 15	92. 9625
108. 20	93. 0125
108. 25	93. 0625
108. 30	93. 1125
108. 35	93. 1625
108. 40	93. 2125
108. 45	93. 2625
108. 50	93. 3125
108. 55	93. 3625
108. 60	93. 4125
108. 65	93. 4625
108. 70	93. 5125
108. 75	93. 5625
108. 80	93. 6125
108. 85	93. 6625
108. 90	93. 7125
108. 95	93. 7625
109. 95	94. 7625
110. 95	95. 7625
111. 95	96. 7625
112. 95	97. 7625
113. 95	98. 7625
114. 95	99. 7625
115. 95	100. 7625
116. 95	101. 7625
117. 95	102. 7625

TABLE 5-10 NAV SMO SYNTHESIZER FREQUENCIES

5.5.1 PRELIMINARY EVALUATION (Figure 5-50)

A. Verify the NAV SMO failure!

1. Perform the alignment procedure of Section 5.2.1.
2. Does the NAV SMO supply 10mw to a 50 ohm load?
3. Is the synthesized frequency correct when dialing through all KHz (20 each) and all MHz (10 each) positions with both clockwise and counterclockwise rotation?

B. Is the failure external from the NAV SMO enclosure?

1. Check all power and control lines to the NAV SMO for proper operation. Wire color and feedthru assignments are shown in Figure 5-50. Control wire functions are defined in Table 4-3 where "0" is ground potential and "1" is 5vdc.
2. Is there a short circuit in the COMM SMO disabling the 400KHz oscillator in the NAV SMO (KX 170A only)?

5.5.2 NAV SMO DIAGNOSTIC PROCEDURE

If the tests of 5.5.1 substantiate the NAV SMO failure, proceed as follows:

A. Open the Loop

—NOTE—

> To properly troubleshoot the NAV SMO, it is imperative that the feedback loop be disabled. This is accomplished very simply by applying a positive, 0-10 volt adjustable D-C voltage from a low impedance source to TP201, the VCO bias point.

B. Is the High Reference Oscillator Operating Properly?

Using a 1Kpf capacitor, connect a VHF frequency counter to the junction of R230 and R231 in the High Reference Oscillator and check for 53.93125MHz. If the oscillator is inoperative or off frequency, refer to section 5.5.11 for servicing information.

C. Is the Low Reference Oscillator Operational?

Connect a frequency counter to TP205 in the Low Reference Oscillator and measure 400.000KHz. Remove the counter coax, connect an oscilloscope to TP205 and observe the waveform of Figure 5-13. If a malfunction is observed, refer to Section 5.5.5 for servicing instructions.

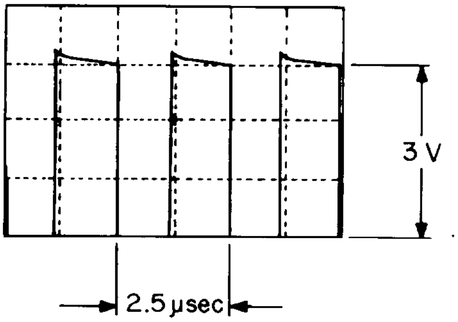

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FIGURE 5-13 LOW REFERENCE OSCILLATOR OUTPUT

D. Does the VCO and Receiver Buffer Perform Properly?

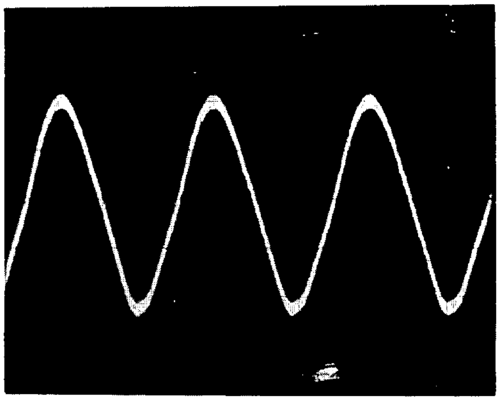
Dial 116.70MHz on the NAV frequency selector and adjust the VCO bias voltage to 6.50V. Connect a VHF counter to the VCO Buffer, TP203, and adjust L201 to obtain a frequency of approximately 101.5125MHz. Erratic or improper tuning, or low output should be corrected by troubleshooting the VCO and/or VCO Buffer as outlined in Sections 5.5.6 and 5.5.10.

E. Is the Implicit Divide by 2 Halving the VCO Frequency?

Without altering the tuning voltage or the channel frequency setting connect the VHF counter to TP204 and read a frequency of approximately 50.756MHz. If a malfunction is observed, the circuit may be serviced as outlined in the troubleshooting instructions of Section 5.5.12.

F. Is the Mixer Working Properly?

With 116. 70MHz selected and 6. 50vdc bias applied to the VCO as in previous steps, connect an oscilloscope to the junction of L204, C240 and C241. The waveform should be of the approximate amplitude and frequency of Figure 5-14. Failure to obtain the desired trace would indicate a malfunction in the Mixer circuit which can be serviced as outlined in the troubleshooting instructions of Section 5. 5. 13.



Vertical:	0. 05V/div
Horizontal:	0. 1μsec/div
Selected Freq. :	116. 70MHz

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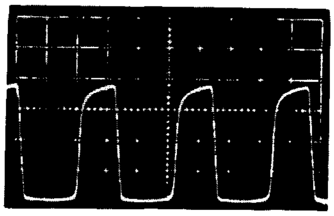
FIGURE 5-14 MIXER OUTPUT

G. Is the Squaring Amplifier in Good Health?

With the VCO oscillating near 101. 5125MHz (NAV frequency selector at 116. 70MHz) monitor the Squaring Amplifier output, TP206, with an oscilloscope having a bandwidth of at least 30MHz. If the high reference oscillator is functioning properly, the waveform will appear as in Figure 5-15. If not, troubleshoot the squaring amplifier as in Section 5. 5. 15.



Vertical:	1V/DIV
Horizontal:	. 1μsec/DIV
Selected Freq:	116. 700MHz
Squaring Amp. Freq. :	3. 175MHz

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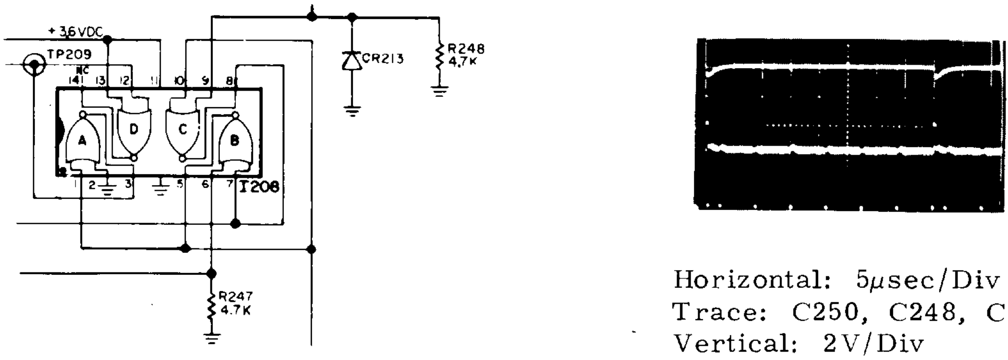
FIGURE 5-15 SQUARING AMPLIFIER OUTPUT

H. Does the Programmable Divider Provide Proper Frequency Division?

Short, test points, TP207, TP208, and TP209. This disables the phase and frequency comparator to permit testing of the programmable counter. Maintain the channel setting and the VCO tuning voltage of Steps D through G. Attach the oscilloscope probe to Pin 9 of I202 or I206 to monitor the counter output. The waveform of Figure 5-16 should be obtained. Note the pulse period of approximately 40μsec. Dial the ten MHz positions, leaving the VCO bias unchanged, and look for the counter output pulse rate to increase uniformly as lower channel frequencies are dialed. Return the MHz dial to the 116MHz position and dial through the twenty KHz positions. Observe a gradual advance in output pulse rate as numbers are dialed from the 0. 95 to . 00 using counterclockwise rotation.

If erroneous operation of the Programmable Counter is observed, service the counter using the procedure of Section 5. 5. 3. Upon completion of the counter checks, remove the shorting connections from test points TP207, TP208 and TP209.



Horizontal: 5μsec/Div
Trace: C250, C248, CR213
Vertical: 2V/Div

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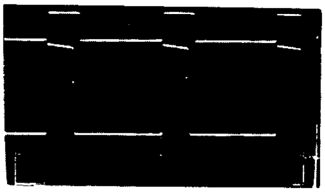
FIGURE 5-16 PROGRAMMABLE DIVIDER OUTPUT

I. Is the Phase and Frequency Comparator Operational?

Connect the oscilloscope probe to the junction of Pins 1, 5 and 10 of I208 and R215 to monitor the Phase and Frequency Comparator output. With the channel selector at 116. 70MHz, vary the VCO bias voltage above and below 6. 50 volts. The output voltage on the scope should be dominately high when the VCO bias is low, and low when the VCO bias is high. Waveforms are illustrated on the "set-reset" output "Q" of the Phase and Frequency Comparator Timing Diagrams of Figure 5-33. If a malfunction is noted, troubleshoot the circuit as illustrated in Section 5. 5. 4.

J. Does the Voltage Translator Operate Properly?

Repeat the test of Step I but with the oscilloscope probe attached to TP202. Waveforms are illustrated in Figure 5-17. Service the circuit as required using the reference information of Section 5. 5. 8.



Horizontal: 5μsec/Div
Upper Trace: Comparator Output (Pins 1, 5, and 10 of I208)
Upper vertical: 1V/Div
Lower Trace: Translator Output (TP202)
Lower Vertical: 2V/Div

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FIGURE 5-17 VOLTAGE TRANSLATOR

K. What if no Problems are Observed?

Troubleshoot the remaining block, the VCO Low Pass Filter per the discussion of Section 5. 5. 7.

5.5.3 PROGRAMMABLE DIVIDER (FIGURE 5-19)

The Programmable Divider consists of integrated circuits I201, I202, I204, I206 and gates A and D in I203. Reference material includes the divider theory of Section 4 and the Timing Diagram of Figure 5-32.

—NOTE—

If the COMM SMO is functioning properly, the servicing technician has the option of using comparison techniques in troubleshooting the NAV SMO.

5.5.3.1 Troubleshooting Procedure.

I. Test Setup

A. Open either end of L204, the Mixer Low Pass Filter choke.

B. Short Pins TP207, TP208 and TP209 together.

C. Use a coaxial pigtail to connect an HP 606A, or equivalent, to the tie point of C240 and C241.

II. Equipment Adjustments

A. Using a frequency counter, set the 606A, to a CW frequency of 3.175MHz.

B. Adjust the HP 606A CW level to obtain a crisp square wave (0 volts base line, 4 volts peak line) at TP206, when viewed by a 30MHz bandwidth or wider oscilloscope.

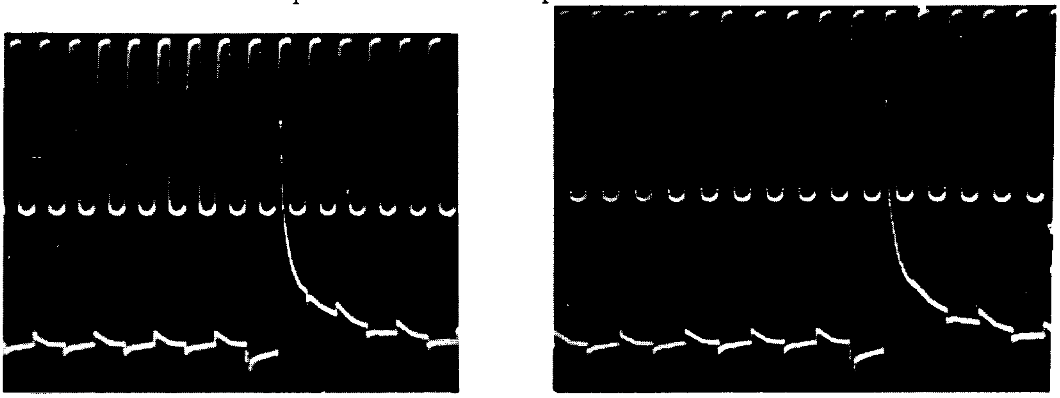
C. Dial the NAV channel selector to 116.70MHz. If comparison techniques are to be used select either 126.60MHz or 135.70MHz for the COMM channel.

III. Observations

A. Use a 30MHz bandwidth (or wider) oscilloscope. Provide external sync from the leading edge of the pulse appearing at the junction of R248 and CR213.

B. Compare the waveform at Pin 6 of the I204 to the equivalent point in the COMM SMO or to the timing diagrams. The desired output is a pulse train with a 4 volt reference level, a 40μsec period (25KHz rep rate), negative pulse width of approximately 210nsec, and 0 volts negative excursion.

C. If the desired oscilloscope trace was obtained in B, the counter is operational at 116. 70MHz. Dial 117. 950MHz. With the oscilloscope sync as in A on preceeding page, simultaneously monitor TP206 and Pin 9 of I208. Note the relationship of the pulses as the dial is rotated sequencially to the next lowest channel. The output pulse (Pin 9 of I208) should step 1 input pulse increment with each 50KHz step in dialing. See Figure 5-18. If the counter meets the above requirements it is operational.



Selected Freq. = 116. 70MHz

Selected Freq. = 116. 65MHz

Vertical: Top-1V/div (TP206)
Bottom - 0. 5V/div (Pin 9 of I208)
Horizontal: 0. 5μsec/div

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FIGURE 5-18 PROGRAMMABLE DIVIDER

D. Failure to meet the requirements of Step B requires a complete check of the I-C input/output timing as defined in either the Timing Diagram (Figure 5-32 or an operable COMM or NAV SMO.

E. Failure to meet the requirements of Step C implies a problem with the preset function of the Programmable Divider. Make a complete check of the divider flip-flops immediately preceeding and following the preset enable pulse (negative pulse on Pin 6 of I204. The desired preset states are defined in Table 4-3, where 0 is ground and 1 is 5 volts, and should occur immediately following the preset enable pulse. Also review Figure 5-32.

F. Replace components and make repairs as necessary to obtain the desired counter operation.

5.5.4 PHASE AND FREQUENCY COMPARATOR (Figure 5-19)

The Phase and Frequency Comparator consists of integrated circuits I205, I207, I208, gates C and B of I203 and wave shaping networks composed of C249, C250, C269, R247, R248 and CR213. Reference information sources include the Phase and Frequency Comparator Timing Diagrams of Figure 5-33 and the theory of Section 4.2.

—NOTE—

If the COMM SMO is operating properly it may be used to provide supplementary information using comparison techniques.

5.5.4.1 Troubleshooting Procedure

A. Connect an external power supply to the VCO bias test point TP201.

B. Monitor the Comparator output (Pins 1, 5, or 10 of I208) on an oscilloscope.

C. Adjust the VCO bias voltage low (less than 6.50 volts) and look for a high output voltage (around 1.5 volts). Refer to Figure 5-33 for the appropriate timing diagram.

D. Adjust the VCO bias voltage high (greater than 6.50 volts) and look for a low voltage output voltage (near ground potential). Refer to Figure 5-33 for the appropriate timing.

E. Failure to meet the conditions of Steps C and D requires a systematic comparison of the input (output) relationships obtained to those appearing in either the Timing Diagram or the functioning COMM SMO.

   1. Disable the counter hold pulses by shorting test points TP207, TP208 and TP209 and check the divide by 16 block (I205) for proper 2, 4, 8 and 16 ripple counter operation.

   2. Check the differentiation networks for proper waveshaping (tie point of C250, CR213, R248 and the tie point of C249 and R247).

   3. Remove the shorting connections at test points TP207, TP208 and TP209. Repeat the tests of Steps C and D. If proper operation is still not obtained monitor the gates of the MC817P's (I207 and I208) and B and C of I204 for proper operation.

5.5.5 LOW REFERENCE OSCILLATOR (Figure 5-19 NAV) (5-29, COMM)

The Low Reference Oscillator consists of transistors Q210 (Q315) and Q211 (Q316), with crystal Y202 (Y303) as the frequency determining element. The Low Reference Oscillator serves both the NAV and COMM SMO's. (KX 170A only).

5.5.5.1 Troubleshooting Procedures. Using an oscilloscope check TP205 (TP305) for a square wave output (See Figure 5-13). Capacitively couple a frequency counter to TP205 (TP305) and check for 400KHz. Check Q210 (Q315) and Q211 (Q316) and the associated circuitry. See Figure 5-50 and 5-51 for typical D-C operating voltage levels.

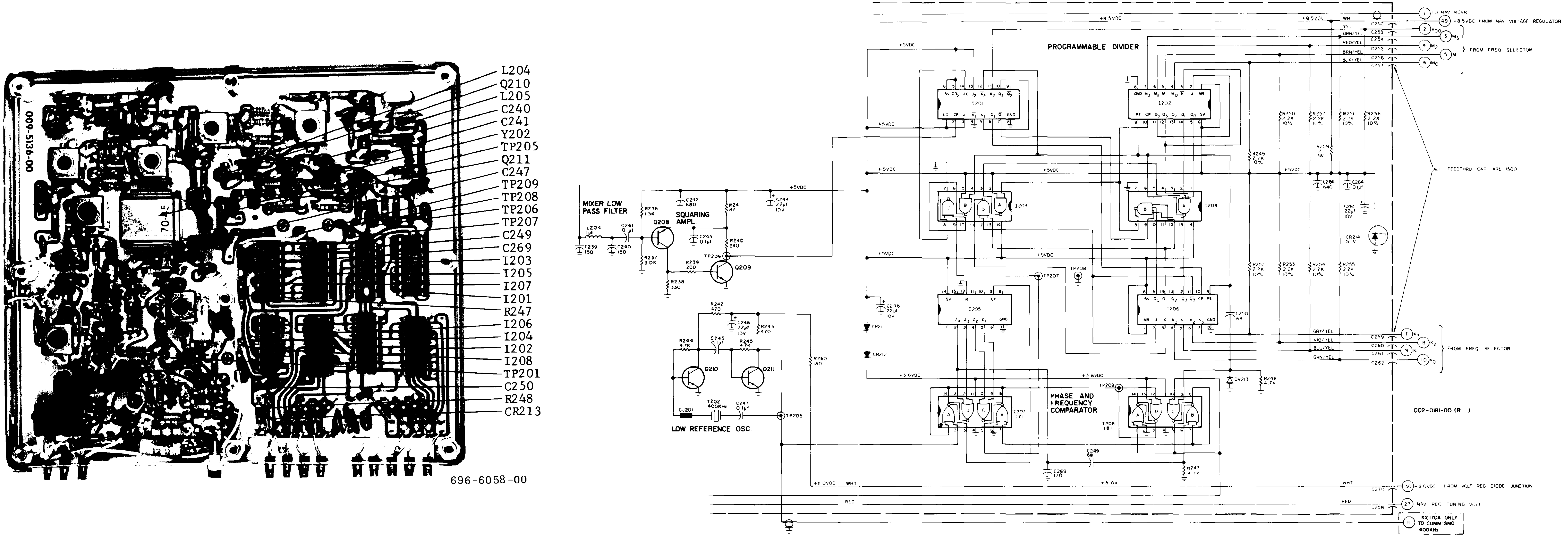


FIGURE 5-19
NAV LOW REFERENCE OSCILLATOR/PROGRAMMABLE DIVIDER/
PHASE AND FREQUENCY COMPARATOR

5. 5. 6 VOLTAGE CONTROLLED OSCILLATOR (VCO) (Figure 5-20)

The Voltage Controlled Oscillator (Q201) is a Colpitts oscillator. Frequency determining elements include CR201, L201, C204 and C205. Basic theory appears in Section 4. 2. 2. 2.

5. 5. 6. 1 Troubleshooting Procedure. Compare the supply and bias voltages for Q201 with those appearing in Figure 5-50 and replace components as necessary to obtain proper bias. Apply a 7. 2 volt tuning bias voltage, from a low impedance source, to TP201 and use a frequency counter to monitor the frequency at the collector of Q201. Adjust L201 to obtain a frequency of approximately 102. 7625. The VCO frequency should vary proportionately as the tuning voltage is varied. If erratic or erroneous operation is obtained, check the frequency determining elements. Failure of the VCO to oscillate implies an open varactor diode (CR201), an open trimmer coil (L201), or a bad transistor (Q201).

5. 5. 7 VCO LOW PASS FILTER (Figure 5-20)

The VCO Low Pass Filter consisting of T201, C211, C212 and C213 is an elliptic low pass filter designed to recover the D-C voltage from the output of the 25KHz Voltage Translator. It has been factory adjusted and no attempt should be made to readjust in the field.

5. 5. 7. 1 Troubleshooting Procedure. Using an oscilloscope, check for a square wave input at TP202. Using a D-C voltmeter, check for a D-C voltage at TP201 (7. 20VDC at 117. 95MHz to 2. 84VDC at 108. 00MHz.

5. 5. 8 25KHz VOLTAGE TRANSLATOR (Figure 5-20)

The Voltage Translator consists of transistors Q204 and Q205 which shifts the error voltage level from the Phase and Frequency Comparators to a level sufficient to operate the VCO.

5. 5. 8. 1 Troubleshooting Procedure. Using an oscilloscope trace the input signal from R215 to the output of TP202. See Figure 5-50 for typical D-C operating voltage levels.

5. 5. 9 RECEIVER BUFFER (Figure 5-20)

The Receiver Buffer consists of transistor, Q202, with output transformer, T202.

5. 5. 9. 1 Troubleshooting Procedure. Using an oscilloscope, trace the input signal from C216 to the output at Pin 2 of T202. See Figure 5-50 for typical D-C operating voltage levels.

5.5.10 VCO BUFFER (Figure 5-20)

The VCO Buffer consists of transistor Q203 with output transformer T203.

5.5.10.1 Troubleshooting Procedure. Using an oscilloscope, trace the input signal from C220 to the output at T203. See Figure 5-50 for typical D-C operating voltage levels.

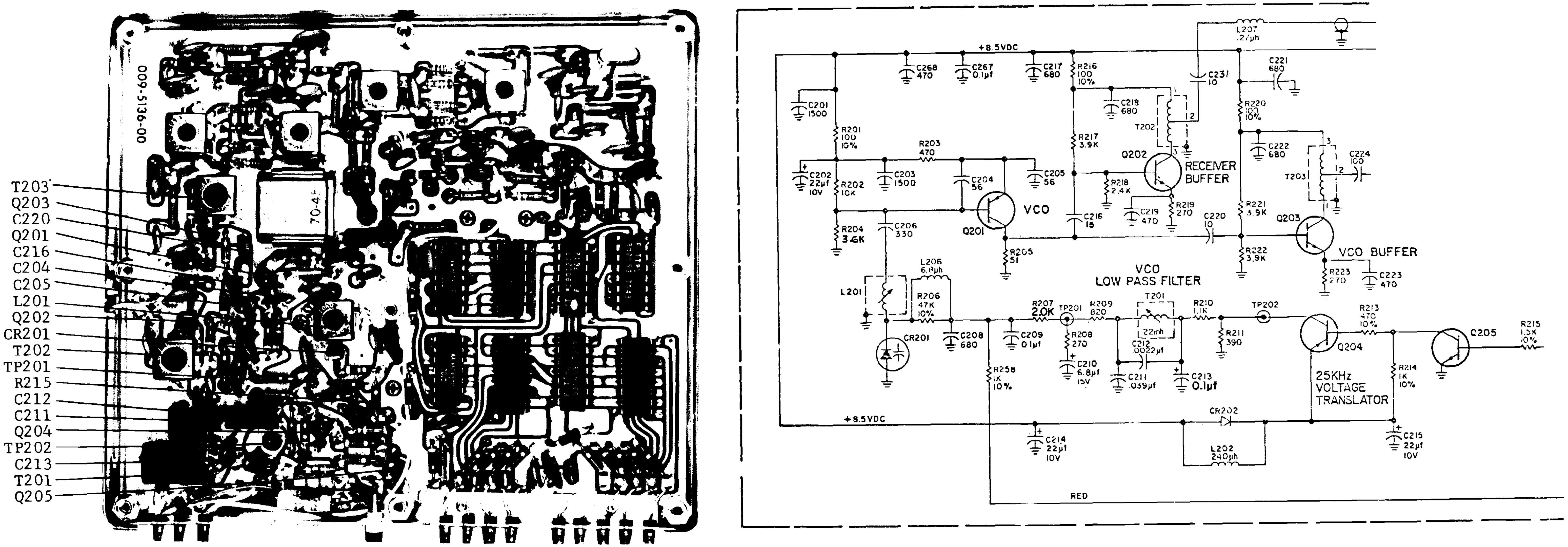


FIGURE 5-20 VCO BUFFER

(Dwg. No. 696-6059-00 R-0)

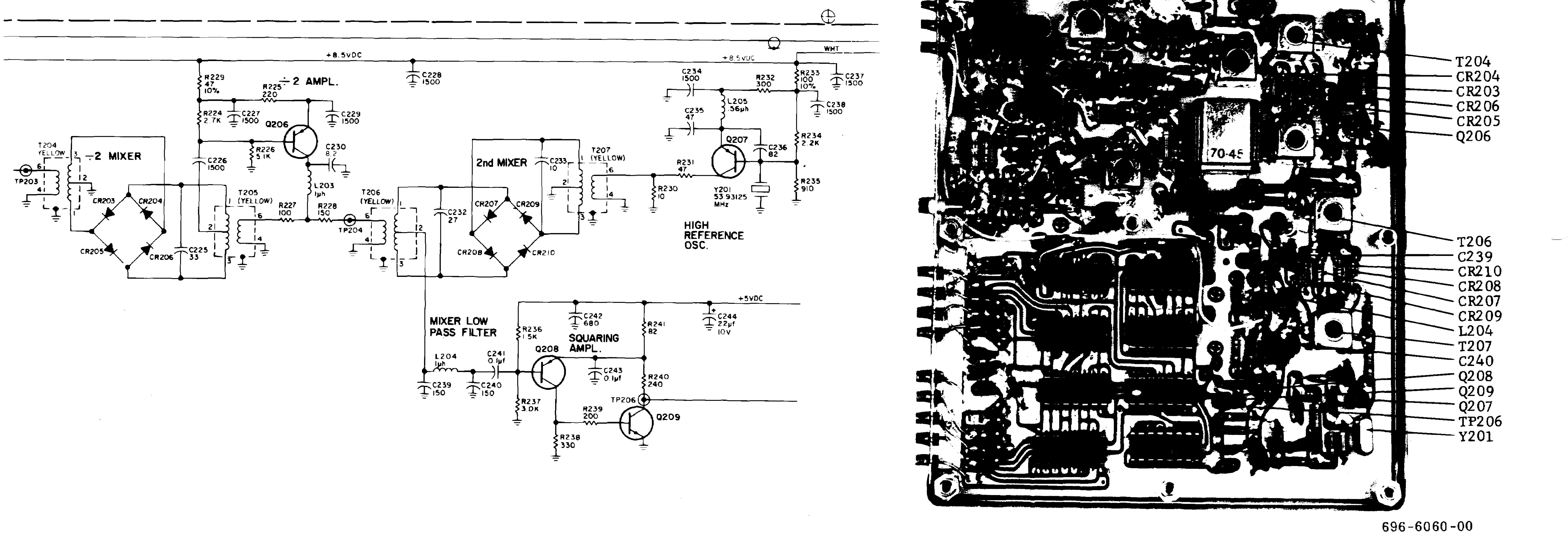


FIGURE 5-21
NAV HIGH REFERENCE OSCILLATOR, IMPLICIT DIVIDE BY 2 CIRCUIT
2ND MIXER, MIXER LOW PASS FILTER, SQUARING AMPLIFIER

5.5.11 HIGH REFERENCE OSCILLATOR (Figure 5-21)

The High Frequency Oscillator consists of transistor Q207 connected in a typical Colpitts configuration with crystal Y201 determining the operating frequency.

5.5.11.1 Troubleshooting Procedure. Check Pin 6 of T207 for oscillator output. Check supply and biasing voltage (See Figure 5-50 for typical D-C operating voltage levels).

5.5.12 IMPLICIT DIVIDE BY 2 CIRCUIT (Figure 5-21)

The Implicit Divide by 2 circuit consists of balanced mixer CR203, CR204, CR205 and CR206 and amplifier Q206. For circuit theory refer to Section 4.2.

5.5.12.1 Troubleshooting Procedure. Using an oscilloscope verify the output of VCO Buffer at Pin 6 of T204. See Figure 5-50 for typical D-C operating voltage levels.

5.5.13 2ND MIXER (Figure 5-21)

This is a balanced mixer consisting of transformer T206 and T207 with diodes CR207, CR208, CR209 and CR210.

5.5.13.1 Troubleshooting Procedure. With the power removed from the KX 170A/KX 175, and using an ohmmeter, check all diodes for a possible open. Check all transformer windings for D-C continuity.

5.5.14 MIXER LOW PASS FILTER (Figure 6-10)

The Mixer Low Pass Filter is a basic pi- section low pass filter consisting of inductor L204 and capacitors C239 and C240.

5.5.14.1 Troubleshooting Procedure. Using an oscilloscope trace the signal from the output of the 2nd Mixer (Pin 2 of T206) to the input of the Squaring Amplifier (base Q208).

5.5.15 SQUARING AMPLIFIER (Figure 5-21)

The Squaring Amplifier consists of transistors Q208 and Q209.

5.5.15.1 Troubleshooting Procedure. Using an oscilloscope check for Mixer output at the base of Q208. Check TP206 for a 4 volt square wave output. Check transistor Q208 and Q209 and associated circuitry. See Figure 5-50 for typical D-C operating voltage levels (with the base of Q208 bypassed).

5.6 TROUBLESHOOTING THE COMM SMO

The COMM SMO synthesizes 360 frequencies, providing a power level of 10mw into a 50Ω load. The relationship of channel frequency to synthesized frequency is illustrated in Table 5-11. Theory of Operation is presented in Section 4.

LO BAND		HI BAND	
Selected Channel (MHz)	Synthesizer Frequency Receiver (MHz)	Selected Channel (MHz)	Synthesizer Frequency Receiver (MHz)
118.00	127.00	127.00	118.00
118.05	127.05	127.05	118.05
118.10	127.10	127.10	118.10
118.15	127.15	127.15	118.15
118.20	127.20	127.20	118.20
118.25	127.25	127.25	118.25
118.30	127.30	127.30	118.30
118.35	127.35	127.35	118.35
118.40	127.40	127.40	118.40
118.45	127.45	127.45	118.45
118.50	127.50	127.50	118.50
118.55	127.55	127.55	118.55
118.60	127.60	127.60	118.60
118.65	127.65	127.65	118.65
118.70	127.70	127.70	118.70
118.75	127.75	127.75	118.75
118.80	127.80	127.80	118.80
118.85	127.85	127.85	118.85
118.90	127.90	127.90	118.90
118.95	127.95	127.95	118.95
119.95	128.95	128.95	119.95
120.95	129.95	129.95	120.95
121.95	130.95	130.95	121.95
122.95	131.95	131.95	122.95
123.95	132.95	132.95	123.95
124.95	133.95	133.95	124.95
125.95	134.95	134.95	125.95
126.95	135.95	135.95	126.95

TABLE 5-11 COMM SMO SYNTHESIZER FREQUENCIES

5.6.1 PRELIMINARY EVALUATION (Figure 5-51)

A. Verify the COMM SMO failure!

1. Perform the alignment procedure of Section 5.2.2.
2. Does the COMM SMO supply 10mw to a 50 ohm load?
3. Is the synthesized frequency correct when dialing through all KHz (20 ea.) and all MHz (18 ea.) positions with both clockwise and counterclockwise rotation.

B. Is the failure external from the COMM SMO enclosure?

1. Check all power and control lines to the COMM SMO for proper operation. Wire color and feedthru assignment are shown in Figure 5-51. Control wire functions are defined in Table 4-4 where "0" is ground and "1" is 5VDC.
2. Does the NAV SMO supply a 400KHz reference to the COMM SMO? (KX 170A Only)

5.6.2 COMM SMO DIAGNOSTIC PROCEDURE

If the tests of 5.6.1 substantiate the COMM SMO failure, proceed as follows:

A. Open the loop.

—NOTE—

> To properly troubleshoot the COMM SMO it is imperative that the feedback loop be disabled. This is accomplished very simply by applying a positive, adjustable, D-C voltage from a low impedance source to TP301, the VCO bias point.

B. Is the High Reference Oscillator operating properly?

Using a 1Kpf coupling capacitor connect a VHF frequency counter to the junction of CJ301 and CJ302 in the High Reference Oscillator and check for 71.025 ±1KHz when a low band (118.00 - 126.95MHz) frequency, or 66.525 ±1KHz when a high band 127.00-135.95MHz frequency has been selected on the COMM frequency dial.

If the oscillator is inoperative or off frequency, refer to Section 5. 6. 10 for servicing information.

C. Is the Low Reference Oscillator Operational?

Connect a frequency counter to TP305 and measure 400, 000 (+30, -10)Hz. Remove the counter, connect an oscilloscope to TP305 and observe the waveform. The proper waveform is shown in Figure 5-23 below.

Horizontal: 0. 5μsec/div
Vertical: 1V/CM
Selected Freq: 126. 70MHz

696-6061-00

FIGURE 5-23 LOW REFERENCE OSCILLATOR OUTPUT

If an incorrect waveform is observed, refer to Section 5. 5. 5 for servicing instructions.

D. Does the VCO and Receiver Buffer perform properly?

Dial 126. 70MHz on the COMM frequency selector, and adjust the VCO bias voltage to 6. 85V. Connect a VHF counter to the Receiver Buffer, TP303, and adjust C315 to obtain a frequency of approximately 135. 70MHz.

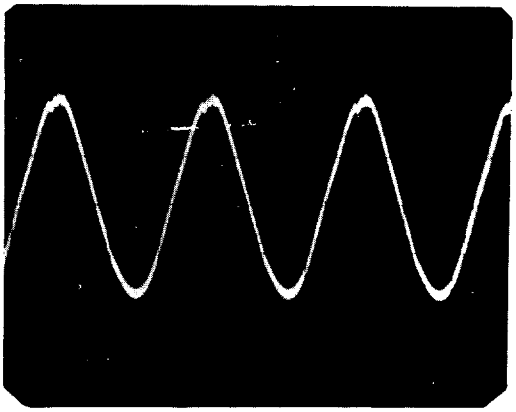
Change the COMM frequency selector dial to 135. 70MHz and adjust C314 to obtain a frequency of approximately 126. 70MHz. Erratic or improper tuning, or low output should be corrected by troubleshooting the VCO and/or VCO Buffer as outlined in Sections 5. 6. 5 and 5. 6. 9.

E. Is the Implicit Divide by 2 halving the VCO frequency?

Without altering the tuning voltage or the channel frequency setting, connect the VHF counter to TP304 and read a frequency of approximately 63. 85MHz. Change the COMM frequency selector dial back to 126. 70MHz and read a frequency of approximately 67. 85 MHz on the counter. If a malfunction is observed, the circuit may be serviced using the troubleshooting instructions of Section 5. 6. 11.

F. Is the Mixer Working Properly?

With 126. 70 selected and 6. 85VDC bias applied to the VCO, as in previous steps, connect an oscilloscope to the junction of L305, C376 and C377. The waveform should be one of the approximate amplitude and frequency of Figure 5-24.



Horizontal: 0. 1μsec/div
Vertical: . 05V/div
Selected Freq: 126. 70MHz

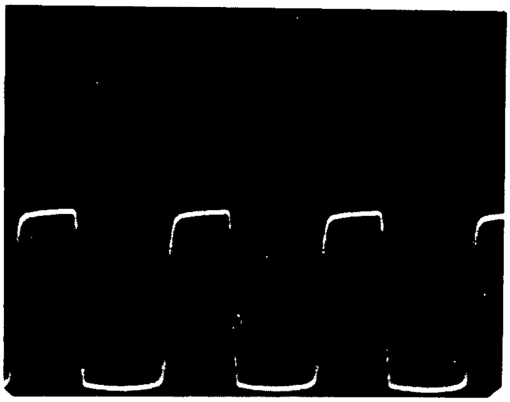
696-6062-00

FIGURE 5-24 MIXER OUTPUT

Failure to obtain the desired trace would indicate a malfunction in the Mixer circuit which can be serviced using the troubleshooting information of Section 5. 6. 12.

G. Is the Squaring Amplifier Working Properly?

With the VCO oscillating at 135. 70MHz (COMM frequency selector 126. 70MHz), monitor the Squaring Amplifier output, TP306, with an oscilloscope having a bandwidth of at least 30MHz. If the reference oscillator is functioning properly, the waveform will appear as in Figure 5-25. If not, troubleshoot the squaring amplifier as in Section 5. 6. 14.



Horizontal: 0. 1μsec/div
Vertical: 1V/div
Selected Freq.: 126. 70MHz

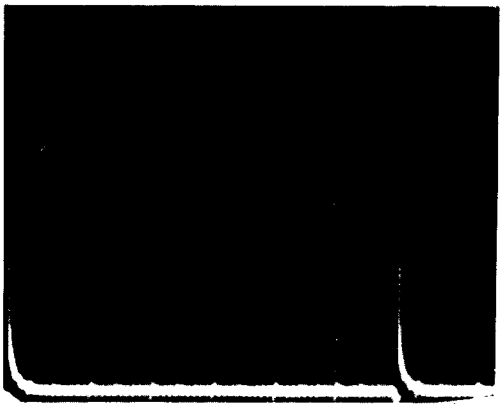
696-6063-00

FIGURE 5-25 SQUARING AMPLIFIER OUTPUT

H. Does the Programmable Divider provide proper frequency division?

Short together test points TP307, TP308 and TP309. This disables the phase and frequency comparator to permit testing of the programmable counter. Maintain the channel setting and the VCO tuning voltage of steps D through G. Attach the oscilloscope probe to the junction point of C384, CR317, R366 and Pin 9 of I308 to monitor the counter output. The waveform of Figure 5-26 should be obtained. Note the pulse period of 40μsec. Dial the eighteen MHz positions, leaving the VCO bias unchanged, and look for the counter output pulse rate to increase uniformly as lower channel frequencies are dialed. Return the MHz dial to the 126MHz position and dial through the twenty KHz positions. Observe a gradual increase in output pulse rate as numbers are dialed from the 0. 95 to 0. 00 using counterclockwise rotation.

If erroneous operation of the Programmable Counter is observed, service the counter using the procedure outlined in Section 5. 6. 3. Upon completion of the counter checks, remove the shorting connections from TP307, TP308 and TP309.



Horizontal: 5μsec/div
Vertical: 1. 0V/div
Selected Freq: 126. 7MHz

696-6064-00

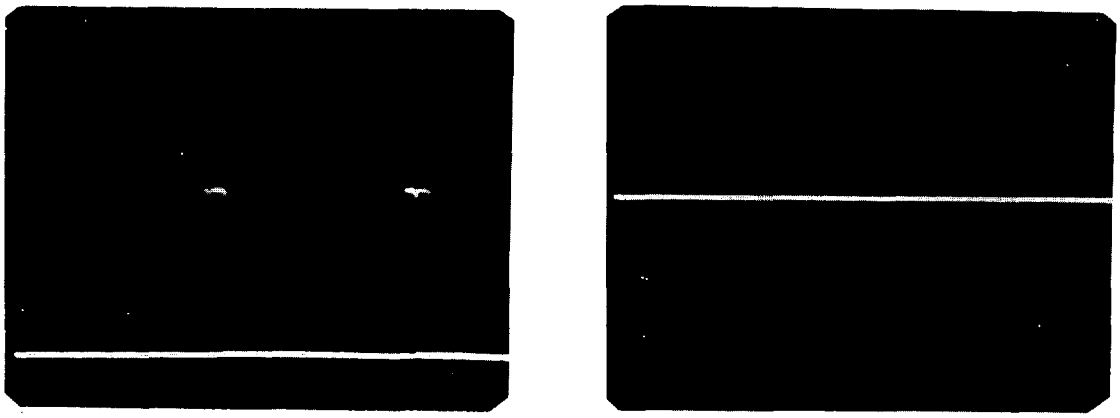
FIGURE 5-26 PROGRAMMABLE DIVIDER OUTPUT

I. Is the Phase and Frequency Comparator Operational?

Connect the oscilloscope probe to the tie point of Pins 1, 5, and 10 of I308 and R333 to monitor the Phase and Frequency Comparitor output. With the COMM channel selector at 126. 70MHz, vary the VCO bias above and below 6. 85 volts. The output voltage on the scope should be dominately high when the VCO bias is low, and low when the VCO bias is high. Waveforms are illustrated on the "set-reset" output "$\overline{Q}$" of the Phase and Frequency Comparator timing diagrams of Figure 5-33. If a malfunction is noted, troubleshoot the circuit as instructed in Section 5. 6. 4.

J. Does the Voltage Translator Operate Properly?

Repeat the test of Step I but with the oscilloscope probe attached to TP302. Waveforms are illustrated in Figure 5-27. Troubleshoot the circuit as required using the information given in Section 5. 6. 7.



(a) VCO frequency and bias voltage high.

(b) VCO frequency and bias voltage low.

Horizontal: 10μsec/div
Vertical: 2V/div
Selected Freq: 126.70MHz

696-6065-00

FIGURE 5-27 VOLTAGE TRANSLATOR

K. What if no Problems are Observed?

Service the remaining block, the VCO Low Pass Filter. Compare waveforms with those of Figure 4-14 and voltage levels of figure 5-51. Check for continuity.

5.6.3 PROGRAMMABLE DIVIDER (Figure 5-29)

The Programmable Divider consists of integrated circuits, I301, I302, I304, I306 and gates A and D in I303. Reference material includes the divider theory of Section 4.2 (c) and the Timing Diagram of Figure 5-32.

–NOTE–

If the NAV SMO is functioning properly, the servicing technician has the option of using comparison techniques in troubleshooting the COMM SMO.

5.6.3.1 Troubleshooting Procedure.

I. Test Setup.

A. Open either end of L305, the Mixer Low Pass Filter choke.

B. Short Pins TP307, TP308 and TP309 together.

C. Use a coaxial pigtail to connect an H/P 606A or equivalent, to the tie point of C376 and C377.

II. Equipment Adjustments.

A. Using a frequency counter, set the 606A to a CW frequency of 3.175MHz.

B. Adjust the H/P 606ACW level to obtain a crisp square wave (0 volts base line, 4 volts peak line) at TP306, when viewed by an oscilloscope having a 30MHz or wider bandwidth.

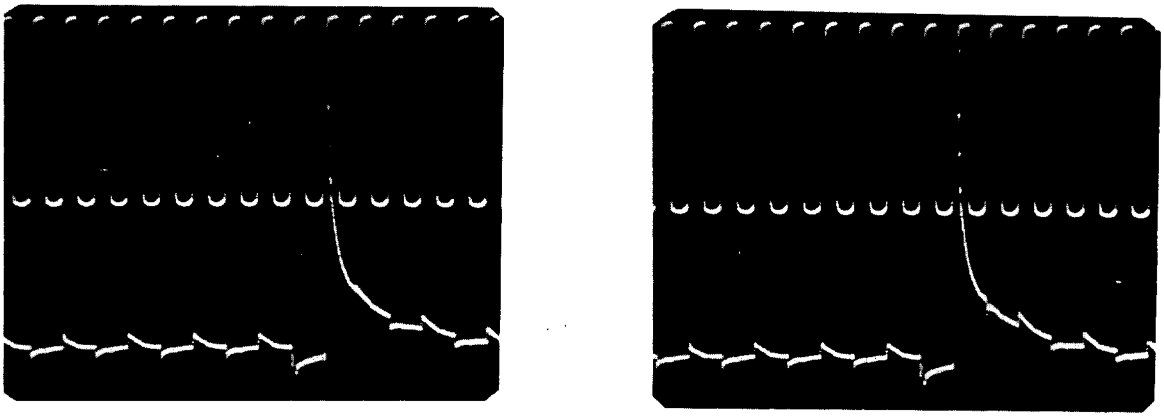
C. Dial the COMM channel selection to 126.70MHz. If NAV SMO comparison techniques are to be used, select 116.70MHz for the NAV channel.

III. Observations

A. Use a 30MHz bandwidth (or wider) oscilloscope. Provide external sync from the leading edge of the pulse appearing at the junction of R366 and CR317.

B. Compare the waveform at Pin 9 of I308 to the equivalent point in the NAV SMO or to the timing diagram (See Figure 5-32). The desired output is a pulse train with a 2. 5 volt peak level, a 40μsec period (25KHz rep. rate), and 0 volts base line.

C. If the desired oscilloscope trace was obtained in B, the counter is operational at 126. 70MHz. Dial 135. 95MHz. With the oscilloscope sync as in A above, simultaneously monitor TP306 and Pin 9 of I308. Note the relationship of the pulses as the dial is rotated sequentially to the next lowest channel. The output pulse should step 1 input pulse increment with each 50KHz step in dialing (See Figure 5-28). If the counter meets the above requirements it is operational.



f = 126. 70MHz

f = 126. 65MHz

Vertical: Top-1V/div (TP306)
Bottom-0. 5V/div (Pin 9 of the I308)
Horizontal: 0. 5μsec/div

696-6066-00

FIGURE 5-28 PROGRAMMABLE DIVIDER

D. Failure to meet the requirements of Step B requires a complete check of the I-C input/output timing as defined in either the timing diagram (Figure 5-32) or an operable COMM or NAV SMO.

E. Failure to meet the requirements of Step C implies a problem with the preset function of the Programmable Divider. A complete check of the divider flip-flops immediately preceeding and following the preset enable pulse (negative pulse on Pin 6 of the I304). The desired preset states are defined in Table 4-4, where 0 is ground and 1 is 5 volts and should occur immediately following the preset enable pulse.

F. Replace components and make repairs as necessary to obtain the desired counter operation.

5.6.4 PHASE AND FREQUENCY COMPARATOR (Figure 5-29)

The Phase and Frequency Comparator consists of integrated circuits I305, I307, I308, gates B and C of I303 and wave shaping networks consisting of C383, C384, CR317, C565, R366 and R367. Reference information sources include the Phase and Frequency Comparator Timing Diagram of Figure 5-33 and the theory of Section 4. 2. 2.

–NOTE–

If the NAV SMO is operating properly
it may be used to provide supplementary
information using comparison techniques.

5.6.4.1 Troubleshooting Procedure

A. Connect an external power supply to the VCO bias test point, TP301.

B. Monitor the comparitor output (Pins 1, 5, or 10 of I308) on an oscilloscope.

C. Adjust the VCO bias voltage low (less than 6. 85 volts with 126. 70 or 135. 70MHz selected) and look for a high output voltage (around 1. 5 volts). Refer to Figure 5-33 for the appropriate timing diagram.

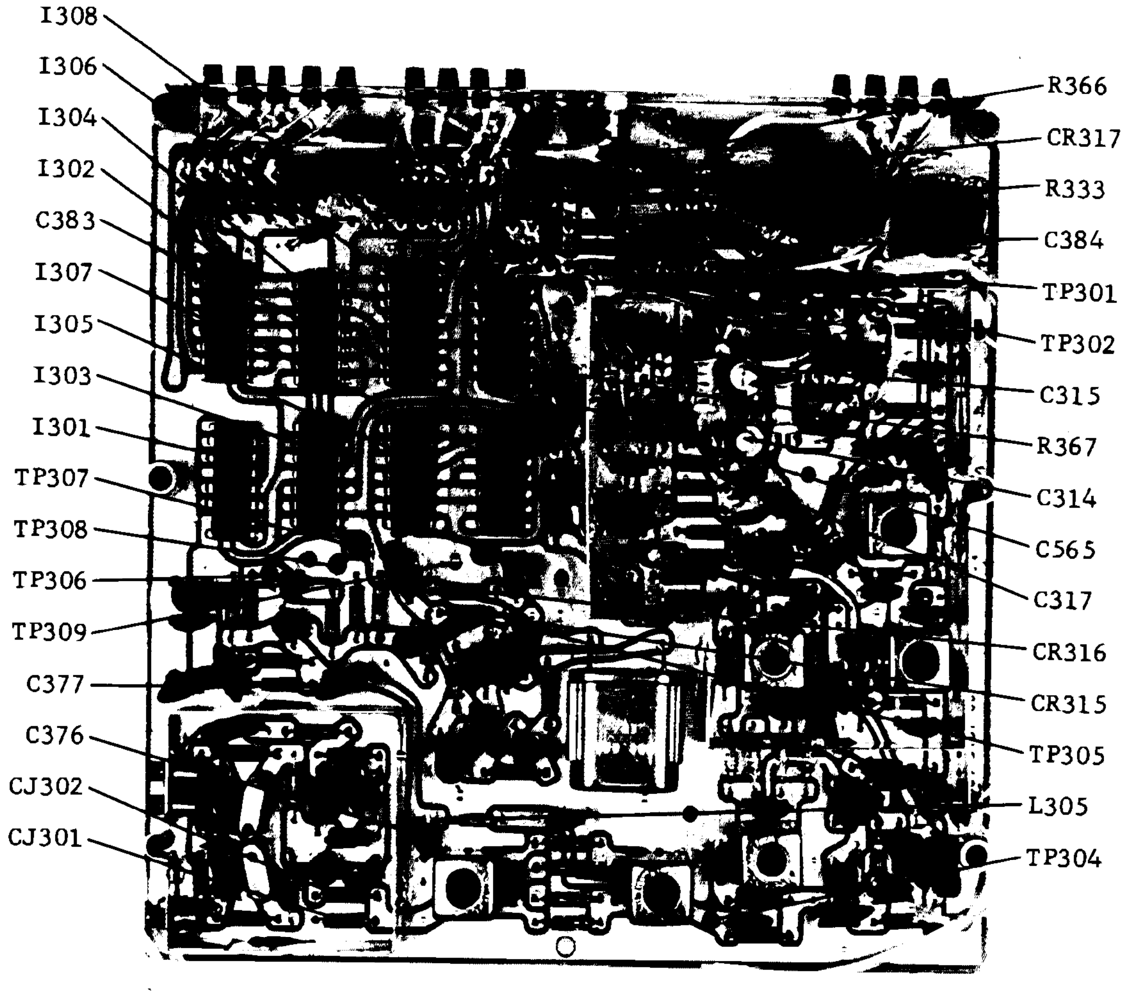
D. Adjust the VCO bias voltage high (greater than 6. 85 volts) and look for a low output voltage (near ground potential). Refer to Figure 5-33 for the appropriate timing.

E. Failure to meet the conditions of Steps C and D requires a systematic comparison of the input output relationships appearing in either the Timing Diagram or the functioning NAV SMO.

  1. Disable the counter hold pulses by shorting test points TP307, TP308, and TP309, and check the divide by 16 block (I305) for proper divide by 2, divide by 4, divide by 8 and divide by 16 ripple counter operation.

  2. Check the differentiation networks for proper wave shaping (tie point of C384, CR317, and R366 and the tie point of C383 and R367.

3. Remove the shorting connections at test point TP307, TP308 and TP309. Repeat the tests of Steps C and D above. If proper operation is still not obtained, monitor the gates of the MC817P's (I307 and I308) and B and C of the I304 for proper input/output operation.



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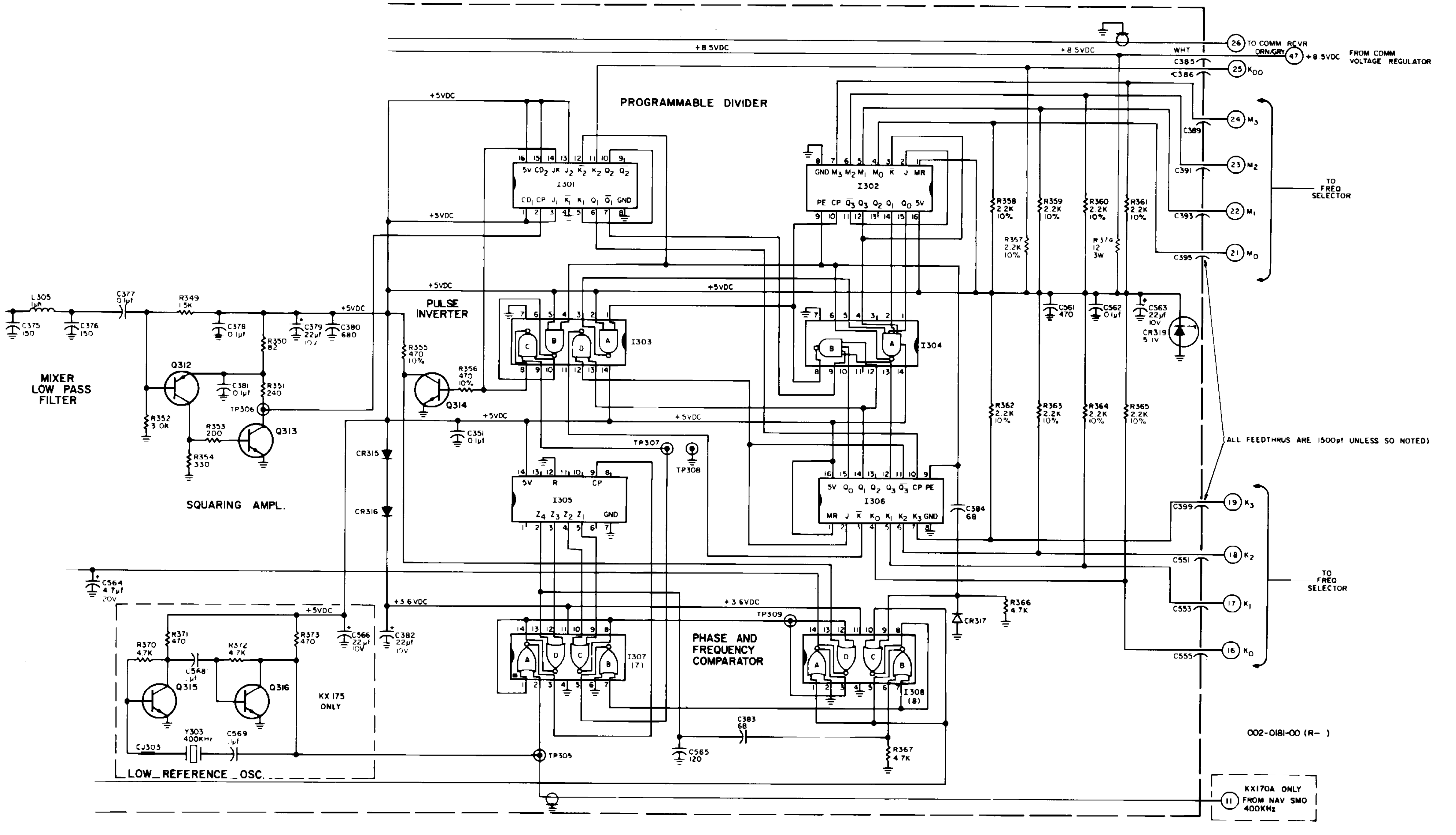


FIGURE 5-29 COMM PROGRAMMABLE DIVIDER/
PHASE AND FREQUENCY COMPARATOR

5.6.5 VOLTAGE CONTROLLED OSCILLATOR (VCO) (Figure 5-30)

The Voltage Controlled Oscillator (VCO) consists of transistor Q302, Varactor diode CR303, with frequency adjust capacitors C314 and C315 and HI-LO VCO switching transistor Q301. Diodes CR301 and CR302 disable the VCO transistor Q302 when the COMM frequency selector wafer is dialed to a nonvalid COMM channel. In the low portion of the COMM band (118.00-126.95MHz), the Hi line is grounded on receive and the "Lo" line is grounded on transmit. Therefore, in receive the "Hi" line forward biases CR301 applying bias to Q302 for normal operation. CR302 is reverse biased by R346 (High Reference Oscillator Section). In the high portion of the COMM band (127.00-135.95MHz) the "Lo" line is grounded on receive and the "Hi" line is grounded on transmit. Therefore, in receive the "Lo" line, forward biases CR302 which again applies bias to Q302. At the same time, the "Lo" line enables VCO switch Q301, placing trimmer C314 in parallel with C315. CR301 is reverse biased by R347 (High Reference Oscillator Section).

5.6.5.1 Troubleshooting Procedure. Check the supply and bias voltages of Q302. Check for proper operation of the Hi-Lo switching wafer and associated diodes CR301 and CR302. (See Section 5.6.11) Make repairs as necessary to obtain proper operating conditions. Supply a 7.0 volt bias voltage from a low impedance source to TP301 and monitor the VCO output frequency by capacitively coupling a frequency counter to the collector of Q302 with a 100pf diskcap. With the frequency selector at 126.95MHz adjust C315 to get a frequency of approximately 135.950MHz. If this is unattainable, verify that Q301, is turned off and check the frequency determining elements, C317, C387, C315, C343, L301, and CR303. Dial 135.950MHz and adjust C314 to obtain a VCO frequency of 126.950 MHz. If erratic or erroneous operation is noted, check the frequency determining components and verify that Q301 is saturated. If the VCO fails to operate, check L301 and CR303 and Q302. Check the VCO for a proportional change in frequency with tuning voltage changes on the low and high bands.

5.6.6 VCO LOW PASS FILTER (Figure 5-30)

The VCO Low Pass Filter consisting of T307, C348, C349, and C350 is an elliptic low pass filter designed to recover D-C voltage from the output of the 25KHz Voltage Translator. It has been factory adjusted and no attempt should be made to readjust in the field.

5.6.6.1 Troubleshooting Procedure. Using an oscilloscope, check for a square wave input at TP302. Using a D-C voltmeter, check for a D-C voltage at TP301 (7.00V DC at 126.95MHz to 2.58V DC at 118.00MHz.

5.6.7 25KHz VOLTAGE TRANSLATOR (Figure 5-30)

The Voltage Translator consists of transistors Q308 and Q309 which shift the error voltage level from the Phase and Frequency Comparator to a level sufficient to operate the VCO.

5.6.7.1 Troubleshooting Procedure. Using an oscilloscope, trace the input signal from pins 1, 5, or 10 of I308 to the output at TP302. See Figure 5-51 for typical D-C operating voltage levels.

5.6.8 RECEIVER BUFFER (Figure 5-30)

The Receiver Buffer consists of transistor Q303 with output transformer T301.

5.6.8.1 Troubleshooting Procedure. Using an oscilloscope, trace the input signal from R309 to the output at TP303. See Figure 5-51 for typical D-C operating voltage levels.

5.6.9 TRANSMIT BUFFER/TX ENABLE SWITCH/OUT OF LOCK TX DISABLE

The Transmit Buffer consists of Q306 with output transformer T305. It provides drive to the transmitter only when both the TX Enable Switch, Q305, is turned off and the Out of Lock Disable switch Q307 is saturated providing an emitter current path to ground.

5.6.9.1 Troubleshooting Procedure. Key the transmitter and use an oscilloscope to track the signal from T301 to Pin 2 of the output transformer T305. Using a D-C voltmeter, check the TX enable switch Q305 for proper operation (Saturated in receive, open in transmit) and check the Out of Lock Disable Q307 for proper operation (saturated-bringing the emitter resistors of Q303 and Q306 to ground. See Figure 5-51 for typical D-C operating voltage levels.

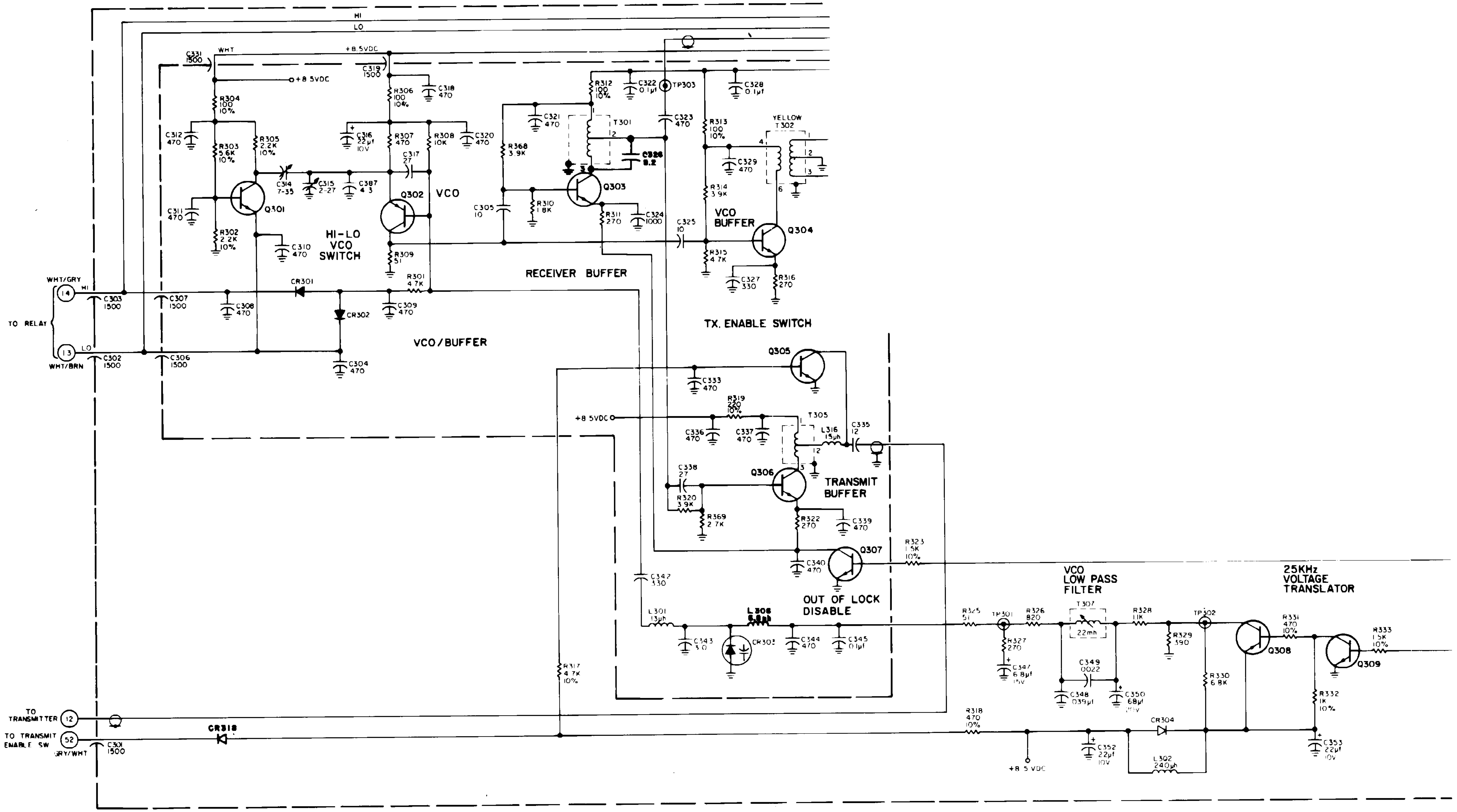
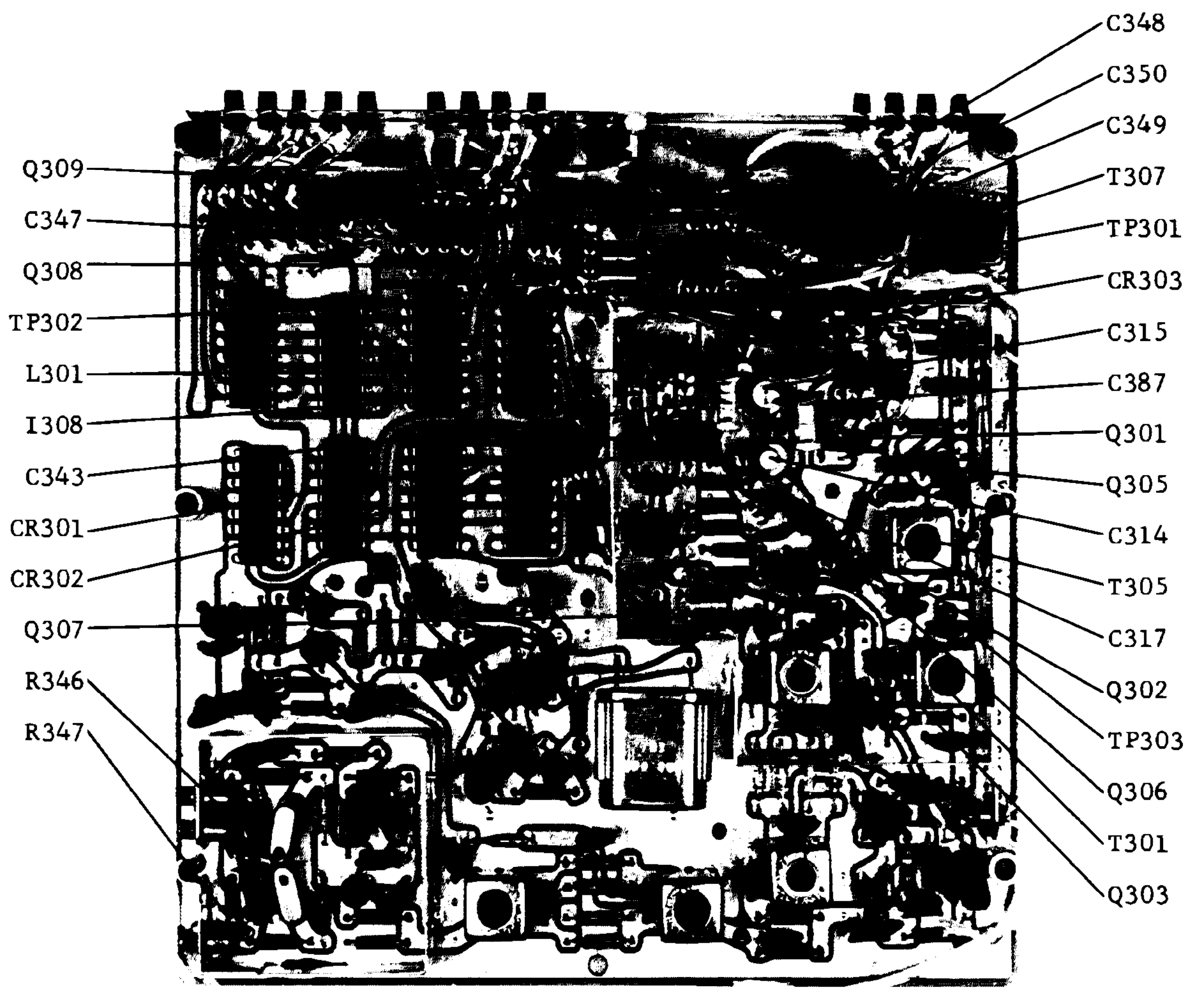


FIGURE 5-30 COMM VOLTAGE CONTROLLED OSCILLATOR/ VCO LOW PASS FILTER/25KHz VOLTAGE TRANSLATOR/ VCO BUFFER/TRANSMIT BUFFER/TRANSMIT ENABLE SWITCH/ OUT-OF-LOCK TRANSMIT DISABLE



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5. 6. 10 HIGH REFERENCE OSCILLATOR (Figure 5-31)

The High Reference Oscillator consists of transistor Q311 operating in a typical Colpitts configuration. Crystals Y301 and Y302 determine the operating frequency. In the low portion of the COMM band (118. 00-126. 95MHz), Y301 is used on receive and Y302 is used on transmit. In the high portion of the COMM band (127. 00-135. 95MHz), Y302 is used on receive and Y301 on transmit.

5. 6. 10. 1 Troubleshooting Procedure. Check the oscillator output at Pin 6 of T306. The following table gives the desired functions under the various conditions encountered.

Low Band	(118. 00 - 126. 95MHz)	High Band	(127. 00 - 135. 95MHz)
Receive	f = 71. 025MHz "Lo" +8. 5V "Hi" GND CR314 Reverse Biased CR313 Forward Biased	Receive	f = 66. 525MHz "Lo" GND "Hi" +8. 5V CR314 Forward Biased CR313 Reverse Biased
Transmit	f = 66. 525MHz "Lo" GND "Hi" +8. 5V CR314 Forward Biased CR313 Reverse Biased	Transmit	f = 71. 025MHz "Lo" +8. 5V "Hi" GND CR314 Reverse Biased CR313 Forward Biased

TABLE 5-12 HIGH REFERENCE OSCILLATOR TROUBLESHOOTING TABLE

Check supply and biasing voltages (See Figure 5-51 for typical D-C operating voltage levels).

5. 6. 11 IMPLICIT DIVIDE BY 2 CIRCUIT (5-31)

The Implicit Divide by 2 circuit consists of balanced mixer CR305, CR306, CR307 and CR308 and amplifier Q310. For circuit theory refer to Section 4. 2.

5. 6. 11. 1 Troubleshooting Procedure. Using an oscilloscope verify output from VCO Buffer at Pin 6 of T302. Check for signal at the base of Q310 and track through the amplifier section working toward TP304. See Figure 5-51 for typical D-C operating voltage levels. Refer to 5. 5. 12. 1 for procedure for isolating amplifier and mixer failures.

5. 6. 12 2ND MIXER (Figure 5-31)

This is a balanced mixer consisting of transformers T304 and T306 and diodes CR309, CR310, CR311 and CR312.

5.6.12.1 Troubleshooting Procedure. With the power removed from the KX 170A/KX 175 using an ohmmeter check all diodes for a possible open. Check all transformer windings for D-C continuity.

5.6.13 MIXER LOW PASS FILTER (Figure 5-31)

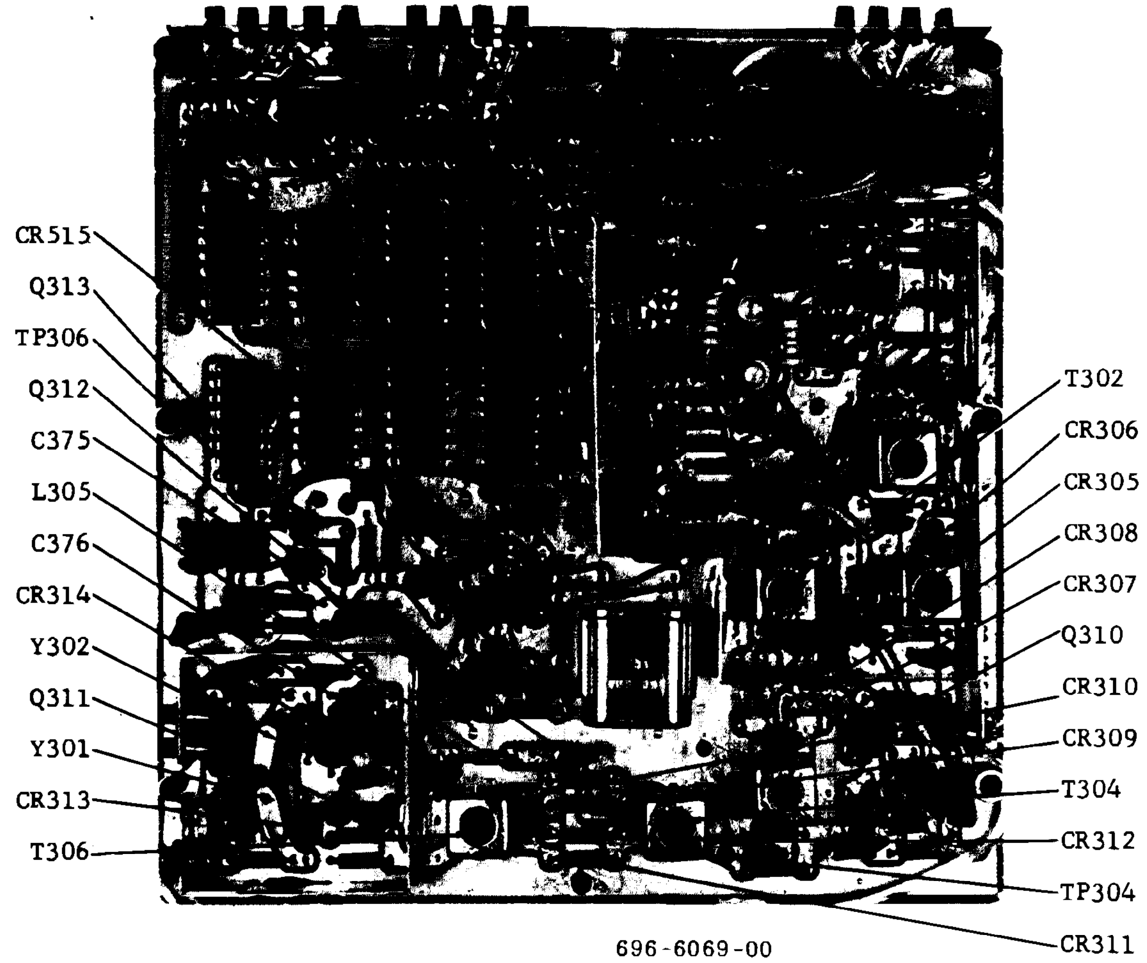
The Mixer Low Pass Filter is a basic pi- section low pass filter consisting of inductor L305 and capacitors C375 and C376.

5.6.13.1 Troubleshooting Procedure. Using an oscilloscope trace the signal from the output of the Second Mixer (Pin 2 of T304) to the input of the Squaring Amplifier (base of Q312).

5.6.14 SQUARING AMPLIFIER (Figure 5-31)

The Squaring Amplifier consists of transistors Q312 and Q313.

5.6.14.1 Troubleshooting Procedure. Using an oscilloscope check for mixer output signal at the base of Q312. Check TP306 for a 4 volt square wave output. Check transistors Q312 and Q313 and associated circuitry (See Figure 5-51 for typical D-C operating voltage levels).



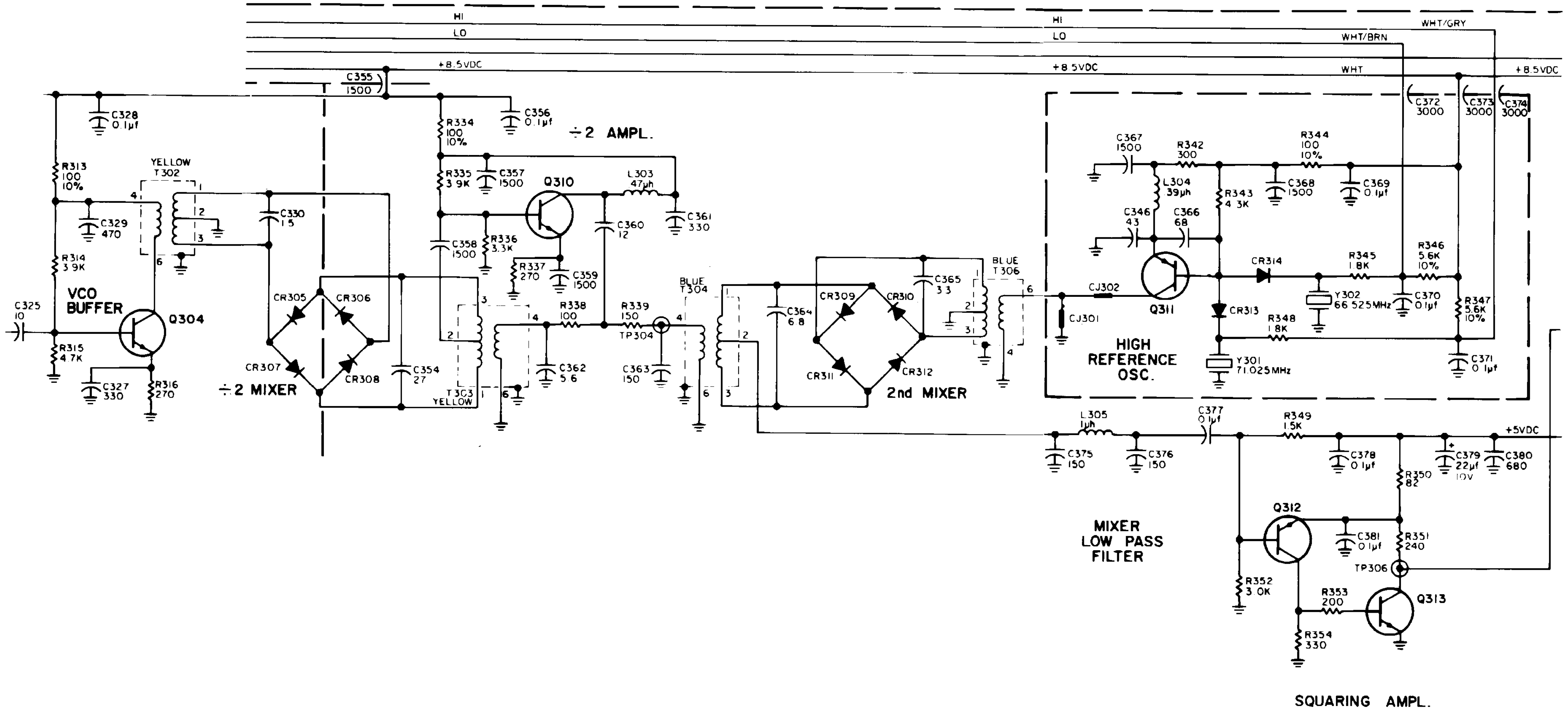
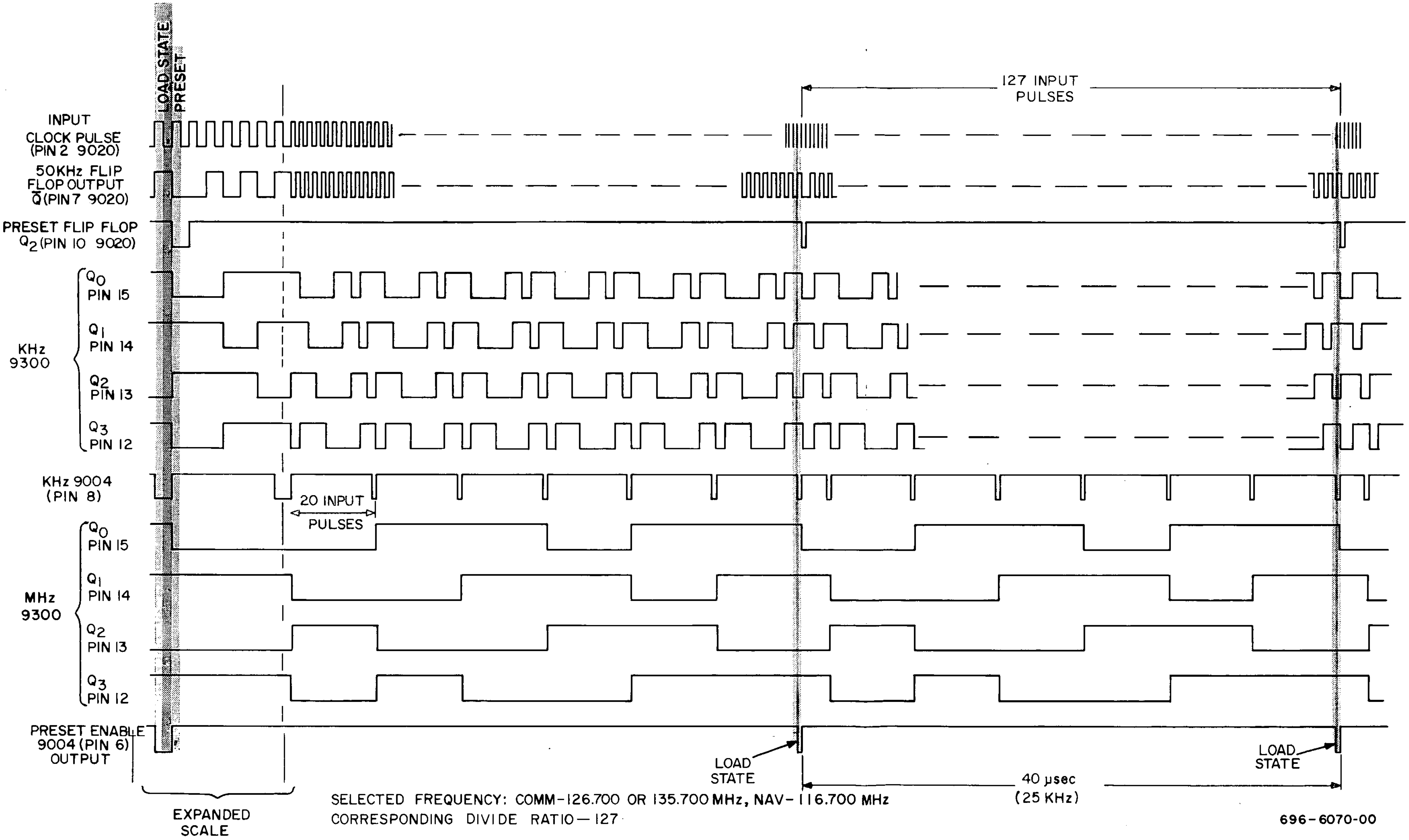


FIGURE 5-31 COMM HIGH REFERENCE OSCILLATOR/
IMPLICIT-2 CIRCUIT/2ND MIXER/MIXER LOW PASS
FILTER/SQUARING AMPLIFIER



SELECTED FREQUENCY: COMM-126.700 OR 135.700 MHz, NAV-116.700 MHz
CORRESPONDING DIVIDE RATIO—127

FIGURE 5-32 TIMING DIAGRAM PROGRAMMABLE DIVIDER

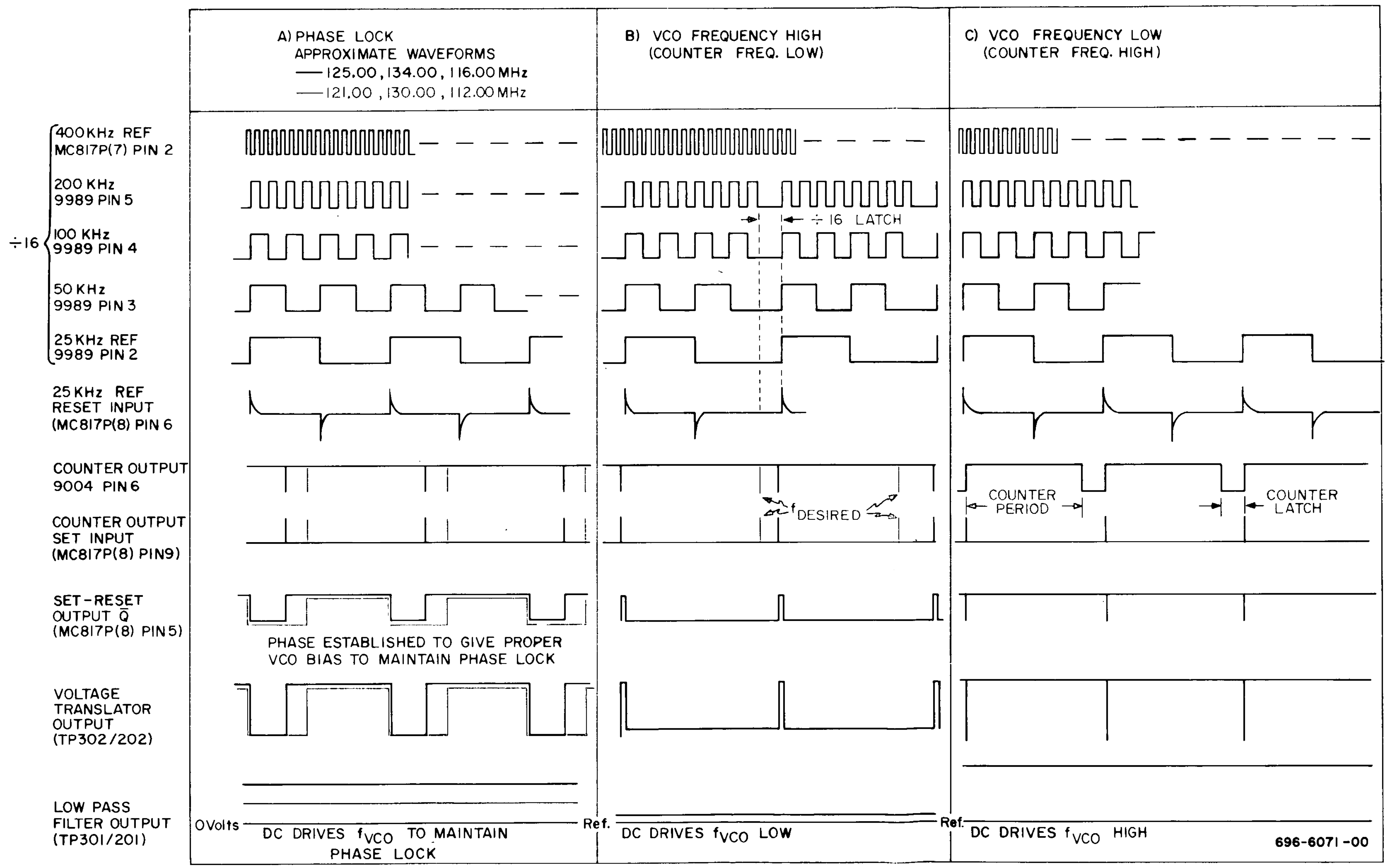


FIGURE 5-33 TIMING DIAGRAM PHASE AND FREQUENCY COMPARATOR

5.7 TROUBLESHOOTING THE NAV RECEIVER

Receiver schematic diagram Figure 5-52.

5.7.1 PRELIMINARY EVALUATION (Isolating the malfunction by stage gain measurements)

a. At some convenient channel frequency apply a 10μv RF signal modulated 30% by a 1KHz audio signal.

b. Connect an oscilloscope to the detector TP403 and determine that the output is approximately 1.7 volts peak-to-peak. If so the failure is in audio processing, (go to step f). If not, the failure is between the R-F input and the detector (go to step c).

c. Determine if the failure is within the AGC AMP. Connect a variable voltage power supply to TP412 through a 1KΩ resistor. Compare the input voltage to output voltage relationship with the typical data of Figure 5-34.

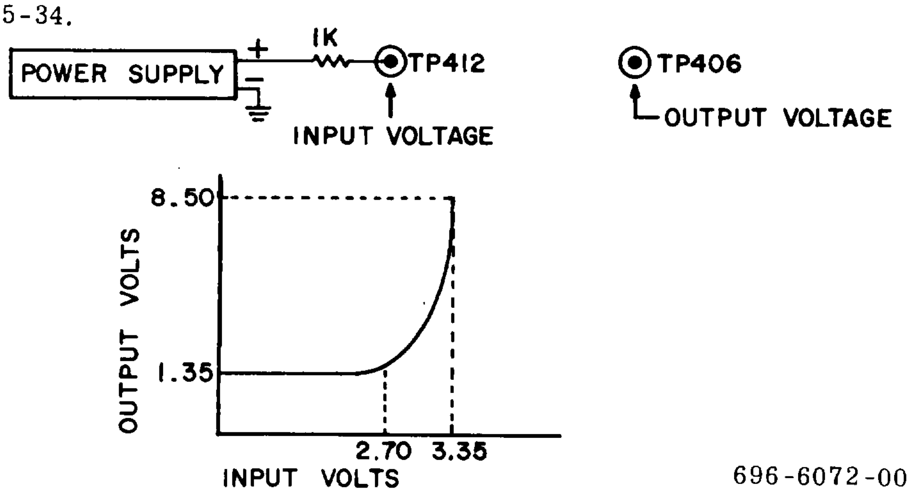


FIGURE 5-34 AGC AMP D-C CHARACTERISTICS

If reasonable correlation is obtained, disconnect the power supply and proceed to step d. If not, repair the AGC amplifier.

d. Check the detector for proper operation. Connect TP412 to ground, disabling the AGC Amp. Apply 4. 0Vdc to AGC test point TP406 to provide receiver quieting. Inject a . 7Vrms 1. 1857MHz signal having 30%, 1KHz amplitude modulation to the base of detector transistor Q404 as shown (Figure 5-35).

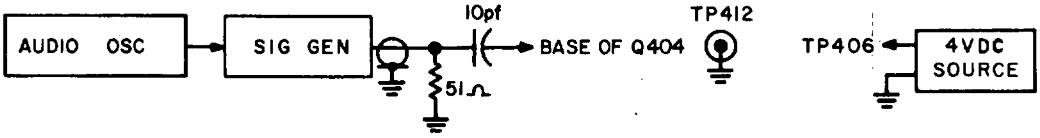


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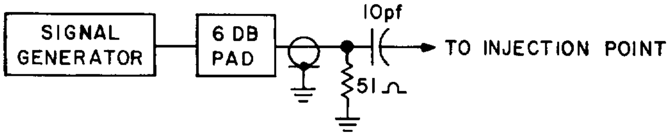
FIGURE 5-35 DETECTOR TEST SETUP

Using an oscilloscope at the detector collector (TP403) there should be approximately 3. 5Vdc with a 2. 0V peak to peak signal superimposed. If this result is not obtained repair the detector refering to the discussion of 5. 7. 8. If the detector operation appears normal, continue to step e.

e. Locate the malfunctioning R-F/I-F/detector stage by comparing stage gain of the defective receiver with the typical data appearing in the stage gain chart. Connect a digital voltmeter to the AGC test point (TP406). Using a signal generator adjusted to the desired frequency and having 30%, 1KHz modulation, inject signals to the appropriate points indicated in the chart and compare results with the chart data.

The tests might logically proceed stage by stage from the detector toward the RF Amp section. An alternative procedure is to choose a point in the middle of the gain chain for the initial test and proceed toward the front end, if the test is passed, or toward the detector if the test has failed. When the malfunctioning stage is identified, proceed to the specific maintenance information dealing with that portion of the circuit. Refer to the index.



Injection point	Injection Freq.	Test Setup	Injection level for AGC threshold (typical)
Q404 (Base)	1.1857MHz	TP402 Grounded	0.7Vrms
I402 (pin 3)	1.1857MHz	TP402 Grounded	10mVrms
I401 (pin 3)	1.1857MHz	TP402 Grounded	400μ Vrms
TP402	1.1857MHz	T407 swamped pins 1-3 with 200Ω and ground removed from TP402.	625μ Vrms
TP402	15.1875MHz	T407 swamped pins 1-3 with 200Ω and ground removed from TP402.	60μ Vrms
T402 (pin 2)	15.1875MHz	T407 swamped pins 1-3 with 200Ω and ground removed from TP402	250μ Vrms
T401 (pin 4)	112.5MHz	T407 swamped pins 1-3 with 200Ω and ground removed from TP402	40μ Vrms
Q401 (base)	112.5MHz	T407 swamped pins 1-3 with 200Ω and ground removed from TP402	3μ Vrms
L401 (tap)	112.5MHz	T407 swamped pins 1-3 with 200Ω and ground removed from TP402	5μ Vrms

TABLE 5-13 NAV STAGE GAIN CHART

f. Trace the audio signal through the audio processing network to locate the malfunctioning stage. Refer to 5. 7. 8.

KING
KX 170A/KX 175
NAVIGATION RECEIVER/
COMMUNICATIONS TRANSCEIVER

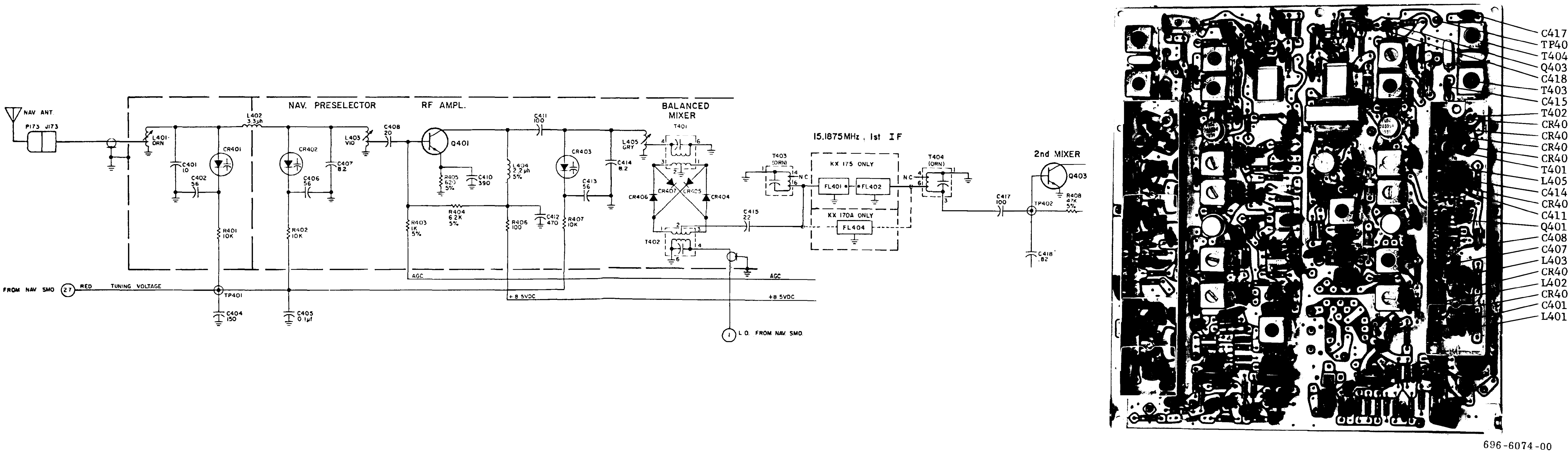


FIGURE 5-36 NAV PRESELECTOR/RF AMPLIFIER/1ST MIXER/1ST I. F.

5.7.2 PRESELECTOR/RF AMPLIFIER (Figure 5-36)

The NAV preselector is a three pole filter, consisting of three variable inductors L401, L403 and L405 in conjunction with varactors CR401, CR402 and CR403 and fixed capacitors C401, C407 and C414. The varactors are tuned by a voltage supplied from the NAV SMO.

The gain of RF Amplifier Q401, is reduced by applying an increasing, positive AGC voltage to the base.

5.7.2.1 Troubleshooting Procedure. Check for correct tuning voltage. (See tuning voltage chart, Section 5.2.3 Table 5-3.) Check for RF signal at base of Q401. If no signal appears at Q401, check for RF signal at the input coaxial cable and the top of L403. Check coupling inductor L402 and capacitor C408. If signal appears at the base of Q401, check for RF signal at the top of L405. If no signal appears, check RF Amplifier Q401, coupling capacitor C411 and associated circuitry (See Figure 5-32 for operating voltage levels).

5.7.3 1ST MIXER (Figure 5-36)

The balanced mixer consists of T401, T402 and CR404 through CR407. The R-F signal is connected to pin 4 of T401 and the synthesizer injection to pin 4 of T402. The IF signal appears on pin 2 of T402.

5.7.3.1 Troubleshooting Procedure. Check frequency and amplitude of NAV SMO Local Oscillator injection at pin 4 of T402. (Point X of Figure 5-4). Check for the presence of the RF Signal at pin 4 of T401 (after removing Local Oscillator coaxial cable). If both of the above checks prove satisfactory, check continuity of transformer windings and diodes CR404 - CR407.

5.7.4 1ST I-F (Figure 5-36)

The first I-F consists of a four pole crystal filter (KX 175/KX 175B only) or 2 pole crystal filter (KX 170A/KX 170B only). Capacitors C415 and C417 provide matching to the first and second mixers respectively. Transformers T403 and T404 provide proper reactive terminations to the filter.

5.7.4.1 Troubleshooting Procedure. Remove the 2nd Local Oscillator injection from Q403 by lifting one lead of Local Oscillator coupling capacitor C418. Check for signal (15.1875MHz) at the base of the second mixer (TP402). If no signal is present, check each filter component.

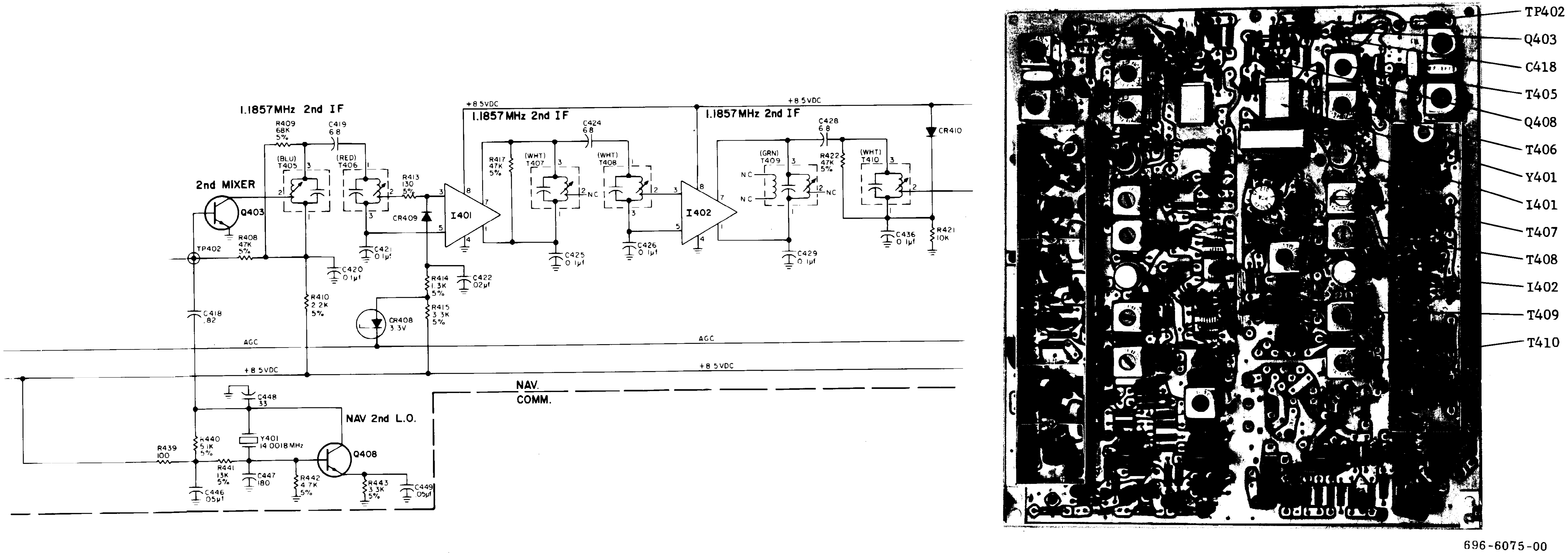


FIGURE 5-37 NAV 2ND LOCAL OSCILLATOR, 2ND MIXER, AND 2ND I. F.

5.7.5 2ND LOCAL OSCILLATOR (L. O.) (Figure 5-37)

The second Local Oscillator consists of a transistor Q408 operating as a Pierce oscillator with crystal, Y401, determining its operating frequency (14.0018MHz).

5.7.5.1 Troubleshooting Procedure. Check for proper injection signal at TP402 (400mv peak-to-peak) and if possible, measure frequency with a counter. Check coupling capacitor, C418. If no injection, check Q408 and associated circuitry (See Figure 5-52 for operating voltage level).

5.7.6 2ND MIXER (Figure 5-37)

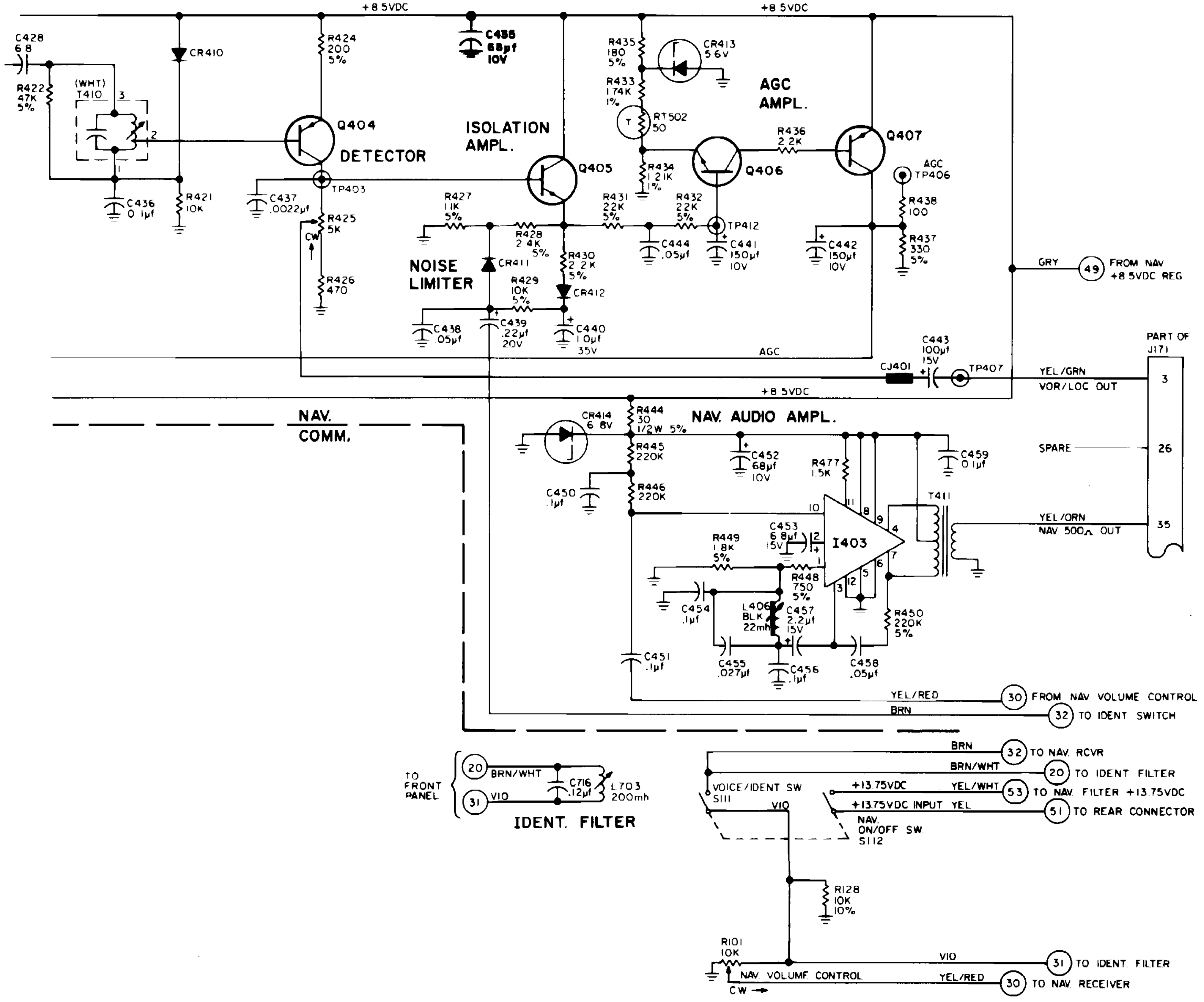
The second mixer consists of a transistor, Q403, to which both the R-F signal and the Local Oscillator injection are coupled into the base.

5.7.6.1 Troubleshooting Procedure. If both the 1st I-F signal (See Section 5.7.4.1 and Local Oscillator injection (See Section 5.7.5.1) are present at TP402, and if they are of the correct frequency (IF = 15.1875MHz, LO = 14.0018MHz) check Q408 and circuitry (See Figure 5-52 for operating voltage levels).

5.7.7 2ND I-F (Figure 5-37)

The second I-F consists of three pairs of double tuned filters T405-T406, T407-T408, T409-T410, with I-C Amplifiers I401 and I402 providing selectivity and I-F gain, AGC voltage is applied to I401. The second I-F is tuned to 1.1857MHz. Refer to section 4.4.2.8 for AGC theory.

5.7.7.1 Troubleshooting Procedure. Check for proper second I-F signal at Pin 2 of each I-F transformer, starting with T405 and working towards T410. If no R-F signal is found at any of the above points, check the associated circuitry between that point and the last point at which a signal was observed. (For operating voltage levels, see Figure 5-52.)



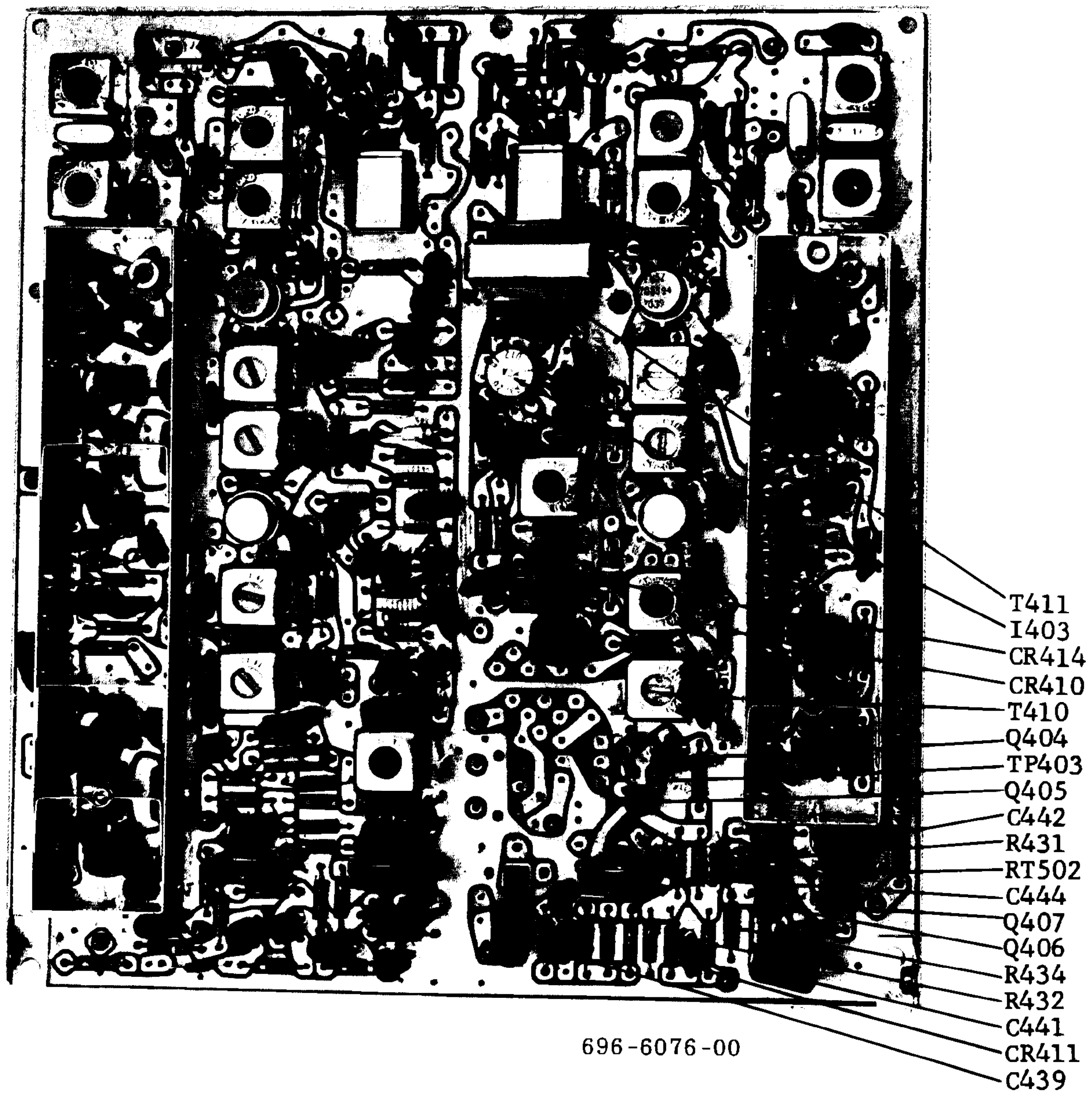


FIGURE 5-38 NAV DETECTOR/NOISE LIMITER, AGC AMPLIFIER, IDENT FILTER, AND AUDIO AMPLIFIER

5. 7. 8 DETECTOR/NOISE LIMITER (Figure 5-38)

The detector consists of transistor Q404 which is operated in the collector detection mode by the trickle bias supplied by CR410. Isolation amplifier Q405 is an emitter follower which prevents the noise limiter from loading the detector. For a detailed description of the noise limiter see paragraph 4. 3. 2. 6.

5. 7. 8. 1 Troubleshooting Procedure. Check the detected signal at TP403. If no signal is present, check for I-F signal at Pin 2 of T410. Further, check transistor Q404 and associated circuitry (See Figure 5-52 for operating voltage levels).

For the noise limiter, first check the emitter of Q405 for a detected audio signal. Using an oscilloscope, check the audio at the junction of CR411 and C439. If no audio exists, check CR411 for an open or reverse biased condition. (See Figure 5-52 for operating voltage levels).

5. 7. 9 AGC AMPLIFIER (Figure 5-38)

The output of the isolation amplifier is filtered (and phase shifted) by the filter network R431, C444, R432 and C441 and applied to the base of AGC amplifier Q406. Q406 compares this voltage with the AGC threshold reference appearing at the junction of RT502 and R434 and amplifies the difference voltage in conjunction with Q407.

5. 7. 9. 1 Troubleshooting Procedure. An inoperative AGC system can best be checked by comparing the D-C operating voltage levels of the AGC circuitry. These operating voltage levels are shown in Figure 5-52.

For a motorboating AGC system,check capacitors C441 and C442 for either a capacitance change or an open circuit to the capacitor.

5. 7. 10 IDENT FILTER (Figure 5-38)

The NAV Ident Filter consists of a parallel L-C trap using fixed capacitor, C716 and a variable inductor L703 to tune the filter to 1020Hz. A switch, S111 located on the transceiver front panel disables the ident filter by directly shorting across the L-C network when in the "Ident" position.

5. 7. 10. 1 Troubleshooting Procedure. Check for proper operation of switch S111 by placing an ohmmeter across L703 and switching S111 back and forth between "Voice" and "Ident" positions. With the switch in "Voice" position, S111 should be open and the ohmmeter should read the resistance of L703 which is approximately 25 ohms. If the ohmmeter reads open or high, L703 is open. If the ohmmeter reads close to zero ohms, S111 is not opening in the "Voice" position. With S111 in "Ident" position, the ohmmeter should read zero ohms. Check for proper alignment of L703 by modulating the Signal

Generator with a variable frequency audio generator. As the audio frequency range is scanned, a definite dip should be observed in the audio output at the resonate frequency of the filter. The dip should be observed in the audio output at the resonate frequency of the filter. If the dip is slightly removed from 1020Hz (use a counter to measure the audio frequency if available) realignment may be necessary. If no dip is observed and the above tests have proven satisfactory, check C716 for an open circuit or an incorrect value.

5. 7. 11 AUDIO AMPLIFIER (Figure 5-38)

The NAV Audio Amplifier consists of a decoupled-regulated supply voltage (Zener diode CR414), I-F audio amp I403, and output transformer T411. The NAV Audio Volume Control, R101, is located on the transceiver front panel.

5. 7. 11. 1 Troubleshooting Procedure. Check the D-C operating voltage levels of the Audio Amplifier I403 (See Figure 5-52). If the D-C levels are OK, trace the audio from the ident filter thru the NAV Volume Control R101 (NAV Volume Control should be all the way clockwise) to Pin 10 of I403. To check transformer T411, with an oscilloscope look at Pins 4 and 7 of I403 to see if a signal exists. If so, and it does not appear at Pin 35 of J171, check T411 for an open secondary winding or the yellow-orange wire for an open circuit.

5.8 TROUBLESHOOTING THE COMM RECEIVER

Receiver schematic diagram Figure 5-52.

5.8.1 PRELIMINARY EVALUATION (Isolating the malfunction by stage gain measurements).

a. At some convenient channel frequency, apply a 10μv RF signal modulated 30% by a 1KHz audio signal.

b. Connect an oscilloscope to the detector TP410 and determine that the output is approximately 1.0 volts peak-to-peak. If so the failure is in audio processing (go to step f). If not the failure is between the R-F input and the detector (go to step c).

c. Determine if the failure is within the AGC AMPL. Connect a variable voltage power supply to TP413 through a 1KΩ resistor. Compare the input voltage to output voltage relationship with the typical data of Figure 5-39.

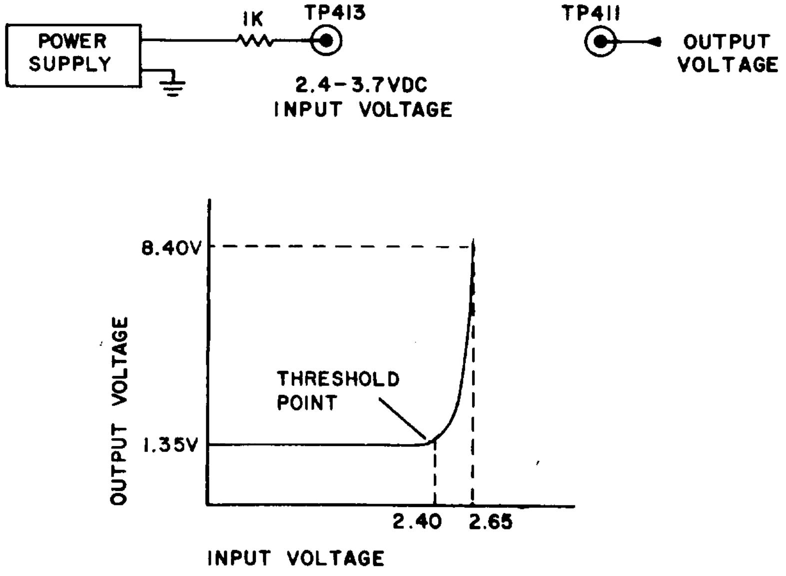


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FIGURE 5-39 AGC AMPL. D-C CHARACTERISTICS

If reasonable correlation is obtained, disconnect the power supply and proceed to step d. If not, repair the AGC amplifier.

d. Check the detector for proper operation. Connect TP413 to ground, disabling the AGC AMPL.. Apply 4.0Vdc to AGC test point TP411 to provide receiver quieting. Inject a 0.4Vrms, 861.25 KHz signal having 30%, 1KHz amplitude modulation as shown to the base of detector transistor Q414 as shown. (Figure 5-40).

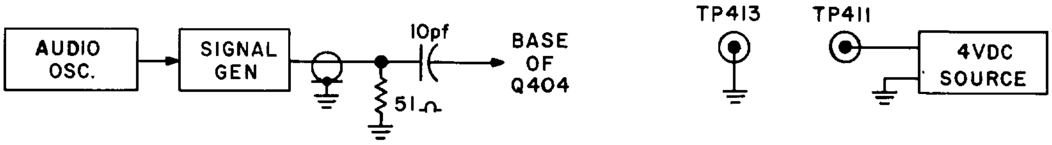

FIGURE 5-40 DETECTOR TEST SETUP
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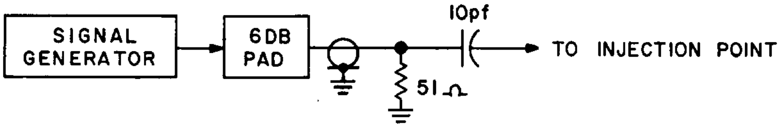
Using an oscilloscope at the detector collector,(TP410) should be approximately 2.5Vdc with a 1.0V peak to peak signal superimposed. If this result is not obtained repair the detector refering to the discussion of 5.8.8. If the detector operation appears normal, continue to step e.

e. Locate the malfunctioning R-F/I-F/detector stage by comparing stage gain of the defective receiver with the typical data appearing in the stage gain chart. Connect a digital voltmeter to the AGC test point (TP411). Using a signal generator adjusted to the desired frequency and having 30%, 1KHz modulation, inject signals to the appropriate points indicated in the chart and compare results with the chart data.

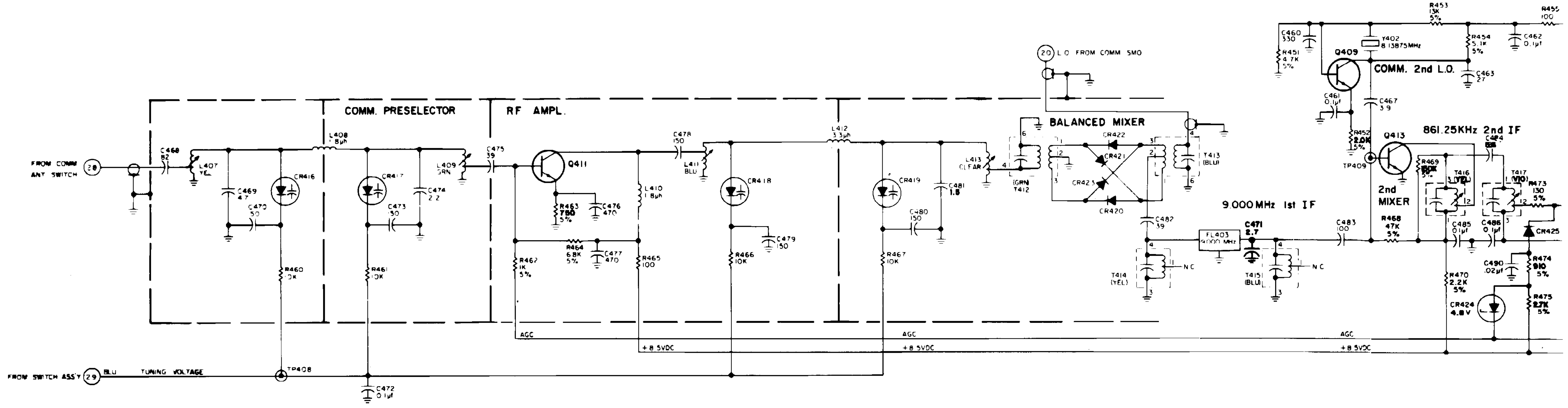
The tests might logically proceed stage by stage from the detector toward the RF AMPL. section. An alternative procedure is to choose a point in the middle of the gain chain for the initial test and proceed toward the front end, if the test is passed, or toward the detector if the test has failed. When the malfunctioning stage is identified, proceed to the specific maintenance information dealing with that portion of the circuit. Refer to the index.



Injection point	Injection Freq.	Test Setup	Injection level for AGC threshold (typical)
Q414(base)	861.25KHz	TP409 Grounded	0.6Vrms
I405(pin 3)	861.25KHz	TP409 Grounded	9mVrms
I404(pin 3)	861.25KHz	TP409 Grounded	250μVrms
TP409	861.25KHz	T418 swamped pins 1-3 with 200Ω and ground removed from TP409	400μVrms
TP409	9.00MHz	T418 swamped pins 1-3 with 200Ω and ground removed from TP409	30μVrms
T413(pin 2)	9.00MHz	T418 swamped pins 1-3 with 200Ω and ground removed from TP409	100μVrms
T412(pin 4)	126.50MHz	T418 swamped pins 1-3 with 200Ω and ground removed from TP409	40μVrms
Q411(base)	126.50MHz	T418 swamped pins 1-3 with 200Ω and ground removed from TP409	20μVrms
L407(tap)	126.50MHz	T418 swamped pins 1-3 with 200Ω and ground removed from TP409	15μVrms

TABLE 5-14 COMM STAGE GAIN CHART

f. Trace the audio signal through the audio processing network to locate the malfunctioning stage. Refer to 5. 8. 8.



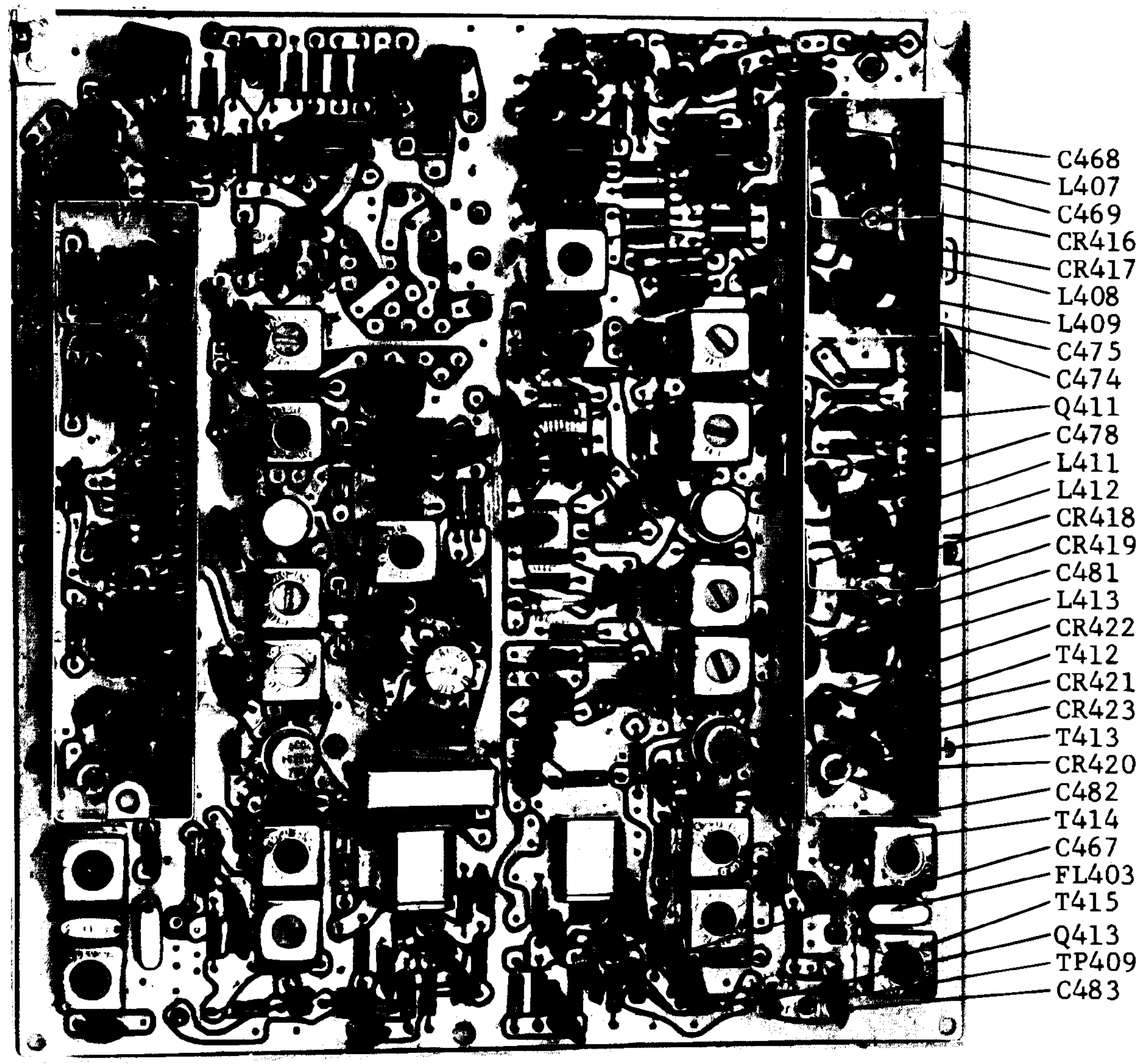


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FIGURE 5-41 COMM PRESELECTOR, R. F. AMPLIFIER, 1ST MIXER, AND 1ST I. F.

5. 8. 2 PRESELECTOR/RF AMPLIFIER (Figure 5-41)

The COMM preselector is a four pole filter, consisting of four variable inductors L407, L409, L411 and L413 in conjunction with varactor CR416, CR417, CR418, CR419 and fixed capacitors C469, C474, and C481. The varactors are tuned by a tuning voltage obtained from a COMM MHz tuning wafer (S102).

The R-F Amplifier Q411 provides RF gain which is reduced by an increasing AGC voltage to the base.

5. 8. 2. 1 Troubleshooting Procedure. Check for correct tuning voltage (See tuning voltage chart Section 5. 2. 3). Check for R-F signal at base of Q411. If no signal appears, check for R-F signal at the input coaxial cable and the top of L407 and L409. Check coupling elements C468, L408 and C475. If signal appears at Q411 base, check for R-F signal at the top of L411 and L413. If no signal appears at the top of L411, check the R-F amplifier, Q411, coupling components C478 and L412 and associated circuitry (See Figure 5-52 for operating voltage levels).

5. 8. 3 1ST MIXER (Figure 5-41)

Balanced mixer components include T412, T413, and CR420 through CR423. The R-F signal is connected to pin 4 of T412 while the COMM SMO receiver injection is applied to pin 4 of T413. The resultant 1st IF signal appears on pin 2 of T413.

5. 8. 3. 1 Troubleshooting Procedure. Check frequency and amplitude of COMM SMO L. O. injection at pin 4 of T413 (Point Y of Figure 5-4). Check for the presence of the R-F signal at pin 4 of T412 (after removing L. O. injection coaxial cable). If both of the above checks prove satisfactory, check for continuity of transformer windings and diodes CR420-423.

5. 8. 4 1ST I-F (Figure 5-41)

The first I-F consists of a two pole crystal filter (KX 170A/KX 175/KX 170B only) or a six pole crystal filter (KX 175B only) tuned to 9.0000MHz. (T414, T415 and FL403 or FL405, FL406 and FL407, KX 175B only).

5.8.4.1 Troubleshooting Procedure. Remove the second L. O. injection from Q413 by lifting one lead of L. O. coupling capacitor C467. Check for R-F signal (9.0000MHz) at the base of the second mixer (TP409). If no signal is present, check each filter component associated coupling capacitors C482 and C483.

5. 8. 5 2ND LOCAL OSCILLATOR (Figure 5-42)

The second L. O. consists of a transistor Q409 operating as a Pierce Oscillator with crystal Y402 determining its operating frequency (8. 13875MHz).

5. 8. 5. 1 Troubleshooting Procedure. Check for proper injection signal and measure frequency with a counter. Check coupling capacitor C467. If no injection, check Q409 and associated circuitry (See Figure 5-52 for operating voltage levels).

5. 8. 6 2ND MIXER (Figure 5-42)

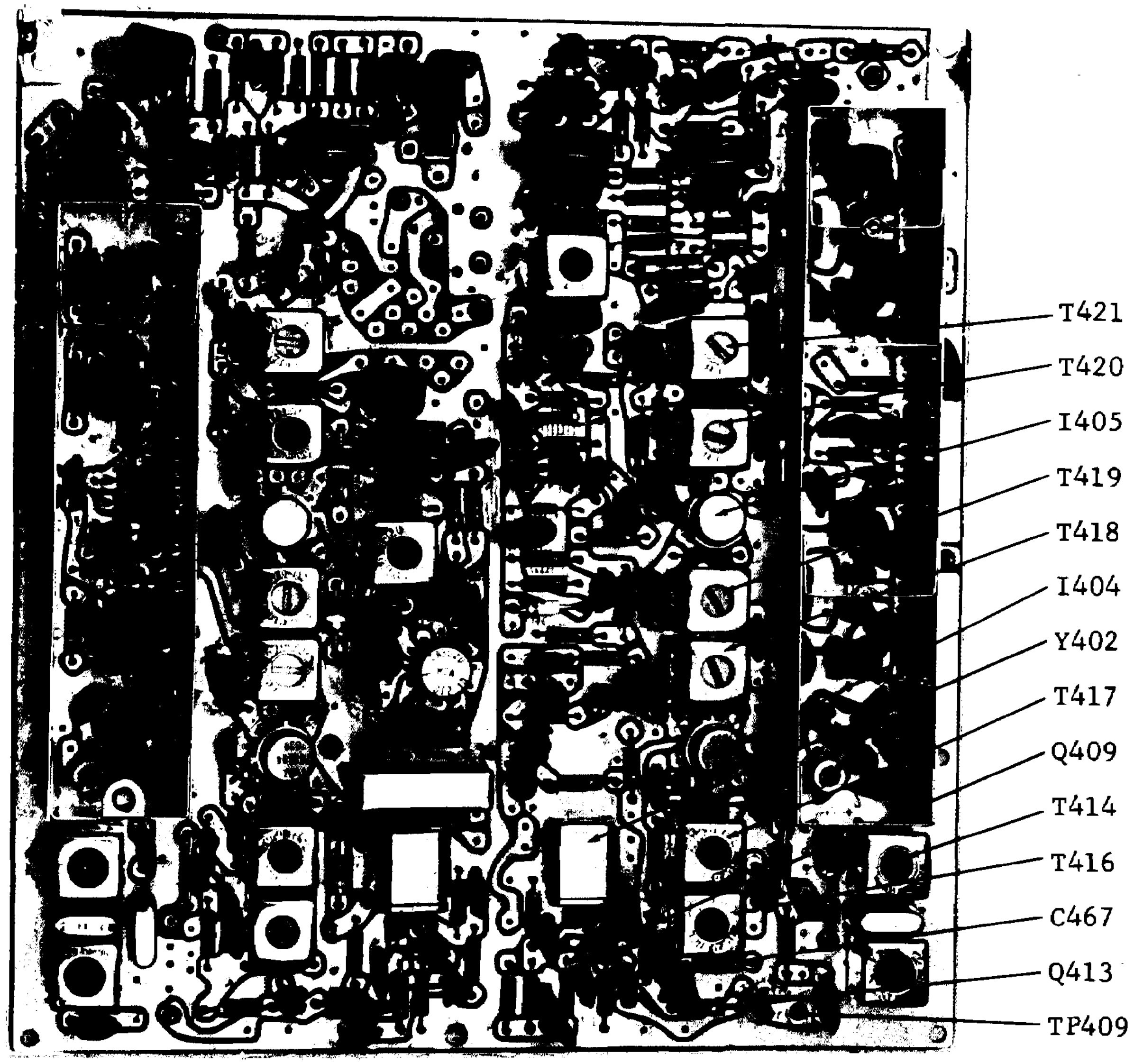
The second mixer consists of a transistor, Q413, to which both the R-F signal and the L. O. injection are coupled into the base.

5. 8. 6. 1 Troubleshooting Procedure. If both the 1st I-F signal (see Section 5. 8. 4) and the L. O. injection (see Section 5. 8. 5) are present at TP409 and if they are of the correct frequency, (IF=9. 000MHz, L. O. = 8. 1375MHz) check Q413 and circuitry (see Figure 5-52 for operating voltage levels).

5. 8. 7 2ND I-F (Figure 5-42)

The second I-F consists of three pairs of double tuned filters T416-T417, T418-T419, T420-T421, with I-C amplifiers I404 and I405 providing selectivity and I-F gain. AGC voltage is applied to I404. The second I-F is tuned to 861. 25KHz. Refer to section 4. 3. 2. 7 for AGC theory.

5. 8. 7. 1 Troubleshooting Procedure. Check for proper second I-F signal at Pin 2 of each I-F transformer, starting with T416 and working towards T421. If no I-F signal is found at any of the above points, check the associated circuitry between that point and the last point at which a signal was observed (For operating voltage levels, see Figure 5-52.



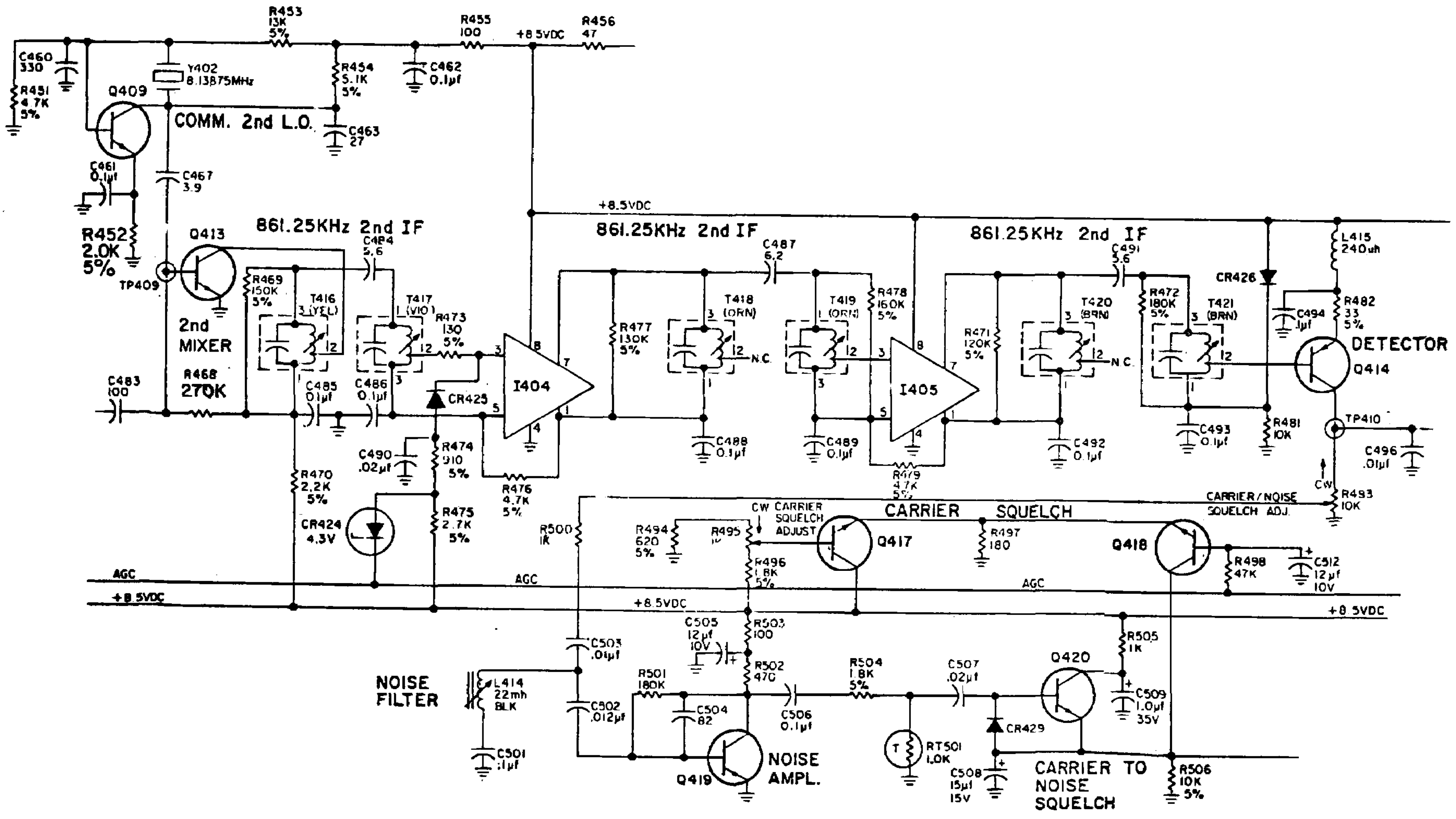


FIGURE 5-42 COMM 2ND L.O., 2ND MIXER, 2ND I.F., AND DETECTOR
(Dwg. No. 696-6080-00)

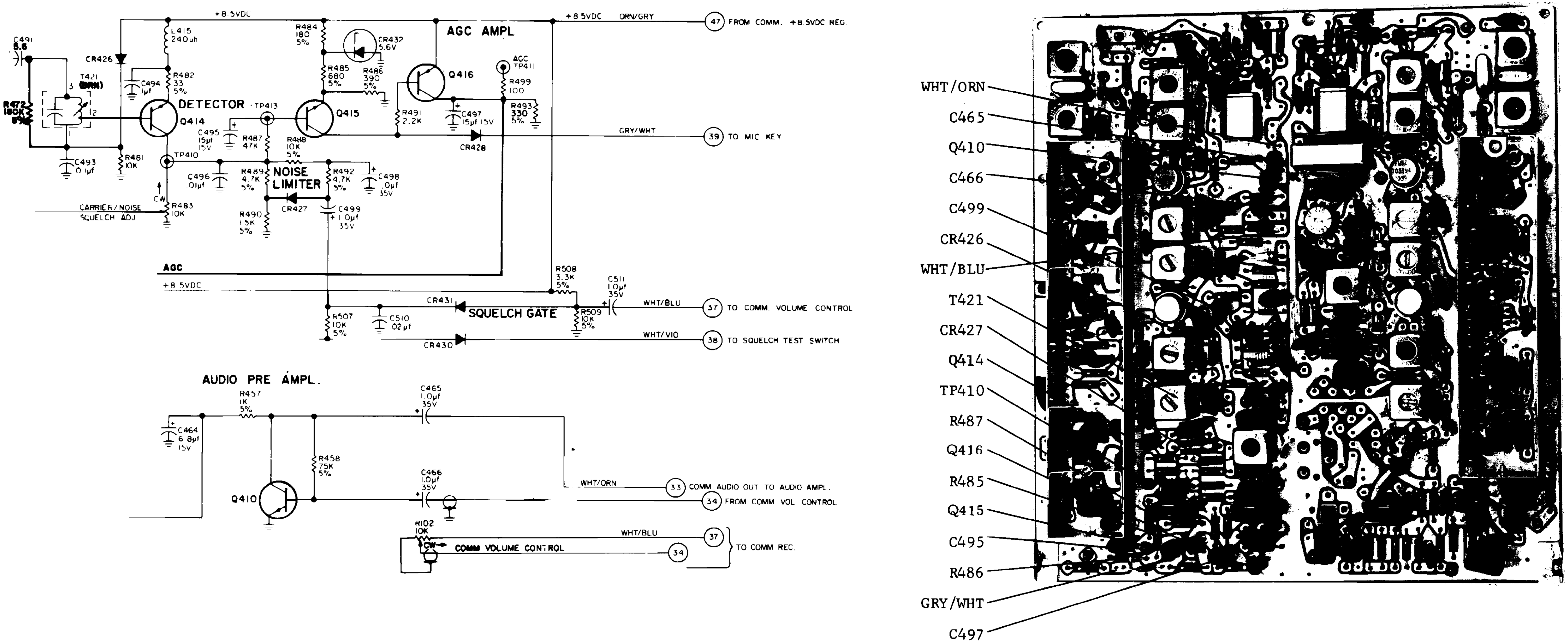


FIGURE 5-43 NAV DETECTOR/NOISE LIMITER/
AGC AMPLIFIER/AUDIO PREAMPLIFIER
(Dwg. No. 696-6081-00)

5.8.8 DETECTOR/NOISE LIMITER (Figure 5-43)

The detector consists of transistor Q414 which is operated in the collector detection mode by the trickle bias supplied by CR426. For a detailed description of the noise limiter see paragraph 4. 3. 2. 6.

5. 8. 8. 1 Troubleshooting Procedure. Check for detected signal at TP410. If no signal is present, check for I-F signal at Pin 2 of T421. Further, check transistor Q414 and associated circuitry. (See Figure 5-52 for operating voltage levels)

For noise limiter operation, first check TP410 for a detected audio signal. Using an oscilloscope, check the audio at the junction of CR427 and C499. If no audio exists, check CR427 for an open or reverse biased condition. (See Figure 5-52 for operating voltage levels).

5.8.9 AGC AMPLIFIER (Figure 5-43)

The detector output is filtered by the filter network R487 and C495 and applied to the base of AGC amplifier Q415. Q415 compares this voltage with the AGC threshold reference appearing at the junction of R485 and R486 and the voltage difference controls AGC transistor Q416.

5. 8. 9. 1 Troubleshooting Procedure. An inoperative AGC system can best be checked by comparing the D-C operating voltage levels of the AGC circuitry Q415, Q416, R487, R485, and R486. These operating voltage levels are shown in Figure 5-52.

For a motorboating AGC system, check capacitors C495 and C497 for either a capacitance change or an open circuit to the capacitor.

5.8.10 AUDIO PREAMPLIFIER (Figure 5-43)

The COMM audio preamplifier consists of transistor Q410 operating as a Class A Audio stage. The COMM Audio Volume Control R102 is located on the transceiver front panel.

5. 8. 10. 1 Troubleshooting Procedure. Check for audio existing at the white-blue wire going to the COMM Volume Control. If no audio is present, refer to paragraph 5. 8. 11 for the squelch gate troubleshooting procedure. If audio is present, check for audio at the coax returning from the volume control (make sure volume control is all the way clockwise-full volume). If no audio is present check the volume control for continuity (10K from white-blue wire to ground).

If audio is present at the volume control coax but not on the white-orange audio out line, check coupling capacitors C466 and C465. If audio exists at the base of Q410 but not the collector, check Q410 and associated circuitry. (See Figure 5-52 for operating voltage levels.)

5. 8. 11 SQUELCH GATE (Figure 5-44)

The basic squelch gate consists of gating diode CR431 and squelch reference network R508 and R509. As long as CR431 is forward biased (i. e. , The cathode is dropped to a lower D-C potential than the anode squelch reference voltage), the diode acts as an A-C short circuit and audio passes from the noise limiter, through C499, CR431 and C511 to the COMM Volume Control. If CR431 is reverse biased (i. e. , The cathode voltage is held at a lower positive D-C potential than the anode squelch reference voltage), the diode acts as an A-C open circuit and no audio is allowed to pass.

Under normal operation, there are three conditions which will give an unsquelched receiver; the squelch test switch in test position, carrier to noise squelch gating and carrier squelch gating.

5. 8. 11. 1 Troubleshooting Procedure. The squelch gate is most easily checked by determining what is or is not allowing CR431 to become forward biased. If the receiver remains unsquelched with no signal, check CR431 for a shorted condition, check the squelch test switch S109 for proper open circuit condition in "on" position, check the carrier to noise squelch for proper operation, (see paragraph 5. 8. 13. 1 and check carrier squelch for proper operation, (see paragraph 5. 8. 14. 1). If the receiver remains squelched with signal applied, check CR431, R506 and R507 for an open condition, and check the carrier to noise and carrier squelch circuits for proper operation (see above for appropriate paragraphs).

5. 8. 12 NOISE AMPLIFIER AND FILTER (Figure 5-44)

The noise amplifier and filter consist of the noise amplifier Q419 and the elliptic filter formed by C503, C502, C501, L414, R500 and the input impedance of Q419. The filter rejects frequencies below 7KHz and the amplifier is used to amplify the filtered noise above this frequency.

5. 8. 12. 1 Troubleshooting Procedure. With no signal input to the receiver, check for amplified (clipped-square wave) noise at the collector of Q419. If no noise exists (but is present at TP410), check the carrier/noise squelch adjust pot R483 for an open condition, check the filter network for open components, and check Q419 and associated circuitry (See Figure 5-52 for operating voltage levels).

5. 8. 13 CARRIER TO NOISE SQUELCH (Figure 5-44)

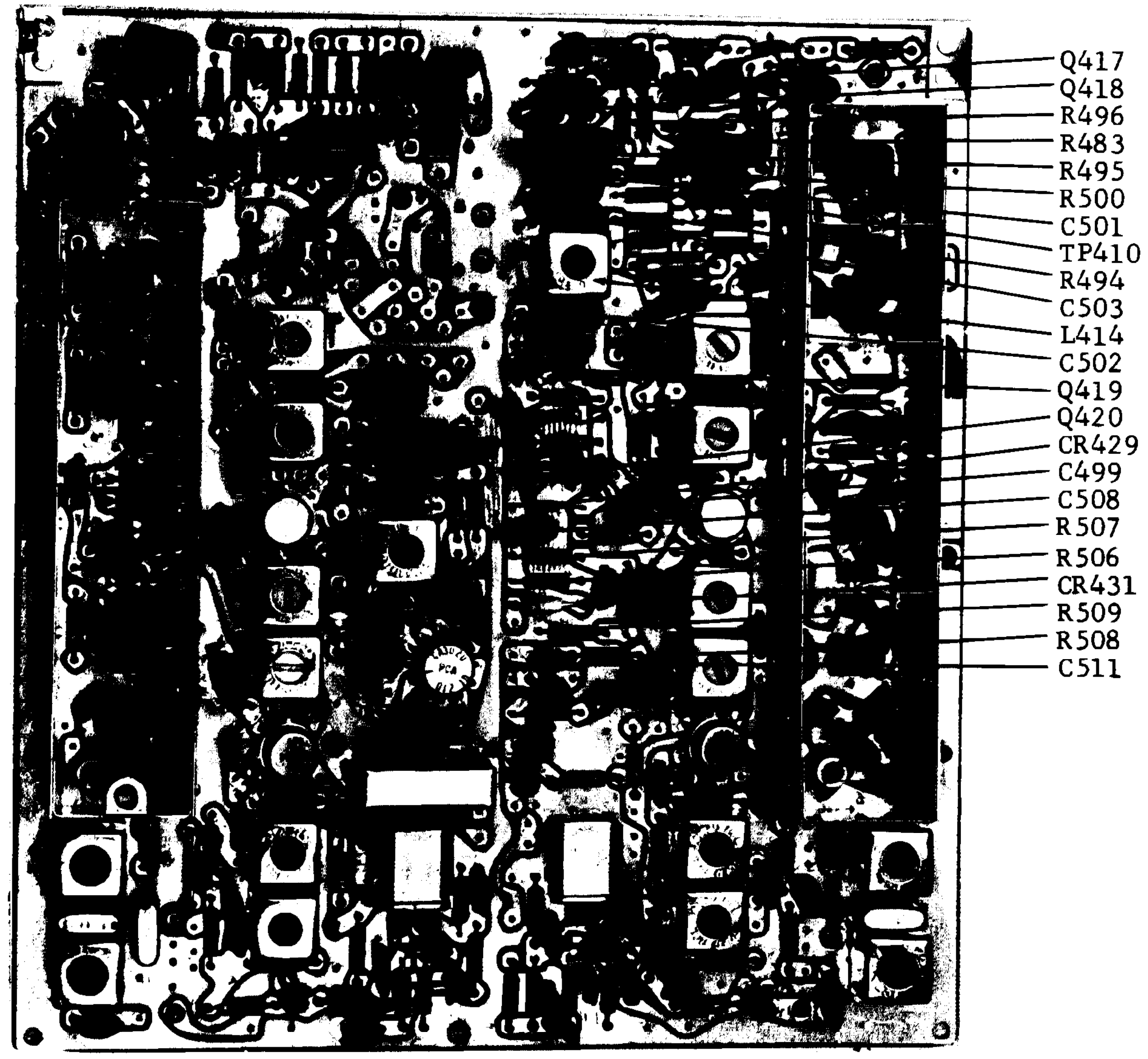
The carrier to noise squelch consists of transistor Q420 and CR429 in conjunction with capacitor C508. For a detailed description of operation see Section 4. 3. 2. 9. The basic operation is that with no signal input, noise is amplified in transistor Q420, and a voltage is developed across C508 which biases squelch gate CR431 off. With an input signal, noise is reduced and the voltage developed across C508 drops allowing CR431 to become forward biased.

5. 8. 13. 1 Troubleshooting Procedure. With no signal applied to the receiver input, check for a D-C voltage of approximately 7. 5V across C508. If there is no D-C or if it is much lower than 7. 5V, check Q420 and all associated circuitry (See Figure 5-52 for operating voltage levels).

5. 8. 14 CARRIER SQUELCH (Figure 5-44)

The carrier squelch consists of the differential amplifier pair Q417 and Q418. Its principle operation is to compare the AGC voltage with a preset carrier squelch reference voltage (Potentiometer R495). When the AGC voltage becomes greater than this reference voltage, Q418 turns on and forward biases squelch gate diode CR431.

5. 8. 14. 1 Troubleshooting Procedure. Check the voltage reference string R494, R495 and R496 for continuity. Check for differential amplifier operation of Q417 and Q418. When an R-F signal is applied to the receiver (above 15μv hard) the AGC voltage on the base of Q418 should turn it on pulling its collector voltage down and allowing Squelch Gate diode CR431 to turn on. For approximate D-C operating levels, refer to Figure 5-52. It should be noted there that the given D-C operating voltage levels for the carrier squelch are only approximate as they are dependent upon the quiescent AGC level and will vary between units. They are given for comparison purpose only.



696-6082-00

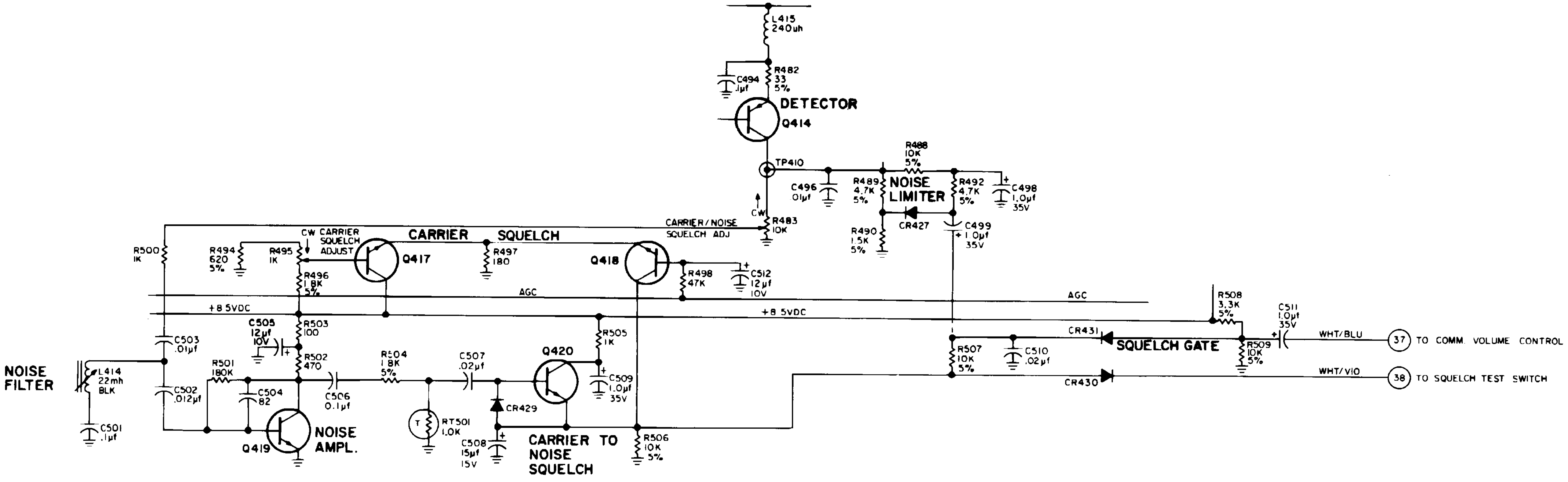


FIGURE 5-44 COMM SQUELCH GATE, NOISE AMPLIFIER AND FILTER, CARRIER TO NOISE SQUELCH AND CARRIER SQUELCH

5.9 TROUBLESHOOTING THE AUDIO AMPL (Schematic Diagram Figure 5-53)

5. 9. 1 SUMMING JUNCTION (Figure 5-45)

The summing junction consists of resistor network R703 thru R707 and R722. Besides a COMM receiver audio input, it provides up to four external auxilary inputs with approximately 30db of isolation between any two of the external inputs (600Ω).

5. 9. 1. 1 Troubleshooting Procedure. A direct approach using either an ohmmeter to check for open resistors and open or shorted paths or an audio oscillator to inject a 1KHz tone into each input port with an oscilloscope to check for the tone is recommended. Check C704 for proper input coupling.

5. 9. 2 T-R DIODE SWITCH (Figure 5-45)

The T-R Diode switch consists of switching diodes CR701 and CR702 along with associated bias circuitry. For receive condition, the audio mute line is open eliminating any D-C current path to CR701. This, in effect reverse biases CR701 and forward biasing CR702.

For transmit operations the audio mute line is grounded by K701 allowing CR701 to become forward biased thru R701 and R721. This pulls the anode of CR702 low causing it to become reverse biased. Thus, summing junction audio is blocked while the mike audio line is coupled thru C714, CR701 and C705 into the Audio Pre-Driver Amplifier Q701.

5. 9. 2. 1 Troubleshooting Procedure. Check the reference voltage developed between R708 and R710. Alternately ground audio mute line (white-grey) and check biasing of diodes CR701 and CR702. For D-C operating voltages under both transmit and receive conditions, see Figure 5-53. Check for open or shorted diodes CR701 and CR702 and check coupling capacitor C705.

5. 9. 3 AUDIO PRE-DRIVER AMPLIFIER (Figure 5-45)

The Audio Pre-Driver Amplifier, Q701 operates as a Class A audio stage. It is used in both the transmit and receive modes.

5.9.3.1 Troubleshooting Procedure. Check the coupling capacitors C705 and C706 for proper operation. If audio appears on the base of Q701 but does not appear on the collector, check Q701 and associated circuitry (See Figure 5-53 for operating voltage levels).

5.9.4 AUDIO DRIVER AMPLIFIER (Figure 5-45)

The Audio Driver Amplifier Q702 operates as a Class A audio stage having coupling transformer T701 as its output load. Distortion is reduced and gain stabilized with the use of feedback network R718, R713 and C715.

5.9.4.1 Troubleshooting Procedure. Check coupling transformer for an open winding (no D-C on collector of Q702). If audio appears on the base of Q702 but not on the collector, check Q702 and associated circuitry (See Figure 5-53 for operating voltage levels).

5.9.5 AUDIO OUTPUT AMPLIFIER (Figure 5-53)

The Audio Output Amplifier consists of T701, T702 and Q703-Q706. It operates as a conventional transformer coupled Class B Push-Pull Output Stage. It is used for receiver audio output and as a modulator for the transmitter.

5.9.5.1 Troubleshooting Procedure. Check fuse F701 to make sure it has not blown. The output circuits receive their supply voltage through this fuse. Check transformers T701 and T702 (open windings - no D-C voltages). Check Q703-Q706 for proper operation. (See Figure 5-53 for operating voltage levels.)

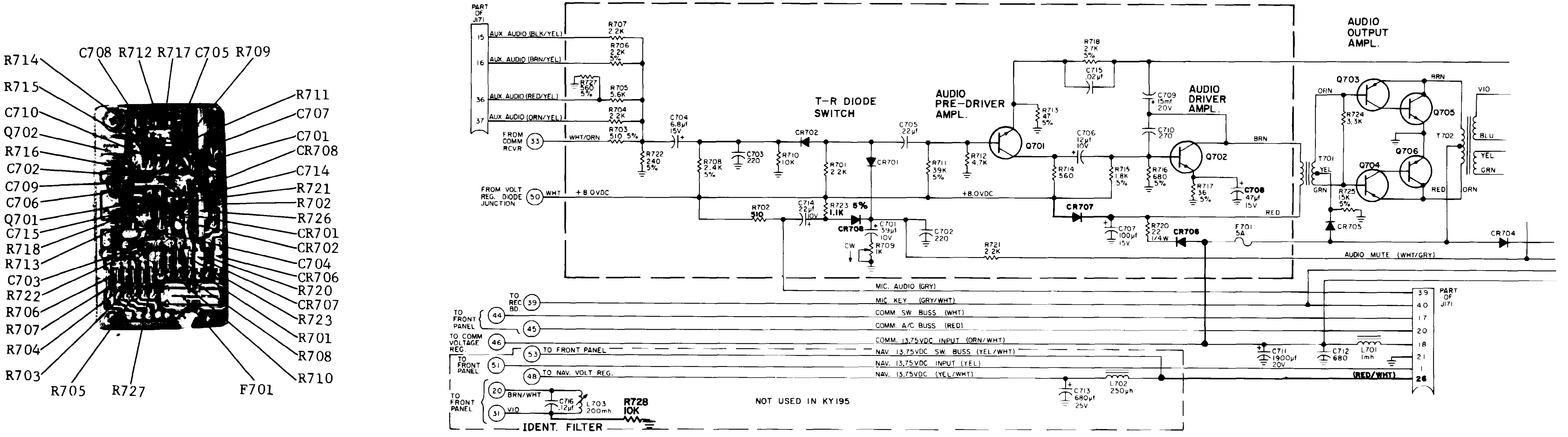


FIGURE 5-45 SUMMING JUNCTION, T-R DIODE SWITCH, AUDIO PRE-DRIVER, AUDIO DRIVER, AUDIO OUTPUT AMPLIFIER (Dwg. No. 696-6083-00)

5.10 TROUBLESHOOTING THE TRANSMITTER (Schematic Diagram Figure 5-53)

5. 10. 1 BUFFER AMPLIFIER (Figure 5-46)

The Buffer Amplifier, Q601, operates as a Class A R-F amplifier. It receives its R-F drive from the COMM SMO but is active only in the transmit mode when 13. 75V is supplied to its collector thru relay K701, and the COMM SMO Transmit Buffer (Q306) is activated.

5. 10. 1. 1 Troubleshooting Procedure. Check for R-F excitation from the COMM SMO at the coaxial cable input. Using a high frequency oscilloscope (being careful not to load the circuit) check for an R-F signal on the base of Q601. Check for R-F signal at the collector of Q601. If no signal is present, check Q601 and associated circuitry (see Figure 5-53 for operating voltage levels).

5. 10. 2 PRE-DRIVER AMPLIFIER (Figure 5-46)

The Pre-Driver Amplifier Q602 is also operated as a Class A, R-F amplifier. It is also active only in the transmit mode since it receives its 13. 75V supply voltage as does Q601 - thru the transmit relay K701.

5. 10. 2. 1 Troubleshooting Procedure. Check for R-F drive from Q601. If an R-F signal is present on the base of Q602, but not on the collector, check Q602 and associated circuitry (See Figure 5-53 for operating voltage levels).

5. 10. 3 DRIVER AMPLIFIER (Figure 5-46)

The Driver Amplifier, Q603, is operated as a Class A-B, R-F Amplifier. It is collector modulated, receiving a modulated supply voltage thru K701. The resistor and diode combinations CR601-R608 and CR602-R615 are chosen to linearize modulation by allowing full upward modulation but limiting the downward modulation of Q603.

5. 10. 3. 1 Troubleshooting Procedure. Check for R-F drive from Q602. If an R-F signal is present at the base of Q603 but not at the collector, check Q603 and its associated circuitry (See Figure 5-53 for D-C operating voltage levels). If no modulation occurs on the collector, check the modulated supply voltage from K701 for proper modulation level, check resistor-diode combinations (R608-CR601 and R615-CR602) for open circuits short circuits or incorrect component value.

5. 10. 4 FINAL AMPLIFIER (Figure 5-46)

The Final Amplifier Q604 is operated as a Class C R-F amplifier. It is also collector modulated, receiving its modulated supply voltage thru K701 in the transmit mode only. It receives both upward and downward modulation.

5. 10. 4. 1 Troubleshooting Procedure. Check for R-F drive from Q603. If an R-F signal is present at the base of Q604 but not the collector, check Q604 and its associated circuitry (See Figure 5-53 for D-C operating voltage levels). If no modulation occurs on the collector of Q604, check the modulated supply voltage from K701 for proper modulation level.

5. 10. 5 LOW PASS FILTER/T-R DIODE SWITCHING (Figure 5-46)

The Low Pass Filter is a 3-section elliptical filter designed to reduce the harmonic output of the power amplifier. The T-R Diode Switching is accomplished with diodes CR603 and CR604. In the receive mode, a positive bias voltage is applied to diodes CR603 and CR604 thru resistors R616 and R617. The received signal is coupled from the antenna thru the 3rd pole and diode CR604, to the COMM receiver. Diode CR603 and R-F bypass capacitor C626 provide a terminating device to minimize the insertion loss.

In the transmit mode, the D-C bias voltage is removed from the resistor, diode combination by relay K701 and the R-F power from the transmitter reverse biases diodes CR603 and CR604 due to self-rectification.

5. 10. 5. 1 Troubleshooting Procedure. With power removed, check all resistive (R616 and R617) and all inductive (L604, FL601, FL602 and FL603) components for D-C continuity (all inductive components should read approximately zero ohms). In the receive mode, check for proper forward biasing of diodes CR603 and CR604. In the transmit mode, check to see if the bias voltage is removed from CR603 and CR604.

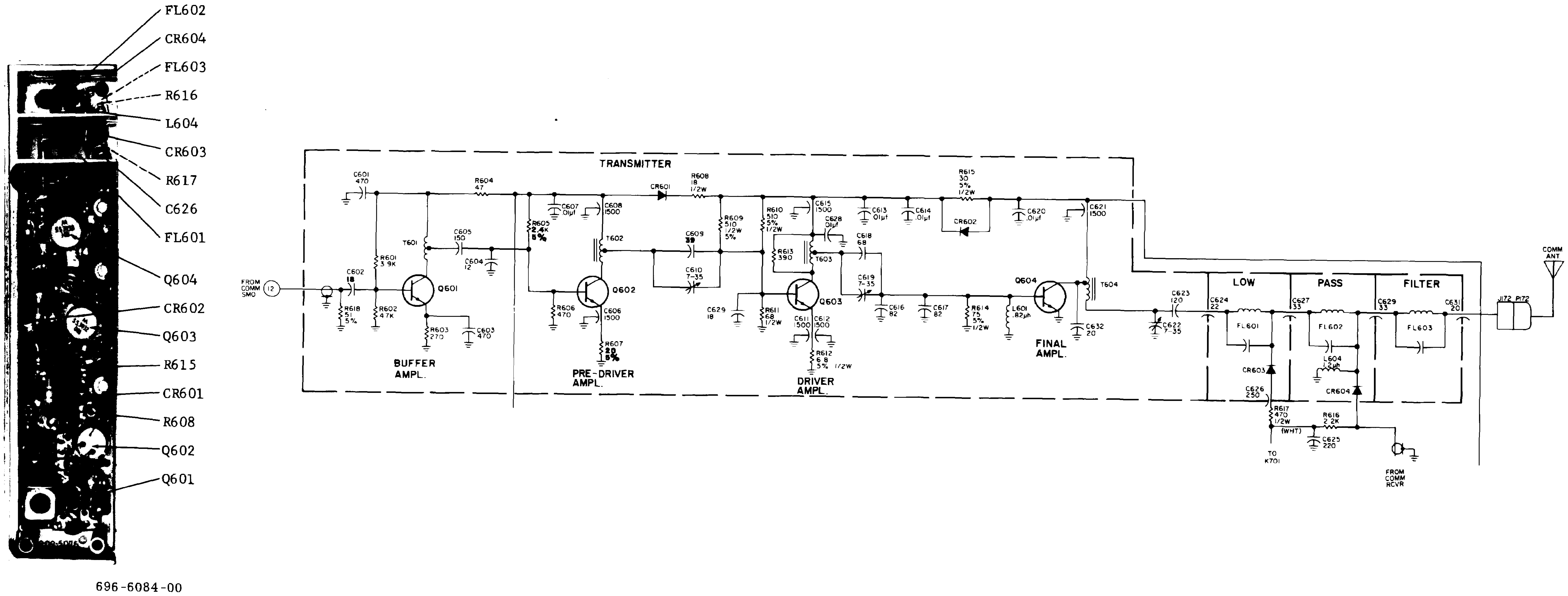


FIGURE 5-46 FINAL AMPLIFIER

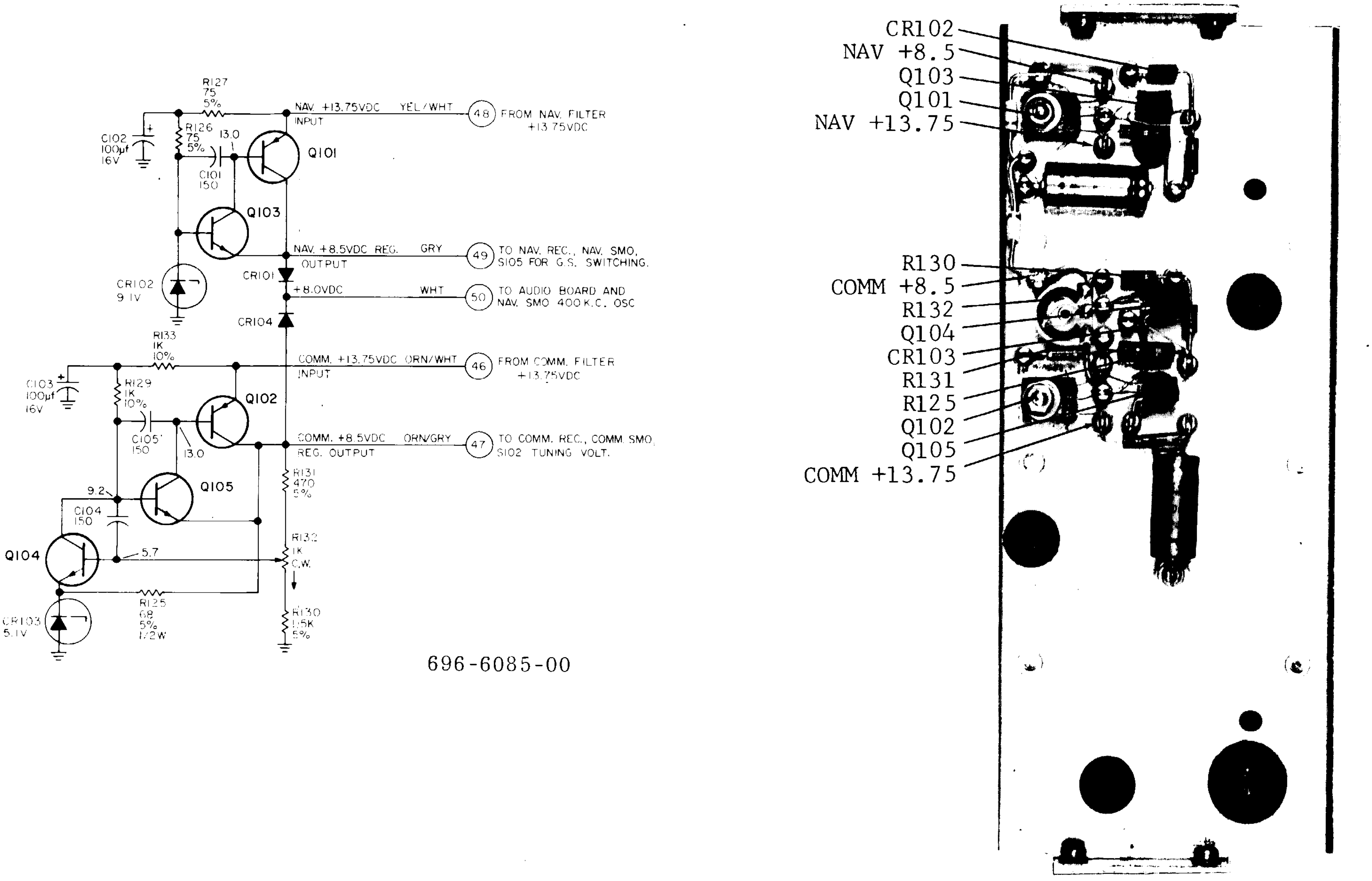


FIGURE 5-47 REGULATORS

5.11 TROUBLESHOOTING THE REGULATORS

5. 11. 1 COMM 8. 5 VOLT REGULATOR (Figures 5-47 and 5-54)

A complementary configuration using two transistors (Q102 and Q105) as a series pass element was selected to enhance low supply voltage operation. Transistor Q104 provides negative feedback to the base of Q105.

5. 11. 1. 1 Troubleshooting Procedure. If no output, check for 13. 75V input on orange-white wire. If 13. 75V is present, disconnect the orange-grey wires (3 total) and the white (2 wires). Check the collector of Q102 for 8. 5V. If this has corrected the problem, replace wires one at a time to isolate the shorted assembly. Erroneous or erratic adjustment, necessitates checking R130-R132, CR103 and R125.

If output is high (13. 75V), check for shorted transistor Q102, Q105 or an open connection to Q104.

5. 11. 2 8. 5V NAV REGULATOR (Figure 5-47 and 5-54)

The 8. 5v NAV regulator is a conventional series regulator consisting of a series control transistor pair Q101 and Q103 and reference element CR102.

5. 11. 2. 1 Troubleshooting Procedure. If no output, check for 13. 75V input on yellow/white wire. If 13. 75V is present, disconnect the grey (3 total) wires, and white (2 total) wires, and check the collector of Q101 for 8. 5V. If this has corrected the problem, replace wires one at a time to isolate the shorted assembly. Check the voltage at zener diode CR102 (approximately 9. 1V).

If output is high, check for shorted transistor Q101 or Q103 or open connection on zener CR102.

5.12 TROUBLESHOOTING THE KA 39 VOLTAGE REGULATOR (Figure 5-56)

The KA 39 Voltage Converter contains dual series regulators converting 27. 5Vdc to 13. 75Vdc. The COMM regulator, "A", incorporates reference element CR101 and the Darlington series pass configuration consisting of Q101 and Q102. Protection from reverse voltage connections and negative transients is provided by diode CR102. Capacitor C101 suppresses spurious oscillations which might otherwise appear with reactive loads. The NAV regulator, "B" functions electrically in the same manner as the "A" regulator.

5. 12. 1 Troubleshooting Procedure. Compare actual operating voltage with those specified in Figure 5-56. Low voltage could be caused by a shorted output, a shorted zener reference diode, an open zener diode bias resistor (R102"A"orR103 "B"), an open collector resistor (R101 "A" or R104 "B"), or an open series pass transistor. Conversely, a high voltage could result from shorted series pass transistors, a shorted capacitor (C101 or C102) an open zener diode, a shorted zener diode bias resistor (R102 or R103) or an out of tolerance zener diode.

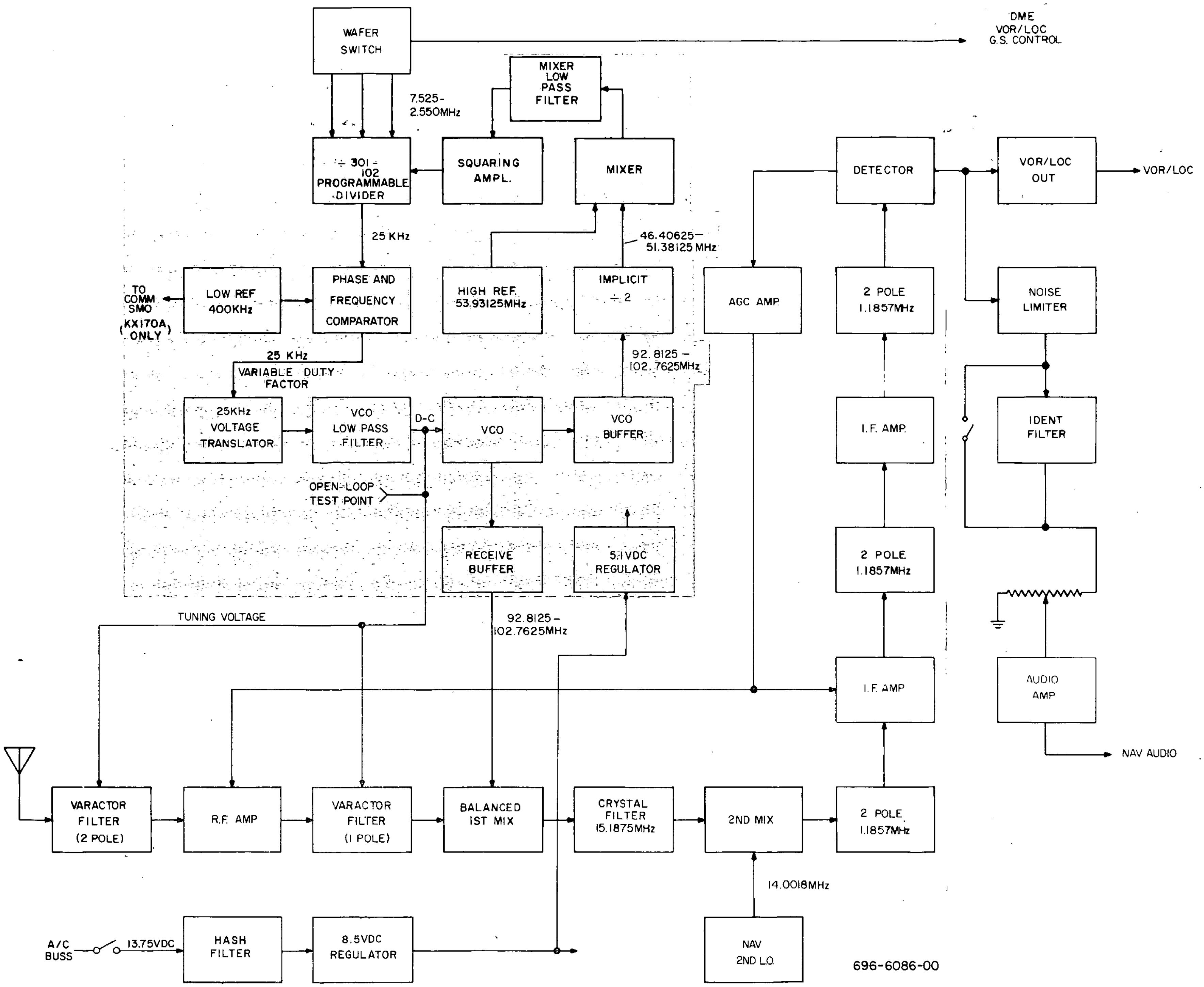


FIGURE 5-48 NAV BLOCK DIAGRAM

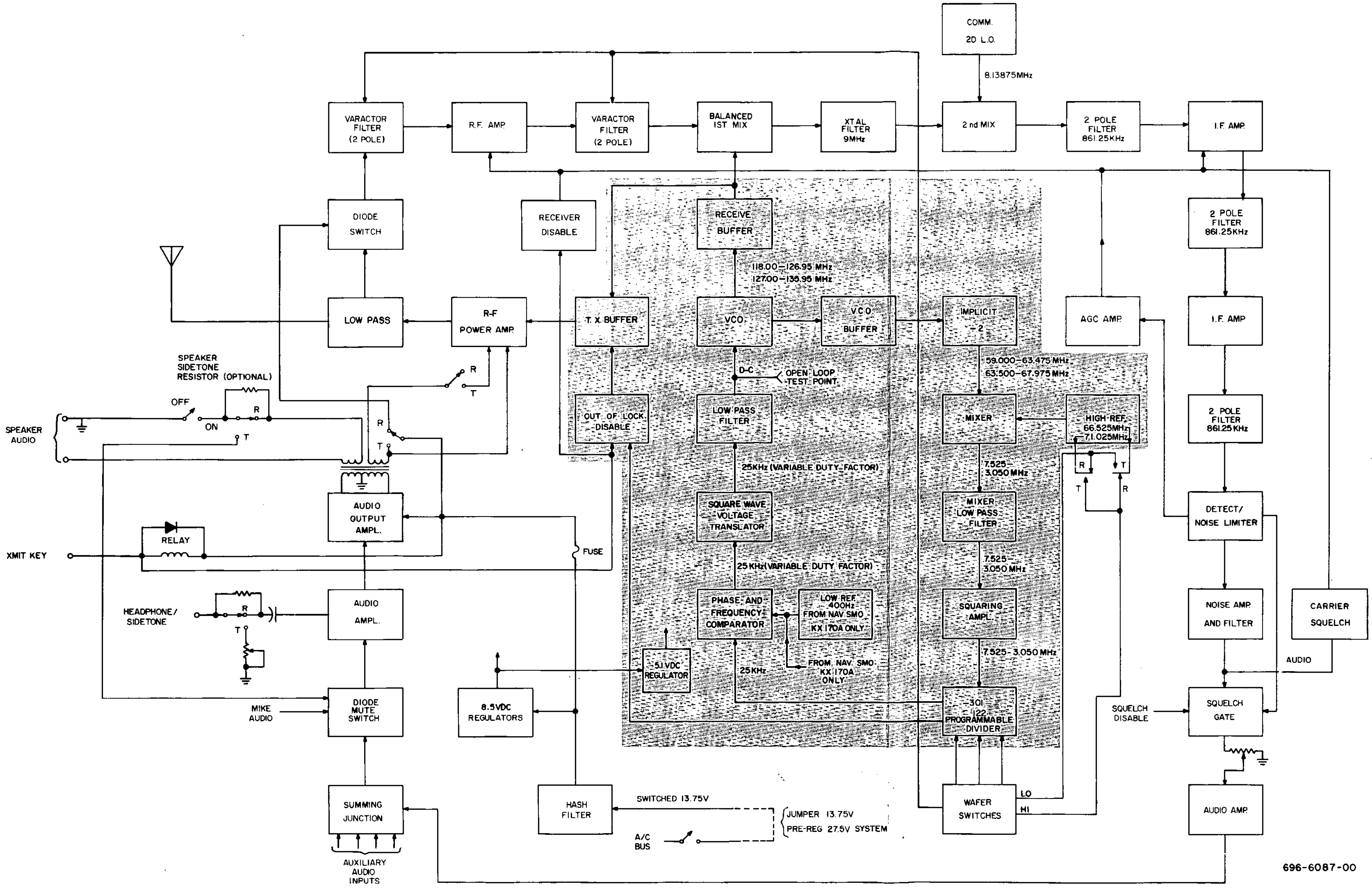
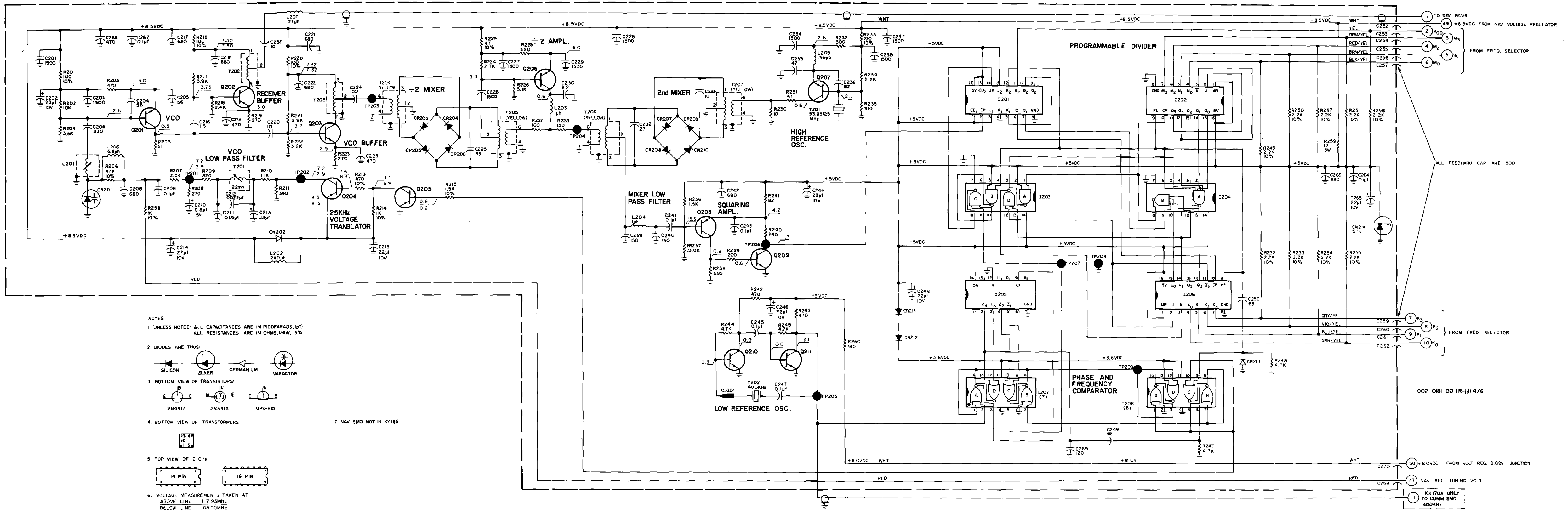


FIGURE 5-49 COMM BLOCK DIAGRAM

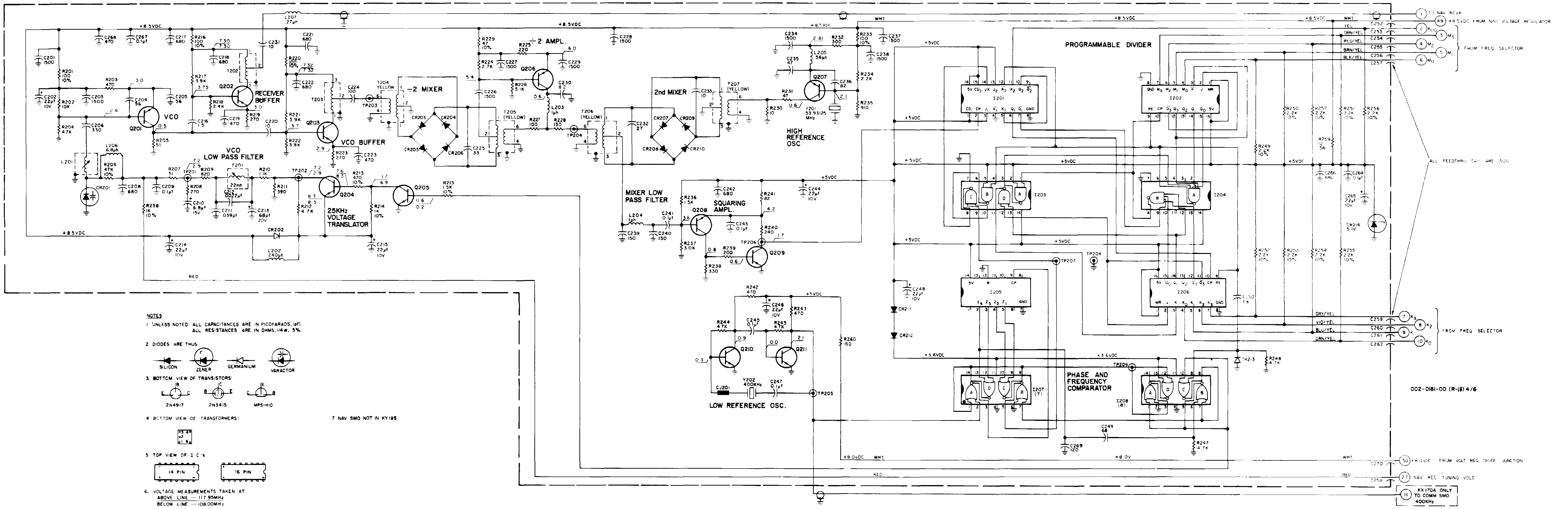


NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W, 5%.
2. DIODES ARE THUS:
3. BOTTOM VIEW OF TRANSISTORS:
4. BOTTOM VIEW OF TRANSFORMERS:
5. TOP VIEW OF I. C.'s
6. VOLTAGE MEASUREMENTS TAKEN AT:
ABOVE LINE — 117.95MHz
BELOW LINE — 108.00MHz
7. NAV SMO NOT IN KY195

FIGURE 5-50 NAV SMO SCHEMATIC DIAGRAM
(Dwg. No. 002-0181-00 R-25 4/6)

KING



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W, 5%.

2. DIODES ARE THUS

3. BOTTOM VIEW OF TRANSISTORS:

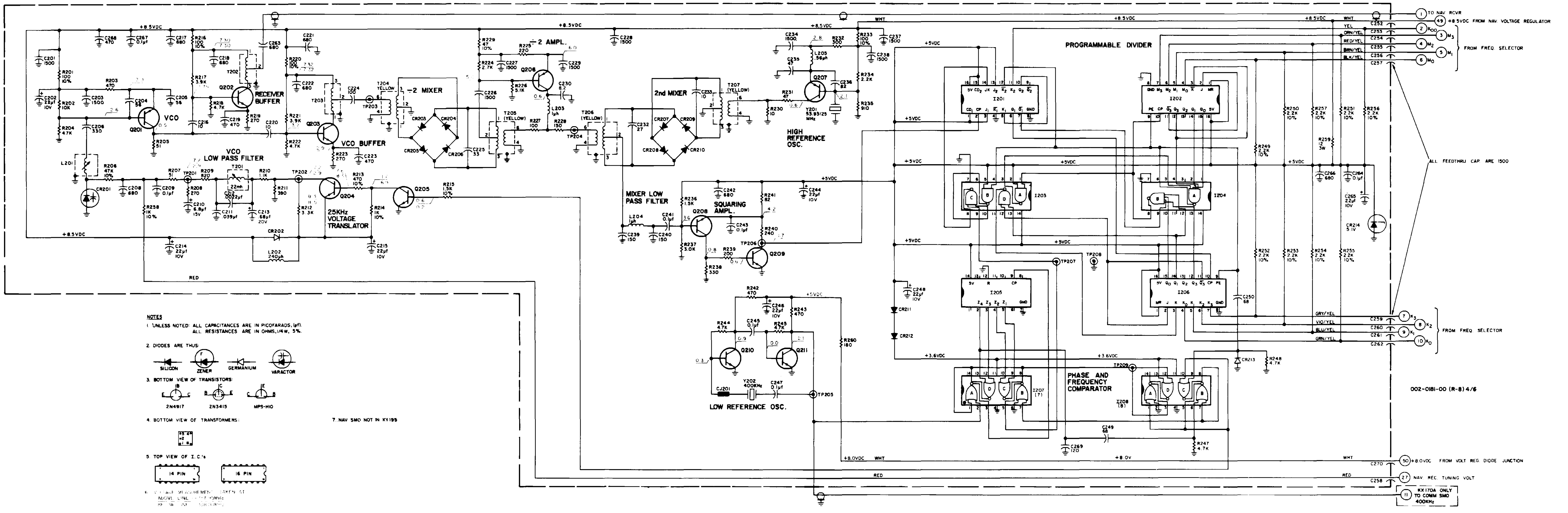
4. BOTTOM VIEW OF TRANSFORMERS:

5. TOP VIEW OF I.C.'s

6. VOLTAGE MEASUREMENTS TAKEN AT:
ABOVE LINE — 117.95MHz
BELOW LINE — 108.00MHz

7. NAV SMO NOT IN KY195

FIGURE 5-50 NAV SMO SCHEMATIC DIAGRAM



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf).
ALL RESISTANCES ARE IN OHMS, 1/4W, 5%.

2. DIODES ARE THUS:

3. BOTTOM VIEW OF TRANSISTORS:

4. BOTTOM VIEW OF TRANSFORMERS:

5. TOP VIEW OF I.C.'s

6. VOLTAGE MEASUREMENTS TAKEN AT
ABOVE LINE [illegible] MHz
BELOW LINE [illegible] MHz

7. NAV SMO NOT IN KY195

FIGURE 5-50 NAV SMO SCHEMATIC DIAGRAM

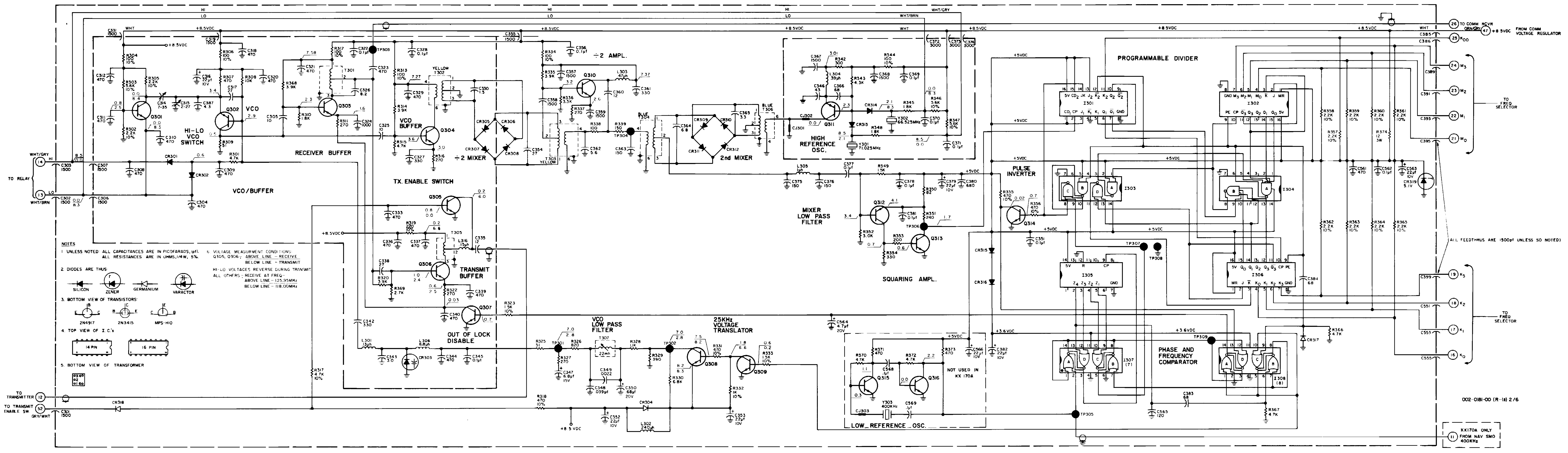
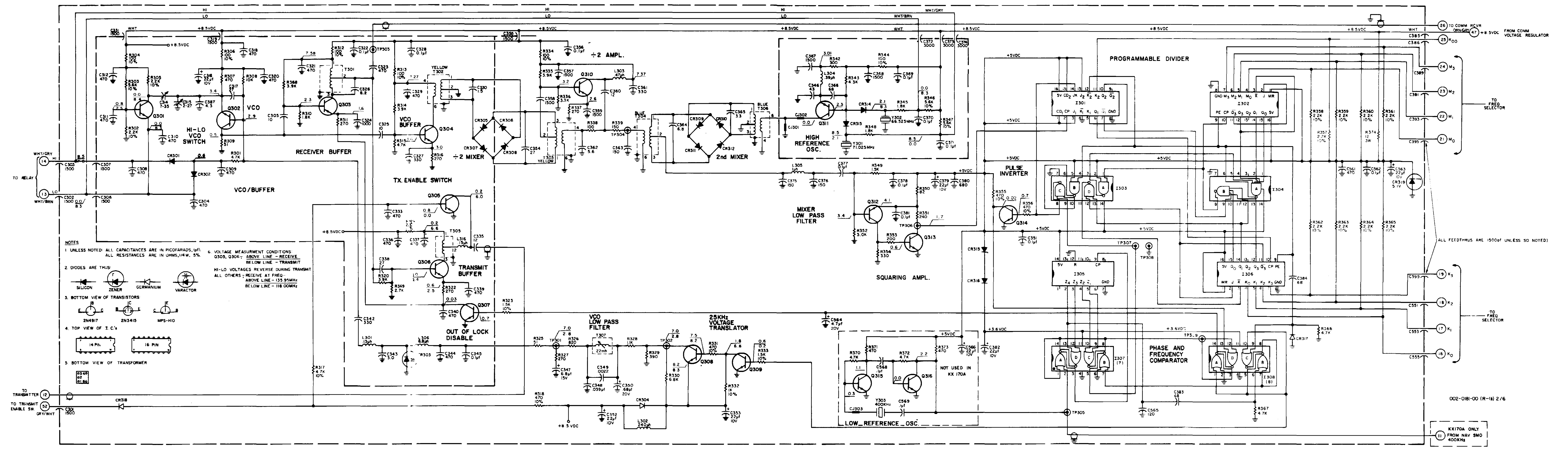


FIGURE 5-51 COMM SMO SCHEMATIC DIAGRAM
(Dwg. No. 002-0181-00 R-25 2/6)

KING



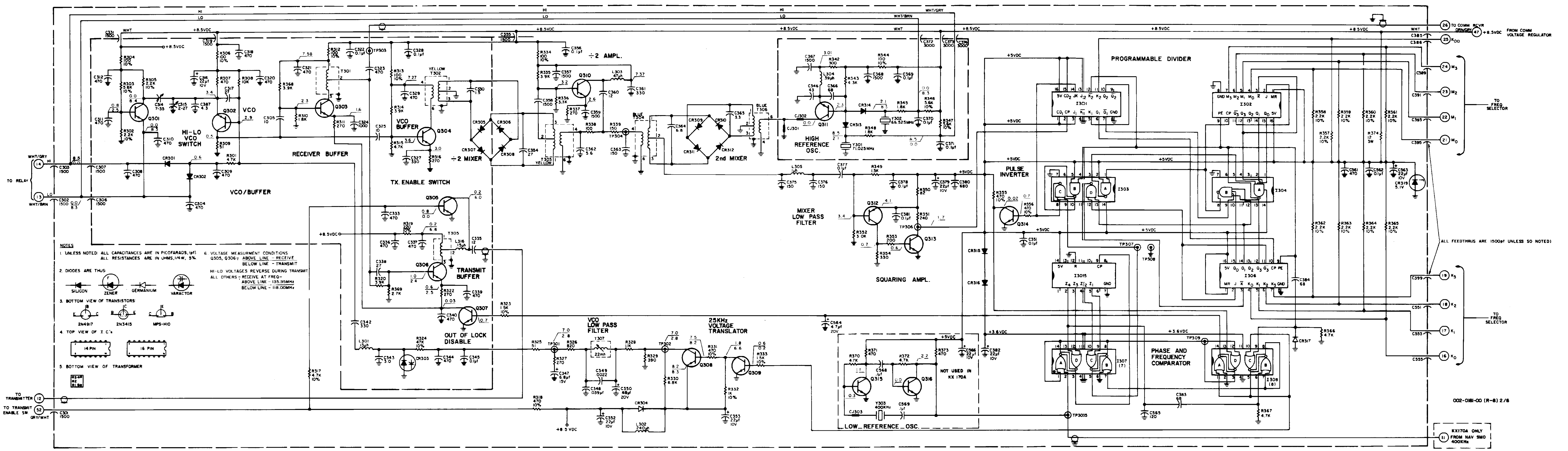
NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4 W, 5%.
2. DIODES ARE THUS: SILICON ZENER GERMANIUM VARACTOR
3. BOTTOM VIEW OF TRANSISTORS: 2N4917 2N3415 MPS-H10
4. TOP VIEW OF I.C.'s 14 PIN 16 PIN
5. BOTTOM VIEW OF TRANSFORMER
6. VOLTAGE MEASURMENT CONDITIONS: Q305, Q306 ÷ ABOVE LINE - RECEIVE / BELOW LINE - TRANSMIT
   HI-LO VOLTAGES REVERSE DURING TRANSMIT.
   ALL OTHERS ÷ RECEIVE AT FREQ- ABOVE LINE - 135.95MHz / BELOW LINE - 118.00MHz

ALL FEEDTHRUS ARE 1500pf UNLESS SO NOTED

FIGURE 5-51 COMM SMO SCHEMATIC DIAGRAM

COMM SMO SCHEMATIC



NOTES

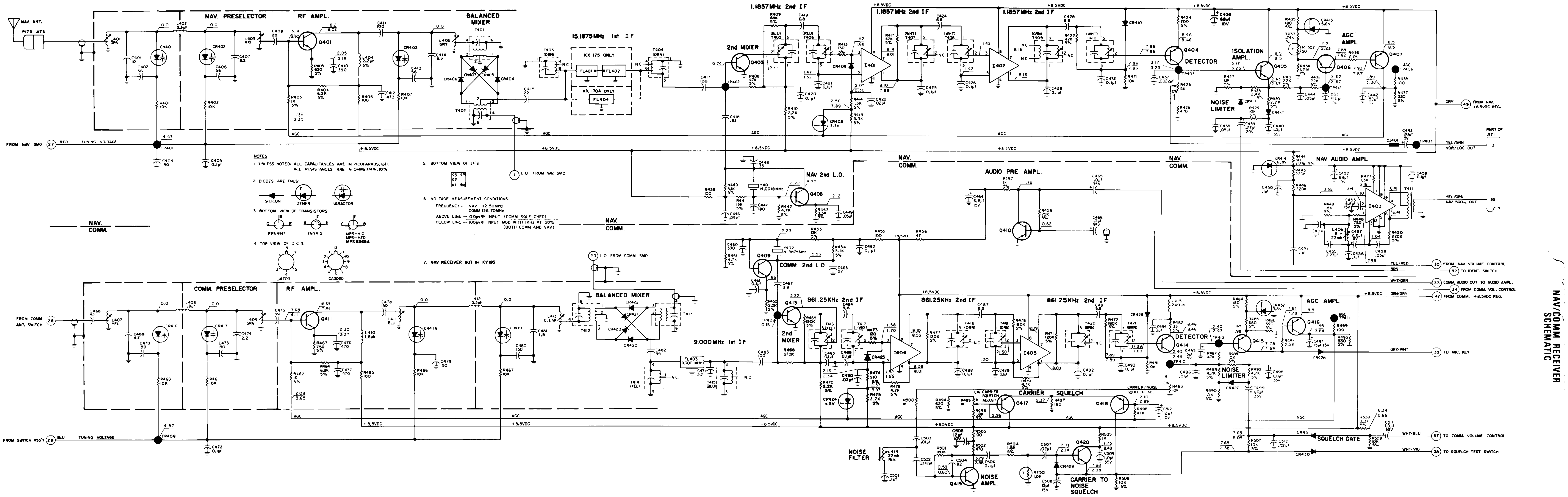
1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W, 5%.
2. DIODES ARE THUS: SILICON ZENER GERMANIUM VARACTOR
3. BOTTOM VIEW OF TRANSISTORS: 2N4917 2N3415 MPS-H10
4. TOP VIEW OF I.C.'s 14 PIN 16 PIN
5. BOTTOM VIEW OF TRANSFORMER
6. VOLTAGE MEASURMENT CONDITIONS Q305, Q306 ; ABOVE LINE - RECEIVE / BELOW LINE - TRANSMIT

HI-LO VOLTAGES REVERSE DURING TRANSMIT

ALL OTHERS ; RECEIVE AT FREQ- ABOVE LINE - 135.95MHz / BELOW LINE - 118.00MHz

FIGURE 5-51 COMM SMO SCHEMATIC DIAGRAM

KING



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W, 10%.

2. DIODES ARE THUS: SILICON ZENER VARACTOR

3. BOTTOM VIEW OF TRANSISTORS: FPN4917 2N3415 MPS-H10 MPS-H20 MPS 6568A

4. TOP VIEW OF I C'S μA703 CA3020

5. BOTTOM VIEW OF IF'S

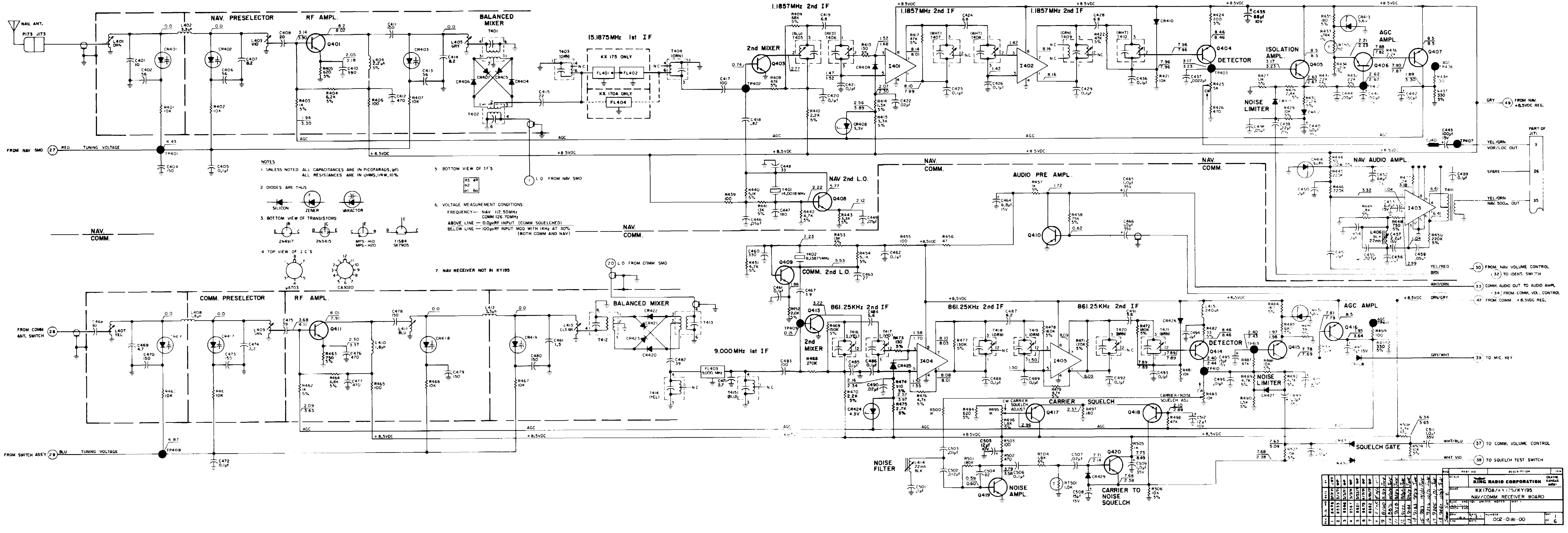
6. VOLTAGE MEASUREMENT CONDITIONS:
FREQUENCY— NAV 112.50MHz
COMM 126.70MHz
ABOVE LINE — 0.0μvRF INPUT (COMM SQUELCHED)
BELOW LINE — 100μvRF INPUT MOD WITH 1KHz AT 30% (BOTH COMM AND NAV)

7. NAV RECEIVER NOT IN KY195

NAV/COMM RECEIVER SCHEMATIC

FIGURE 5-52 NAV/COMM RECEIVER SCHEMATIC DIAGRAM
(Dwg. No. 002-0181-00 R-26 1/6)

KING



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf).
ALL RESISTANCES ARE IN OHMS, 1/4W, 10%.

2. DIODES ARE THUS:
SILICON ZENER VARACTOR

3. BOTTOM VIEW OF TRANSISTORS:
2N4917 2N3415 MPS-H10 MPS-H20 TIS84 SK7905

4. TOP VIEW OF I C'S
μA703 CA3020

5. BOTTOM VIEW OF IF'S

6. VOLTAGE MEASUREMENT CONDITIONS:
FREQUENCY— NAV 112.50MHz
COMM 126.70MHz
ABOVE LINE — 0.0μvRF INPUT (COMM SQUELCHED)
BELOW LINE — 100μvRF INPUT MOD WITH 1KHz AT 30% (BOTH COMM AND NAV)

7. NAV RECEIVER NOT IN KY195

KING RADIO CORPORATION
OLATHE KANSAS 66061
NAME KX170A/KX175/KY195
NAV/COMM RECEIVER BOARD
NUMBER 002-0181-00
SHT 1 OF 6

NAV/COMM RECEIVER SCHEMATIC

FIGURE 5-52 NAV/COMM RECEIVER SCHEMATIC DIAGRAM
(Dwg. No. 002-0181-00 R-25 1/6)

Rev. 2, December, 1972

KING

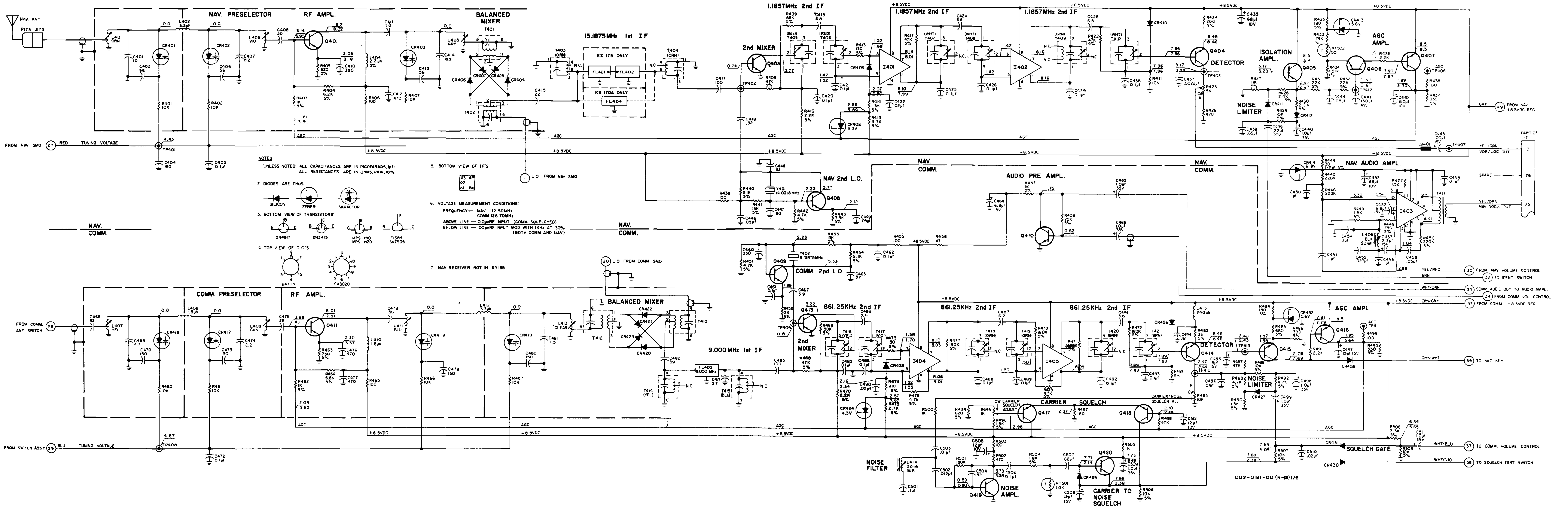
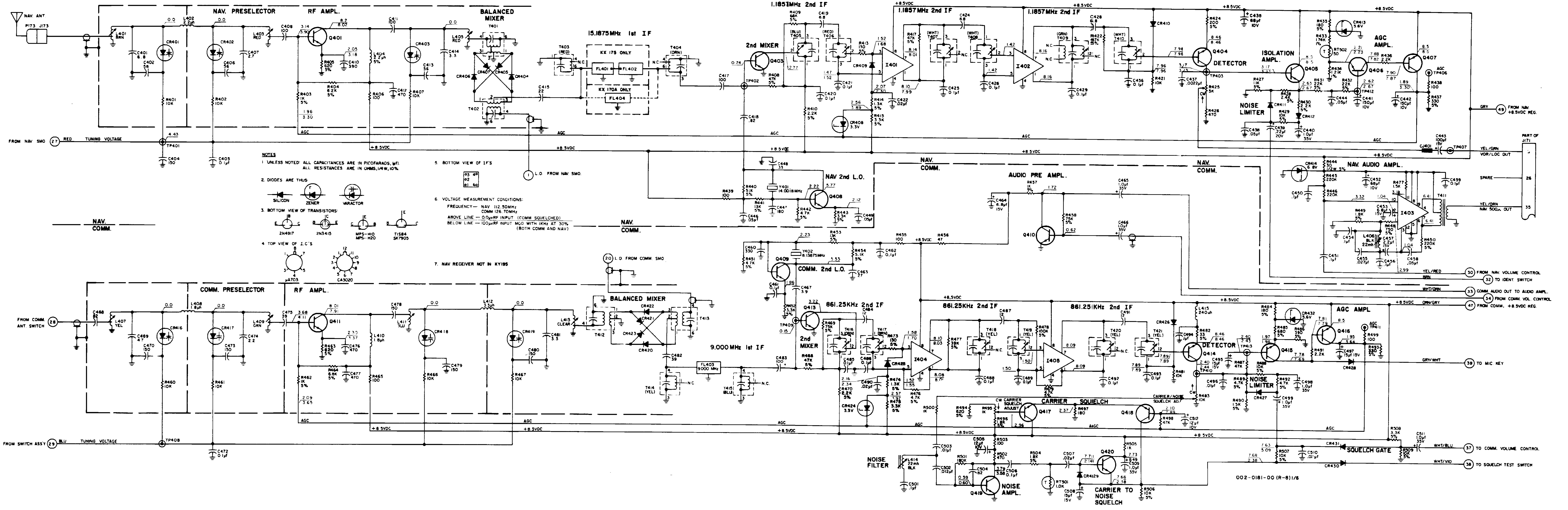


FIGURE 5-52 NAV/COMM RECEIVER SCHEMATIC DIAGRAM

KING



NOTES

1 UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf).
ALL RESISTANCES ARE IN OHMS, 1/4 W, 10%.

2. DIODES ARE THUS:
SILICON ZENER VARACTOR

3. BOTTOM VIEW OF TRANSISTORS:
2N4917 2N3415 MPS-H10 MPS-H20 TIS84 SK7905

4 TOP VIEW OF I.C'S
μA703 CA3020

5. BOTTOM VIEW OF IF'S

6. VOLTAGE MEASUREMENT CONDITIONS:
FREQUENCY— NAV 112.50MHz
COMM 126.70MHz
ABOVE LINE — 0.0μvRF INPUT (COMM SQUELCHED)
BELOW LINE — 100μvRF INPUT MOD WITH 1KHz AT 30%
(BOTH COMM AND NAV)

7. NAV RECEIVER NOT IN KY195

FIGURE 5-52 NAV/COMM RECEIVER SCHEMATIC DIAGRAM

NAV/COMM RECEIVER SCHEMATIC

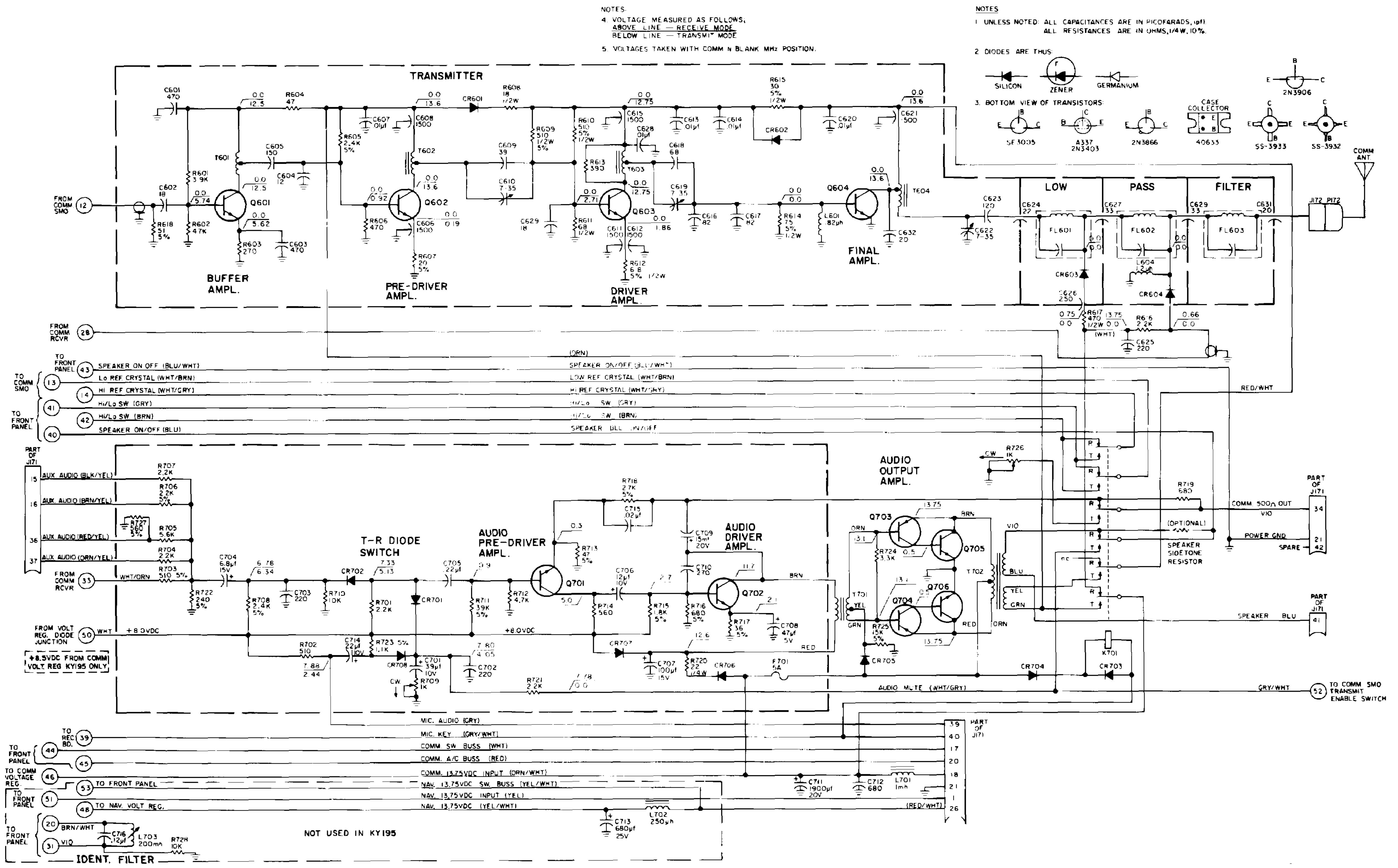


FIGURE 5-53 TRANSMITTER/AUDIO SCHEMATIC DIAGRAM

(Dwg. No. 002-0181-00 R-25 3/6)

TRANSMITTER/AUDIO SCHEMATIC

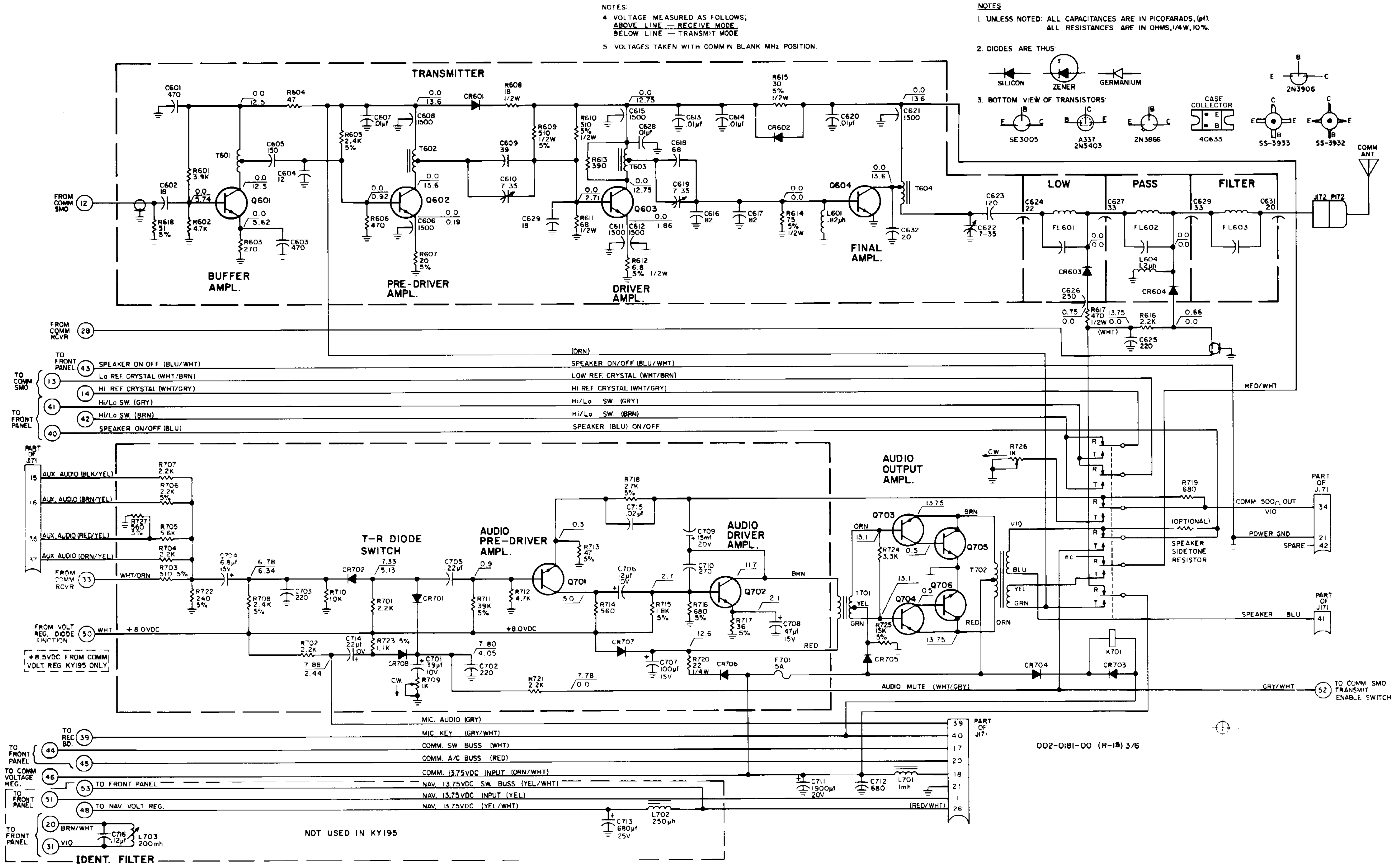


FIGURE 5-53 TRANSMITTER/AUDIO SCHEMATIC DIAGRAM

TRANSMITTER/AUDIO SCHEMATIC

KING

NOTES:

4. VOLTAGE MEASURED AS FOLLOWS;
ABOVE LINE — RECEIVE MODE
BELOW LINE — TRANSMIT MODE

5. VOLTAGES TAKEN WITH COMM IN BLANK MHz POSITION.

NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W, 10%.

2. DIODES ARE THUS:

3. BOTTOM VIEW OF TRANSISTORS:

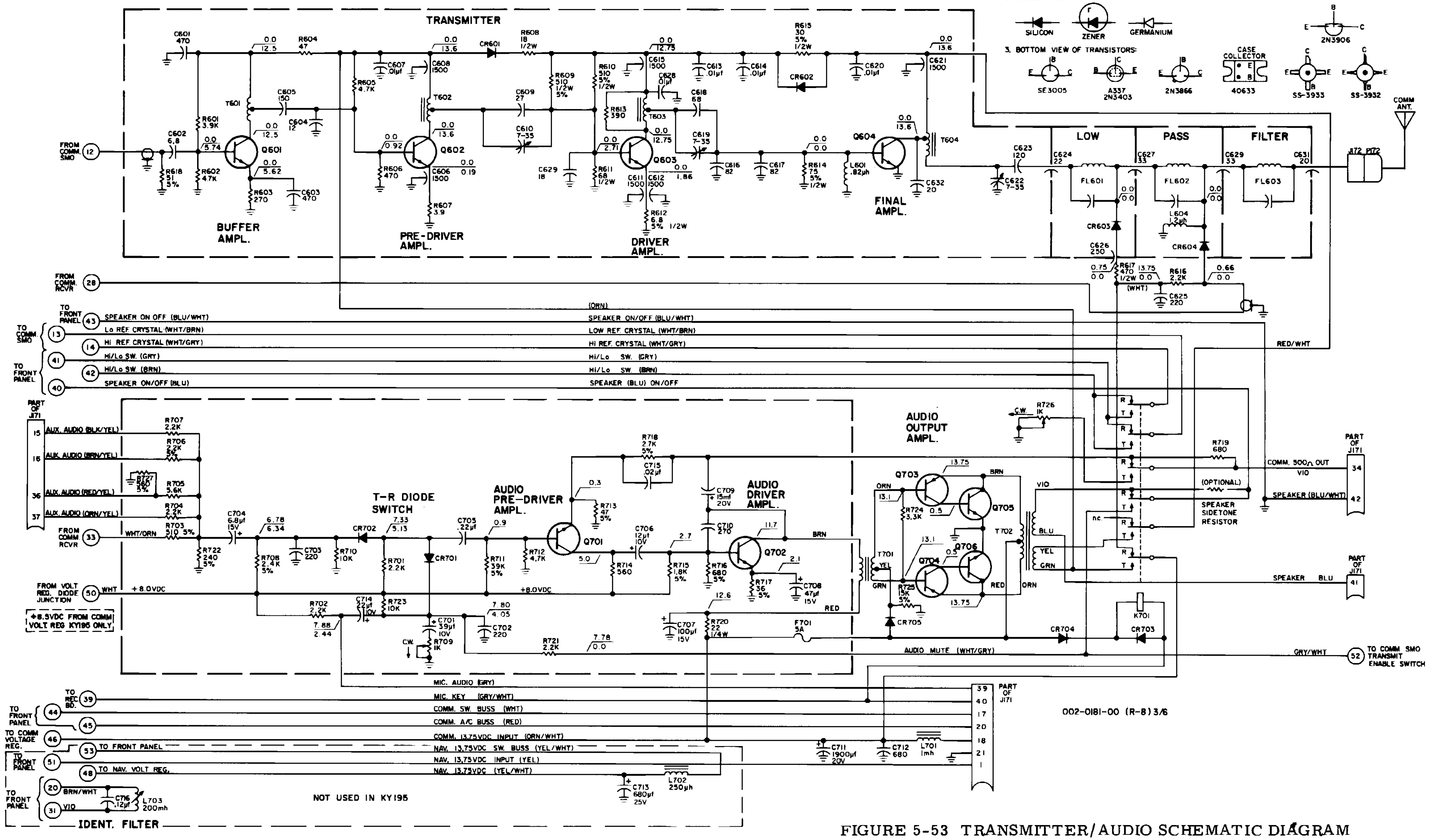
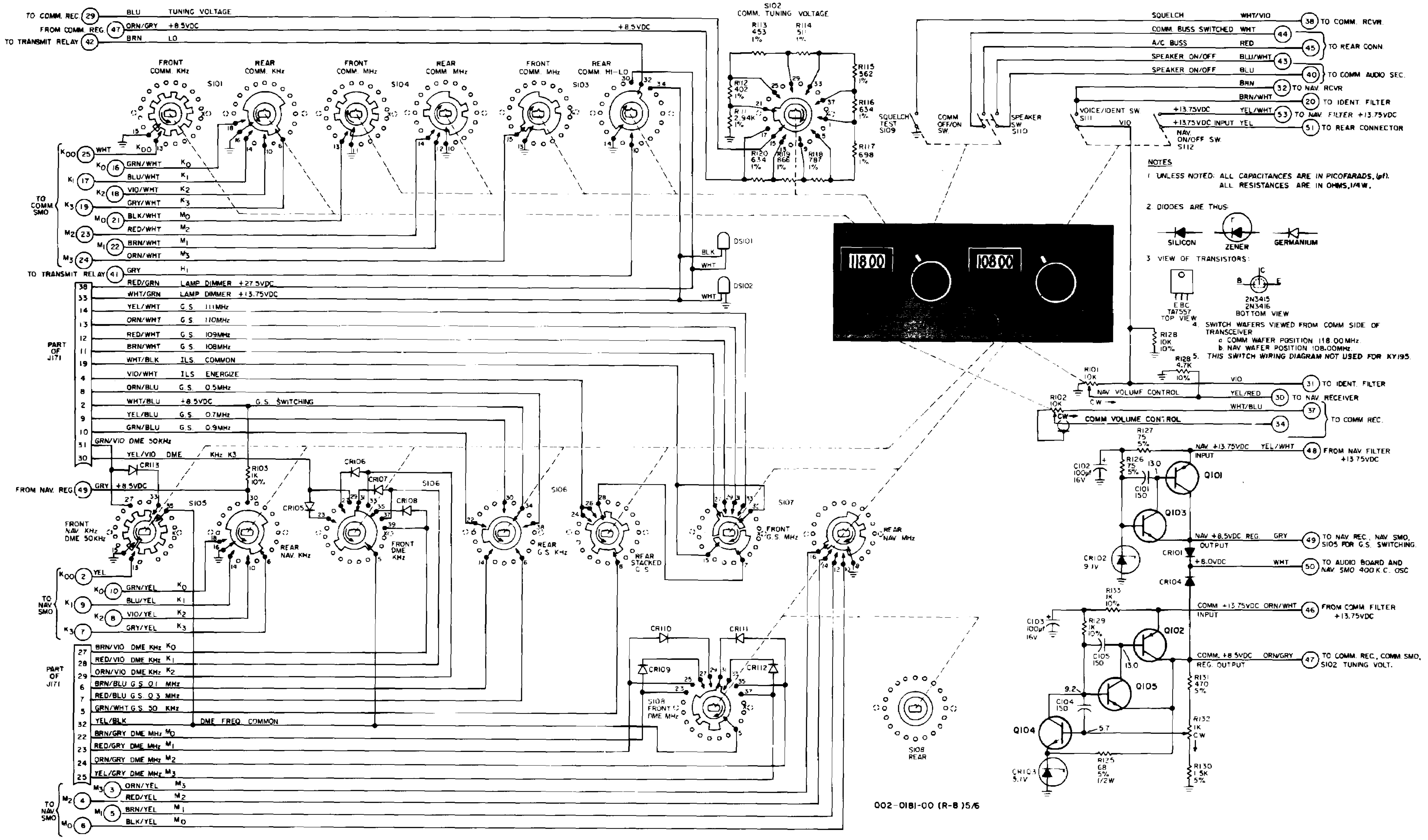


FIGURE 5-53 TRANSMITTER/AUDIO SCHEMATIC DIAGRAM

TRANSMITTER/AUDIO SCHEMATIC



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W.

2. DIODES ARE THUS:

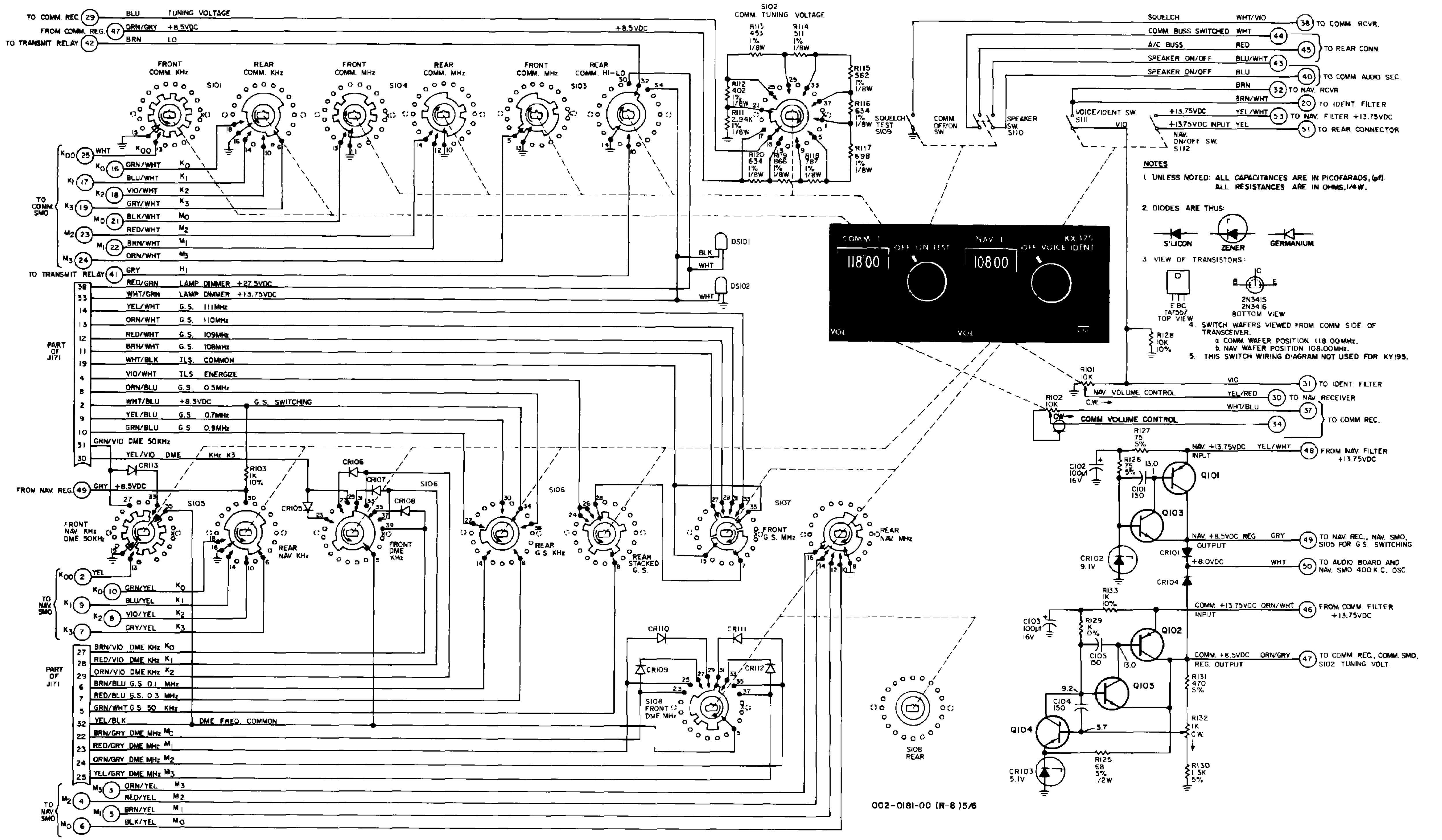
3. VIEW OF TRANSISTORS:

4. SWITCH WAFERS VIEWED FROM COMM SIDE OF TRANSCEIVER
   a. COMM WAFER POSITION 118.00MHz.
   b. NAV WAFER POSITION 108.00MHz.

5. THIS SWITCH WIRING DIAGRAM NOT USED FOR KY195.

002-0181-00 (R-8)5/6

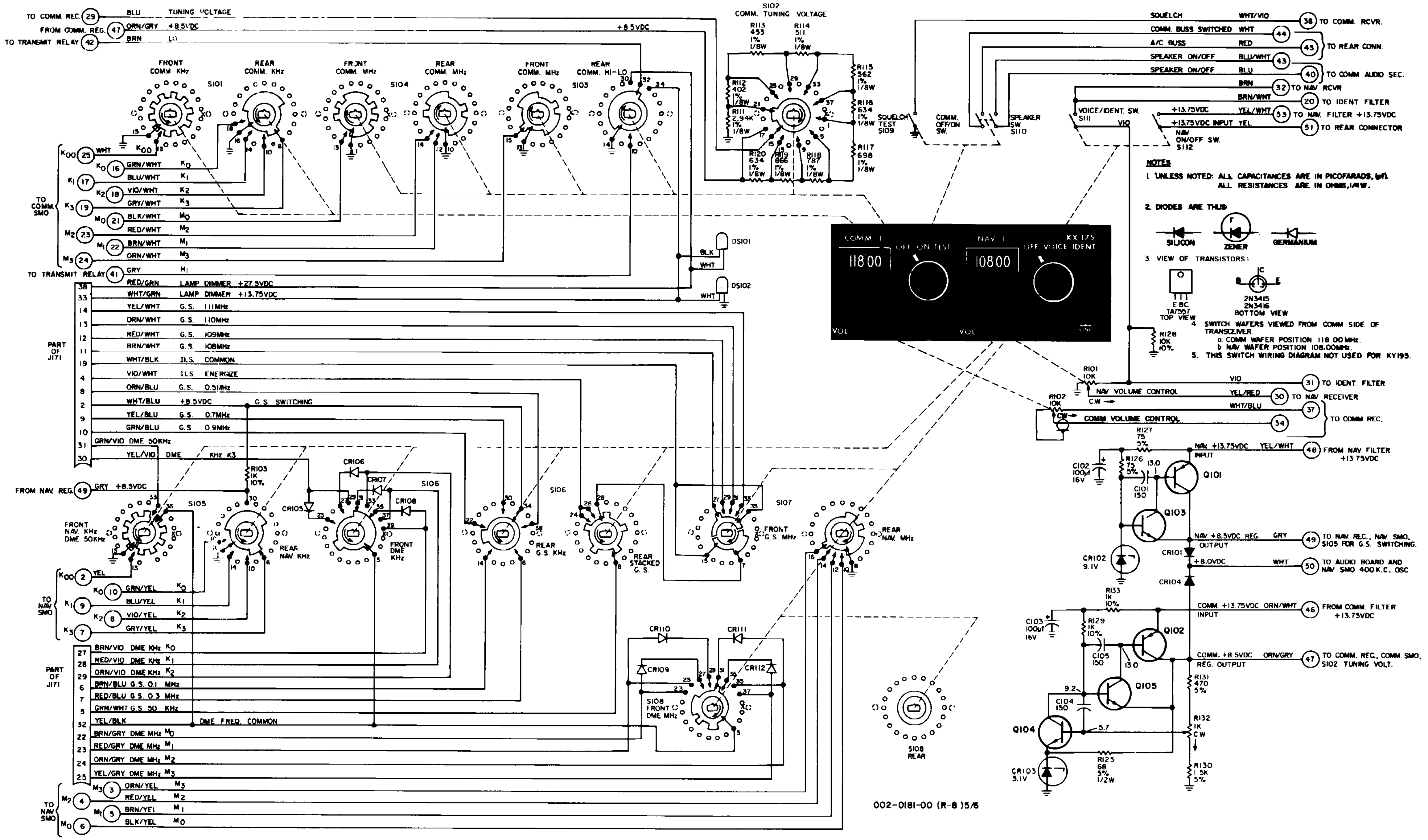
FIGURE 5-54 SWITCHING ASSEMBLY SCHEMATIC DIAGRAM
(Dwg. No. 002-0181-00 R-25 5/6)



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf).
   ALL RESISTANCES ARE IN OHMS, 1/4W.
2. DIODES ARE THUS:
3. VIEW OF TRANSISTORS:
4. SWITCH WAFERS VIEWED FROM COMM SIDE OF TRANSCEIVER.
   a. COMM WAFER POSITION 118.00MHz.
   b. NAV WAFER POSITION 108.00MHz.
5. THIS SWITCH WIRING DIAGRAM NOT USED FOR KY195.

FIGURE 5-54 SWITCHING ASSEMBLY SCHEMATIC DIAGRAM



NOTES

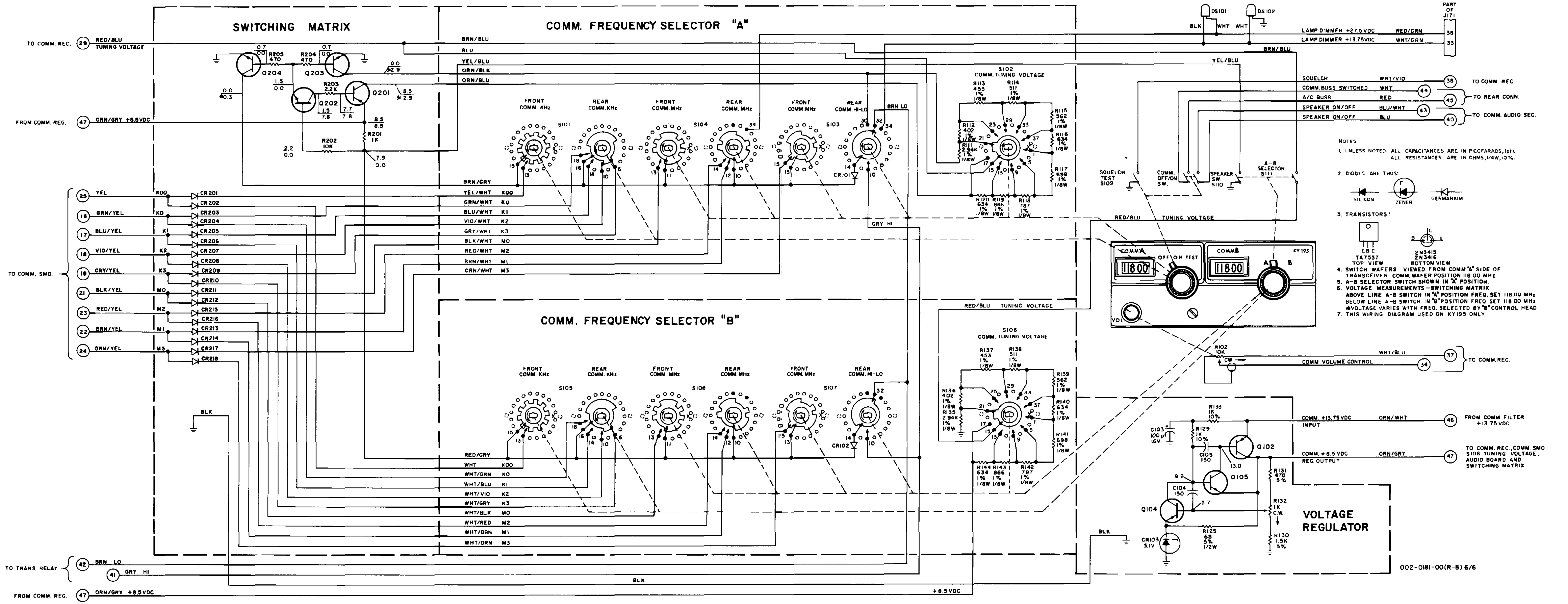
1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf).
ALL RESISTANCES ARE IN OHMS, 1/4W.

2. DIODES ARE THUS:

3. VIEW OF TRANSISTORS:

4. SWITCH WAFERS VIEWED FROM COMM SIDE OF TRANSCEIVER.
    a. COMM WAFER POSITION 118.00MHz.
    b. NAV WAFER POSITION 108.00MHz.
5. THIS SWITCH WIRING DIAGRAM NOT USED FOR KY195.

FIGURE 5-54 SWITCHING ASSEMBLY SCHEMATIC DIAGRAM



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W, 10%.
2. DIODES ARE THUS:
3. TRANSISTORS:
4. SWITCH WAFERS VIEWED FROM COMM "A" SIDE OF TRANSCEIVER. COMM. WAFER POSITION 118.00 MHz.
5. A-B SELECTOR SWITCH SHOWN IN "A" POSITION.
6. VOLTAGE MEASUREMENTS—SWITCHING MATRIX
   ABOVE LINE A-B SWITCH IN "A" POSITION FREQ. SET 118.00 MHz
   BELOW LINE A-B SWITCH IN "B" POSITION FREQ. SET 118.00 MHz
   *VOLTAGE VARIES WITH FREQ. SELECTED BY "B" CONTROL HEAD
7. THIS WIRING DIAGRAM USED ON KY195 ONLY.

FIGURE 5-55 KY 195 SWITCHING ASSEMBLY SCHEMATIC DIAGRAM

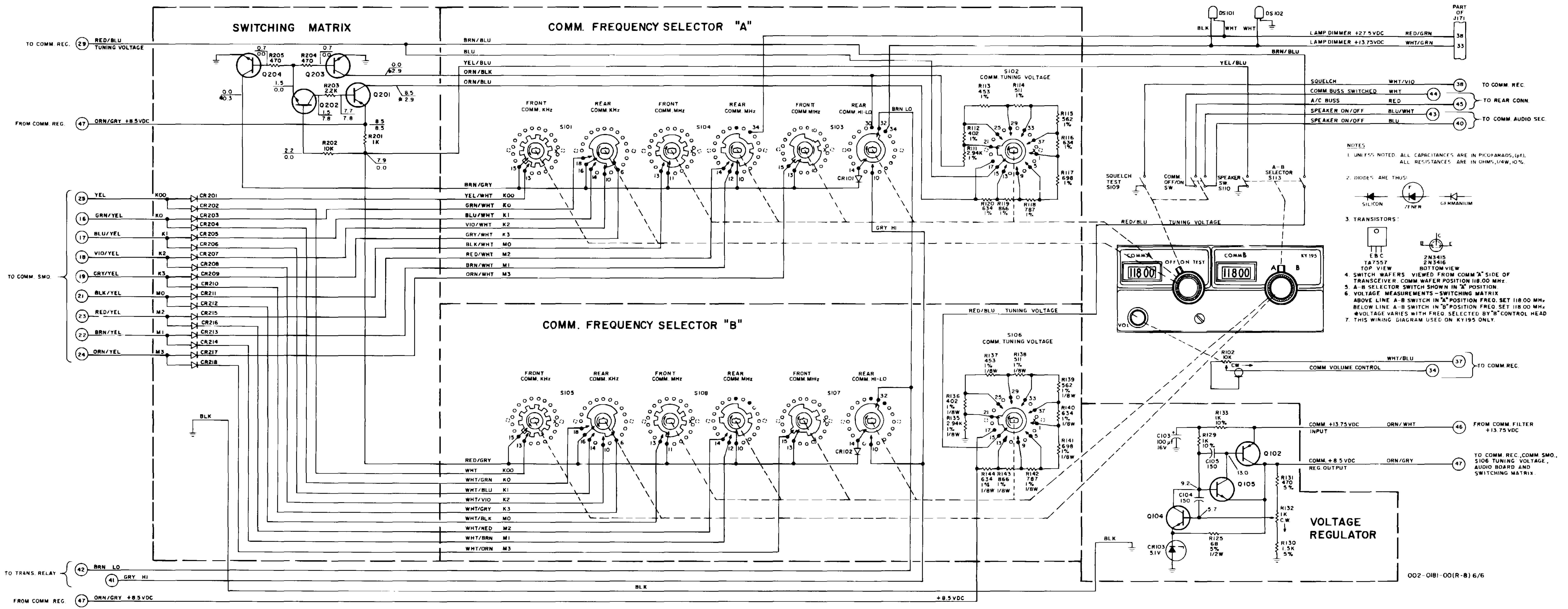
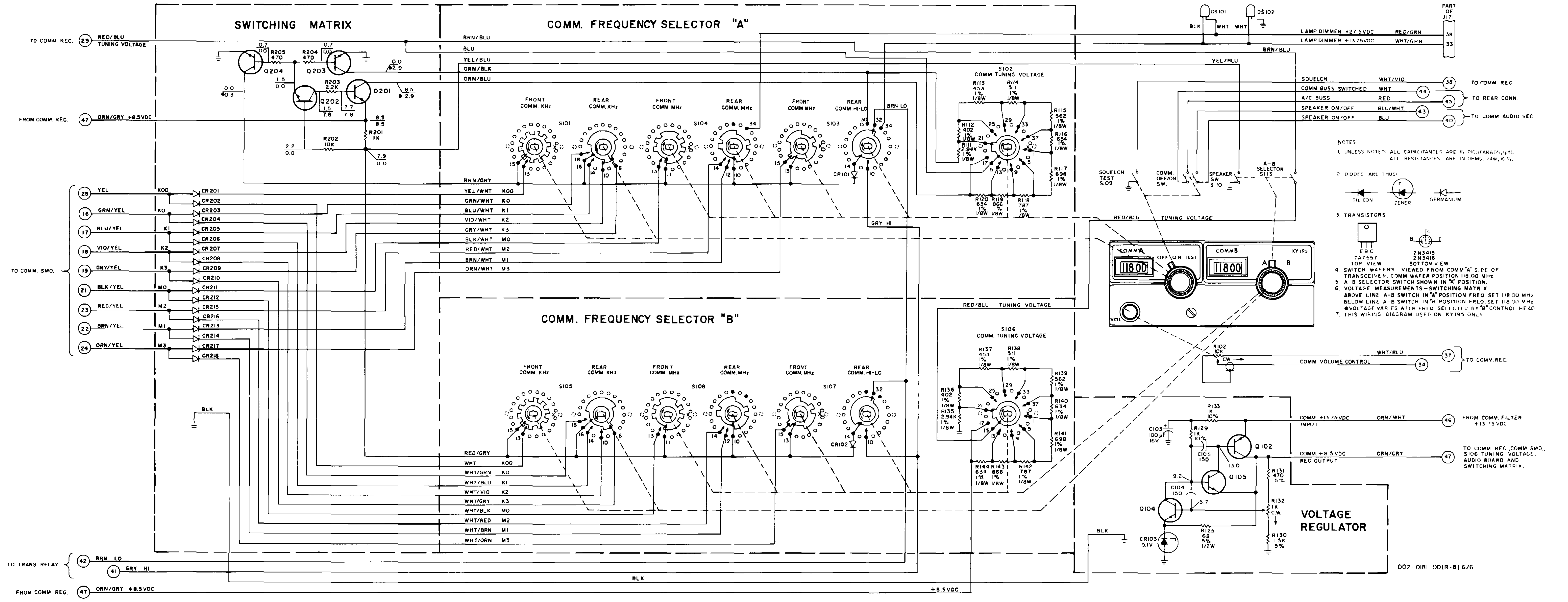


FIGURE 5-55 KY 195 SWITCHING ASSEMBLY SCHEMATIC DIAGRAM
(Dwg. No. 002-0181-00 R-25 6/6)

KING

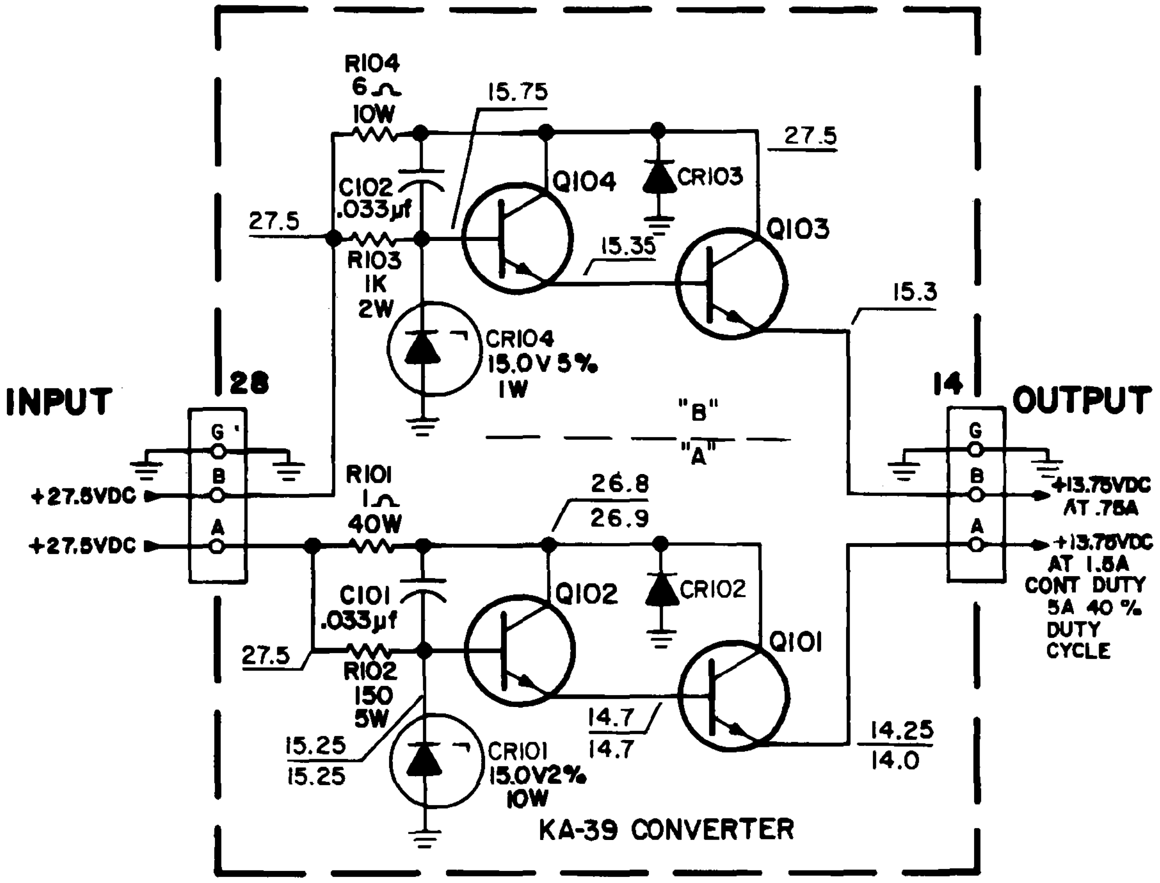


NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS,(pf).
   ALL RESISTANCES ARE IN OHMS,1/4W,10%.
2. DIODES ARE THUS:
3. TRANSISTORS:
4. SWITCH WAFERS VIEWED FROM COMM "A" SIDE OF TRANSCEIVER. COMM. WAFER POSITION 118.00 MHz.
5. A-B SELECTOR SWITCH SHOWN IN "A" POSITION.
6. VOLTAGE MEASUREMENTS – SWITCHING MATRIX
   ABOVE LINE A-B SWITCH IN "A" POSITION FREQ. SET 118.00 MHz
   BELOW LINE A-B SWITCH IN "B" POSITION FREQ. SET 118.00 MHz
   ✱VOLTAGE VARIES WITH FREQ. SELECTED BY "B" CONTROL HEAD
7. THIS WIRING DIAGRAM USED ON KY195 ONLY.

KY 195 SWITCHING ASSEMBLY SCHEMATIC

FIGURE 5-55 KY 195 SWITCHING ASSEMBLY SCHEMATIC DIAGRAM



002-0162-00 (R-2)

NOTE:

CONVERTER "A" VOLTAGES:

ABOVE LINE - RCVR AS LOAD, NO AUDIO.

BELOW LINE - TRANSMIT CONDITION AS LOAD, NO MODULATION.

FIGURE 5-56 KA 39 VOLTAGE CONVERTER SCHEMATIC DIAGRAM

ASSEMBLY NO. 069-1016-00
DESCRIPTION KX175
UNIT KX175
REVISION 14
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0419-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	006-0057-00	IK MANUAL	1
	008-0004-00	LUG GROUND #4	1
	008-0005-03	LUG GROUND	2
	012-1006-00	TAPE COATED LACING	
	016-1015-00	ADHESIVE	
	016-1038-00	SPRAY ADHESIVE	
	035-1011-00	END CAP SHIPPING	2
	035-1013-04	SHIPPING BAG PLAST	1
R1	035-1031-00	SHIPPING CARTON	1
	047-1728-01	COMM COVER	1
	047-1729-01	COVER PA	1
	047-1730-02	LEFT SIDE RAIL	1
	047-1731-02	RIGHT SIDE RAIL	1
	047-1737-01	NAV COVER	1
R1	047-1747-00	TOP COVER	1
	047-1943-00	CLIP SPRING	1
	047-2267-02	COVER BOTTOM	1
	047-2268-01	SHIELD PAD (MIXER)	2
	047-2269-01	SHIELD PAD (OSC)	1
	047-2293-01	SHIELD PAD	1
R1	047-2327-01	COVER EQUIPMENT	1
	057-1210-00	PATENT LABEL	1
	057-1344-01	SERIAL NUMBER TAG	1
	076-0339-00	SPACER	6
	089-2105-22	NUT SPEED NO 4	8
	089-2140-00	NUT ESNA #4	2
R1	089-5878-04	SCR PPH 4-40X1/4	2
R1	089-5878-13	SCR PHP 4-40X13/16	7
	089-5899-04	SCR PPH 2 56X1/4	4
	089-5903-04	SCR PPH 4-40X1/4	7
	089-6008-03	SCR PFH 4 40X3/16	10
	089-6008-04	SCR PFH 4-40X1/4	12
	089-6167-05	SCR FHP 6-32X5/16	4
	089-6258-04	SCR PFH 4-24X1/4	8
	091-0118-03	INSULATOR	2
	091-0118-04	INSULATOR	1
	091-0118-05	FISHPAPER	1
	150-0020-10	TUBING TEF CLR 18	.2
	187-1011-00	LINER RUBBER	2
	200-0082-00	REAR PLATE ASSY	1
	200-0249-00	NAV/COMM BOARD SA	1
	200-0250-00	REAR DIVIDER SA	1
	200-0251-00	COMM SMO SA	1
	200-0252-00	NAV SMO SA	1
	200-0253-00	SWITCH HEAD SA	1

NOTE: R indicates revision. See page 6-2A for revision and new parts.

ASSEMBLY NO. 069-1016-00
DESCRIPTION KX175
UNIT KX175
REVISION 14
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0419-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	200-0254-00	FRONT PLATE SA	1
	200-0255-00	CONN CABLE SA	1

Parts List Revision Record

Assembly No: 069-1016-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
ADDED		006-5053-00	Maintenance Manual	1
CHANGE		035-1031-01	Shipping Carton	1
CHANGE		047-2338-01	Top Cover	1
CHANGE		047-1695-00	Cover Equipment	1
CHANGE		089-7018-04	Scr. THP #4-40×1/4	2
CHANGE		089-7018-13	Scr. THP #4-40×13/16	7

Assembly No: 069-1016-00 (B/MRL Rev. 14) Manual Revision 2

ADDED		047-2496-01	Shield, Pad (NAV I. F.)	
ADDED		047-2497-01	Shield, Pad (COMM I. F.)	1
ADDED		091-0118-06	Insulator	1
ADDED		091-0118-07	Insulator	1

ASSEMBLY NO. 200-0254-00 PAGE 1
DESCRIPTION FRONT PLATE SA
UNIT KX175
REVISION 14
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0334-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	008-0005-03	LUG GROUND	1
	008-0040-00	LUG SOLDER	1
	016-1007-04	SEALANT LOCTITE	
	016-1016-00	LUBRICANT MOLYCT G	
	026-0001-00	WIRE TC26 BUSS	.3
R4	029-0096-00	GEAR DRIVE MC	2
R4	029-0097-00	GEAR DRIVE KC	2
	047-1672-00	SPRING DETENT	2
	047-1706-00	FRONT PANEL INSERT	1
	047-1708-00	FRAME LENS	2
	047-1713-00	SPRING SWITCH	2
R1	047-2212-00	INSERT FRONT PANEL	1
	073-0053-00	KNOB KC	2
	073-0085-00	KNOB MODE	2
	073-0123-01	KNOB MC	2
	073-0143-02	PANEL FRONT	1
R4	076-0278-00	SHAFT KC	2
R4	076-0279-00	SHAFT MC	2
R4	076-0285-00	DIAL STOP PIN	1
	078-0024-00	SPRING COMPRESSION	1
	088-0125-00	HOLD DOWN UNIT	1
R4	088-0128-00	LENS	2
	088-0141-00	LEVER SWITCH	2
	089-2106-30	NUT HEX	2
	089-5569-03	SCR PTH 2-56X3/16	8
R2	089-5857-04	SCR BRIS 4-40X1/4	4
R2	089-5861-04	SCR BRIS 6-32X1/4	8
	089-5874-03	SCR PHP 2-56X3/16	1
	089-5899-02	SCR PPH 2-56X1/8	4
	089-8023-30	WASHER FLAT #2 SS	6
	089-8042-30	WASHER LOCK IN14	2
	089-8184-00	WASHER SPACER	1
	090-0019-01	RING RETAINING	2
	090-0041-01	RING RETAINING	2
R1	090-0052-02	PIN ROLL	1
	090-0170-00	CLAMP HOLD DOWN	6
	092-0026-00	SCREW HOLD DOWN	1
	147-0019-00	BUSHINGS	4
	150-0003-10	TUBING TEF CLR 24	.3
	150-0004-10	TUBING TEF CLR 22	.1
	150-0020-10	TUBING TEF CLR 18	.1
R 101	133-0059-00	RES VARI 10K	1
R 102	133-0059-00	RES VARI 10K	1
R2 R 128	130-0103-25	RES 10K 10% QW	1
S 109	031-0113-00	SWITCH SPST	1

NOTE: R indicates revision. See page 6-4A for revision and new parts.

ASSEMBLY NO. 200-0254-00

DESCRIPTION FRONT PLATE SA
UNIT KX175
REVISION 14
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0334-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
S 110	031-0114-00	SWITCH DPST	1
S 111	031-0113-00	SWITCH SPST	1
S 112	031-0113-00	SWITCH SPST	1

Parts List Revision Record

Assembly No: 200-0254-00 Manual Revision 1

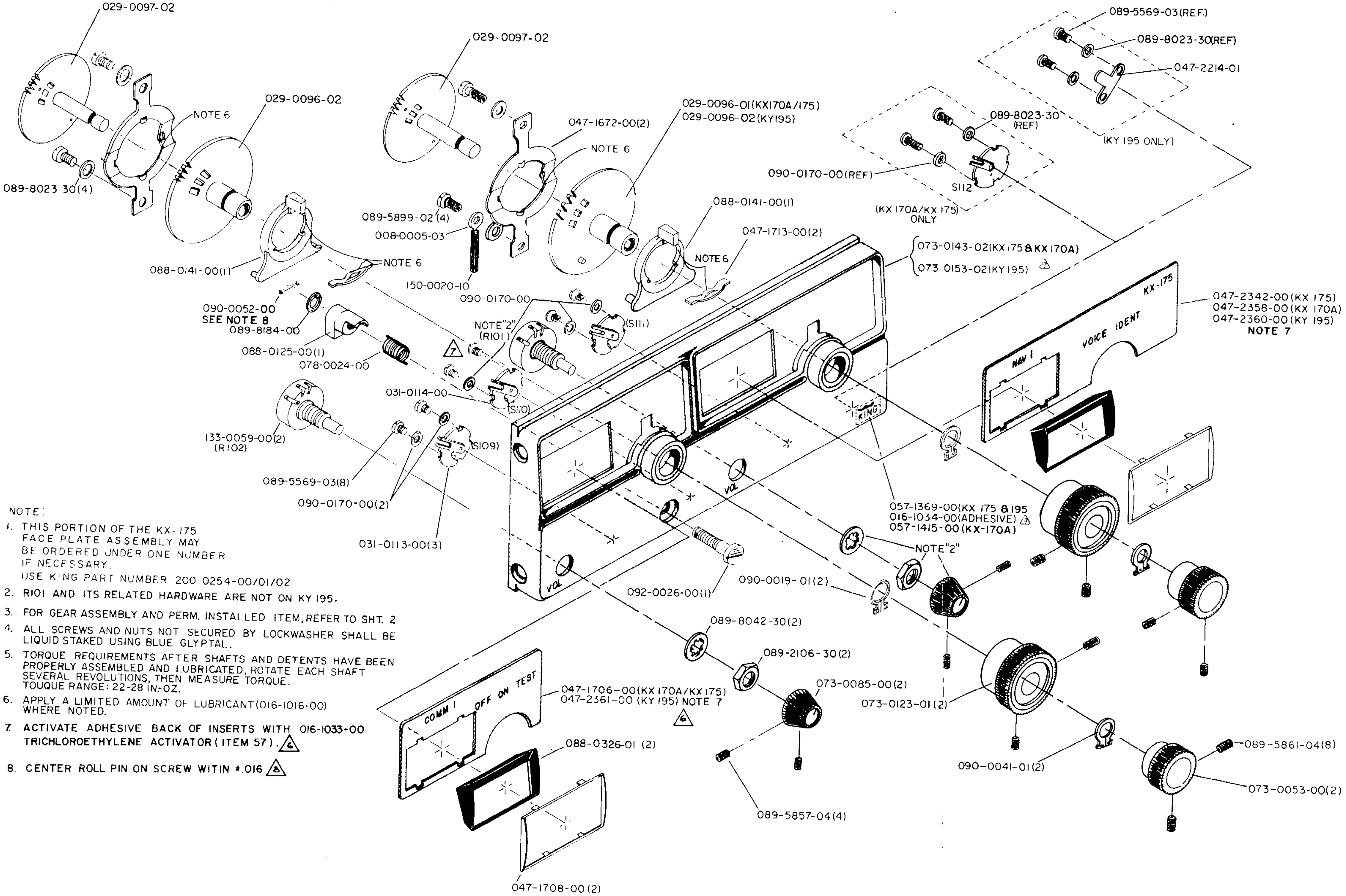
ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R2 ADDED		016-1015-00	Indus Adhesive #4475	
ADDED		016-1033-00	Trichloroethlyene Activator	
ADDED		016-1034-00	Adhesive	
CHANGE		047-2342-00	Insert, Front Panel	1
ADDED		057-1369-00	Logo	1
CHANGE		090-0052-00	Pin Roll	1

Assembly No: 200-0254-00 (B/MRL Rev. 13) Manual Revision 2

CHANGE		089-6218-04	#4-40 Eristol SS	4
CHANGE		089-6222-04	#6-32 Bristol SS	8
CHANGE		130-0472-25	Res F/C 4. 7K 10% QW	1
ADDED		016-1045-00	Silicone Seal	
DELETED		016-1015-00	Indus. Adhesive #4475	

Assembly No: 200-0254-00 (B/MRL Rev. 14) Manual Revision 4

CHANGE		029-0096-02	Gear, Drive, MHz	1
CHANGE		029-0097-02	Gear, Drive, KHz	2
CHANGE		088-0326-01	Lens	2
DELETED		076-0278-00		
DELETED		076-0279-00		
DELETED		076-0285-00		
ADDED		029-0096-01	Gear, Drive, MHz	1



NOTE:

1. THIS PORTION OF THE KX-175 FACE PLATE ASSEMBLY MAY BE ORDERED UNDER ONE NUMBER IF NECESSARY.
   USE KING PART NUMBER 200-0254-00/01/02
2. R101 AND ITS RELATED HARDWARE ARE NOT ON KY 195.
3. FOR GEAR ASSEMBLY AND PERM. INSTALLED ITEM, REFER TO SHT. 2
4. ALL SCREWS AND NUTS NOT SECURED BY LOCKWASHER SHALL BE LIQUID STAKED USING BLUE GLYPTAL.
5. TORQUE REQUIREMENTS AFTER SHAFTS AND DETENTS HAVE BEEN PROPERLY ASSEMBLED AND LUBRICATED, ROTATE EACH SHAFT SEVERAL REVOLUTIONS, THEN MEASURE TORQUE. TOUQUE RANGE: 22-28 IN.-OZ.
6. APPLY A LIMITED AMOUNT OF LUBRICANT (016-1016-00) WHERE NOTED.
7. ACTIVATE ADHESIVE BACK OF INSERTS WITH 016-1033-00 TRICHLOROETHYLENE ACTIVATOR (ITEM 57). △6
8. CENTER ROLL PIN ON SCREW WITIN ±.016 △8

FIGURE 6-1 FRONT PLATE ASSEMBLY
(Dwg. No. 300-0334-00 Rev. 11)

ASSEMBLY NO. 200-0253-00
DESCRIPTION SWITCH HEAD SA
UNIT KX175
REVISION 8
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0333-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	008-0001-01	LUG GROUND	2
	008-0005-03	LUG GROUND	7
	016-1004-00	THERMAL COMPOUND	
	R2 016-1008-05	ADHESIVE GLYPTAL	
	016-1016-00	LUBRICANT MOLYCT G	
	025-0018-00	WIRE CW26 BLACK	1.1
	025-0018-30	WIRE CW26 ORN/BLK	.7
	025-0018-40	WIRE CW26 YEL/BLK	.6
	025-0018-90	WIRE CW26 WHT/BLK	.6
	R2 025-0018-99	WIRE CW26 WHITE	1.4
	026-0001-00	WIRE TC26 BUSS	.8
	R2 029-0095-00	GEAR FACE	2
	047-1675-01	SUPPORT DIAL	1
	047-1714-00	BRACKET SWITCH	1
	047-2115-00	BRACKET SWITCH	1
	047-2208-02	PLATE DIAL MTG	1
	R2 076-0284-01	SHAFT DIAL GEAR	1
	R2 076-0284-02	SHAFT DIAL GEAR	1
	076-0298-00	SPACER	4
	076-0298-01	SPACER	10
	076-0298-03	SPACER	2
	076-0299-00	COLLAR	2
	R2 076-0472-00	SWITCH SHAFT	1
	R2 076-0472-01	SWITCH SHAFT	1
	R2 076-0473-00	SWITCH SHAFT	2
	088-0136-00	FILTER LAMP BLUE	2
	R2 088-0213-10	COUNTER WHEEL W/MK	2
	R2 088-0213-11	COUNTER WHEEL W/MK	1
	R2 088-0213-12	COUNTER WHEEL W/MK	1
	089-2005-37	NUT STOP 2-56	4
	089-2076-30	NUT 4-40	2
	089-2140-00	NUT ESNA #4	6
	089-5381-21	SC MACH 4-40X5/16	4
	089-5857-04	SCR BRIS 4-40X1/4	4
	R2 089-5857-06	SCR BRIS 4-40X3/8	4
	089-5903-04	SCR PPH 4-40X1/4	2
	089-5903-06	SCREW 4-40X3/8	2
	R2 089-6289-03	SCREW SHH 4-40X1/4	6
	089-8003-34	WASHER SPLITLOCK 4	2
	089-8023-30	WASHER FLAT #2 SS	4
	089-8025-30	WASHER #4	2
	R1 089-8079-10	WASHER	2
	090-0140-02	SOCKET LAMP	1
	090-0160-00	SOCKET LAMP	1
	091-0015-00	GROMMET RUBBER	3

NOTE: R indicates revision. See page 6-9A for revision and new parts.

ASSEMBLY NO. 200-0253-00 PAGE 2
DESCRIPTION SWITCH HEAD SA
UNIT KX175
REVISION 8
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0333-00

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
		091-0015-11	GROMMET RUBBER	1
		091-0018-05	WASHER NYLON	2
		091-0068-04	WASHER SHOULDER	2
		150-0003-10	TUBING TEF CLR 24	.5
R2		150-0005-10	TUBING TEF CLR 20	.1
		150-0020-10	TUBING TEF CLR 18	.6
	C 101	113-5151-01	CAP 150PF 10% X5F	1
	C 102	097-0056-33	CAP 100UF 16V	1
	C 103	097-0056-33	CAP 100UF 16V	1
	C 104	113-5151-01	CAP 150PF 10% X5F	1
	C 105	113-5151-01	CAP 150PF 10% X5F	1
	CR 101	007-6021-00	DIODE TS-2	1
	CR 102	007-5026-00	DIODE ZENER 9.1V	1
	CR 103	007-5016-00	DIODE ZENER 5.1V	1
	CR 104	007-6021-00	DIODE TS-2	1
R2	CR 105	007-6033-00	DIODE 1N270	1
R2	CR 106	007-6033-00	DIODE 1N270	1
R2	CR 107	007-6033-00	DIODE 1N270	1
R2	CR 108	007-6033-00	DIODE 1N270	1
R2	CR 109	007-6033-00	DIODE 1N270	1
R2	CR 110	007-6033-00	DIODE 1N270	1
R2	CR 111	007-6033-00	DIODE 1N270	1
R2	CR 112	007-6033-00	DIODE 1N270	1
	DS 101	037-0007-10	LAMP BULB 14V	1
	DS 102	037-0007-10	LAMP BULB 14V	1
	Q 101	007-0184-01	TRANSISTOR TA7557	1
	Q 102	007-0184-01	TRANSISTOR TA7557	1
	Q 103	007-0078-02	TRANSISTOR 2N3416	1
	Q 104	007-0078-00	TRANSISTOR 2N3415	1
	Q 105	007-0078-02	TRANSISTOR 2N3416	1
	R 103	130-0102-25	RES 1K 10% QW	1
R2	R 111	136-2941-22	RES 2.94K 1% EW	1
R2	R 112	136-4020-22	RES 402 1% EW	1
R2	R 113	136-4530-22	RES 453 1% EW	1
R2	R 114	136-5110-22	RES 511 1% EW	1
R2	R 115	136-5620-22	RES 562 1% EW	1
R2	R 116	136-6340-22	RES 634 1% EW	1
R2	R 117	136-6980-22	RES 698 1% EW	1
R2	R 118	136-7870-22	RES 787 1% EW	1
R2	R 119	136-8660-22	RES 866 1% EW	1
R2	R 120	136-6340-22	RES 634 1% EW	1
	R 125	130-0680-33	RES 68OHM 5% HW	1
	R 126	130-0750-23	RES 75 5% QW	1
	R 127	130-0750-23	RES 75 5% QW	1
	R 129	130-0102-25	RES 1K 10% QW	1

NOTE: R indicates revision. See page 6-9A for revision and new parts.

ASSEMBLY NO. 200-0253-00
DESCRIPTION SWITCH HEAD SA
UNIT KX175
REVISION 8
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0333-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R 130	130-0152-23	RES 1.5K 5% QW	1
R 131	130-0471-23	RES 470 5% QW	1
R 132	133-0016-02	RES VARI 1K	1
R 133	130-0102-25	RES 1K 10% QW	1
S 101	031-0104-00	WAFER SWITCH	1
R2 S 102	031-0107-00	WAFER SWITCH	1
S 103	031-0106-00	WAFER SWITCH	1
S 104	031-0105-00	WAFER SWITCH	1
R2 S 105	031-0154-00	SWITCH WAFER	1
R2 S 106	031-0155-00	SWITCH WAFER	1
S 107	031-0156-00	SWITCH WAFER	1
R2 S 108	031-0157-00	SWITCH WAFER	1

NOTE: R indicates revision. See page 6-10 for revision and new parts.

Parts List Revision Record

Assembly No: 200-0253-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R2 ADDED	CR113	007-6033-00	Diode, 1N270	1
DELETE		089-8079-10	Washer	2

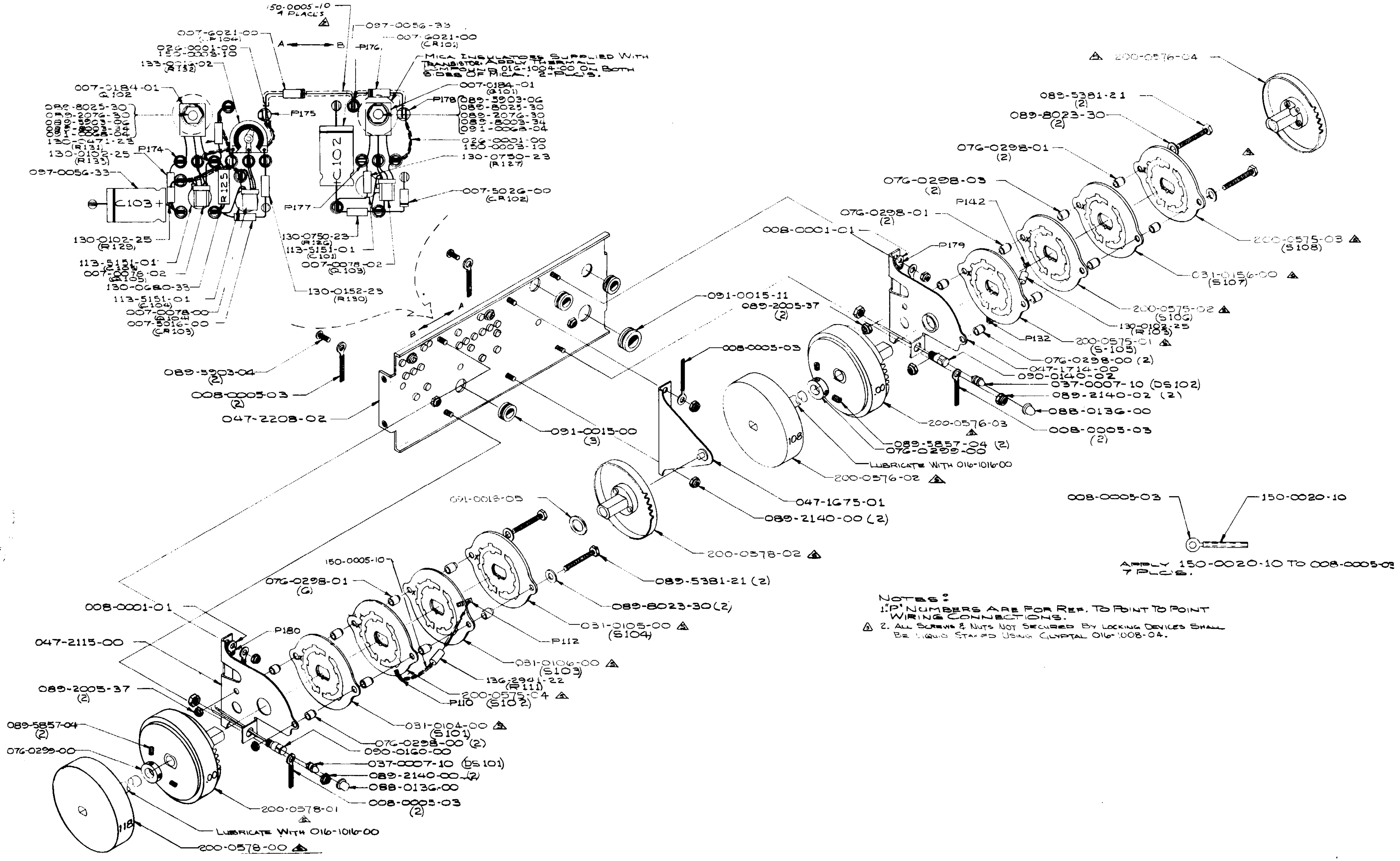
Assembly No: 200-0253-00 (B/MRL Rev. 8) Manual Revision 2

CHANGE		150-0005-01	Tubing, Teflon #20	.2
DELETE		025-0018-99	Wire #26 Wht.	1.4
DELETE		029-0095-00	Gear Face	2
DELETE		076-0284-01	Shaft Dial Gear	1
DELETE		076-0284-02	Shaft Dial Gear	1
DELETE	R112	136-4020-22	Res. 402 1% EW	1
DELETE	R113	136-4530-22	Res. 453 1% EW	1
DELETE	R114	136-5110-22	Res. 511 1% EW	1
DELETE	R115	136-5620-22	Res. 562 1% EW	1
DELETE	R116	136-6340-22	Res. 634 1% EW	1
DELETE	R120	136-6340-22	Res. 634 1% EW	1
DELETE	R117	136-6980-22	Res. 698 1% EW	1
DELETE	R118	136-7870-22	Res. 787 1% EW	1
DELETE	R119	136-8660-22	Res. 866 1% EW	1
DELETE		088-0213-10	Counter Wheel w/mk	2
DELETE		016-1008-05	Adhesive Glyptal	
DELETE		076-0472-00	Switch Shaft	1
DELETE		076-0472-01	Switch Shaft	1
DELETE		076-0473-00	Switch Shaft	1
DELETE		089-5857-06	SCR BRIS 4-40×3/8	4
DELETE		089-6289-03	SCR SHH 4-40×1/4	6
CHANGE	S102	200-0575-04	Swtich Ass'y COMM	1
CHANGE	S105	200-0575-01	Switch Ass'y NAV	1
CHANGE	S106	200-0575-02	Switch Ass'y NAV	1
CHANGE	S108	200-0575-03	Switch Ass'y NAV	1
CHANGE	R111	136-2941-22	Res. 2.94K 1% QW	1
DELETE	CR105	007-6033-00	Dio 1N270	1
DELETE	CR106	007-6033-00	Dio 1N270	1
DELETE	CR107	007-6033-00	Dio 1N270	1
DELETE	CR108	007-6033-00	Dio 1N270	1
DELETE	CR109	007-6033-00	Dio 1N270	1
DELETE	CR110	007-6033-00	Dio 1N270	1

Parts List Revision Record

Assembly No: 200-0253-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
DELETE	CR111	007-6033-00	Dio 1N270	1
DELETE	CR112	007-6033-00	Dio 1N270	1
DELETE	CR113	007-6033-00	Dio 1N270	1
CHANGE	From	088-0213-11	Counter Wheel w/mk	1
	To	200-0576-02	Wheel Ass'y NAV MHz	1
CHANGE	From	088-0213-12	Counter Wheel w/mk	1
	To	200-0578-00	Wheel Ass'y COMM MHz	1
ADD		200-0578-02	Gear Ass'y COMM	1
ADD		200-0576-04	Gear Ass'y NAV	1
ADD		200-0578-01	Wheel Ass'y COMM KHz	1
ADD		200-0576-03	Wheel Ass'y NAV KHz	1



MICA INSULATORS SUPPLIED WITH TRANSISTOR. APPLY THERMAL COMPOUND 016-1004-00 ON BOTH SIDES OF MICA. 2-PLC'S.

LUBRICATE WITH 016-1016-00

LUBRICATE WITH 016-1016-00

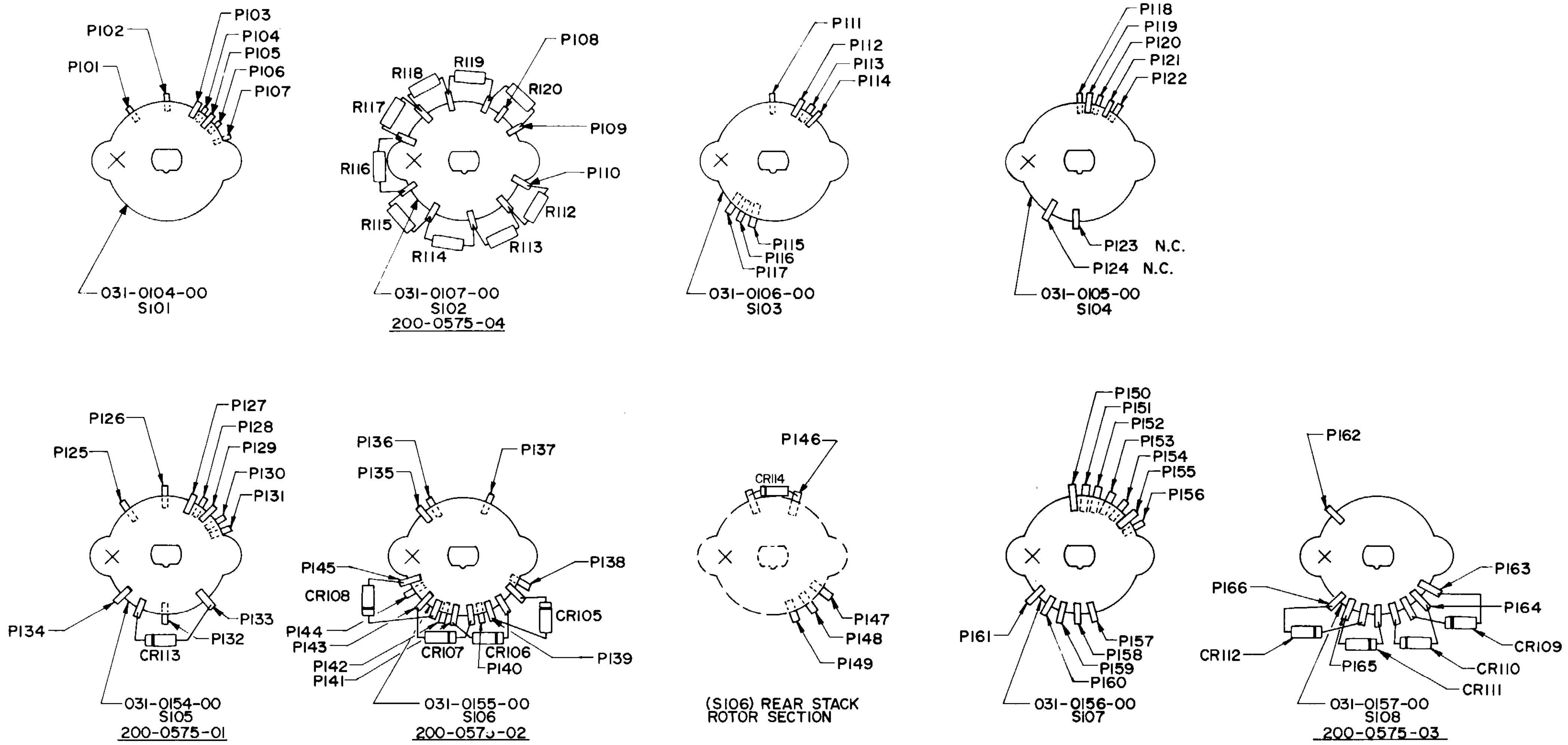
APPLY 150-0020-10 TO 008-0005-03 7 PLC'S.

NOTES:
1. 'P' NUMBERS ARE FOR REF. TO POINT TO POINT WIRING CONNECTIONS.
2. ALL SCREWS & NUTS NOT SECURED BY LOCKING DEVICES SHALL BE LIQUID STAKED USING GLYPTAL 016-1008-04.

FIGURE 6-2 SWITCH HEAD SUB-ASSEMBLY
(Dwg. No. 300-0333-00 R-6)

NOTES:

1. ▯ NEARSIDE TERM.
2. ⬚ FARSIDE TERM.
3. SWITCHES READ FROM LEFT SIDE OF UNIT



SWITCHING HEAD SUB ASS'Y WIRING CHART					
PART NO.	FROM	TO	LENGTH	COLOR	REMARKS
026-0001-00	P112 & P113(S103)	P119 & P118(S104)	1.2	—//—	SLEEVED WITH (150-0003-10) .4 LG.
"	P129& P130(S105)	P151 (S107)	2.2	—//—	" " " 1.3 "
"	P135(S106)	P162 (S108)	1.2	—//—	" " " .7 "
"	P105(S101)	P106(S101)	.4	—//—	—//—
"	P147(S106)	P148(S106)	.5	—//—	—//—
025-0018-00	P105(S101)	P180(GND)	4.6	BLACK	SEE SHEET I FOR CONNECTIONS
"	P119(S104)	P180 "	3.6	"	" " "
"	P129(S105)	P179 "	4.5	"	" " "
025-0018-90	P155(S107)	P161(S107)	6.6	WHT/BLK	—//—
REF.	DS101	P115(S103)	3.8	WHITE	" " "
"	DS101	P117(S103)	3.8	BLACK	" " "
"	DS102	P117(S103)	8.0	WHITE	" " "
025-0018-40	P134(S105)	P162(S108)	5.2	YEL/BLK	—//—
025-0018-30	P149(S106)	P150(S107)	6.4	ORN/BLK	—//—

FIGURE 2-A SWITCH HEAD ASSEMBLY
(DWG. NO. 300-0333-00 SHT. 2 R-6)

ASSEMBLY NO. 200-0248-00 PAGE 1
DESCRIPTION NAV SMO BOARD SA
UNIT KX175
REVISION 11
USED ON ASSEMBLY 200-0252-00
ASSEMBLY DRAWING NO. 300-0325-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	009-5136-01	NAV SMO BOARD	1
	012-1038-00	DISC ADHESIVE	1
	025-0018-22	WIRE CW26 RED	.5
	025-0018-99	WIRE CW26 WHITE	.6
	026-0001-00	WIRE TC26 BUSS	.8
	026-0013-00	WIRE COAX RG178U	1.2
	047-2154-00	CAN CHOKE	1
	088-0066-00	PLASTIC SPACER	1
	150-0003-10	TUBING TEF CLR 24	.4
	150-0015-10	TUBING TEF CLR 12	.1
C 201	114-5152-00	CAP 1500PF X5F	1
C 202	096-1030-22	CAP TANT 22UF 20%	1
C 203	114-5152-00	CAP 1500PF X5F	1
C 204	118-0003-00	CAP 56PF 5% N750	1
C 205	118-0003-00	CAP 56PF 5% N750	1
C 206	113-5331-00	CAP 330PF 10% X5F	1
C 208	113-5681-00	CAP 680PF 10% X5F	1
C 209	114-7104-00	CAP .1UF 20% X5R	1
C 210	096-1030-17	CAP TANT 6.8UF 20%	1
C 211	105-0033-39	CAP MY .039UF 5%	1
C 212	105-0033-09	CAP MY .0022UF 5%	1
R2 C 213	096-1030-14	CAP TANT .68MF 5%	1
C 214	096-1030-22	CAP TANT 22UF 20%	1
C 215	096-1030-22	CAP TANT 22UF 20%	1
R1 C 216	113-3100-00	CAP 10PF 5% N150	1
C 217	113-5681-00	CAP 680PF 10% X5F	1
C 218	113-5681-00	CAP 680PF 10% X5F	1
C 219	113-5471-00	CAP 470PF 10% X5F	1
C 220	113-3100-00	CAP 10PF 5% N150	1
C 221	113-5681-00	CAP 680PF 10% X5F	1
C 222	113-5681-00	CAP 680PF 10% X5F	1
C 223	113-5471-00	CAP 470PF 10% X5F	1
C 224	113-5101-01	CAP 100PF 10% X5F	1
C 225	113-3330-00	CAP 33PF 5% N150	1
C 226	114-5152-00	CAP 1500PF X5F	1
C 227	114-5152-00	CAP 1500PF X5F	1
C 228	114-5152-00	CAP 1500PF X5F	1
C 229	114-5152-00	CAP 1500PF X5F	1
C 230	113-3082-00	CAP 8.2PF 5% N150	1
C 232	113-3270-00	CAP 27PF 5% N150	1
C 233	113-3100-00	CAP 10PF 5% N150	1
C 234	114-5152-00	CAP 1500PF X5F	1
C 235	113-3470-00	CAP 47PF 5% X5F	1
C 236	113-3820-00	CAP 82PF 5% X5F	1
C 237	114-5152-00	CAP 1500PF X5F	1

NOTE: R indicates revision. See page 6-21A for revision and new parts.

ASSEMBLY NO. 200-0248-00
DESCRIPTION NAV SMO BOARD SA
UNIT KX175
REVISION 11
USED ON ASSEMBLY 200-0252-00
ASSEMBLY DRAWING NO. 300-0325-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
C 238	114-5152-00	CAP 1500PF X5F	1
C 239	113-5151-01	CAP 150PF 10% X5F	1
C 240	113-5151-01	CAP 150PF 10% X5F	1
C 241	114-7104-00	CAP .1UF 20% X5R	1
C 242	113-5681-00	CAP 680PF 10% X5F	1
C 243	114-7104-00	CAP .1UF 20% X5R	1
C 244	096-1030-22	CAP TANT 22UF 20%	1
C 245	114-7104-00	CAP .1UF 20% X5R	1
C 246	096-1030-22	CAP TANT 22UF 20%	1
C 247	114-7104-00	CAP .1UF 20% X5R	1
C 248	096-1030-22	CAP TANT 22UF 20%	1
C 249	113-3680-00	CAP 68PF 5% X5F	1
C 250	113-3680-00	CAP 68PF 5% X5F	1
C 252	106-0034-00	CAP FT 1.5KPF 20%	1
C 253	106-0034-00	CAP FT 1.5KPF 20%	1
C 254	106-0034-00	CAP FT 1.5KPF 20%	1
C 255	106-0034-00	CAP FT 1.5KPF 20%	1
C 256	106-0034-00	CAP FT 1.5KPF 20%	1
C 257	106-0034-00	CAP FT 1.5KPF 20%	1
C 258	106-0034-00	CAP FT 1.5KPF 20%	1
C 259	106-0034-00	CAP FT 1.5KPF 20%	1
C 260	106-0034-00	CAP FT 1.5KPF 20%	1
C 261	106-0034-00	CAP FT 1.5KPF 20%	1
C 262	106-0034-00	CAP FT 1.5KPF 20%	1
R1 C 263	113-5681-00	CAP 680PF 10% X5F	1
C 264	114-7104-00	CAP .1UF 20% X5R	1
C 265	096-1030-22	CAP TANT 22UF 20%	1
C 266	113-5681-00	CAP 680PF 10% X5F	1
	200-0083-00	TRANSMITTER ASSY	1
C 611	106-0018-01	CAP FT 1.5KPF 40%	1
C 612	106-0018-01	CAP FT 1.5KPF 40%	1
C 623	113-3121-00	CAP 120PF 5% X5F	1
C 267	114-7104-00	CAP .1UF 20% X5R	1
C 268	113-5471-00	CAP 470PF 10% X5F	1
C 269	113-3121-00	CAP 120PF 5% X5F	1
C 270	106-0034-00	CAP FT 1.5KPF 20%	1
CJ 201	026-0018-00	CIRCUIT JUMPER	1
CR 201	007-4012-00	DIODE SMV626	1
CR 202	007-6033-00	DIODE 1N270	1
CR 203	007-6045-00	DIODE FH1100	1
CR 204	007-6045-00	DIODE FH1100	1
CR 205	007-6045-00	DIODE FH1100	1
CR 206	007-6045-00	DIODE FH1100	1
CR 207	007-6045-00	DIODE FH1100	1
CR 208	007-6045-00	DIODE FH1100	1

NOTE: R indicates revision. See page 6-22 for revision and new parts.

ASSEMBLY NO. 200-0248-00
DESCRIPTION NAV SMO BOARD SA
UNIT KX175
REVISION 11
USED ON ASSEMBLY 200-0252-00
ASSEMBLY DRAWING NO. 300-0325-00

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	CR 209	007-6045-00	DIODE FH1100	1
	CR 210	007-6045-00	DIODE FH1100	1
	CR 211	007-6035-00	DIODE 1N816	1
	CR 212	007-6035-00	DIODE 1N816	1
	CR 213	007-6033-00	DIODE 1N270	1
	CR 214	007-5016-00	DIODE ZENER 5.1V	1
	I 201	120-0019-00	INT CKT U6B902059X	1
	I 202	120-0021-00	INT CKT U6B930059X	1
	I 203	120-0014-00	INT CKT U6A900259X	1
	I 204	120-0016-00	INT CKT U6A900459X	1
	I 205	120-1035-00	INT CKT U6A998979X	1
	I 206	120-0021-00	INT CKT U6B930059X	1
	I 207	120-1029-00	INT CKT MC817P	1
	I 208	120-1029-00	INT CKT MC817P	1
	L 201	019-2151-00	COIL, V C O	1
	L 202	019-2082-70	CHOKE 240UH 5%	1
	L 203	019-2054-16	CHOKE 1.0UH 5%	1
	L 204	019-2054-16	CHOKE 1.0UH 5%	1
	L 205	019-2054-13	CHOKE .56UH 5%	1
R2	Q 201	007-0119-00	TRANSISTOR 2N4917	1
	Q 202	007-0195-00	TRANSISTOR MPSH10	1
	Q 203	007-0195-00	TRANSISTOR MPSH10	1
R2	Q 204	007-0119-00	TRANSISTOR 2N4917	1
	Q 205	007-0078-00	TRANSISTOR 2N3415	1
R2	Q 206	007-0119-00	TRANSISTOR 2N4917	1
R2	Q 207	007-0119-00	TRANSISTOR 2N4917	1
R2	Q 208	007-0119-00	TRANSISTOR 2N4917	1
	Q 209	007-0195-00	TRANSISTOR MPSH10	1
	Q 210	007-0078-00	TRANSISTOR 2N3415	1
	Q 211	007-0078-00	TRANSISTOR 2N3415	1
	R 201	130-0101-25	RES 100 10% QW	1
	R 202	130-0103-23	RES 10K 5% QW	1
	R 203	130-0471-23	RES 470 5% QW	1
R4	R 204	130-0472-23	RES 4.7K 5% QW	1
	R 205	130-0510-23	RES 51 5% QW	1
	R 206	130-0473-25	RES 47K 10% QW	1
	R 207	130-0510-23	RES 51 5% QW	1
	R 208	130-0271-23	RES 270 5% QW	1
	R 209	130-0821-23	RES 820 5% QW	1
	R 210	130-0112-23	RES 1.1K 5% QW	1
	R 211	130-0391-23	RES 390OHM 5% QW	1
R2	R 212	130-0332-23	RES 3.3K 5% QW	1
	R 213	130-0471-25	RES 470 10% QW	1
	R 214	130-0102-25	RES 1K 10% QW	1
	R 215	130-0152-25	RES 1.5K 10% QW	1

NOTE: R indicates revision. See page 6-22 for revision and new parts.

ASSEMBLY NO. 200-0248-00
DESCRIPTION NAV SMO BOARD SA
UNIT KX175
REVISION 11
USED ON ASSEMBLY 200-0252-00
ASSEMBLY DRAWING NO. 300-0325-00

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	R 216	130-0101-25	RES 100 10% QW	1
	R 217	130-0392-23	RES 3.9K 5% QW	1
R1	R 218	130-0472-23	RES 4.7K 5% QW	1
	R 219	130-0271-23	RES 270 5% QW	1
	R 220	130-0101-25	RES 100 10% QW	1
	R 221	130-0392-23	RES 3.9K 5% QW	1
R1	R 222	130-0472-23	RES 4.7K 5% QW	1
	R 223	130-0271-23	RES 270 5% QW	1
	R 224	130-0272-23	RES 2.7K 5% QW	1
	R 225	130-0221-23	RES 220 5% QW	1
	R 226	130-0512-23	RES 5.2K 5% QW	1
	R 227	130-0101-23	RES 100 5% QW	1
	R 228	130-0151-23	RES 150 5% QW	1
	R 229	130-0470-25	RES 47 10% QW	1
	R 230	130-0100-23	RES 10 5% QW	1
	R 231	130-0470-23	RES 47OHM 5% QW	1
	R 232	130-0301-23	RES 300 5% QW	1
	R 233	130-0101-25	RES 100 10% QW	1
	R 234	130-0222-23	RES 2.2K 5% QW	1
	R 235	130-0911-23	RES 910 5% QW	1
	R 236	130-0152-23	RES 1.5K 5% QW	1
	R 237	130-0302-23	RES 3K 5% QW	1
	R 238	130-0331-23	RES 330 5% QW	1
	R 239	130-0201-23	RES 200 5% QW	1
	R 240	130-0241-23	RES 240 5% QW	1
	R 241	130-0820-23	RES 82 5% QW	1
	R 242	130-0471-23	RES 470 5% QW	1
	R 243	130-0471-23	RES 470 5% QW	1
	R 244	130-0472-23	RES 4.7K 5% QW	1
	R 245	130-0472-23	RES 4.7K 5% QW	1
	R 247	130-0472-23	RES 4.7K 5% QW	1
	R 248	130-0472-23	RES 4.7K 5% QW	1
	R 249	130-0222-23	RES 2.2K 5% QW	1
	R 250	130-0222-25	RES 2.2K 10% QW	1
	R 251	130-0222-25	RES 2.2K 10% QW	1
	R 252	130-0222-25	RES 2.2K 10% QW	1
	R 253	130-0222-25	RES 2.2K 10% QW	1
	R 254	130-0222-25	RES 2.2K 10% QW	1
	R 255	130-0222-25	RES 2.2K 10% QW	1
	R 256	130-0222-25	RES 2.2K 10% QW	1
	R 257	130-0222-25	RES 2.2K 10% QW	1
	R 258	130-0102-25	RES 1K 10% QW	1
	R 259	132-0107-30	RES WW 12 5% 3 1/4	1
	R 260	130-0181-23	RES 180 5% QW	1
	T 201	019-2109-00	INDUCTOR VARI	1

NOTE: R indicates revision. See page 6-22 for revision and new parts.

ASSEMBLY NO. 200-0248-00
DESCRIPTION NAV SMO BOARD SA
UNIT KX175
REVISION 11
USED ON ASSEMBLY 200-0252-00
ASSEMBLY DRAWING NO. 300-0325-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
T 202	019-3044-00	TRANSFORMER RF	1
T 203	019-3044-00	TRANSFORMER RF	1
T 204	019-5056-02	TRANSFORMER MIXER	1
T 205	019-5056-02	TRANSFORMER MIXER	1
T 206	019-5056-02	TRANSFORMER MIXER	1
T 207	019-5056-02	TRANSFORMER MIXER	1
Y 201	044-0027-00	XTAL 53.93125MHZ	1
Y 202	044-0028-00	XTAL 400KHZ	1

Parts List Revision Record

Assembly No: 200-0248-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE	C216	113-3150-00	Cap. 15pf, 5%, N150	1
ADDED	C231	113-3100-00	Cap. 10pf, 5%, N150	1
DELETE	C263	113-5681-00	Cap. 680pf, 10%, X5F	1
R4 ADDED	L206	019-2084-00	Choke 6. 8μf, 5%	1
ADDED	L207	019-2084-06	Choke . 27μf, 5%	1
CHANGE	R218	130-0242-23	Res. 2. 4K, 5%, QW	1
CHANGE	R222	130-0392-23	Res. 3. 9K, 5%, QW	1

Assembly No: 200-0248-00 (B/MRL Rev. 10) Manual Revision 2

DELETE	R212	130-0332-23	Res. F. C. 3. 3K 5% QW	1
CHANGE	C213	114-7104-00	Cap D/C . 1μf ±20% 12V	1
CHANGE	R207	130-0202-23	Res. F. C. 2. 0K 5% QW	1
ADD		090-0104-04	Solder Ring, preform	12
CHANGE	Q201	007-0238-00	Tstr. FPN 4917	1
CHANGE	Q204	007-0238-00	Tstr. FPN 4917	1
CHANGE	Q206	007-0238-00	Tstr. FPN 4917	1
CHANGE	Q207	007-0238-00	Tstr. FPN 4917	1
CHANGE	Q208	007-0238-00	Tstr. FPN 4917	1

Assembly No: 200-0248-00 (B/MRL Rev. 11) Manual Revision 4

CHANGE	R204	130-0362-23	Res. F/C 3. 6K 5% QW	1
CHANGE	L206	019-2084-40	Choke, 6. 8μf 5%	1

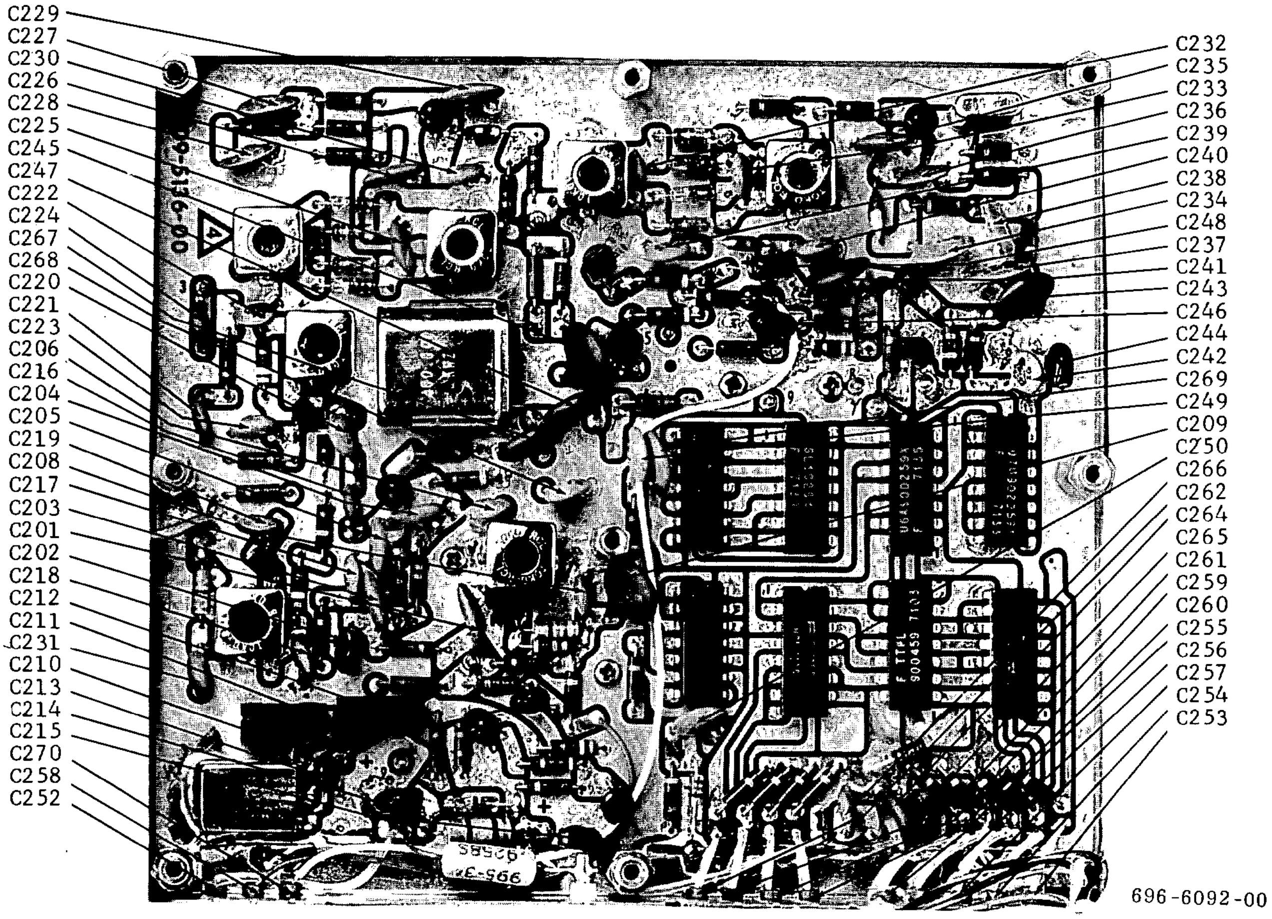


FIGURE 6-3A NAVIGATION SMO BOARD ASSEMBLY

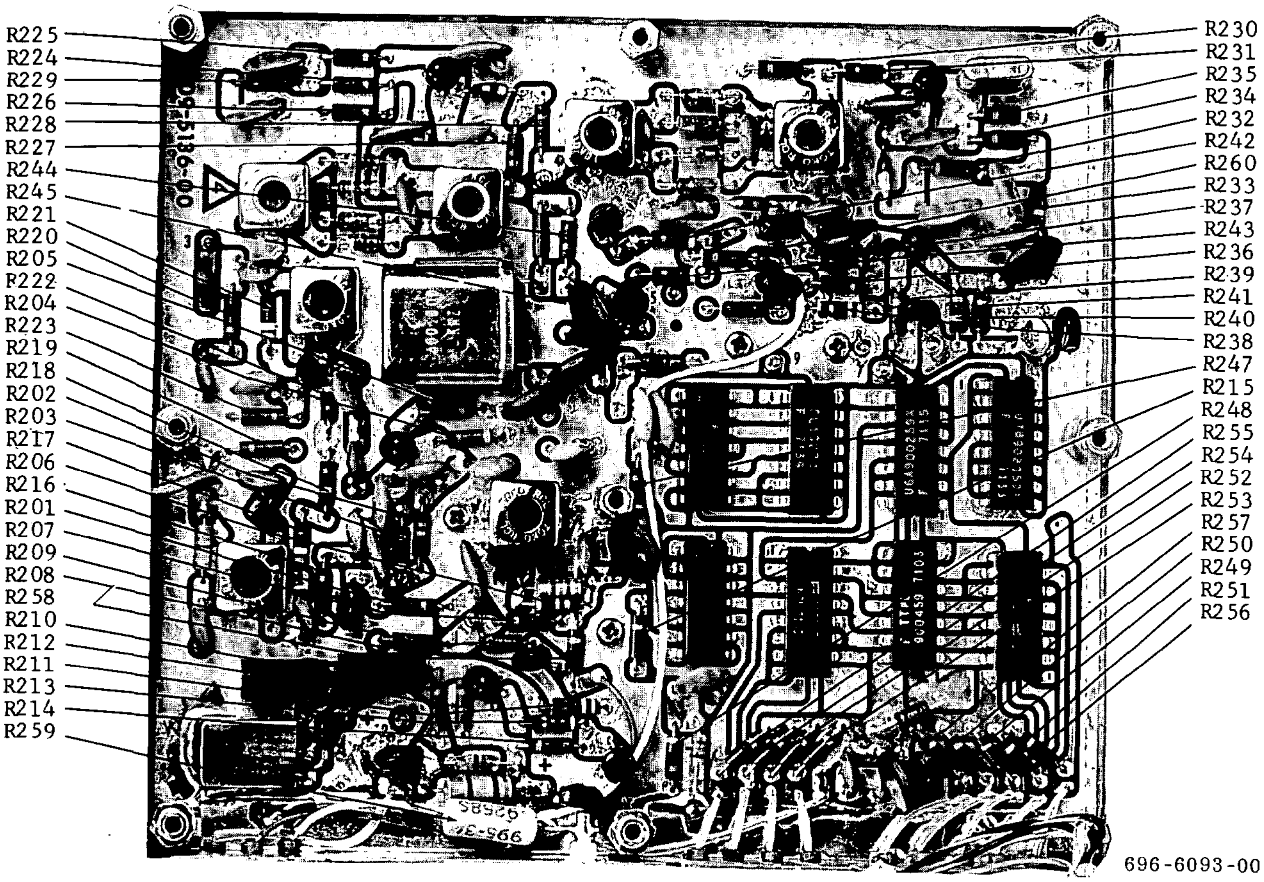


FIGURE 6-3B NAVIGATION SMO BOARD ASSEMBLY
(Dwg. No. 696-6093-00)

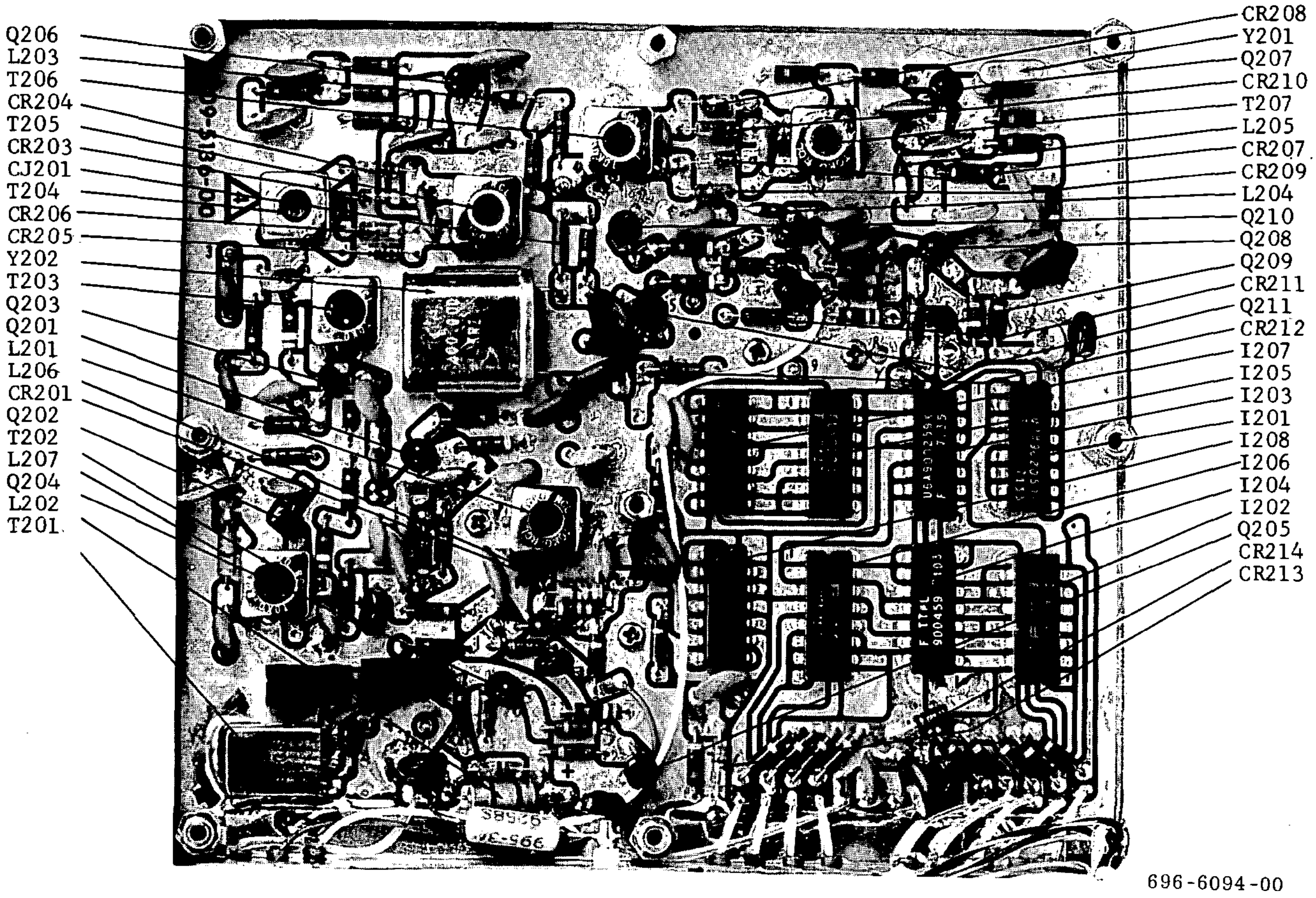


FIGURE 6-3C NAVIGATION SMO BOARD ASSEMBLY

ASSEMBLY NO. 200-0252-00
DESCRIPTION NAV SMO SA
UNIT KX175
REVISION
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0332-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	016-1011-00	PLIOBOND CEMENT	
	047-2230-02	TRAY NAV SMO	1
	076-0165-09	SPACER	1
	076-0339-00	SPACER	1
	076-0343-00	SPACER	1
	089-5874-03	SCR PHP 2-56X3/16	4
	089-5878-05	SC PPH 4-40X5/16	2
	091-0088-01	NAV INSULATION	1
	200-0248-00	NAV SMO BOARD SA	1

Parts List Revision Record

Assembly No. 200-0252-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
No Change				

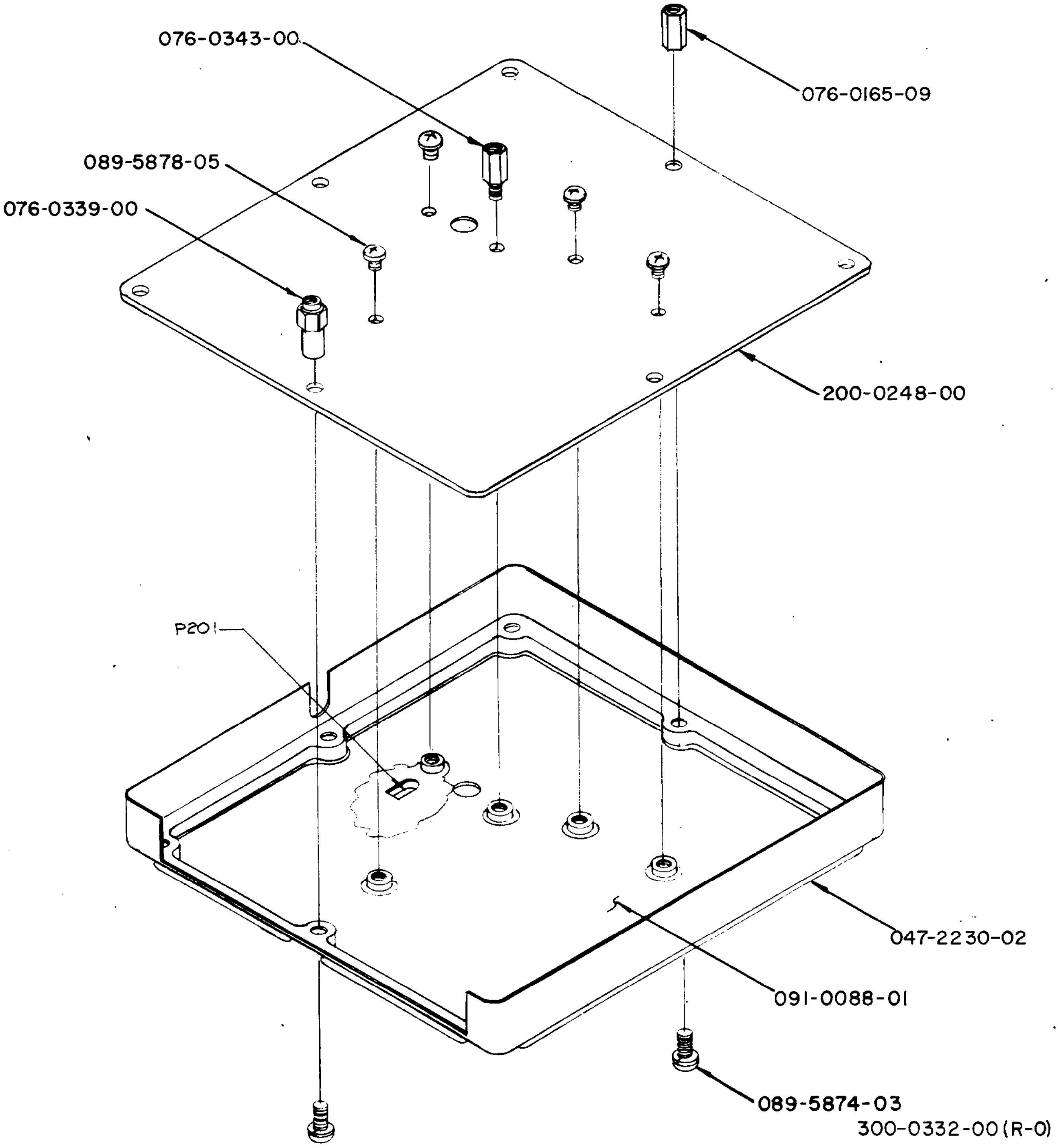


FIGURE 6-4 NAVIGATION SMO SUB-ASSEMBLY

ASSEMBLY NO. 200-0247-00
DESCRIPTION COMM SMO SA
UNIT KX175
REVISION 9
USED ON ASSEMBLY 200-0251-00
ASSEMBLY DRAWING NO. 300-0324-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	009-5137-02	COMM SMO BOARD	1
	012-1038-00	DISC ADHESIVE	1
	025-0018-91	WIRE CW26 WHT/BRN	1.5
	025-0018-98	WIRE CW26 WHT/GRY	1.5
	025-0018-99	WIRE CW26 WHITE	2.0
	026-0001-00	WIRE TC26 BUSS	2.0
	026-0013-00	WIRE COAX RG178U	2.2
	047-1852-01	ENCLOSURE OSC	1
	047-1853-01	ENCLOSURE VCO	1
	088-0066-00	PLASTIC SPACER	2
	150-0003-10	TUBING TEF CLR 24	2.4
	150-0005-10	TUBING TEF CLR 20	.1
	150-0015-10	TUBING TEF CLR 12	.2
C 301	106-0034-00	CAP FT 1.5KPF 20%	1
C 302	106-0034-00	CAP FT 1.5KPF 20%	1
C 303	106-0034-00	CAP FT 1.5KPF 20%	1
C 304	113-5471-00	CAP 470PF 10% X5F	1
C 305	113-3100-00	CAP 10PF 5% N150	1
C 306	106-0034-00	CAP FT 1.5KPF 20%	1
C 307	106-0034-00	CAP FT 1.5KPF 20%	1
C 308	113-5471-00	CAP 470PF 10% X5F	1
C 309	113-5471-00	CAP 470PF 10% X5F	1
C 310	113-5471-00	CAP 470PF 10% X5F	1
C 311	113-5471-00	CAP 470PF 10% X5F	1
C 312	113-5471-00	CAP 470PF 10% X5F	1
C 314	102-0024-09	CAP VARI 7-35PF	1
C 315	102-0029-00	CAP VARI 2-27PF	1
C 316	096-1030-22	CAP TANT 22UF 20%	1
C 317	113-3270-00	CAP 27PF 5% N150	1
C 318	113-5471-00	CAP 470PF 10% X5F	1
C 319	106-0034-00	CAP FT 1.5KPF 20%	1
C 320	113-5471-00	CAP 470PF 10% X5F	1
C 321	113-5471-00	CAP 470PF 10% X5F	1
C 322	114-7104-00	CAP .1UF 20% X5R	1
C 323	113-5471-00	CAP 470PF 10% X5F	1
C 324	113-5102-00	CAP 1KPF 10% X5F	1
C 325	113-3100-00	CAP 10PF 5% N150	1
C 327	113-5331-00	CAP 330PF 10% X5F	1
C 328	114-7104-00	CAP .1UF 20% X5R	1
C 329	113-5471-00	CAP 470PF 10% X5F	1
C 330	113-3015-00	CAP 1.5PF 5% N150	1
C 331	106-0034-00	CAP FT 1.5KPF 20%	1
C 333	113-5471-00	CAP 470PF 10% X5F	1
C 335	113-3120-00	CAP 12PF 5% N150	1
C 336	113-5471-00	CAP 470PF 10% X5F	1

NOTE: R indicates revision. See page 6-35 for revision and new parts.

ASSEMBLY NO. 200-0247-00
DESCRIPTION COMM SMO SA
UNIT KX175
REVISION 9
USED ON ASSEMBLY 200-0251-00
ASSEMBLY DRAWING NO. 300-0324-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
C 337	113-5471-00	CAP 470PF 10% X5F	1
C 338	113-3270-00	CAP 27PF 5% N150	1
C 339	113-5471-00	CAP 470PF 10% X5F	1
C 340	113-5471-00	CAP 470PF 10% X5F	1
C 342	113-5331-00	CAP 330PF 10% X5F	1
C 343	109-0008-00	CAP 3PF N3300	1
C 344	113-5471-00	CAP 470PF 10% X5F	1
C 345	114-7104-00	CAP .1UF 20% X5R	1
C 346	104-0001-45	CAP 43PF 5% 100V	1
C 347	096-1030-17	CAP TANT 6.8UF 20%	1
C 348	105-0033-39	CAP MY .039UF 5%	1
C 349	105-0033-09	CAP MY .0022UF 5%	1
C 350	096-1030-14	CAP TANT .68MF 5%	1
C 351	114-7104-00	CAP .1UF 20% X5R	1
C 352	096-1030-22	CAP TANT 22UF 20%	1
C 353	096-1030-22	CAP TANT 22UF 20%	1
C 354	113-3270-00	CAP 27PF 5% N150	1
C 355	106-0034-00	CAP FT 1.5KPF 20%	1
C 356	114-7104-00	CAP .1UF 20% X5R	1
C 357	114-5152-00	CAP 1500PF X5F	1
C 358	114-5152-00	CAP 1500PF X5F	1
C 359	114-5152-00	CAP 1500PF X5F	1
C 360	113-3120-00	CAP 12PF 5% N150	1
C 361	113-5331-00	CAP 330PF 10% X5F	1
C 362	113-3056-00	CAP 5.6PF 5% N150	1
C 363	113-5151-01	CAP 150PF 10% X5F	1
C 364	113-3068-00	CAP 6.8PF 5% N150	1
C 365	113-3033-00	CAP 3.3PF 5% N150	1
C 366	113-3680-00	CAP 68PF 5% X5F	1
C 367	114-5152-00	CAP 1500PF X5F	1
C 368	114-5152-00	CAP 1500PF X5F	1
C 369	114-7104-00	CAP .1UF 20% X5R	1
C 370	114-7104-00	CAP .1UF 20% X5R	1
C 371	114-7104-00	CAP .1UF 20% X5R	1
C 372	106-0013-00	CAP FT 3KPF 20%	1
C 373	106-0013-00	CAP FT 3KPF 20%	1
C 374	106-0013-00	CAP FT 3KPF 20%	1
C 375	113-5151-01	CAP 150PF 10% X5F	1
C 376	113-5151-01	CAP 150PF 10% X5F	1
C 377	114-7104-00	CAP .1UF 20% X5R	1
C 378	114-7104-00	CAP .1UF 20% X5R	1
C 379	096-1030-22	CAP TANT 22UF 20%	1
C 380	113-5681-00	CAP 680PF 10% X5F	1
C 381	114-7104-00	CAP .1UF 20% X5R	1
C 382	096-1030-22	CAP TANT 22UF 20%	1

NOTE: R indicates revision. See page 6-35 for revision and new parts.

ASSEMBLY NO. 200-0247-00
DESCRIPTION COMM SMO SA
UNIT KX175
REVISION 9
USED ON ASSEMBLY 200-0251-00
ASSEMBLY DRAWING NO. 300-0324-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
C 383	113-3680-00	CAP 68PF 5% X5F	1
C 384	113-3680-00	CAP 68PF 5% X5F	1
C 385	106-0034-00	CAP FT 1.5KPF 20%	1
C 386	106-0034-00	CAP FT 1.5KPF 20%	1
C 387	109-0008-01	CAP 4.3PF N3300	1
C 389	106-0034-00	CAP FT 1.5KPF 20%	1
C 391	106-0034-00	CAP FT 1.5KPF 20%	1
C 393	106-0034-00	CAP FT 1.5KPF 20%	1
C 395	106-0034-00	CAP FT 1.5KPF 20%	1
C 399	106-0034-00	CAP FT 1.5KPF 20%	1
C 551	106-0034-00	CAP FT 1.5KPF 20%	1
C 553	106-0034-00	CAP FT 1.5KPF 20%	1
C 555	106-0034-00	CAP FT 1.5KPF 20%	1
C 561	113-5471-00	CAP 470PF 10% X5F	1
C 562	114-7104-00	CAP .1UF 20% X5R	1
C 563	096-1030-22	CAP TANT 22UF 20%	1
C 564	096-1030-11	CAP TANT 4.7UF 20%	1
C 565	113-3121-00	CAP 120PF 5% X5F	1
C 566	096-1030-22	CAP TANT 22UF 20%	1
C 568	114-7104-00	CAP .1UF 20% X5R	1
C 569	114-7104-00	CAP .1UF 20% X5R	1
CJ 301	026-0018-00	CIRCUIT JUMPER	1
CJ 302	026-0018-00	CIRCUIT JUMPER	1
CJ 303	026-0018-00	CIRCUIT JUMPER	1
CR 301	007-6035-00	DIODE 1N816	1
CR 302	007-6035-00	DIODE 1N816	1
CR 303	007-4012-00	DIODE SMV626	1
CR 304	007-6033-00	DIODE 1N270	1
CR 305	007-6045-00	DIODE FH1100	1
CR 306	007-6045-00	DIODE FH1100	1
CR 307	007-6045-00	DIODE FH1100	1
CR 308	007-6045-00	DIODE FH1100	1
CR 309	007-6045-00	DIODE FH1100	1
CR 310	007-6045-00	DIODE FH1100	1
CR 311	007-6045-00	DIODE FH1100	1
CR 312	007-6045-00	DIODE FH1100	1
CR 313	007-6059-00	DIODE FD400	1
CR 314	007-6059-00	DIODE FD400	1
CR 315	007-6035-00	DIODE 1N816	1
CR 316	007-6035-00	DIODE 1N816	1
CR 317	007-6033-00	DIODE 1N270	1
CR 319	007-5016-00	DIODE ZENER 5.1V	1
I 301	120-0019-00	INT CKT U6B902059X	1
I 302	120-0021-00	INT CKT U6B930059X	1
I 303	120-0014-00	INT CKT U6A900259X	1

NOTE: R indicates revision. See page 6-35 for revision and new parts.

ASSEMBLY NO. 200-0247-00
DESCRIPTION COMM SMO SA
UNIT KX175
REVISION 9
USED ON ASSEMBLY 200-0251-00
ASSEMBLY DRAWING NO. 300-0324-00

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	I 304	120-0016-00	INT CKT U6A900459X	1
	I 305	120-1035-00	INT CKT U6A998979X	1
	I 306	120-0021-00	INT CKT U6B930059X	1
	I 307	120-1029-00	INT CKT MC817P	1
	I 308	120-1029-00	INT CKT MC817P	1
	L 301	019-2099-01	CHOKE .13UH	1
	L 302	019-2082-70	CHOKE 240UH 5%	1
	L 303	019-2054-12	CHOKE .47UH 5%	1
	L 304	019-2084-10	CHOKE .39UH	1
	L 305	019-2054-16	CHOKE 1.0UH 5%	1
	L 316	019-2054-06	CHOKE .15UH 5%	1
	Q 301	007-0195-00	TRANSISTOR MPSH10	1
R2	Q 302	007-0119-00	TRANSISTOR 2N4917	1
	Q 303	007-0195-00	TRANSISTOR MPSH10	1
	Q 304	007-0195-00	TRANSISTOR MPSH10	1
	Q 305	007-0195-00	TRANSISTOR MPSH10	1
	Q 306	007-0195-00	TRANSISTOR MPSH10	1
	Q 307	007-0078-00	TRANSISTOR 2N3415	1
R2	Q 308	007-0119-00	TRANSISTOR 2N4917	1
	Q 309	007-0078-00	TRANSISTOR 2N3415	1
	Q 310	007-0195-00	TRANSISTOR MPSH10	1
R2	Q 311	007-0119-00	TRANSISTOR 2N4917	1
R2	Q 312	007-0119-00	TRANSISTOR 2N4917	1
	Q 313	007-0195-00	TRANSISTOR MPSH10	1
	Q 314	007-0078-00	TRANSISTOR 2N3415	1
	Q 315	007-0078-00	TRANSISTOR 2N3415	1
	Q 316	007-0078-00	TRANSISTOR 2N3415	1
	R 301	130-0472-23	RES 4.7K 5% QW	1
	R 302	130-0222-25	RES 2.2K 10% QW	1
	R 303	130-0562-25	RES 5.6K 10% QW	1
	R 304	130-0101-25	RES 100 10% QW	1
	R 305	130-0222-25	RES 2.2K 10% QW	1
	R 306	130-0101-25	RES 100 10% QW	1
	R 307	130-0471-23	RES 470 5% QW	1
	R 308	130-0103-23	RES 10K 5% QW	1
	R 309	130-0510-23	RES 51 5% QW	1
	R 310	130-0182-23	RES 1.8K 5% QW	1
	R 311	130-0271-23	RES 270 5% QW	1
	R 312	130-0101-25	RES 100 10% QW	1
	R 313	130-0101-25	RES 100 10% QW	1
	R 314	130-0392-23	RES 3.9K 5% QW	1
	R 315	130-0472-23	RES 4.7K 5% QW	1
	R 316	130-0271-23	RES 270 5% QW	1
	R 317	130-0472-25	RES 4.7K 10% QW	1
	R 318	130-0471-25	RES 470 10% QW	1

NOTE: R indicates revision. See page 6-35 for revision and new parts.

ASSEMBLY NO. 200-0247-00
DESCRIPTION COMM SMO SA
UNIT KX175
REVISION 9
USED ON ASSEMBLY 200-0251-00
ASSEMBLY DRAWING NO. 300-0324-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R 319	130-0221-25	RES 220 10% QW	1
R 320	130-0392-23	RES 3.9K 5% QW	1
R 322	130-0271-23	RES 270 5% QW	1
R 323	130-0152-25	RES 1.5K 10% QW	1
R1 R 324	130-0473-25	RES 47K 10% QW	1
R 325	130-0510-23	RES 51 5% QW	1
R 326	130-0821-23	RES 820 5% QW	1
R 327	130-0271-23	RES 270 5% QW	1
R 328	130-0112-23	RES 1.1K 5% QW	1
R 329	130-0391-23	RES 390OHM 5% QW	1
R 330	130-0682-23	RES 6.8K 5% QW	1
R 331	130-0471-25	RES 470 10% QW	1
R 332	130-0102-25	RES 1K 10% QW	1
R 333	130-0152-25	RES 1.5K 10% QW	1
R 334	130-0101-25	RES 100 10% QW	1
R 335	130-0392-23	RES 3.9K 5% QW	1
R 336	130-0332-23	RES 3.3K 5% QW	1
R 337	130-0271-23	RES 270 5% QW	1
R 338	130-0101-23	RES 100 5% QW	1
R 339	130-0151-23	RES 150 5% QW	1
R 342	130-0301-23	RES 300 5% QW	1
R 343	130-0432-23	RES 4.3K 5% QW	1
R 344	130-0101-25	RES 100 10% QW	1
R 345	130-0182-23	RES 1.8K 5% QW	1
R 346	130-0562-25	RES 5.6K 10% QW	1
R 347	130-0562-25	RES 5.6K 10% QW	1
R 348	130-0182-23	RES 1.8K 5% QW	1
R 349	130-0152-23	RES 1.5K 5% QW	1
R 350	130-0820-23	RES 82 5% QW	1
R 351	130-0241-23	RES 240 5% QW	1
R 352	130-0302-23	RES 3K 5% QW	1
R 353	130-0201-23	RES 200 5% QW	1
R 354	130-0331-23	RES 330 5% QW	1
R 355	130-0471-25	RES 470 10% QW	1
R 356	130-0471-25	RES 470 10% QW	1
R 357	130-0222-25	RES 2.2K 10% QW	1
R 358	130-0222-25	RES 2.2K 10% QW	1
R 359	130-0222-25	RES 2.2K 10% QW	1
R 360	130-0222-25	RES 2.2K 10% QW	1
R 361	130-0222-25	RES 2.2K 10% QW	1
R 362	130-0222-25	RES 2.2K 10% QW	1
R 363	130-0222-25	RES 2.2K 10% QW	1
R 364	130-0222-25	RES 2.2K 10% QW	1
R 365	130-0222-25	RES 2.2K 10% QW	1
R 366	130-0472-23	RES 4.7K 5% QW	1

NOTE: R indicates revision. See page 6-35 for revision and new parts.

ASSEMBLY NO. 200-0247-00
DESCRIPTION COMM SMO SA
UNIT KX175
REVISION 9
USED ON ASSEMBLY 200-0251-00
ASSEMBLY DRAWING NO. 300-0324-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R 367	130-0472-23	RES 4.7K 5% QW	1
R 368	130-0392-23	RES 3.9K 5% QW	1
R 369	130-0272-23	RES 2.7K 5% QW	1
R 370	130-0472-23	RES 4.7K 5% QW	1
R 371	130-0471-23	RES 470 5% QW	1
R 372	130-0472-23	RES 4.7K 5% QW	1
R 373	130-0471-23	RES 470 5% QW	1
R 374	132-0107-30	RES WW 12 5% 3 1/4	1
T 301	019-3044-00	TRANSFORMER RF	1
T 302	019-5056-02	TRANSFORMER MIXER	1
T 303	019-5056-02	TRANSFORMER MIXER	1
T 304	019-5056-01	TRANSFORMER MIXER	1
T 305	019-3044-00	TRANSFORMER RF	1
T 306	019-5056-01	TRANSFORMER MIXER	1
T 307	019-2109-00	INDUCTOR VARI	1
Y 301	044-0027-02	XTAL 71.025MHZ	1
Y 302	044-0027-01	XTAL 66.525MHZ	1
Y 303	044-0028-00	XTAL 400KHZ	1

NOTE: R indicates revision. See page 6-35 for revision and new parts.

Parts List Revision Record

Assembly No. 200-0247-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
ADDED	C326	113-3082-00	Cap. 8.2pf, 5%, N150	1
ADDED	CR318	007-6033-00	Diode, 1N270	1
ADDED	L306	019-2084-40	Choke 6.8μh, 5%	1
DELETE	R324	130-0473-25	Res. 47K, 10%, QW	1

Assembly No. 200-0247-00 (B/MRL Rev. 9) Manual Revision 2

ADDED		090-0104-04	Solder Ring, Preformed	18
CHANGE	Q302	007-0238-00	Tstr. FPN 4917	1
CHANGE	Q308	007-0238-00	Tstr. FPN 4917	1
CHANGE	Q311	007-0238-00	Tstr. FPN 4917	1
CHANGE	Q312	007-0238-00	Tstr. FPN 4917	1

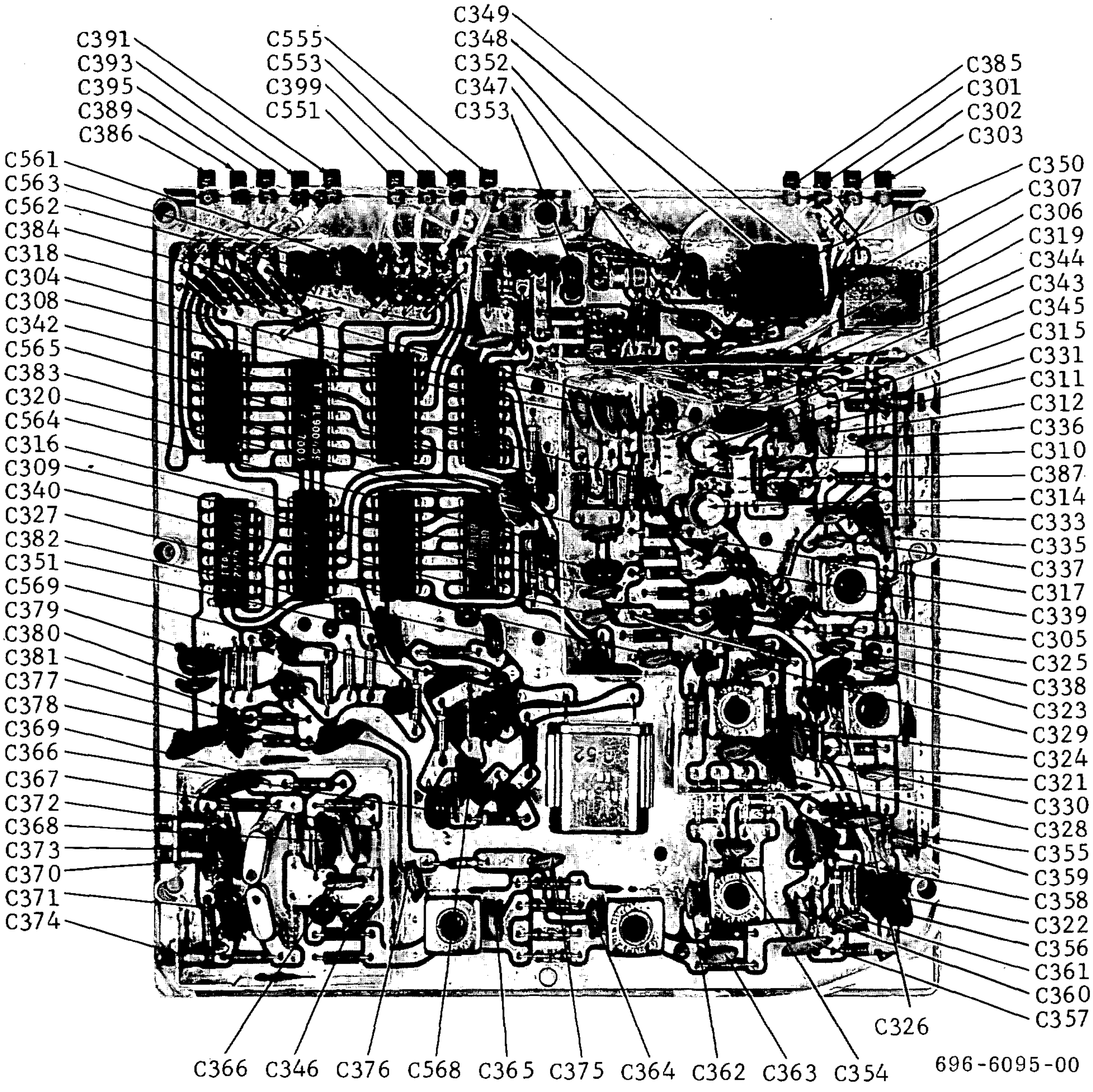


FIGURE 6-5A COMM SMO BOARD ASSEMBLY

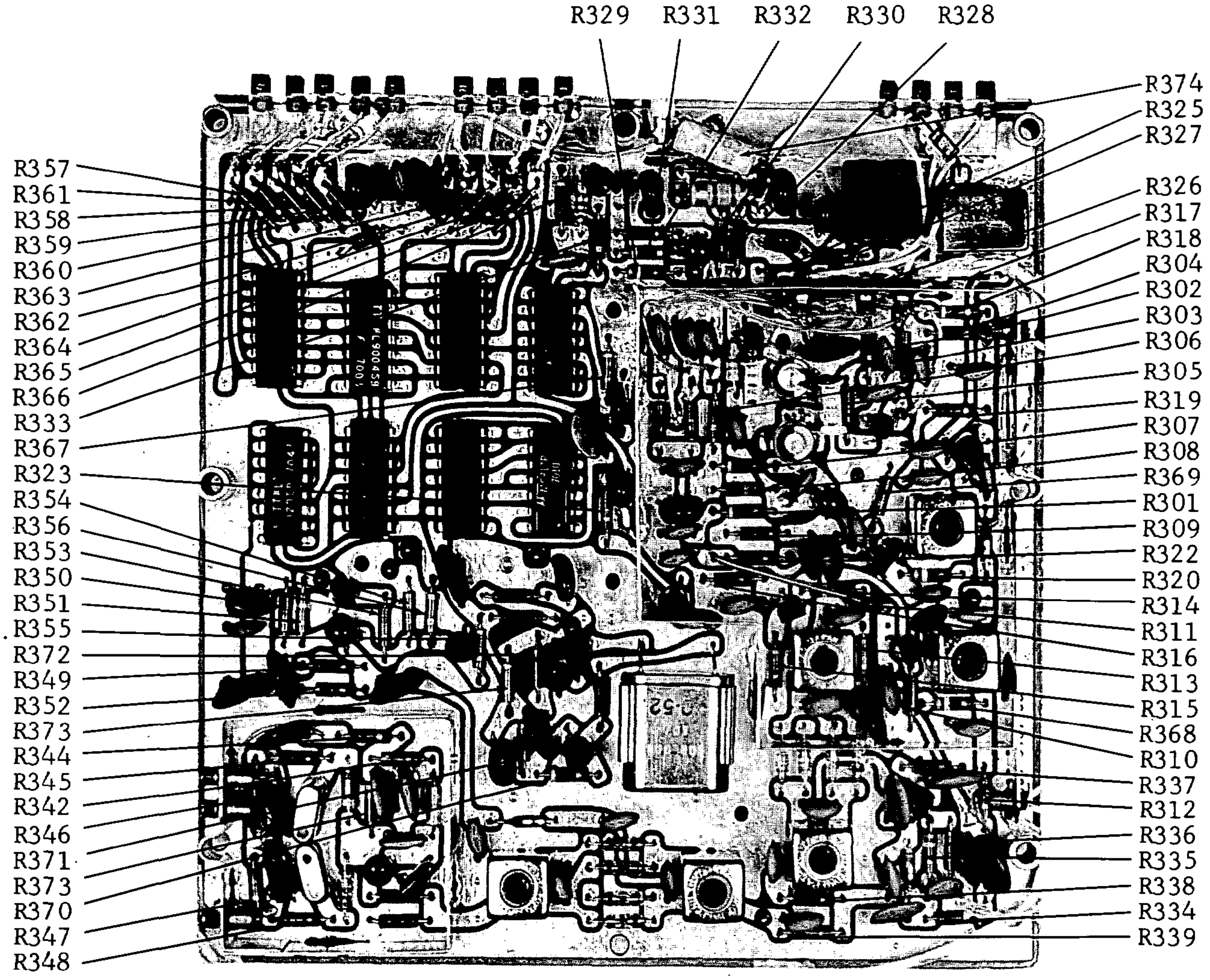


FIGURE 6-5B COMM SMO BOARD ASSEMBLY

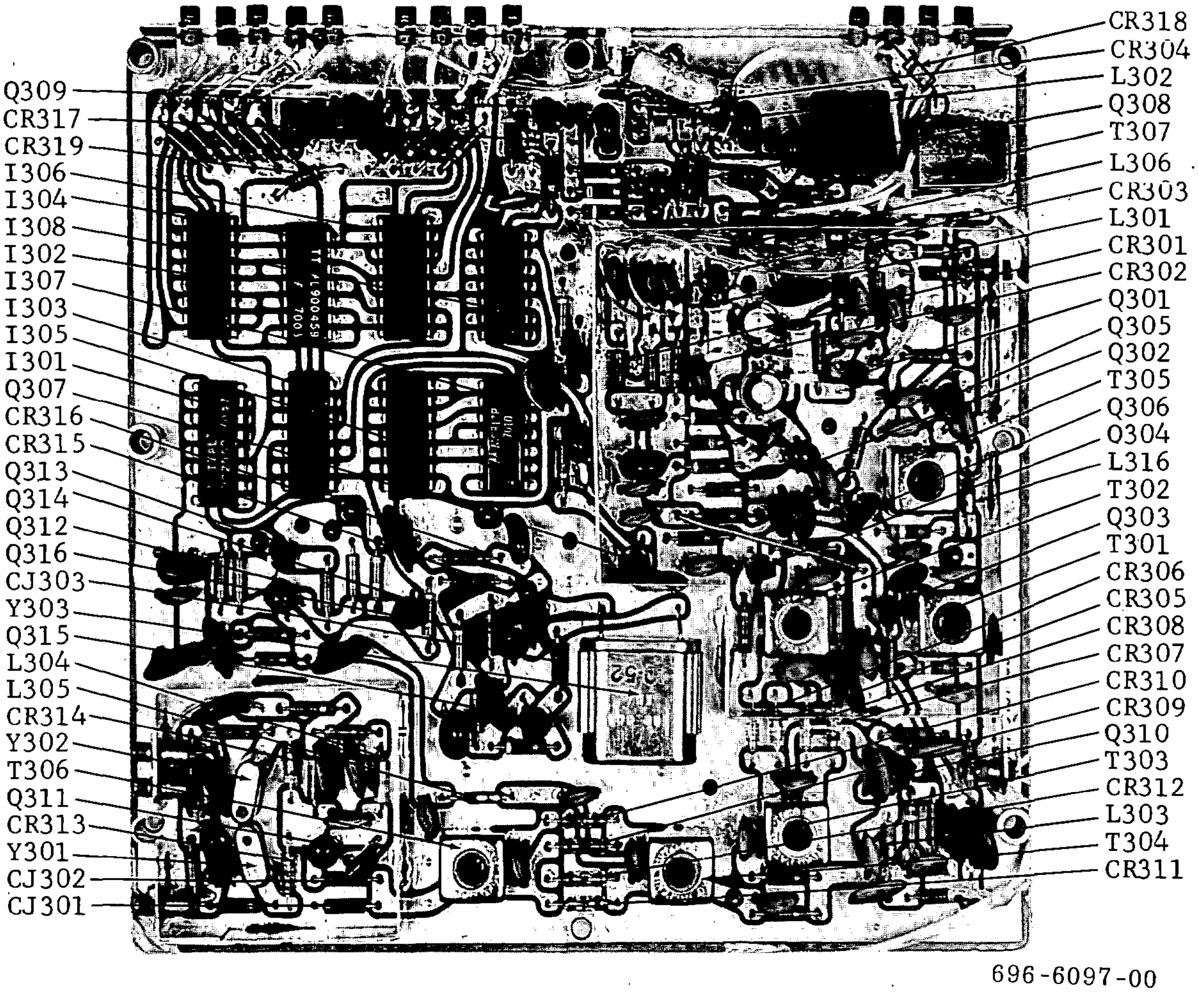


FIGURE 6-5C COMM SMO BOARD ASSEMBLY

ASSEMBLY NO. 200-0251-00
DESCRIPTION COMM SMO SA
UNIT KX175
REVISION 1
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0331-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	016-1011-00	PLIOBOND CEMENT	
	047-1736-02	COMM TRAY	1
	076-0165-09	SPACER	1
	076-0343-00	SPACER	1
	089-5874-03	SCR PHP 2-56X3/16	6
	089-5878-05	SC PPH 4-40X5/16	1
	091-0087-00	COMM INSULATION	1
	200-0247-00	COMM SMO SA	1

NOTE: R indicates revision. See page 6-40 for revision and new parts.

Parts List Revision Record

Assembly No. 200-0251-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
NO CHANGE				

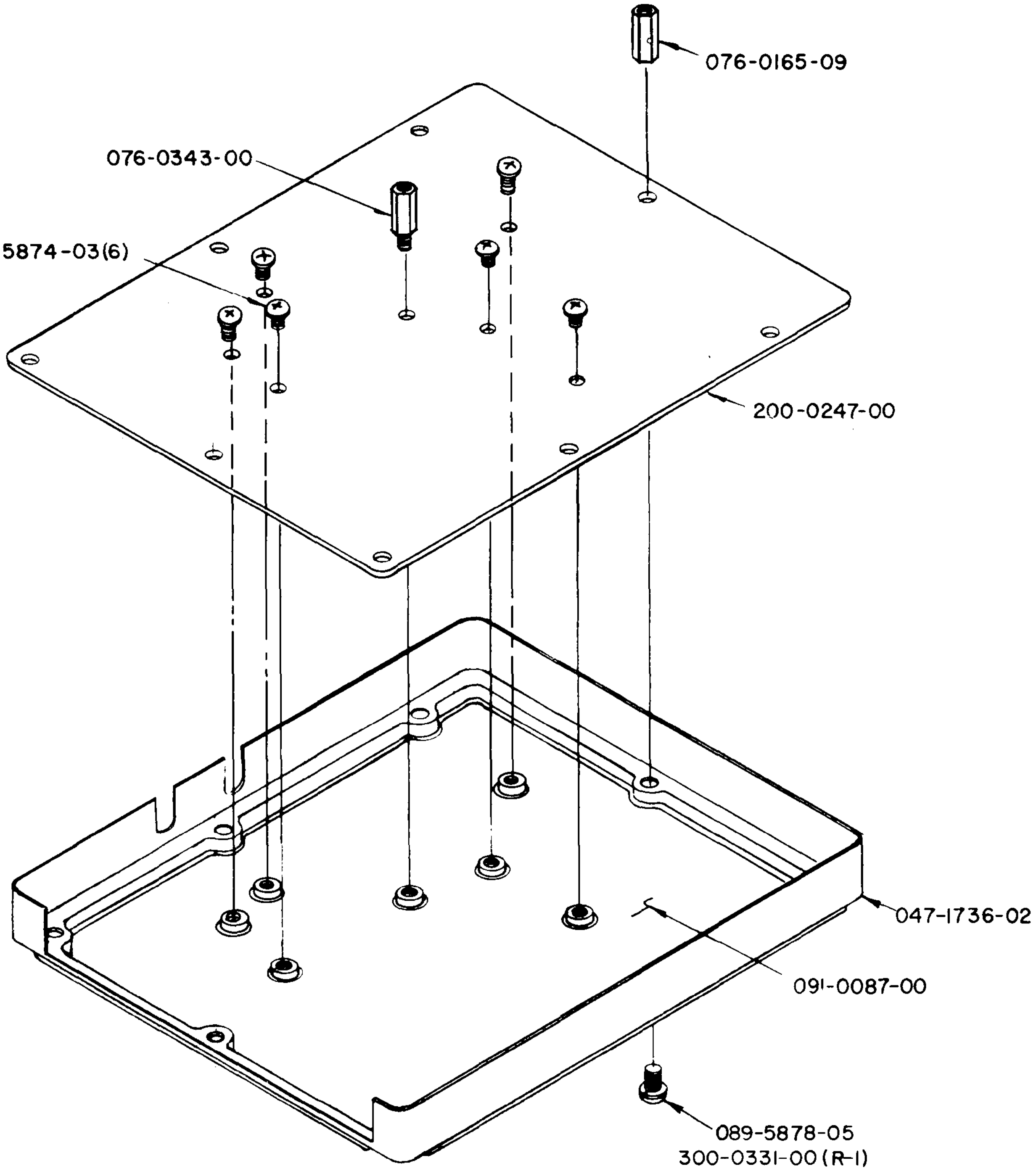


FIGURE 6-6 COMM SMO SUB-ASSEMBLY

ASSEMBLY NO. 200-0249-00 PAGE 1
DESCRIPTION NAV/COMM BOARD SA
UNIT KX175
REVISION 27
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0326-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	009-5142-01	NAV/COMM BOARD	1
	026-0003-00	WIRE TC22 BUSS	.5
	026-0013-00	WIRE COAX RG178U	3.3
	R2 047-1753-01	ENCLOSURE, COMM, PRESELECTOR	1
	R2 047-1754-01	ENCLOSURE, NAV PRESELECTOR	1
	R2 047-1755-01	COVER, NAV PRESELECTOR	1
	R2 047-1756-01	COMM COVER	1
	088-0066-00	PLASTIC SPACER	3
	R2 089-5946-04	SCREW PPH 424 1/4	4
	150-0005-10	TUBING TEF CLR 20	.2
R1 C 401	113-3068-00	CAP 6.8PF 5% N150	1
C 402	114-3560-00	CAP 56PF 5% N150	1
C 404	113-5151-01	CAP 150PF 10% X5F	1
C 405	114-7104-00	CAP .1UF 20% X5R	1
C 406	114-3560-00	CAP 56PF 5% N150	1
R1 C 407	113-3027-00	CAP 2.7PF 5% N150	1
R1 C 408	113-5101-01	CAP 100PF 10% X5F	1
C 410	113-5391-00	CAP 390PF 10% X5F	1
C 411	113-5101-01	CAP 100PF 10% X5F	1
C 412	113-5471-00	CAP 470PF 10% X5F	1
C 413	114-3560-00	CAP 56PF 5% N150	1
R1 C 414	113-3033-00	CAP 3.3PF 5% N150	1
C 415	113-3220-00	CAP 22PF 5% N150	1
C 417	113-5101-01	CAP 100PF 10% X5F	1
C 418	106-0001-18	CAP .82PF 5%	1
C 419	106-0001-34	CAP 6.8PF 5%	1
C 420	114-7104-00	CAP .1UF 20% X5R	1
C 421	114-7104-00	CAP .1UF 20% X5R	1
C 422	113-7203-00	CAP .02UF 20% X5R	1
C 424	106-0001-34	CAP 6.8PF 5%	1
C 425	114-7104-00	CAP .1UF 20% X5R	1
C 426	114-7104-00	CAP .1UF 20% X5R	1
C 428	106-0001-34	CAP 6.8PF 5%	1
C 429	114-7104-00	CAP .1UF 20% X5R	1
C 436	114-7104-00	CAP .1UF 20% X5R	1
C 437	105-0031-08	CAP MY .0022UF 10%	1
C 438	113-7503-00	CAP .05UF 20% X5R	1
C 439	096-1030-29	CAP TANT .22UF 20%	1
C 440	096-1030-02	CAP TANT 1UF 20%	1
C 441	096-1030-25	CAP TANT 150UF 20%	1
C 442	096-1030-25	CAP TANT 150UF 20%	1
C 443	096-1030-08	CAP TANT 100UF 20%	1
C 444	113-7503-00	CAP .05UF 20% X5R	1
C 446	113-7503-00	CAP .05UF 20% X5R	1
C 447	113-5181-00	CAP 180PF 10% X5F	1

NOTE: R indicates revision. See page 6-49 for revision and new parts.

ASSEMBLY NO. 200-0249-00
DESCRIPTION NAV/COMM BOARD SA
UNIT KX175
REVISION 27
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0326-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
C 448	113-3330-00	CAP 33PF 5% N150	1
C 449	113-7503-00	CAP .05UF 20% X5R	1
C 450	114-7104-00	CAP .1UF 20% X5R	1
C 451	114-7104-00	CAP .1UF 20% X5R	1
C 452	096-1030-24	CAP TANT 68UF 20%	1
C 453	096-1030-17	CAP TANT 6.8UF 20%	1
C 454	114-7104-00	CAP .1UF 20% X5R	1
C 455	105-0031-47	CAP MY .027UF 10%	1
C 456	114-7104-00	CAP .1UF 20% X5R	1
C 457	096-1030-03	CAP TANT 2.2UF 10%	1
C 458	113-7503-00	CAP .05UF 20% X5R	1
C 459	114-7104-00	CAP .1UF 20% X5R	1
C 460	113-5331-00	CAP 330PF 10% X5F	1
C 461	114-7104-00	CAP .1UF 20% X5R	1
C 462	114-7104-00	CAP .1UF 20% X5R	1
C 463	113-3270-00	CAP 27PF 5% N150	1
C 464	096-1030-17	CAP TANT 6.8UF 20%	1
C 465	096-1030-02	CAP TANT 1UF 20%	1
C 466	096-1030-02	CAP TANT 1UF 20%	1
C 467	113-3039-00	CAP 3.9PF 5% N150	1
C 468	113-3820-00	CAP 82PF 5% X5F	1
C 469	113-3047-00	CAP 4.7PF 5% N150	1
C 470	113-5151-01	CAP 150PF 10% X5F	1
C 472	114-7104-00	CAP .1UF 20% X5R	1
C 473	113-5151-01	CAP 150PF 10% X5F	1
C 474	113-5022-00	CAP 2.2PF N150	1
C 475	113-3390-00	CAP 39PF 5% N150	1
C 476	113-5471-00	CAP 470PF 10% X5F	1
C 477	113-5471-00	CAP 470PF 10% X5F	1
C 478	113-5151-01	CAP 150PF 10% X5F	1
C 479	113-5151-01	CAP 150PF 10% X5F	1
C 480	113-5151-01	CAP 150PF 10% X5F	1
R1 C 481	113-3033-00	CAP 3.3PF 5% N150	1
C 482	113-3390-00	CAP 39PF 5% N150	1
C 483	113-5101-01	CAP 100PF 10% X5F	1
R1 C 484	113-3120-00	CAP 12PF 5% N150	1
C 485	114-7104-00	CAP .1UF 20% X5R	1
C 486	114-7104-00	CAP .1UF 20% X5R	1
R1 C 487	113-3120-00	CAP 12PF 5% N150	1
C 488	114-7104-00	CAP .1UF 20% X5R	1
C 489	114-7104-00	CAP .1UF 20% X5R	1
C 490	113-7203-00	CAP .02UF 20% X5R	1
R1 C 491	113-3120-00	CAP 12PF 5% N150	1
C 492	114-7104-00	CAP .1UF 20% X5R	1
C 493	114-7104-00	CAP .1UF 20% X5R	1

NOTE: R indicates revision. See page 6-49 for revision and new parts.

ASSEMBLY NO. 200-0249-00
DESCRIPTION NAV/COMM BOARD SA
UNIT KX175
REVISION 27
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0326-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
C 494	114-7104-00	CAP .1UF 20% X5R	1
C 495	096-1030-27	CAP TANT 15UF 20%	1
C 496	105-0031-32	CAP MY .01UF 10%	1
C 497	096-1030-27	CAP TANT 15UF 20%	1
C 498	096-1030-02	CAP TANT 1UF 20%	1
C 499	096-1030-02	CAP TANT 1UF 20%	1
C 501	114-7104-00	CAP .1UF 20% X5R	1
C 502	105-0031-35	CAP MY .012UF 10%	1
C 503	105-0031-32	CAP MY .01UF 10%	1
C 504	113-3820-00	CAP 82PF 5% X5F	1
R1 C 505	096-1030-02	CAP TANT 1UF 20%	1
C 506	114-7104-00	CAP .1UF 20% X5R	1
C 507	113-7203-00	CAP .02UF 20% X5R	1
C 508	096-1030-27	CAP TANT 15UF 20%	1
C 509	096-1030-02	CAP TANT 1UF 20%	1
C 510	113-7203-00	CAP .02UF 20% X5R	1
C 511	096-1030-02	CAP TANT 1UF 20%	1
C 512	096-1030-21	CAP TANT 12UF 20%	1
CJ 401	026-0018-00	CIRCUIT JUMPER	1
CR 401	007-4012-00	DIODE SMV626	1
CR 402	007-4012-00	DIODE SMV626	1
CR 403	007-4012-00	DIODE SMV626	1
CR 404	007-6067-00	DIODE MBD 101	1
CR 405	007-6067-00	DIODE MBD 101	1
CR 406	007-6067-00	DIODE MBD 101	1
CR 407	007-6067-00	DIODE MBD 101	1
CR 408	007-5011-05	DIODE ZENER 3.3V	1
CR 409	007-6035-00	DIODE 1N816	1
R4 CR 410	007-6035-00	DIODE 1N816	1
CR 411	007-6029-00	DIODE SIL 1N457	1
CR 412	007-6029-00	DIODE SIL 1N457	1
CR 413	007-5011-13	DIODE ZENER 5.6V	1
CR 414	007-5011-14	DIODE ZENER 6.8V	1
CR 416	007-4012-00	DIODE SMV626	1
CR 417	007-4012-00	DIODE SMV626	1
CR 418	007-4012-00	DIODE SMV626	1
CR 419	007-4012-00	DIODE SMV626	1
CR 420	007-6067-00	DIODE MBD 101	1
CR 421	007-6067-00	DIODE MBD 101	1
CR 422	007-6067-00	DIODE MBD 101	1
CR 423	007-6067-00	DIODE MBD 101	1
CR 424	007-5011-05	DIODE ZENER 3.3V	1
R1 CR 425	007-6045-00	DIODE FH1100	1
R4 CR 426	007-6035-00	DIODE 1N816	1
CR 427	007-6029-00	DIODE SIL 1N457	1

NOTE: R indicates revision. See page 6-49 for revision and new parts.

ASSEMBLY NO. 200-0249-00 PAGE 4
DESCRIPTION NAV/COMM BOARD SA
UNIT KX175
REVISION 27
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0326-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R1 CR 428	007-6016-00	DIODE SIL 1N4154	1
CR 429	007-6016-00	DIODE SIL 1N4154	1
CR 430	007-6021-00	DIODE TS-2	1
CR 431	007-6029-00	DIODE SIL 1N457	1
CR 432	007-5011-13	DIODE ZENER 5.6V	1
FL 401	017-0035-00	FILTER 15.1875MHZ	1
FL 402	017-0035-00	FILTER 15.1875MHZ	1
FL 403	017-0034-00	FILTER 9.000MHZ	1
I 401	120-3007-00	INT CKT U8B7703394	1
I 402	120-3007-00	INT CKT U8B7703394	1
I 403	120-3006-00	INT CKT CA3020	1
I 404	120-3007-00	INT CKT U8B7703394	1
I 405	120-3007-00	INT CKT U8B7703394	1
R1 L 401	019-2150-00	CHOKE RF	1
R1 L 402	019-2057-16	CHOKE 2.2UH 5%	1
R1 L 403	019-2150-01	CHOKE RF	1
L 404	019-2054-20	CHOKE 2.2UH 5%	1
R1 L 405	019-2150-01	CHOKE RF	1
L 406	019-2109-00	INDUCTOR VARI	1
L 407	019-2150-02	CHOKE RF	1
L 408	019-2057-15	CHOKE 1.8UH 5%	1
L 409	019-2150-03	CHOKE RF	1
L 410	019-2054-19	CHOKE 1.8UH 5%	1
L 411	019-2150-04	CHOKE RF	1
L 412	019-2057-18	CHOKE 3.3UH 5%	1
L 413	019-2150-05	CHOKE RF	1
L 414	019-2109-00	INDUCTOR VARI	1
L 415	019-2082-70	CHOKE 240UH 5%	1
R2 Q 401	007-0093-00	TRANSISTOR SK7905	1
R2 Q 403	007-0196-00	TRANSISTOR MPSH20	1
R2 Q 404	007-0119-00	TRANSISTOR 2N4917	1
Q 405	007-0078-00	TRANSISTOR 2N3415	1
Q 406	007-0078-00	TRANSISTOR 2N3415	1
R2 Q 407	007-0119-00	TRANSISTOR 2N4917	1
Q 408	007-0195-00	TRANSISTOR MPSH10	1
Q 409	007-0195-00	TRANSISTOR MPSH10	1
Q 410	007-0078-00	TRANSISTOR 2N3415	1
R2 Q 411	007-0093-00	TRANSISTOR SK7905	1
R2 Q 413	007-0196-00	TRANSISTOR MPSH20	1
R2 Q 414	007-0119-00	TRANSISTOR 2N4917	1
Q 415	007-0078-00	TRANSISTOR 2N3415	1
R2 Q 416	007-0119-00	TRANSISTOR 2N4917	1
Q 417	007-0078-00	TRANSISTOR 2N3415	1
Q 418	007-0078-00	TRANSISTOR 2N3415	1
Q 419	007-0078-00	TRANSISTOR 2N3415	1

NOTE: R indicates revision. See page 6-49 for revision and new parts.

ASSEMBLY NO. 200-0249-00
DESCRIPTION NAV/COMM BOARD SA
UNIT KX175
REVISION 27
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0326-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
Q 420	007-0078-00	TRANSISTOR 2N3415	1
R 401	130-0103-25	RES 10K 10% QW	1
R 402	130-0103-25	RES 10K 10% QW	1
R 403	130-0102-23	RES 1K 5% QW	1
R 404	130-0622-23	RES 6.2K 10% QW	1
R 405	130-0621-23	RES 620OHM 5% QW	1
R 406	130-0101-25	RES 100 10% QW	1
R 407	130-0103-25	RES 10K 10% QW	1
R 408	130-0473-23	RES 47K 5% QW	1
R 409	130-0683-23	RES 68K 5% QW	1
R 410	130-0222-23	RES 2.2K 5% QW	1
R 413	130-0131-23	RES 130 5% QW	1
R 414	130-0132-23	RES 1.3K 5% QW	1
R 415	130-0332-23	RES 3.3K 5% QW	1
R 417	130-0473-23	RES 47K 5% QW	1
R 421	130-0103-25	RES 10K 10% QW	1
R 422	130-0473-23	RES 47K 5% QW	1
R 424	130-0201-23	RES 200 5% QW	1
R 425	133-0084-01	RES VARI 5K	1
R 426	130-0471-25	RES 470 10% QW	1
R 427	130-0112-23	RES 1.1K 5% QW	1
R 428	130-0242-23	RES 2.4K 5% QW	1
R 429	130-0103-23	RES 10K 5% QW	1
R 430	130-0222-23	RES 2.2K 5% QW	1
R 431	130-0223-23	RES 22K 5% QW	1
R 432	130-0223-23	RES 22K 5% QW	1
R 433	136-1741-77	RES 1.74K 1% QW	1
R 434	136-1211-77	RES 1.21K 1% QW	1
R 435	130-0181-23	RES 180 5% QW	1
R 436	130-0222-25	RES 2.2K 10% QW	1
R 437	130-0331-23	RES 330 5% QW	1
R 438	130-0101-25	RES 100 10% QW	1
R 439	130-0101-25	RES 100 10% QW	1
R 440	130-0512-23	RES 5.2K 5% QW	1
R 441	130-0133-23	RES 13K 5% QW	1
R 442	130-0472-23	RES 4.7K 5% QW	1
R 443	130-0332-23	RES 3.3K 5% QW	1
R 444	130-0300-33	RES 30 5% HW	1
R 445	130-0224-25	RES 220K 10% QW	1
R 446	130-0224-25	RES 220K 10% QW	1
R 447	130-0152-25	RES 1.5K 10% QW	1
R 448	130-0751-23	RES 750 5% QW	1
R 449	130-0182-23	RES 1.8K 5% QW	1
R 450	130-0224-23	RES 220K 5% QW	1
R 451	130-0472-23	RES 4.7K 5% QW	1

NOTE: R indicates revision. See page 6-49 for revision and new parts.

ASSEMBLY NO. 200-0249-00
DESCRIPTION NAV/COMM BOARD SA
UNIT KX175
REVISION 27
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0326-00

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R1	R 452	130-0332-23	RES 3.3K 5% QW	1
	R 453	130-0133-23	RES 13K 5% QW	1
	R 454	130-0512-23	RES 5.2K 5% QW	1
	R 455	130-0101-25	RES 100 10% QW	1
	R 456	130-0470-25	RES 47 10% QW	1
	R 457	130-0102-23	RES 1K 5% QW	1
	R 458	130-0753-23	RES 75K 5% QW	1
	R 460	130-0103-25	RES 10K 10% QW	1
	R 461	130-0103-25	RES 10K 10% QW	1
	R 462	130-0102-23	RES 1K 5% QW	1
R1	R 463	130-0621-23	RES 620OHM 5% QW	1
	R 464	130-0682-23	RES 6.8K 5% QW	1
	R 465	130-0101-25	RES 100 10% QW	1
	R 466	130-0103-25	RES 10K 10% QW	1
	R 467	130-0103-25	RES 10K 10% QW	1
R2	R 468	130-0473-23	RES 47K 5% QW	1
R1	R 469	130-0753-23	RES 75K 5% QW	1
	R 470	130-0222-23	RES 2.2K 5% QW	1
R1	R 471	130-0102-23	RES 1K 5% QW	1
R1	R 472	130-0563-23	RES 56K 5% QW	1
	R 473	130-0131-23	RES 130 5% QW	1
R1	R 474	130-0132-23	RES 1.3K 5% QW	1
R1	R 475	130-0332-23	RES 3.3K 5% QW	1
	R 476	130-0472-23	RES 4.7K 5% QW	1
R1	R 477	130-0393-23	RES 39K 5% QW	1
R1	R 478	130-0104-23	RES 100K 5% QW	1
	R 479	130-0472-23	RES 4.7K 5% QW	1
	R 481	130-0103-25	RES 10K 10% QW	1
	R 482	130-0330-23	RES 33OHM 5% QW	1
	R 483	133-0084-02	RES VARI 10K	1
	R 484	130-0181-23	RES 180 5% QW	1
	R 485	130-0681-23	RES 680OHM 5% QW	1
	R 486	130-0391-23	RES 390OHM 5% QW	1
	R 487	130-0473-25	RES 47K 10% QW	1
	R 488	130-0103-23	RES 10K 5% QW	1
	R 489	130-0472-23	RES 4.7K 5% QW	1
	R 490	130-0152-23	RES 1.5K 5% QW	1
	R 491	130-0222-25	RES 2.2K 10% QW	1
	R 492	130-0472-23	RES 4.7K 5% QW	1
	R 493	130-0331-23	RES 330 5% QW	1
	R 494	130-0621-23	RES 620OHM 5% QW	1
	R 495	133-0084-00	RES VARI 1K	1
	R 496	130-0182-23	RES 1.8K 5% QW	1
	R 497	130-0181-25	RES 180 10% QW	1
	R 498	130-0473-25	RES 47K 10% QW	1

NOTE: R indicates revision. See Page 6-49 for revision and new parts.

ASSEMBLY NO. 200-0249-00
DESCRIPTION NAV/COMM BOARD SA
UNIT KX175
REVISION 27
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0326-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R 499	130-0101-25	RES 100 10% QW	1
R 500	130-0102-25	RES 1K 10% QW	1
R 502	130-0471-25	RES 470 10% QW	1
R 503	130-0101-25	RES 100 10% QW	1
R 504	130-0182-23	RES 1.8K 5% QW	1
R 505	130-0102-25	RES 1K 10% QW	1
R 506	130-0103-23	RES 10K 5% QW	1
R 507	130-0103-23	RES 10K 5% QW	1
R 508	130-0332-23	RES 3.3K 5% QW	1
R 509	130-0103-23	RES 10K 5% QW	1
RT 501	134-1004-00	THERMISTOR 1K	1
RT 502	134-1019-00	THERMISTOR 50	1
R1 T 401	019-5056-04	TRANSFORMER MIXER	1
R1 T 402	019-5056-03	TRANSFORMER MIXER	1
R1 T 403	019-8044-00	TRANSFORMER IF	1
T 404	019-8044-01	TRANSFORMER IF	1
T 405	019-8034-03	TRANSFORMER IF	1
T 406	019-8034-04	TRANSFORMER IF	1
T 407	019-8034-01	TRANSFORMER IF	1
T 408	019-8034-01	TRANSFORMER IF	1
T 409	019-8045-00	TRANSFORMER IF	1
T 410	019-8034-01	TRANSFORMER IF	1
T 411	019-5055-00	TRANSFORMER AUDIO	1
T 412	019-5056-05	TRANSFORMER MIXER	1
T 413	019-5056-04	TRANSFORMER MIXER	1
T 414	019-8043-01	TRANSFORMER IF	1
T 415	019-8043-00	TRANSFORMER IF	1
R1 T 416	019-8034-02	TRANSFORMER IF	1
R1 T 417	019-8034-05	TRANSFORMER IF	1
R1 T 418	019-8034-00	TRANSFORMER IF	1
R1 T 419	019-8034-00	TRANSFORMER IF	1
R1 T 420	019-8034-00	TRANSFORMER IF	1
R1 T 421	019-8034-00	TRANSFORMER IF	1
Y 401	044-0029-01	XTAL 14.0018MHZ	1
Y 402	044-0029-00	XTAL 8.13875MHZ	1

NOTE: R indicates revision. See page 6-49 for revision and new parts.

Parts List Revision Record

Assembly No. 200-0249-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE	C401	113-3100-00	Cap. 10pf, 5%, N150	1
CHANGE	C407	113-3082-00	Cap. 8. 2pf, 5%, N150	1
CHANGE	C408	113-3200-00	Cap. 20pf, 5%, N150	1
CHANGE	C414	113-3082-00	Cap. 8. 2pf, 5%, N150	1
ADDED	C471	113-3027-00	Cap. 2. 7pf, 25%, N150	1
CHANGE	C481	113-3015-00	Cap. 1. 5pf, 25%, N150	1
CHANGE	C484	106-0001-36	Cap. 5. 6pf, 5%	1
CHANGE	C487	106-0001-37	Cap. 6. 2pf, 5%	1
CHANGE	C491	106-0001-36	Cap. 5. 6pf, 5%	1
CHANGE	C505	096-1030-21	Cap. Tant. 12μf, 20%	1
CHANGE	CR425	007-6035-00	Diode, 1N816	1
CHANGE	CR428	007-6059-00	Diode, FD400	1
CHANGE	L401	019-2167-00	Coil, RF	1
CHANGE	L402	019-2057-18	Choke, 3. 3μh, 5%	1
CHANGE	L403	019-2167-01	Choke, RF	1
CHANGE	L405	019-2167-02	Choke, RF	1
CHANGE	R452	130-0202-23	Res. 2. 0K, 5%, QW	1
CHANGE	R463	130-0751-23	Res. 750Ω, 5%, QW	1
CHANGE	R469	130-0154-23	Res. 150K, 5%, QW	1
CHANGE	R471	130-0184-23	Res. 180K, 5%, QW	1
CHANGE	R472	130-0184-23	Res. 180K, 5%, QW	1
CHANGE	R474	130-0911-23	Res. 910Ω, 5%, QW	1
CHANGE	R475	130-0272-23	Res. 2. 7K, 5%, QW	1
CHANGE	R477	130-0134-23	Res. 130K, 5%, QW	1
CHANGE	R478	130-0164-23	Res. 160K, 5%, QW	1
CHANGE	T401	019-5056-03	Transformer Mixer	1
CHANGE	T402	019-5056-05	Transformer Mixer	1
CHANGE	T403	019-8044-01	Transformer IF	1
CHANGE	T416	019-8046-00	Transformer IF	1
CHANGE	T417	019-8046-01	Transformer IF	1
CHANGE	T418	019-8046-02	Transformer IF	1
CHANGE	T419	019-8046-02	Transformer IF	1
CHANGE	T420	019-8046-00	Transformer IF	1
CHANGE	T421	019-8046-00	Transformer IF	1

Assembly No. 200-0249-00 (B/MRL Rev. 26) Manual Revision 2

CHANGE	R468	130-0274-25	Res. F. C. 270K 10% QW	1
CHANGE	Q401	007-0220-00	Tstr. MPS 6568A	1
CHANGE	Q411	007-0220-00	Tstr. MPS 6568A	1

Parts List Revision Record

Assembly No. 200-0249-00 (B/MRL Rev. 26) Manual Revision 2

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE	Q403	007-0196-02	Tstr. SPS 6800	1
CHANGE	Q413	007-0196-02	Tstr. SPS 6800	1
CHANGE	Q404	007-0238-00	Tstr. FPN 4917	1
CHANGE	Q407	007-0238-00	Tstr. FPN 4917	1
CHANGE	Q414	007-0238-00	Tstr. FPN 4917	1
CHANGE	Q416	007-0238-00	Tstr. FPN 4917	1
CHANGE		047-2640-01	Enclosure, Comm. Preselector	1
CHANGE		047-2641-01	Enclosure, Nav. Preselector	1
CHANGE		047-2642-01	Cover, Nav. Preselector	1
CHANGE		047-2643-01	Cover, Comm. Preselector Preselector	1
CHANGE		089-6293-04	Screw, #4-40 x 1/4PHP T. T.	4

Assembly No. 200-0249-00 (B/MRL Rev. 27) Manual Revision 4

CHANGE	CR410	007-6035-03	Dio. 1N816	1
CHANGE	CR 426	007-6035-03	Dio 1N816	1

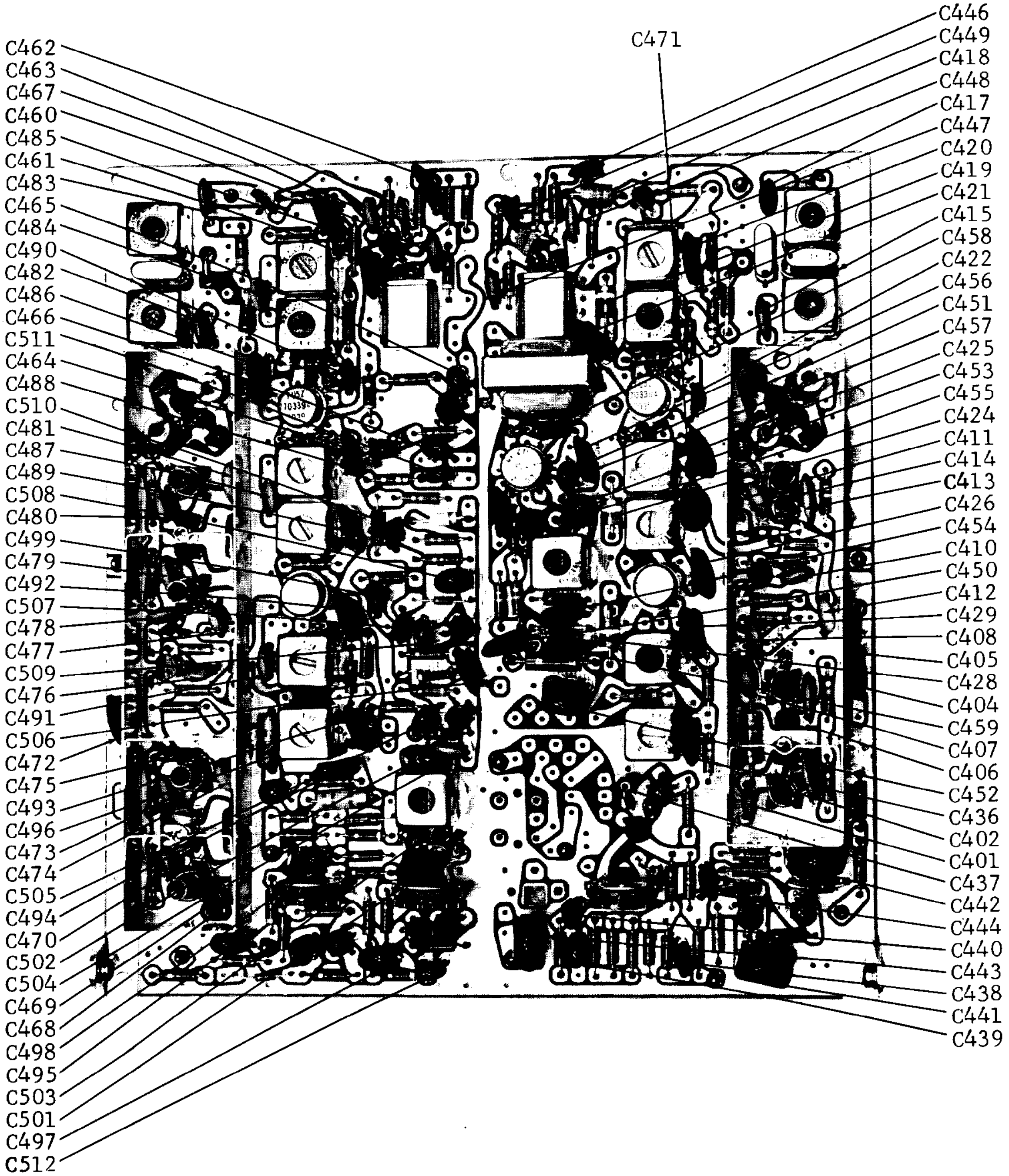


FIGURE 6-7A NAV/COMM BOARD SUB-ASSEMBLY
(Dwg. No. 696-6098-00)

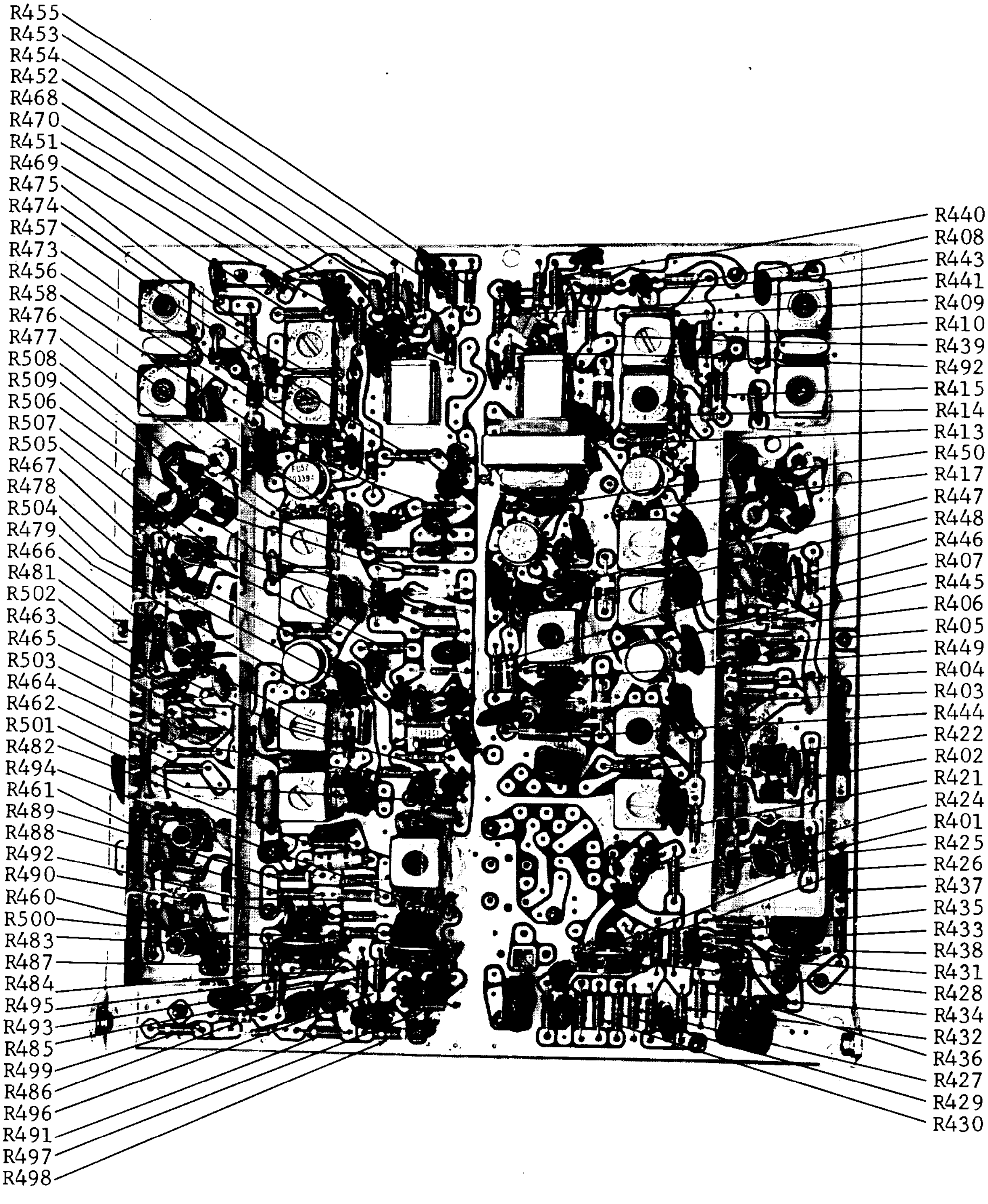


FIGURE 6-7B NAV/COMM BOARD SUB-ASSEMBLY
(Dwg. No. 696-6099-00)

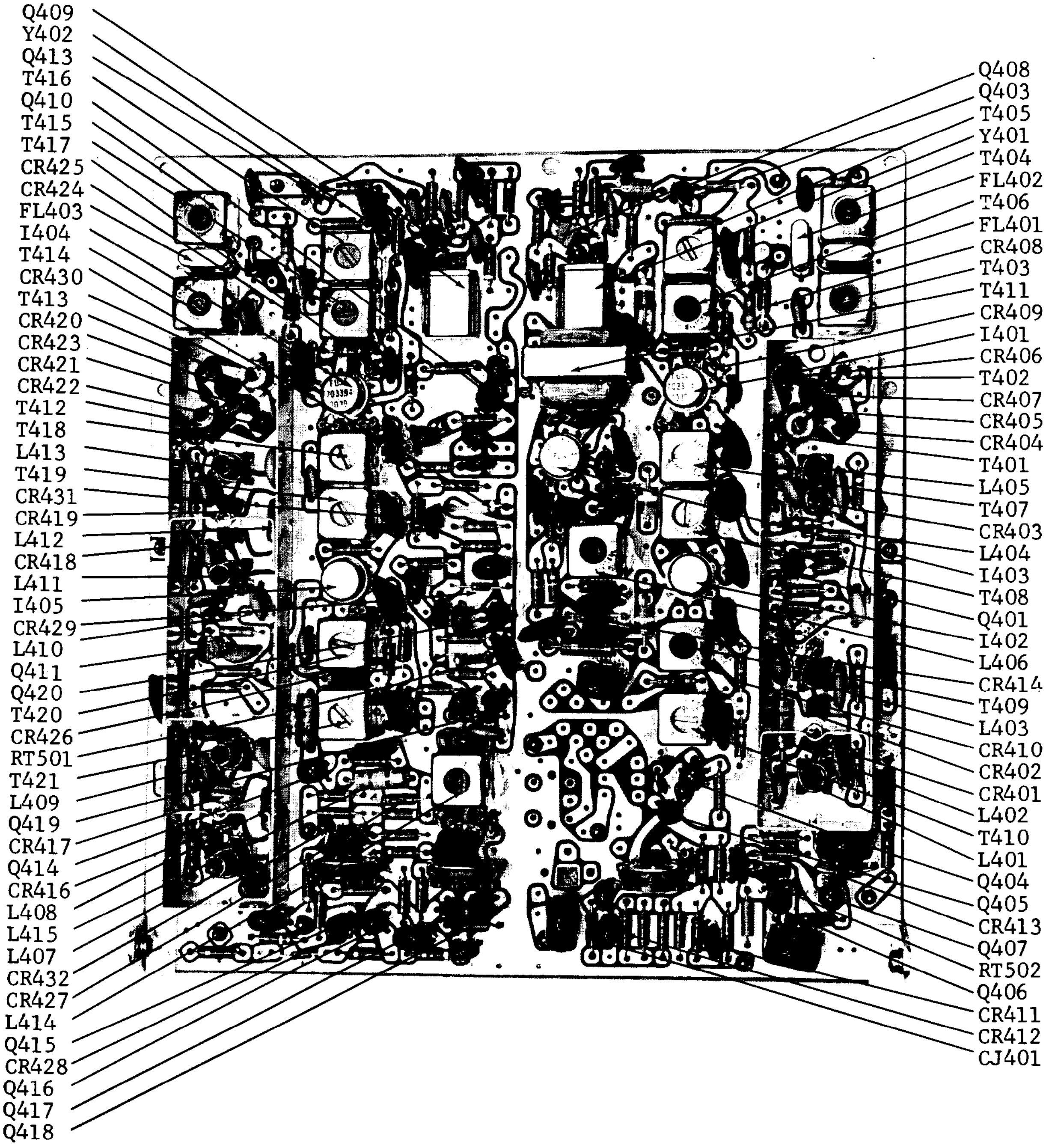


FIGURE 6-7C NAV/COMM BOARD SUB-ASSEMBLY
(Dwg. No. 696-6100-00)

ASSEMBLY NO. 200-0083-00
DESCRIPTION TRANSMITTER ASSY
UNIT KX175
REVISION 11
USED ON ASSEMBLY 200-0082-00
ASSEMBLY DRAWING NO. 300-0106-00

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
		009-5075-00	PC BOARD	1
		150-0042-10	TUBING SHRINKABLE	.2
	C 601	113-5471-00	CAP 470PF 10% X5F	1
R1	C 602	113-3068-00	CAP 6.8PF 5% N150	1
	C 603	113-5471-00	CAP 470PF 10% X5F	1
	C 604	113-3120-00	CAP 12PF 5% N150	1
	C 605	113-5151-01	CAP 150PF 10% X5F	1
	C 606	106-0034-00	CAP FT 1.5KPF 20%	1
	C 607	113-6103-00	CAP .01UF 20% X5F	1
	C 608	106-0034-00	CAP FT 1.5KPF 20%	1
R1	C 609	113-3270-00	CAP 27PF 5% N150	1
	C 610	102-0024-09	CAP VARI 7-35PF	1
	C 613	113-6103-00	CAP .01UF 20% X5F	1
	C 614	113-6103-00	CAP .01UF 20% X5F	1
	C 615	106-0034-00	CAP FT 1.5KPF 20%	1
	C 616	113-3820-00	CAP 82PF 5% X5F	1
	C 617	113-3820-00	CAP 82PF 5% X5F	1
	C 618	113-3680-00	CAP 68PF 5% X5F	1
	C 619	102-0024-09	CAP VARI 7-35PF	1
	C 620	113-6103-00	CAP .01UF 20% X5F	1
	C 621	106-0034-00	CAP FT 1.5KPF 20%	1
	C 622	102-0024-09	CAP VARI 7-35PF	1
	C 628	113-6103-00	CAP .01UF 20% X5F	1
	C 629	113-3180-00	CAP 18PF 5% N150	1
	CR 601	007-6022-00	DIODE TS6	1
	CR 602	007-6022-00	DIODE TS6	1
	L 601	019-2057-11	CHOKE .82UH 5%	1
R1	Q 601	007-0134-00	TRANSISTOR SE3005	1
	R 601	130-0392-25	RES 3.9K 10% QW	1
	R 602	130-0472-25	RES 4.7K 10% QW	1
	R 603	130-0271-25	RES 270 10% QW	1
	R 604	130-0470-25	RES 47 10% QW	1
R1	R 605	130-0472-25	RES 4.7K 10% QW	1
	R 606	130-0471-25	RES 470 10% QW	1
R1	R 607	130-0039-25	RES 3.9 10% QW	1
	R 608	130-0180-35	RES 18 10% HW	1
	R 609	130-0511-33	RES 510 5% HW	1
	R 610	130-0511-33	RES 510 5% HW	1
	R 611	130-0680-35	RES 68 10% HW	1
	R 613	130-0391-25	RES 390 10% QW	1
	R 614	130-0750-33	RES 75 5% HW	1
	R 615	130-0300-33	RES 30 5% HW	1
	R 618	130-0510-23	RES 51 5% QW	1
	T 601	019-3044-00	TRANSFORMER RF	1
	T 602	019-3026-00	TRANS BIFILAR WND	1

NOTE: R indicates revision. See page 6-56 for revision and new parts.

ASSEMBLY NO. 200-0083-00
DESCRIPTION TRANSMITTER ASSY
UNIT KX175
REVISION 11
USED ON ASSEMBLY 200-0082-00
ASSEMBLY DRAWING NO. 300-0106-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
T 603	019-3026-00	TRANS BIFILAR WND	1

NOTE: R indicates revision. See page 6-56 for revision and new parts.

Parts List Revison Record

Assembly No: 200-0083-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE	C602	113-3180-00	Cap, 18pf, 5%, N150	1
CHANGE	C609	113-3390-00	Cap, 39pf, 5%, N150	1
CHANGE	Q601	007-0195-00	Transistor, MPSH10	1
CHANGE	R605	130-0242-23	Res. 2.4K, 5%, QW	1
CHANGE	R607	130-0200-23	Res. 20Ω, 5%, QW	1

Assembly No. 200-0083-00 (B/MRL Rev. 11) Manual Revision 2

ADDED	026-0003-00	Buss Wire #22 AWG T/C	.1
ADDED	026-0001-00	Buss Wire #26 AWG T/C	.1
ADDED	150-0003-10	Tubing, Teflon #24 GA	.1

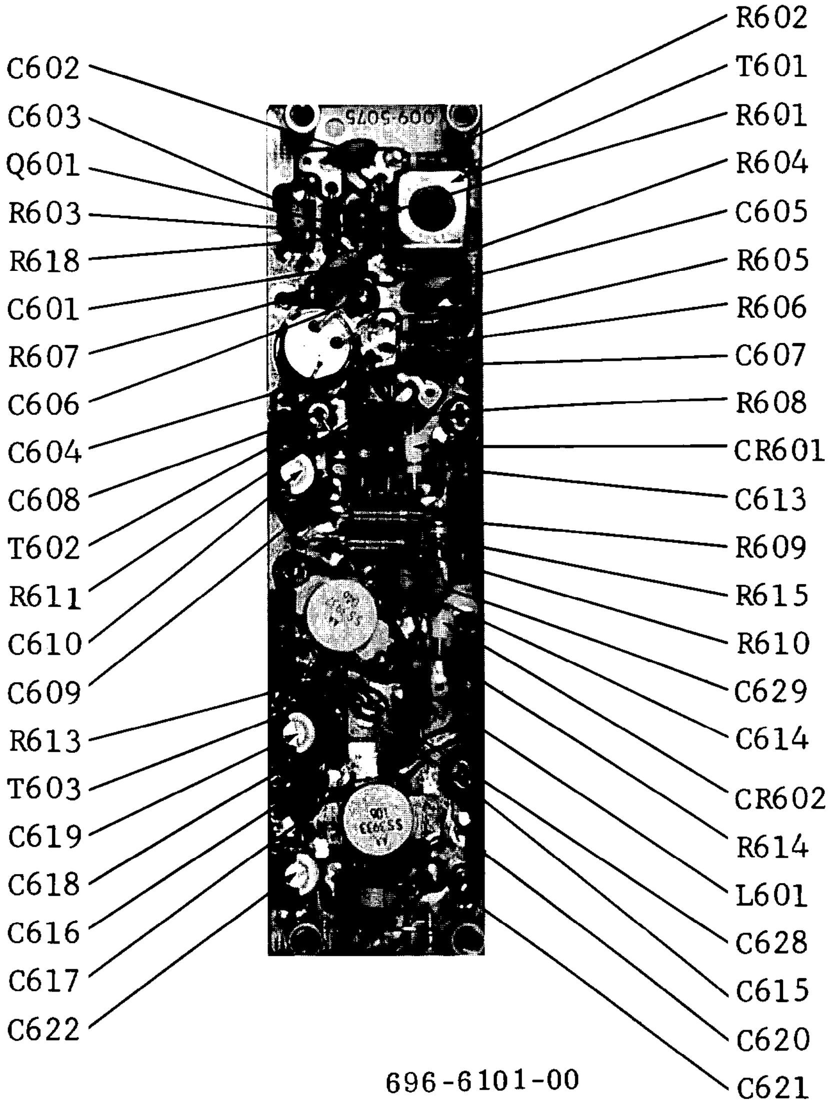


FIGURE 6-8 TRANSMITTER ASSEMBLY
(Dwg. No. 696-6101-00)

ASSEMBLY NO. 200-0082-00 PAGE 1
DESCRIPTION REAR PLATE ASSY
UNIT KX175
REVISION 12
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0105-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	008-0042-00	LUG SOLDER	1
	008-0044-01	TERM DBL END	1
	010-0019-90	TERM STANDOFF WHT	2
	010-0029-90	TERM FEED THRU WHT.	1
	016-1004-00	THERMAL COMPOUND	
	026-0003-00	WIRE TC22 BUSS	.1
	047-1833-01	CONNECTOR COVER	1
	073-0093-02	REAR PLATE	1
R4	076-0164-06	SPACER	4
	089-2005-37	NUT STOP 2-56	1
	089-2272-30	NUT HEX 8-32	2
	089-5874-03	SCR PHP 2-56X3/16	3
	089-5878-04	SCR PPH 4-40X1/4	2
	089-8012-37	LOCK WASHER INT 2	1
	090-0133-00	HEAT SINK	1
	091-0028-00	SCR NYPH 4-40X3/16	1
R1	091-0069-36	WASHER MICA	1
C 624	106-0006-02	CAP FT 22PF 10%	1
C 625	113-5221-01	CAP 220PF 10% X5F	1
C 626	106-0006-03	CAP FT 250PF 20%	1
C 627	106-0006-00	CAP FT 33PF 10%	1
C 629	106-0006-00	CAP FT 33PF 10%	1
C 631	106-0024-00	CAP STANDOFF 20PF	1
C 632	113-3200-00	CAP 20PF 5% N150	1
CR 603	007-6059-00	DIODE FD400	1
CR 604	007-6059-00	DIODE FD400	1
FL 601	017-0025-00	FILTER	1
FL 602	017-0027-00	FILTER	1
FL 603	017-0027-00	FILTER	1
J 172	030-0059-00	CONNECTOR ANT FEM	1
J 173	030-0059-00	CONNECTOR ANT FEM	1
L 604	019-2054-17	CHOKE 1.2UH 5%	1
Q 602	007-0066-00	TRANSISTOR 2N3866	1
Q 603	007-0149-00	TRANSISTOR SS 3932	1
Q 604	007-0150-00	TRANSISTOR SS 3933	1
R 612	130-0068-33	RES 6.8 5% HW	1
R 616	130-0222-25	RES 2.2K 10% QW	1
R 617	130-0471-35	RES 470 10% HW	1
T 604	019-3045-00	TRANSFORMER RF	1

NOTE: R indicates revision. See page 6-59 for revision and new parts.

Parts List Revision Record

Assembly No: 200-0082-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE		091-0155-00	Washer, Mica	1

Assembly No. 200-0082-00 (B/MRL Rev. 12) Manual Revision 4

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE		076-0164-06	Spacer	3
ADDED		076-0139-09	Spacer	1

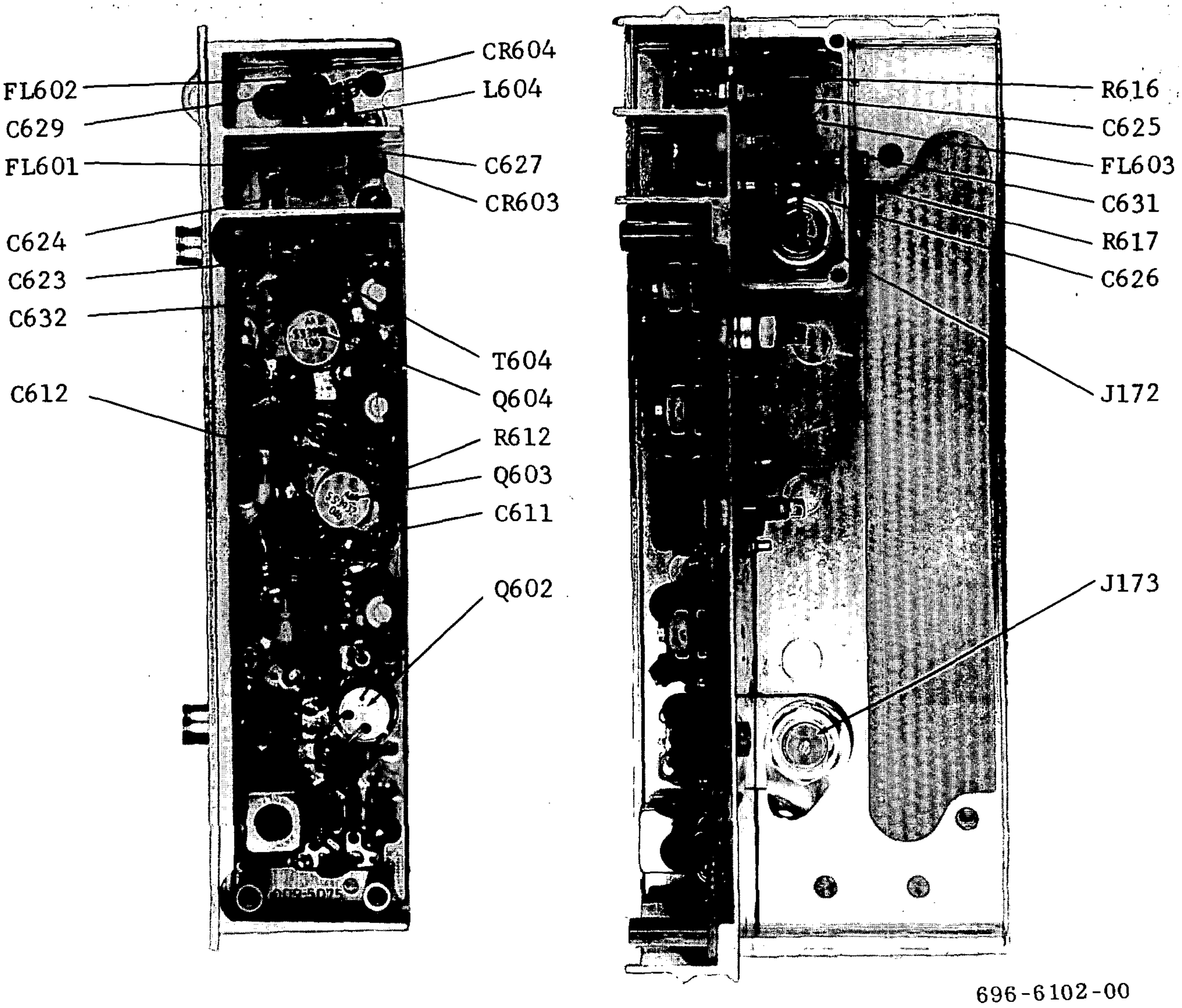


FIGURE 6-9 REAR PLATE
(Dwg. No. 696-6102-00)

ASSEMBLY NO. 200-0246-00
DESCRIPTION AUDIO DRIVE BOARD
UNIT KX175
REVISION 9
USED ON ASSEMBLY 200-0250-00
ASSEMBLY DRAWING NO. 300-0323-00

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
		009-5127-01	AUDIO DRIVE BOARD	1
	C 701	096-1030-23	CAP TANT 39UF 20%	1
	C 702	113-5221-01	CAP 220PF 10% X5F	1
	C 703	113-5221-01	CAP 220PF 10% X5F	1
	C 704	096-1030-17	CAP TANT 6.8UF 20%	1
	C 705	114-7224-00	CAP .22UF 20% X5R	1
	C 706	096-1030-21	CAP TANT 12UF 20%	1
R6	C 707	096-1030-07	CAP TANT 68UF 20% 20V	1
	C 708	096-1030-06	CAP TANT 47UF 10%	1
	C 709	096-1030-09	CAP TANT 15UF 20%	1
	C 710	113-5271-00	CAP 270PF 10% X5F	1
	C 714	096-1030-22	CAP TANT 22UF 20%	1
	C 715	113-7203-00	CAP .02UF 20% X5R	1
	CJ 701	026-0018-00	CIRCUIT JUMPER	1
	CR 701	007-6035-00	DIODE 1N816	1
	CR 702	007-6035-00	DIODE 1N816	1
	F 701	036-0058-04	FUSE 5 AMPS	1
	Q 701	007-0078-00	TRANSISTOR 2N3415	1
	Q 702	007-0039-00	TRANSISTOR 2N3403	1
	R 701	130-0222-25	RES 2.2K 10% QW	1
R2	R 702	130-0222-25	RES 2.2K 10% QW	1
	R 703	130-0511-23	RES 510 5% QW	1
	R 704	130-0222-25	RES 2.2K 10% QW	1
	R 705	130-0562-25	RES 5.6K 10% QW	1
	R 706	130-0222-25	RES 2.2K 10% QW	1
	R 707	130-0222-25	RES 2.2K 10% QW	1
	R 708	130-0242-23	RES 2.4K 5% QW	1
	R 709	133-0084-00	RES VARI 1K	1
	R 710	130-0103-25	RES 10K 10% QW	1
	R 711	130-0393-23	RES 39K 5% QW	1
	R 712	130-0472-25	RES 4.7K 10% QW	1
	R 713	130-0470-23	RES 47OHM 5% QW	1
	R 714	130-0561-25	RES 560 10% QW	1
	R 715	130-0182-23	RES 1.8K 5% QW	1
	R 716	130-0681-23	RES 680OHM 5% QW	1
	R 717	130-0360-23	RES 36OHM 5% QW	1
	R 718	130-0272-23	RES 2.7K 5% QW	1
	R 720	130-0220-25	RES 22 10% QW	1
	R 721	130-0222-25	RES 2.2K 10% QW	1
	R 722	130-0241-23	RES 240 5% QW	1
R1	R 723	130-0103-25	RES 10K 10% QW	1
	R 726	133-0084-00	RES VARI 1K	1
	R 727	130-0561-23	RES 560 5% QW	1

NOTE: R indicates revision. See page 6-62 for revision and new parts.

Parts List Revision Record

Assembly No: 200-0246-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
ADDED	CR706	007-6021-00	Diode TS-2	1
ADDED	CR707	007-6021-00	Diode TS-2	1
ADDED	CR708	007-6029-00	Diode, 1N457A	1
CHANGE	R723	130-0112-23	Res. 1.1K, 5%, QW	1

Assembly No. 200-0246-00 (B/MRL Rev. 8) Manual Revision 2

CHANGE	R702	130-0511-23	Res. 510Ω 5% QW	1

Assembly No. 200-0246-00 (B/MRL Rev. 9) Manual Revision 6

CHANGE	C707	096-1030-08	CAP Tant 100uf 20% 15V	

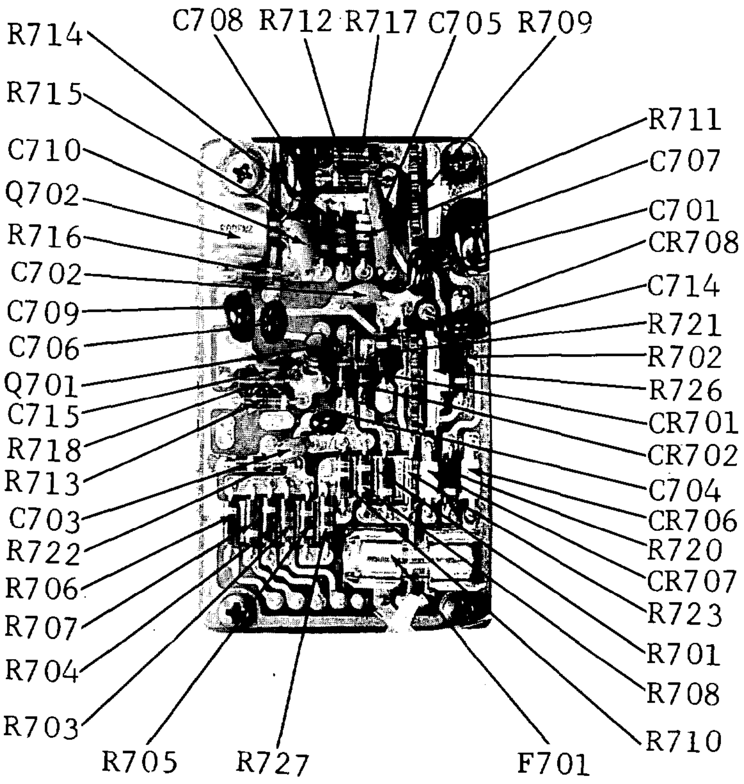


FIGURE 6-10 AUDIO BOARD SUB-ASSEMBLY
(Dwg. No. 696-6083-00)

ASSEMBLY NO. 200-0250-00
DESCRIPTION REAR DIVIDER SA
UNIT KX175
REVISION 6
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0330-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	008-0004-00	LUG GROUND #4	2
	008-0005-01	LUG	3
	008-0040-00	LUG SOLDER	1
	009-0003-08	TERMINAL STRIP	2
	009-0030-00	TERMINAL STRIP	1
	009-0030-01	TERMINAL STRIP	1
	016-1004-00	THERMAL COMPOUND	
	025-0003-02	WIRE SPC 22 RED	1.3
	025-0003-03	WIRE TEF 22 ORN	1.0
	025-0018-29	WIRE CW26 RED/WHT	.6
	025-0018-33	WIRE CW26 ORANGE	.6
	025-0018-69	WIRE CW26 BLUE/WHT	.5
	025-0018-79	WIRE CW26 VIO/WHT	.5
	025-0018-98	WIRE CW26 WHT/GRY	.3
	025-0018-99	WIRE CW26 WHITE	.7
	026-0001-00	WIRE TC26 BUSS	.2
	047-1733-02	DIVIDER REAR	1
	047-2110-01	BRACKET TRANSISTOR	1
	076-0165-04	SPACER	4
	089-2007-37	NUT HEX 3-48	1
	089-2076-30	NUT 4-40	7
	089-2140-00	NUT ESNA #4	4
	089-2144-30	NUT HEX 2-56	2
	089-2147-22	NUT #6 HEX REDUCED	2
	089-5878-04	SCR PPH 4-40X1/4	3
	089-5878-06	SCR PPH 4-40X3/8	1
	089-5903-04	SCR PPH 4-40X1/4	3
	089-5903-05	SCR PHP 4-40X5/16	4
	089-5907-05	SCR PPH 6-32X5/16	2
	089-8001-34	WASHER SPLITLOCK 2	2
	089-8003-34	WASHER SPLITLOCK 4	7
	089-8013-37	WASHER LOCK INT 3	1
	089-8025-30	WASHER #4	4
	091-0068-04	WASHER SHOULDER	4
	150-0003-10	TUBING TEF CLR 24	.2
	150-0005-10	TUBING TEF CLR 20	.2
	150-0020-10	TUBING TEF CLR 18	.3
	200-0246-00	AUDIO DRIVE BOARD	1
C 711	095-0005-02	CAP 1900UF 20V	1
C 712	113-5681-00	CAP 680PF 10% X5F	1
C 713	097-0057-35	CAP 680UF 25V	1
C 716	105-0033-51	CAP MY 12UF 5%	1
CR 703	007-6021-00	DIODE TS-2	1
CR 704	007-6021-00	DIODE TS-2	1
CR 705	007-6035-00	DIODE 1N816	1

NOTE: R indicates revision. See page 6-66 for revision and new parts.

ASSEMBLY NO. 200-0250-00
DESCRIPTION REAR DIVIDER SA
UNIT KX175
REVISION 6
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0330-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
K 701	032-0009-00	RELAY 6P2T	1
L 701	019-2152-00	CHOKE 1MH	1
L 702	019-2102-00	CHOKE 250UH	1
L 703	019-3043-01	IND VARI 200MH	1
Q 703	007-0065-00	TRANSISTOR 2N3906	1
Q 704	007-0065-00	TRANSISTOR 2N3906	1
Q 705	007-0197-00	TRANSISTOR 40633	1
Q 706	007-0197-00	TRANSISTOR 40633	1
R 719	130-0681-25	RES 680 10% QW	1
R 724	130-0332-25	RES 3.3K 10% QW	1
R 725	130-0153-23	RES 15K 5% QW	1
T 701	019-5054-00	TRANS AUDIO DRIVER	1
T 702	019-5062-00	TRANSFORMER MOD	1

NOTE: R indicates revision. See page 6-66 for revision and new parts.

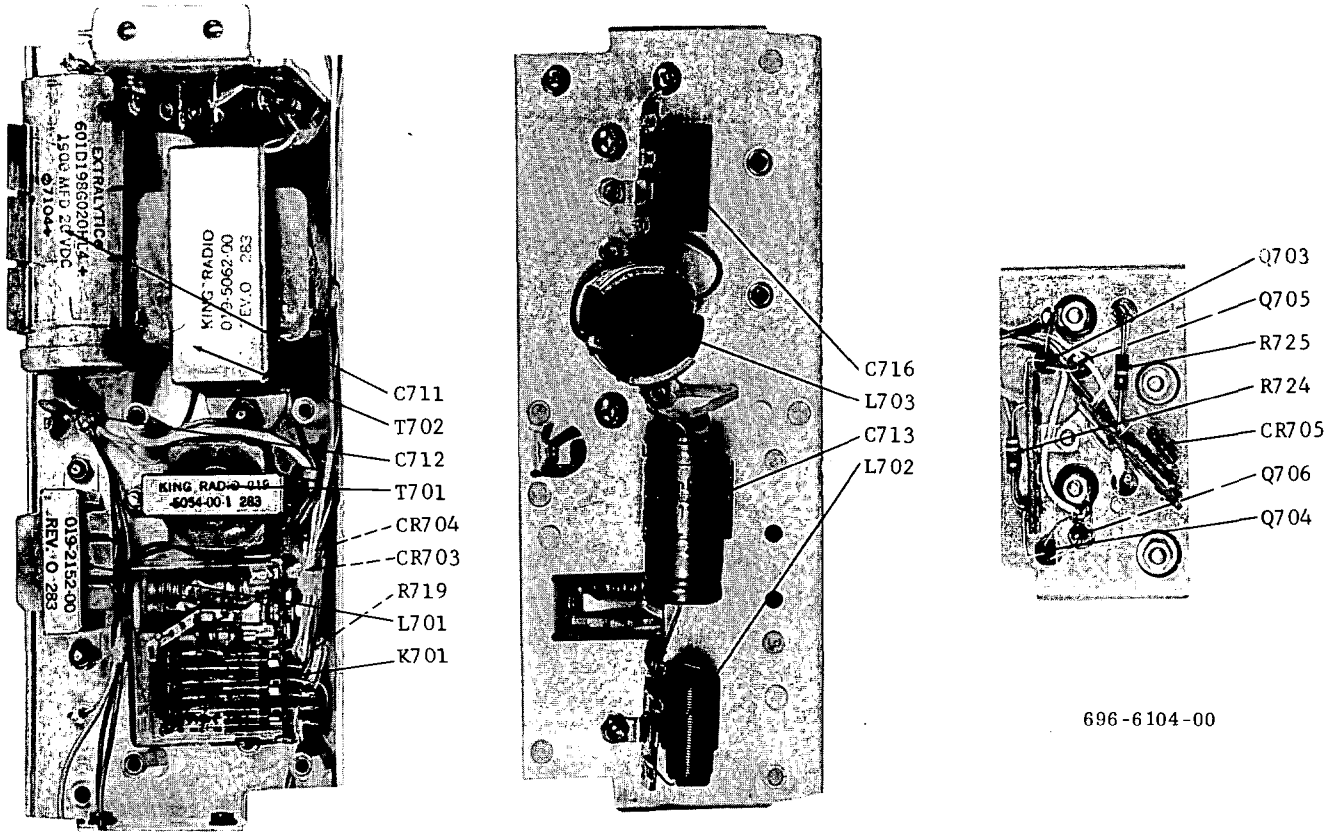
Parts List Revision Record

Assembly No: 200-0250-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
ADDED		016-1034-00	Adhesive	
ADDED		187-1029-00	Channel Rubber	.13

Assembly No: 200-0250-00 (B/MRL Rev. 6) Manual Revision 2

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
ADDED	R728	130-0193-25	Res. F. C. 10K 10% QW	1
ADDED		016-1026-00	RTV 732 Dow-Corning, Clear	
ADDED		091-0172-00	Insulator (Fishpaper)	1
ADDED		016-1043-00	Adhesive, R. T. V.	



COMPONENTS IN THIS VIEW
NOT USED IN KY 197.

FIGURE 6-11 REAR DIVIDER SUB-ASSEMBLY
(Dwg. No. 696-6104-00)

ASSEMBLY NO. 200-0255-00
DESCRIPTION CONN CABLE SA
UNIT KX175
REVISION 8
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0335-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	012-1006-00	TAPE COATED LACING	
	025-0003-00	WIRE SPC 22 BLACK	1.2
	025-0003-04	WIRE 22 YELLOW	1.6
	025-0003-13	WIRE 22 ORN/WHT	2.7
	025-0003-14	WIRE 22 YEL/WHT	2.8
	025-0005-02	WIRE SPC 18 RED	1.6
	025-0005-09	WIRE 18 WHITE	1.6
	025-0018-00	WIRE CW26 BLACK	1.0
	025-0018-04	WIRE CW26 BLK/YEL	1.4
	025-0018-09	WIRE CW26 BLK/WHT	.8
	025-0018-11	WIRE CW26 BROWN	2.3
	025-0018-14	WIRE CW26 BRN/YEL	1.3
	025-0018-16	WIRE CW26 BRN/BLU	1.3
	025-0018-17	WIRE CW26 BRN/VIO	1.3
	025-0018-18	WIRE CW26 BRN/GRY	1.2
	025-0018-19	WIRE CW26 BRN/WHT	4.4
	025-0018-22	WIRE CW26 RED	.8
	025-0018-24	WIRE CW26 RED/YEL	.6
	025-0018-25	WIRE CW26 RED/GRN	1.7
	025-0018-26	WIRE CW26 RED/BLU	1.2
	025-0018-27	WIRE CW26 RED/VIO	1.3
	025-0018-28	WIRE CW26 RED/GRY	1.2
	025-0018-29	WIRE CW26 RED/WHT	2.1
	025-0018-34	WIRE CW26 ORN/YEL	1.4
	025-0018-36	WIRE CW26 ORN/BLU	1.2
	025-0018-37	WIRE CW26 ORN/VIO	1.2
	025-0018-38	WIRE CW26 ORN/GRY	1.2
	025-0018-39	WIRE CW26 ORN/WHT	2.0
	025-0018-40	WIRE CW26 YEL/BLK	1.3
	025-0018-42	WIRE CW26 YEL/RED	1.1
	025-0018-43	WIRE CW26 YEL/ORN	2.1
	025-0018-44	WIRE CW26 YELLOW	.8
	025-0018-45	WIRE CW26 YEL/GRN	1.5
	025-0018-46	WIRE CW26 YEL/BLU	1.2
	025-0018-47	WIRE CW26 YEL/VIO	1.2
	025-0018-48	WIRE CW26 YEL/GRY	1.3
	025-0018-49	WIRE CW26 YEL/WHT	1.3
	025-0018-54	WIRE CW26 GRN/YEL	.7
	025-0018-56	WIRE CW26 GRN/BLU	1.3
	025-0018-57	WIRE CW26 GRN/VIO	1.2
R1	025-0018-58	WIRE CW26 GRN/GRY	1.5
	025-0018-59	WIRE CW26 GRN/WHT	2.1
	025-0018-64	WIRE CW26 BLU/YEL	.7
	025-0018-66	WIRE CW26 BLUE	3.7
	025-0018-69	WIRE CW26 BLUE/WHT	2.6

NOTE: R indicates revision. See page 6-70 for revision and new parts.

ASSEMBLY NO. 200-0255-00
DESCRIPTION CONN CABLE SA
UNIT KX175
REVISION 8
USED ON ASSEMBLY 069-1016-00
ASSEMBLY DRAWING NO. 300-0335-00

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
		025-0018-74	WIRE CW26 VIO/YEL	.6
		025-0018-77	WIRE CW26 VIOLET	2.1
		025-0018-79	WIRE CW26 VIO/WHT	1.9
		025-0018-84	WIRE CW26 GRY/YEL	.6
		025-0018-88	WIRE CW26 GRAY	4.0
		025-0018-89	WIRE CW26 GRY/WHT	4.7
		025-0018-91	WIRE CW26 WHT/BRN	1.7
R1		025-0018-92	WIRE CW26 WHT/RED	.9
		025-0018-93	WIRE CW26 WHT/ORN	2.1
		025-0018-95	WIRE CW26 WHT/GRN	1.5
		025-0018-96	WIRE CW26 WHT/BLU	2.0
		025-0018-97	WIRE CW26 WHT/VIO	.8
		025-0018-98	WIRE CW26 WHT/GRY	1.7
		025-0018-99	WIRE CW26 WHITE	2.6
R1		026-0003-00	WIRE TC22 BUSS	.1
		026-0005-00	WIRE 18 BUSS	.1
		150-0020-10	TUBING TEF CLR 18	2.0
	P 171	030-2109-00	CONN MALE 42 PIN	1

NOTE: R indicates revision. See page 6-70 for revision and new parts.

Parts List Revision Record

Assembly No. 200-0255-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
ADDED		025-0003-12	Wire 22 Red/Wht	.6
DELETE		025-0018-58	Wire CW26 Grn/Gry	1.5
DELETE		025-0018-92	Wire CW26 Wht/Red	.9
DELETE		026-0003-00	Wire TC22 Buss	.1
ADDED		026-0013-00	Coax Cable RG178	.9

NAME	ASS'Y. NO.
Voltage Converter	071-1041-00/01

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY				
				-00	-01	-02	-03	-04
	071-1041-00	KA 38 Single Reg		X				
	071-1041-01	KA 39 Double Reg			X			
	008-0022-00	Lug Solder		2	2			
	008-0046-00	Lug Solder		1	1			
	008-0063-00	Term. Wire		4	6			
	008-0064-00	Lug, Solder		1	1			
	009-0003-03	Term Strip		-	1			
	010-0019-90	Term Standoff		0	1			
	016-1004-00	Thermal Compound		AR	AR			
	025-0003-04	Wire #22AWG (Yel)		.16	.16			
	025-0003-05	Wire #22AWG (Grn)		.31	.31			
	025-0003-06	Wire #22AWG (Blu)		0	.25			
	025-0003-08	Wire #22AWG (Gry)		0	.28			
	026-0004-00	Wire, Cop #20AWG		.1	.1			
	026-0005-00	Wire, Buss #18AWG		.5	1.2			
	047-1964-00	Cover		1	1			
	047-1965-00	Plate, Bottom		1	1			
	057-1270-01	S/N Tag (KA 38)		1	0			
	057-1366-01	NamePlate (KA 39)		0	1			
	073-0117-01	Casting, KA 38/KA39		1	1			
	076-0107-00	Grommet, Plastic		0	1			

Rev. 4, January, 1976 SHT 2 OF 3

K-1651

NAME Voltage Converter

ASS'Y. NO. 071-1041-00/01

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	QUANTITY -01	QUANTITY -02	QUANTITY -03	QUANTITY -04
	089-2140-00	Nut, #4 ESNA		4	6			
	089-2147-22	Nut, #6 ESNA		1	1			
	089-5903-05	Scr. 4-40 x 5/16 PHP		8	8			
	089-5903-08	Scr. 4-40 x 1/2 PHP		4	8			
	089-5907-08	Scr. 6-32 x 1/2"		3	3			
	089-5907-12	Scr. 6-32 x 3/4 PHP		1	1			
	089-5909-12	Scr. 8-32 x 3/4 PHP		2	2			
	089-8005-34	Lock Washer		3	3			
	089-8014-37	Lock Washer, Int. Tooth		8	10			
	089-8017-37	Lock Washer, Int. Tooth		2	2			
	089-8065-30	Washer, Flat		2	3			
	090-0162-00	Block Term.		2	2			
	091-0004-00	Mtg. Wsht, Mica		1	1			
	091-0035-00	Wshr, Insul. Mica		1	2			
	091-0068-04	Wshr, Shoulder		4	6			
	150-0003-10	Tubing, Tef. #24		0	.1			
	150-0007-10	Tubing, Tef. #16		.6	1.0			
Q101	007-0099-00	TSTR 2N4348		1	1			
Q102	007-0159-00	TSTR 2N3441		1	2			
Q103	007-0159-00	TSTR 2N3441		0	-			
Q104	007-0038-00	TSTR 2N3053		0	1			
C101	105-0031-50	Cap, Myl .033μf ±10% 80V		1	2			
C102	105-0031-50	Cap Myl .033μf ±10% 80V		0	-			
CR101	007-5010-02	Dio. Zen 15V 10W 2%		1	1			
CR102	007-6021-00	Dio. TS-2		1	2			
CR103	007-6021-00	Dio. TS-2		0	-			
CR104	007-5011-18	Dio. Zen 15V 1W 5%		0	1			
R101	132-0113-00	Res. 1Ω 40W 5%		1	1			
R102	132-0112-00	Res. 150 ohms 5W 5%		1	1			
R103	132-5004-00	Res. 1KΩ 2W 10%		0	1			
R104	132-0103-31	Res. 6Ω 10W 5%		0	1			

PARTS LIST REVISION HISTORY			ENGR. APPROVAL	
NAME Voltage Converter			ASS'Y. NO. 071-1041-00/01	
ASS'Y. DWG. 300-0198-00		UNIT KA 38/KA 39		USED ON

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				

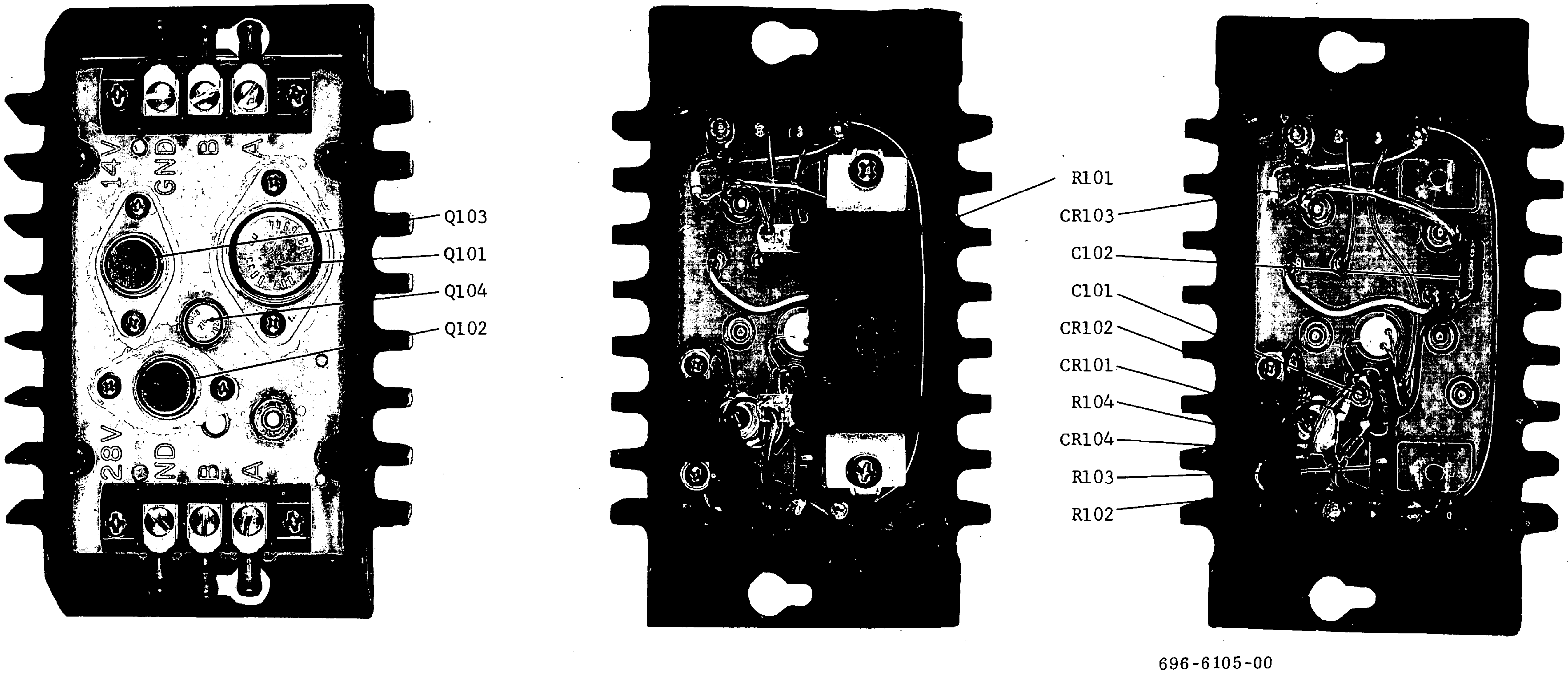


FIGURE 6-12 KA 39 VOLTAGE CONVERTER
(Dwg. No. 696-6105-00)

KX 170A Parts List (Electrical)

Description NAV/COMM Board SA
Unit KX 170A

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
FL404	017-0037-00	Filter 15. 1875MHz	1

NOTE: The KX 175 Parts List also applies to the KX 170A except where differences are noted on the schematics, Figures 5-50, 5-51, 5-52, 5-53, 5-54.

KING®

KY 195
COMMUNICATIONS TRANSCEIVER

INSTALLATION MANUAL
006-0062-01

REV. 1 JANUARY, 1976

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HISTORY OF REVISIONS

Rev. 1, January, 1976

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Front Page	Added
Table of Contents	Added
2-9	Interconnect Updated

SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the King Radio Corporation Silver Crown KY 195.

1.2 PURPOSE OF EQUIPMENT

The King KY 195 COMM combines in a single panel mounted unit a 360 channel VHF COMM Transceiver with dual, independent, frequency selectors.

1.3 DESIGN FEATURES

A. Controls

1. On-Off switch is independent of volume control settings allowing the volume to remain at desired levels.

2. Dual control head with thumb switch selection of frequency selector A or frequency selector B.

3. Automatic squelch eliminates pilot responsibility for continuously monitoring squelch adjustments. Squelch threshold automatically adjusts to open on readable signals. Test position opens squelch to test COMM receiver sensitivity and to listen to extremely weak signals.

4. Frequency selector mechanism features human engineered concentric knobs, airline type drum readout, and blue-white or red back lighting.

B. Electronics

1. Varactor diode tuned filters eliminates use of mechanical tuning shafts and mechanisms.

2. Balanced mixers for superior intermodulation, cross modulation, and L. O. radiation performance.

3. Transistorized transmitter provides 5 watts minimum output power and long term reliability superior to tube designs.

4. The digital frequency synthesizers utilize state of the art integrated circuits to replace all but 4 crystals.

5. Crystal filter selectivity.

6. Carrier to noise squelch with carrier squelch back up functionally described above.

7. Tight AGC (typically 0. 5db from 10μv to 20, 000μv) minimizes audio level variations.

C. Construction

1. Modular construction for ease of maintenance.

2. Rack mounted, removable from the front panel.

3. Anti-theft locking mechanism.

1.4 POWER REQUIREMENTS

The KY 195 requires 13. 75 volts for proper operation. Aircraft having electrical power plants producing 27. 5 volts require the installation of a voltage converter. The KA 39 Voltage Converter, designed to convert 27. 5 volts to 13. 75 volts, may be conveniently remote mounted in the aircraft.

1.5 TECHNICAL CHARACTERISTICS

SPECIFICATION	CHARACTERISTIC
KY 195 TRANSCEIVER	
TSO COMPLIANCE:	
COMM Transmit	C37b (DO-110, Class II)
COMM Receive	C38b (DO-109)
Environmental	DAPBAAXXXXXX
MOUNTING:	Panel mounted, no shock mounting required
SIZE:	6. 312 X 2. 600 X 14. 15 inches w/connectors. (16. 03 X 6. 60 X35. 94 centimeters)

SPECIFICATION	CHARACTERISTIC
WEIGHT:	6.0 lbs. excluding external connectors and harness.
POWER REQUIREMENTS:	13.75V (or 27.5V with KA 39)
COMM Receive	0.65 amps
COMM Transmit (Tone)	4.5 amps (2.8 amps unmodulated)
Lamps	0.16 amps (13.75Vdc), 0.08 amps (27.5Vdc)
COMM TRANSCEIVER	
CRYSTAL CONTROLLED:	360 channels
FREQUENCY RANGE:	118.00 to 135.95MHz with 50kHz spacing
FREQUENCY STABILITY:	±0.005%
TRANSMITTER	
VHF POWER OUTPUT:	5 watts minimum, 50 ohm load
MODULATION:	85% modulation capability with 90% limiting, less than 15% distortion at 80% mod.
MICROPHONE:	Carbon or dynamic mike containing transistorized pre-amp (must provide at least 120mvrms into 500Ω load).
SIDETONE:	Adjustable up to 4mw into 500 ohm headphones
DUTY CYCLE:	1 minute on, 4 minutes off (20%)
RECEIVER	
SENSITIVITY:	1.5μv (soft) will provide a 6db minimum signal plus noise to noise ratio
SELECTIVITY:	Typical 6db at ±15kHz, 70db at ±50kHz

SPECIFICATION		CHARACTERISTIC	
SPURIOUS RESPONSES:		Down at least 60db	
SQUELCH:		Automatic squelch (carrier to noise) with manual disable and carrier squelch override.	
AGC CHARACTERISTICS:		From $10\mu v$ to $20,000\mu v$ audio output will not vary more than 3db.	
AUDIO			
AUXILARY AUDIO INPUTS:		Three (3) 500 ohms with 30db isolation between any two.	
FREQUENCY RESPONSES:		Within 6db from 350Hz to 2500Hz.	
HEADPHONE OUTPUT:		50mw into 500 ohm	
SPEAKER OUTPUT:		4. 5Vrms into auxilary input produces 5 watts audio output	
KA 39 VOLTAGE CONVERTER			
SIZE:		3. 500 X 2. 000 X5. 500 inches (8. 889 X 5. 18 X 13. 87 centimeters)	
WEIGHT:		1. 1 lbs. excluding harness	
		A	B
POWER:	Input Volts	27. 5vdc	27. 5vdc
	Output Volts	13. 75vdc (nominal)	13. 75vdc (nominal)
	Output Current continuous	1. 5A	0. 75A
	Output Current 40% duty	5. 0A	--------

1.6 UNITS AND ACCESSORIES SUPPLIED

A. King KY 195 COMM (069-1018-00)

B. King KY 195 Installation Kit (050-1142-02) includes mating connectors, radio rack, mounting hardware , red lamp filter, etc.

1.7 ACCESSORIES REQUIRED BUT NOT SUPPLIED

A. Communication antenna and cables

B. Headphones and speaker:

   1. Headphones: Low impedance types, 300 to 1,000 ohms.

   2. Speaker: Voice coil impedance 3 to 6 ohms nominal.

C. KA 39 Voltage Converter, 27.5V to 13.75V (required in 27.5V installation only).

D. Microphone: Low impedance carbon, or dynamic with transistor preamp, such as King KA 14.

1.8 LICENSE REQUIREMENTS

The Federal Communications Commission requires that the operator of the transmitter in this equipment hold a Restricted Radio Telephone Operator Permit, or higher class license. A permit may be obtained by an U. S. citizen from the nearest field office of the FCC; no examination is required.

This equipment has been type accepted by the FCC and entered on their list of type accepted equipments as King KY 195 and must be identified as King KY 195.

–CAUTION–

The VHF transmitter in this equipment is guaranteed to meet Federal Communications Commission approval only when King crystals are used.

Use of other than King crystals is considered an unauthorized modification.

SECTION II
INSTALLATION

2.1 GENERAL

This section contains suggestions and factors to consider before installing the KY 195 COMM unit and KA 39 Voltage Converter (27. 5V installations only). Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking each unit. Make a visual inspection of each unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place in the shipping container all packing materials for use in unit storage or reshipment. The KY 195 installation will conform to standards designated by the customer, installing agency and existing conditions as to unit location and type of installation.

2.3 KY 195 INSTALLATION

Listed below are factors and suggestions to consider before installing your KY 195 system. Close adherence to these suggestions will assure more satisfactory performance from your equipment.

(a) The KY 195 is mounted rigid in the aircraft panel. Mark and cut the mounting hole as shown in Figure 2-4. The purpose of the "behind aircraft panel mount cutout is to allow a margin of error in cutout size and prevent the mounting tray front edge from being visible. The mounting tray bottom lip should extend through the mounting hole flush with the instrument panel to insure proper plug pin engagement.

(b) Avoid mounting close to any high external heat source. If this is done, no blower or ram air cooling will be required.

(c) Remember to allow adequate space for installation of cables and connectors.

(d) Secure the mounting rack to instrument panel per Figure 2-4. The rear mounting bosses should be attached to the airframe by means of support brackets.

(e) Slide the KY 195 into the rack and secure by turning locking screwon the front panel.

-CAUTION-

Do not force locking tab screw.

(f) Each KY 195 installation kit contains a locking bar (KPN 047-1720-00), bracket (KPN 047-1721-00) and two rivets (KPN 092-5021-00). These may be installed at customer's option to provide a means of locking the radio to the instrument panel with a padlock located on the lower rear corner of the mounting tray.

Installation consists of riveting the bracket to the mounting tray as shown in Figure 2-4. After the radio installation is complete, the locking bar may be inserted and a small padlock affixed to deter theft.

(g) The installing agency will supply and fabricate all external cables. The plugs required are supplied by King Radio.

2.4 KA 39 INSTALLATION

(For use in 27. 5 volt installations only)

(a) Select the KA 39 location considering good thermal conductivity to the airframe, convenient cable routing, proximity to the KY 195 and separation from other heat sources.

(b) Refer to Figure 2-3 for the KA 39 mounting dimensions.

(c) Secure the KA 39 firmly in place.

(d) The installing agency will supply and fabricate external cables.

2.5 ANTENNA INSTALLATION

(a) A conventional 50 ohm vertically polarized COMM antenna is required with the KY 195. Vertical bent whip antennas are not recommended. Wideband COMM antennas (KA 31 and KA 31A) provide efficient operation over the COMM band. Antennas should be installed per manufacturers recommendations. Additional recommendations are as follow:

1. Mount antenna on flat metal surface or install a ground plane at least 18 inches square.

2. The antenna should be well removed from any projections and the engine(s) and propeller.

3. The COMM Antenna should be well separated from any NAV Antenna to minimize COMM interference to NAV while transmitting.

(b) Refer to Figure 2-2 for the COMM antenna cable connector assembly. Solder tack the snap on shield to the connector base at two points to insure that a good electrical ground is made.

2.6 CABLING

(a) The length and routing of the external cables must be carefully studied and planned prior to installation. Avoid sharp bends and placing cables too near the aircraft control cables.

(b) Fabricate the external cables in accordance with the installation drawing that fulfills the system requirement.

—NOTE—

Use good quality stranded wire that will not support a flame and with at least 600 volt insulation. It is recommended that the mike audio line be in a shielded -twisted pair.

(c) Since other radio equipment will possibly utilize the same speaker circuits for muting, speaker selection and microphone switching must be devised by the installing agency. The KY 195 does not shunt the speaker line of other equipment when the off-on-test switch is turned "off".

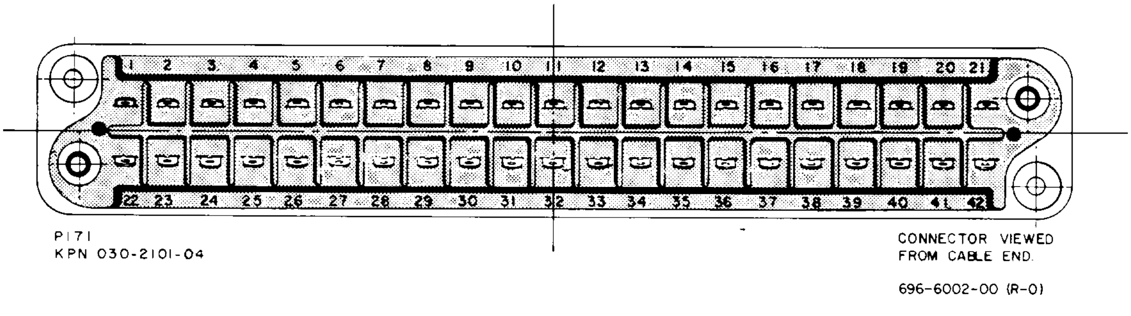
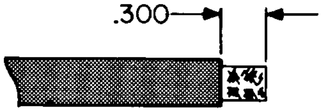
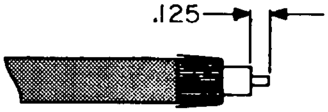


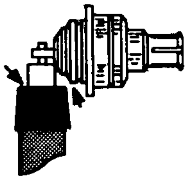
FIGURE 2-1 KY 195 CONNECTOR PIN LOCATIONS



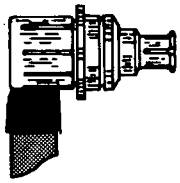
Trim coax cable outer insulation as shown.



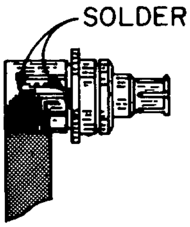
Fold braid back over outer cover of coax. Do not cross strands.



Solder center conductor to center pin of conductor. Make sure front end of braid (Point of fold) is even with bottom of connector. (Shown by arrows)



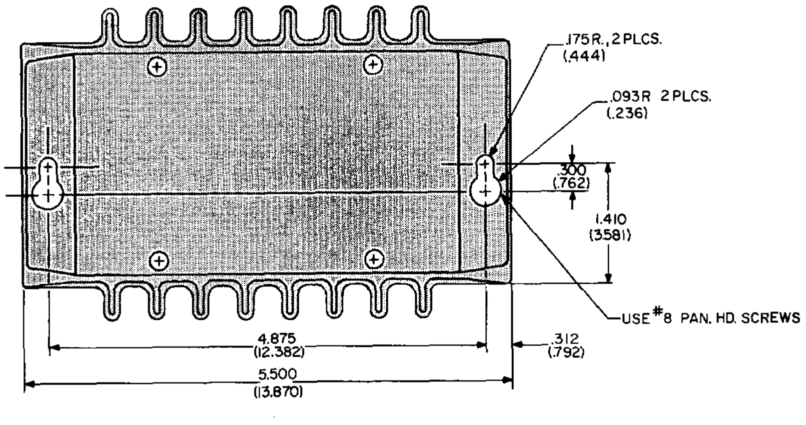
Slide connector cap, with clearance hole in position to clear dielectric, on to connector until it snaps in place.



Push braid forward and flatten against connector cap and solder.
Solder tac connector cap to connector in at least two places to insure good electrical contact.

696-6003-00

FIGURE 2-2 ANTENNA CABLE ASSEMBLY

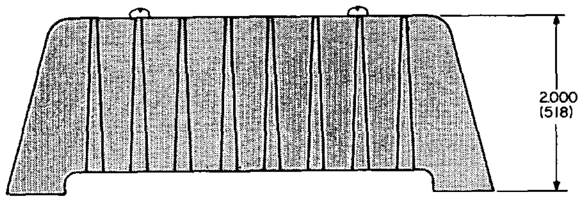


NOTES:

1. ALL DIMENSIONS IN PARENTHESIS ARE IN CENTIMETERS.
2. WEIGHT: 1.1 lbs
3. TERMINALS WILL TAKE 16 TO 22 AWG WIRE.
4. TERMINALS ARE #5-40 X 1/4 BD. HD. SCREWS.

WARNING

DO NOT MOUNT IN CLOSE PROXIMITY
TO HEATER DUCT OR OTHER SOURCES OF HEAT



155-5076-00 (R-)

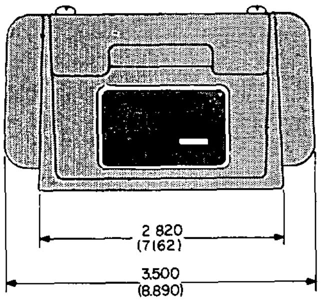
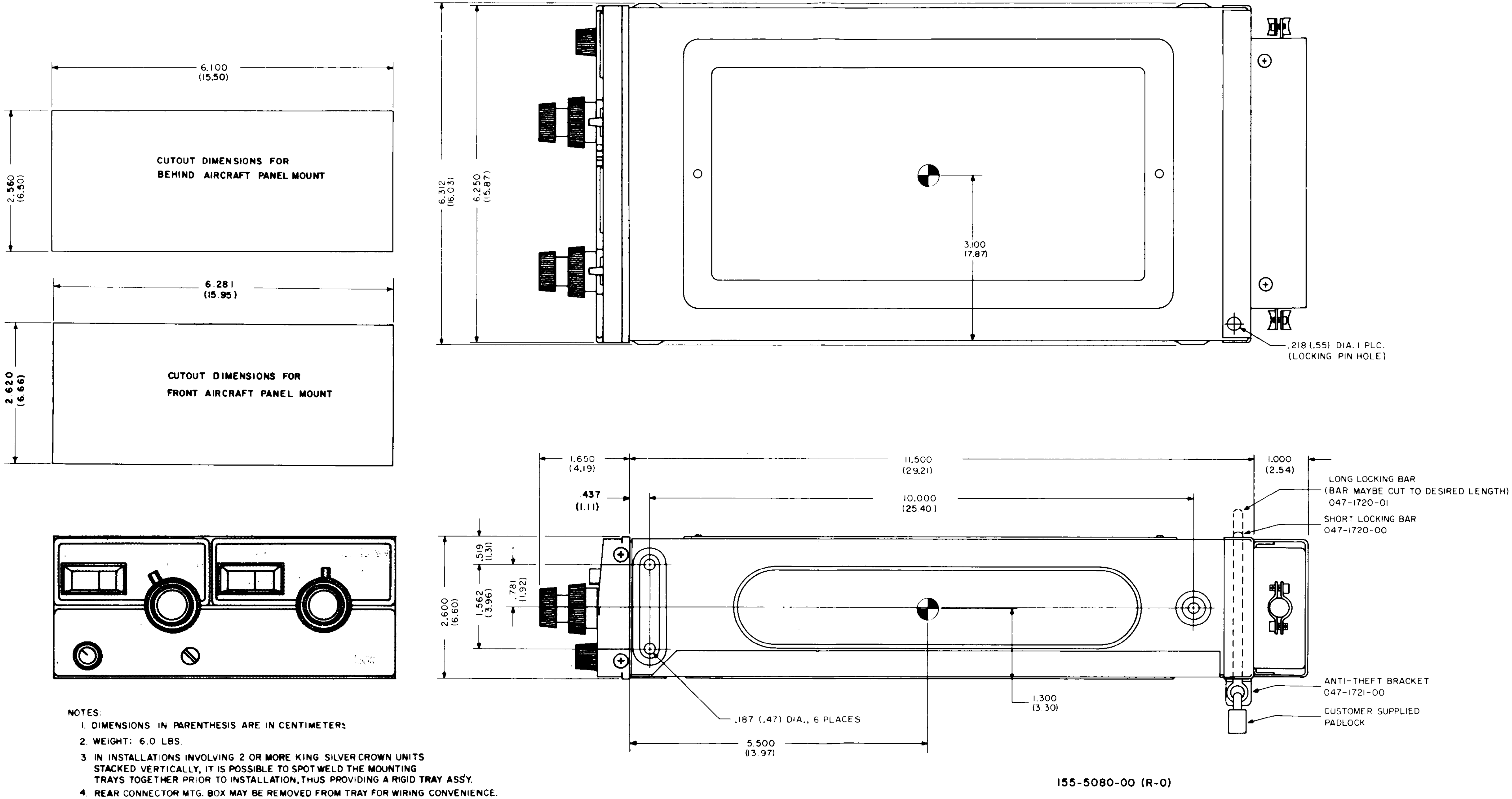


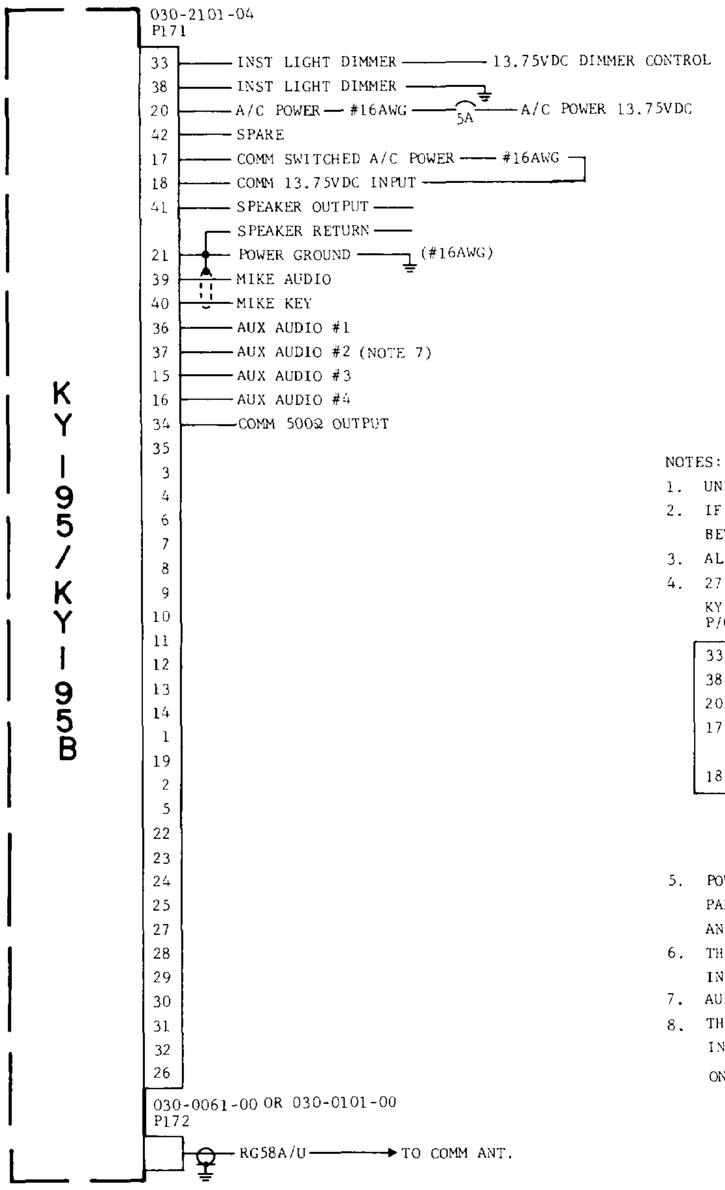
FIGURE 2-3 KA 39
VOLTAGE CONVERTER OUTLINE AND MOUNTING DRAWING



NOTES:

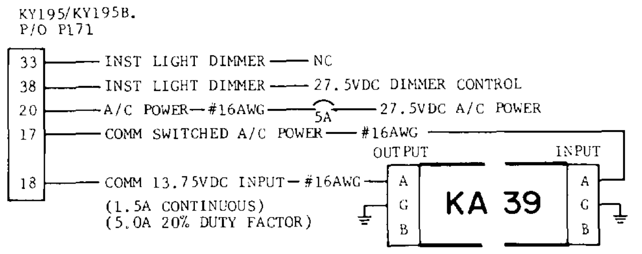
1. DIMENSIONS IN PARENTHESIS ARE IN CENTIMETERS
2. WEIGHT: 6.0 LBS.
3. IN INSTALLATIONS INVOLVING 2 OR MORE KING SILVER CROWN UNITS STACKED VERTICALLY, IT IS POSSIBLE TO SPOT WELD THE MOUNTING TRAYS TOGETHER PRIOR TO INSTALLATION, THUS PROVIDING A RIGID TRAY ASS'Y.
4. REAR CONNECTOR MTG. BOX MAY BE REMOVED FROM TRAY FOR WIRING CONVENIENCE.
5. ANTI THEFT MECHANISM MAY BE INSTALLED AT CUSTOMER OPTION. FASTEN ANGLE BRACKET(047-1721-00) TO MTG. TRAY WITH POP RIVETS (092-5021-00) SUPPLIED. USE SHORT LOCKING BAR FOR SINGLE INSTALLATIONS, LONG BAR FOR MULTIPLE INSTALLATION. CUSTOMER MAY USE ANY PADLOCK HAVING 3/16" DIA. HASP OR SMALLER.

FIGURE 2-4 KY 195 OUTLINE AND MOUNTING DRAWING



NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. IF SPEAKER IS NOT USED, INSTALL A 4Ω, 10W RESISTOR TO SIMULATE LOAD BETWEEN PINS 41 AND 21.
3. ALL GROUNDS ARE AIRFRAME GROUNDS UNLESS OTHERWISE NOTED.
4. 27.5VDC OPERATION:



5. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
6. THE KY195 WILL FUNCTION PROPERLY WHEN PLUGGED INTO KX175 OR KX170A INSTALLATIONS. REFER TO KX170A/KX175 INSTALLATION MANUAL (006-0057-00).
7. AUXILIARY AUDIO #2 IS INTERCOM MIC INPUT ON KY195B, KX170B/KX175B ONLY.
8. THE KY195B WILL FUNCTION PROPERLY WHEN PLUGGED INTO KX170B OR KX175B INSTALLATIONS. REFER TO KX170B/KX175B INSTALLATION MANUAL (006-008[illegible]-00).

ONE POSSIBLE INTERCONNECT IS SHOWN BELOW.

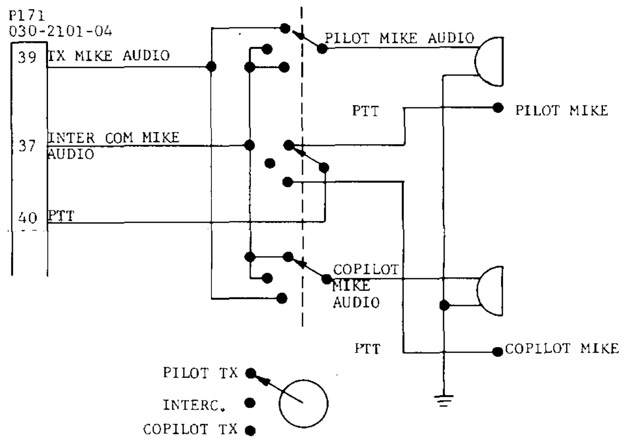


FIGURE 2-5 KY 195 INTERCONNECT
(Dwg. No. 155-1099-00, R-3)

SECTION III

OPERATION

3.1 GENERAL

All controls required to operate the KY 195 are located on the unit front panel.

3.2 KY 195 COMM CONTROLS

3.2.1 COMM ON-OFF TEST CONTROL

The ON-OFF-TEST control is located directly above the COMM A channel selector. Power is supplied to the COMM when this control is either in the ON or TEST position. The TEST position is used to defeat the COMM automatic squelch for both test purposes and listening to extremely weak signals.

3.2.2 COMM VOLUME CONTROL

The Volume (VOL) control, located on the lower left side of the KY 195 is used to adjust the transceiver audio volume. The KY 195 system power ON/OFF switch is independent of this control, allowing the COMM volume to remain at a desired preset level.

3.2.3 COMM A FREQUENCY SELECTOR

The two concentric knobs under the COMM A frequency window are used to dial COMM A frequencies. The larger knob selects MHz and the smaller knob selects KHz. The transceiver is inoperable in the two unused MHz positions between 118MHz and 135MHz. Clockwise rotation selects higher frequencies. The dial mechanism has no stops, permitting continuous rotation.

3.2.4 COMM B FREQUENCY SELECTOR

The two concentric knobs under the COMM B frequency window are used to dial COMM B frequencies. The larger knob selects MHz and the smaller knob selects KHz. The transceiver is inoperable in the two unused MHz potitions between 118MHz and 135MHz. Clockwise rotation selects higher frequencies. The dial mechanism has no stops, permitting continuous rotation.

3.2.5 A-B SELECTOR CONTROL

The A-B leverswitch is used to select control head A or control head B.

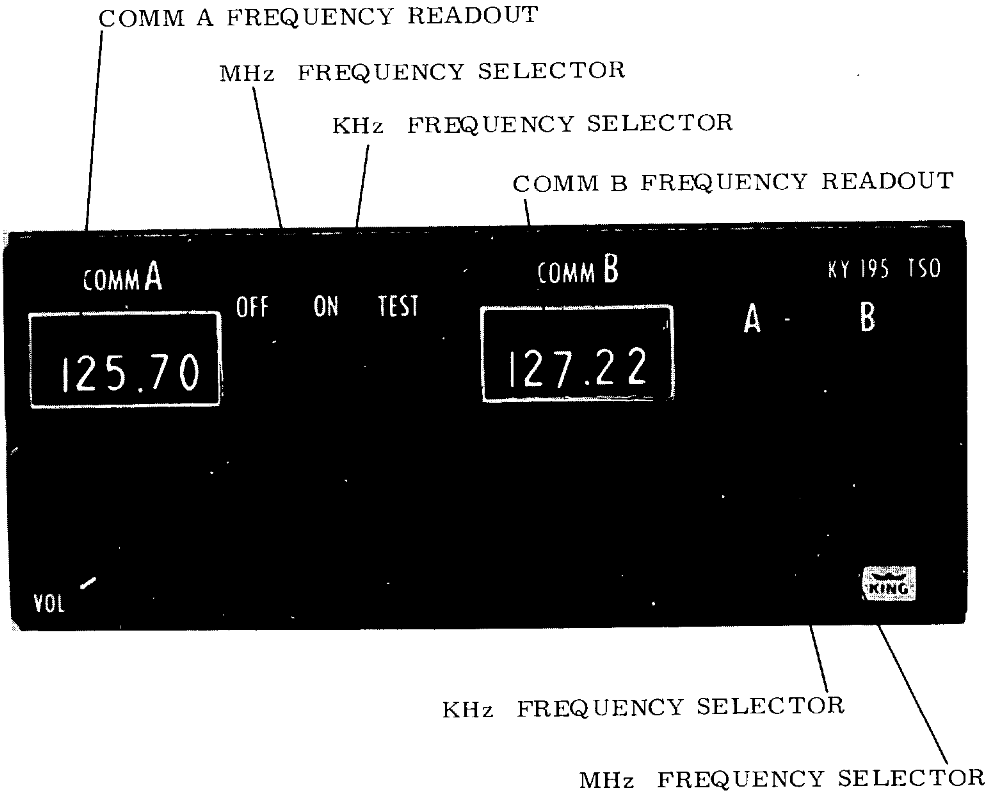


FIGURE 3-1 KY 195 CONTROL FUNCTIONS

3.3 POST-INSTALLATION CHECKOUT

An operational performance flight test is recommended after the installation is completed to insure satisfactory performance of the equipment in its normal environment.

To check the communications transceiver, maintain an appropriate altitude and contact a ground station facility at a range of at least fifty nautical miles. Contact a ground station close in. Place the squelch knob in the test position and listen for any unusual electrical noise which would reduce the COMM receiver sensitivity by increasing the squelch threshold. If possible, verify the communications capability on both the HIGH and LOW ends of the VHF COMM band.

MAINTENANCE/OVERHAUL MANUAL

KY 195
COMMUNICATIONS TRANSCEIVER

KING RADIO CORPORATION®
400 NORTH ROGERS ROAD
OLATHE, KANSAS, U.S.A.

KING
KY 195
COMMUNICATIONS TRANSCEIVER

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SECTION V ILLUSTRATED PARTS LIST

LIST OF ILLUSTRATIONS

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SECTION IV

THEORY OF OPERATION AND MAINTENANCE

4.1 GENERAL

KY 195 unit incorporates a 360 channel communications transceiver, a 5 watt audio system, and dual control heads. The transceiver and audio systems are identical to the respective portions of the KX 175. For theory and maintenance procedures on the COMM transceiver or audio system, refer to the KX 175 text. Theory and maintenance of the dual control head mechanism appear in this section.

4.2 DUAL CONTROL HEAD

Wafer switches in the KY 195 are identical to the COMM wafer switches used in the KX 175. Lever switch "A-B" applies either "A" or "B" channeling information to the SMO and "A" or "B" tuning voltage to the varactor tuned filters in the COMM receiver preselector.

4.3 DUAL CONTROL HEAD-DETAILED DESCRIPTION

Refer to Figure 5-55 in the KX 170A/KX 175 Maintenance Manual for the KY 195 Switching Assembly Diagram.

4. 3. 1 Control Head Selector In "A" Position

The DPST switch (S111) contacts are open and the "B" tuning voltage (red-blue wire) from switch wafer S106 is disconnected from the COMM tuning voltage buss. Additionally, the common wire to the "B" switch wafers (red-gray wire) assumes a voltage of approximately 8 volts, back biasing the isolation diodes associated with the "B" wafer switches which effectively disconnects the "B" switching circuitry from the COMM SMO. Transistors Q201-Q204 are saturated. Q204 shorts the common wire of the "A" switch wafers (brown-gray wire) to ground, activating the "A" wafer switch functions. Q203 connects the negative side of the "A" tuning voltage divider on switch wafer, S102, to ground while Q201 connects the positive side to +8. 5VDC providing a current path through the tuning voltage divider. The "A" tuning voltage from switch wafer S102 is connected directly to the COMM tuning voltage buss (red-blue wire) providing "A" tuning voltage to the COMM receiver preselector.

4. 3. 2 Control Head Selector In "B" Position

The DPST switch (S111) contacts are closed, connecting (a) the COMM tuning voltage from switch wafer S106 to the tuning voltage buss (red-blue wire) and (b) the common wire of the "B" switch wafers (red-gray wire) to ground. With the common wire on ground, the "B" channeling wafers are activated and transistors Q201-Q204 are off.

With Q203 and Q201 off, no current flows through the "A" tuning voltage divider on switch wafer S102, isolating it from the COMM tuning voltage buss (red-blue wire). With Q204 off, the "A" wafers and associated isolation diodes represent an open circuit to the COMM SMO frequency selection circuitry.

4.4 TROUBLESHOOTING THE DUAL CONTROL HEAD

Refer to Figure 5-55 in the KX 170A/KX 175 Maintenance Manual for the KY 195 switching matrix voltage measurements. See the KX 175 Manual for channeling malfunctions, refer to Table 4-4 "COMM Programmable Counter Coding" and for COMM receiver preselector tuning voltage versus channel frequency see Table 5-4 "COMM Channel-Receive SMO Frequency-Tuning Voltage."

1. KY 195 - See Page 6-1 and 6-2 in KX 170A/KX 175 Maintenance Manual.

2. Front Plate Sub-Assembly - See Page 6-3 thru 6-5 in KX 170A/KX 175 Maintenance Manual.

ASSEMBLY NO. 200-0253-01
DESCRIPTION SWITCHING HEAD
UNIT KY 195
REVISION 8
USED ON ASSEMBLY 069-1018-00
ASSEMBLY DRAWING NO. 300-0429-00/14

SYMBOL		PART NUMBER	DESCRIPTION	QUANTITY
	R2	029-0095-00	GEAR, FACE	2
		047-1675-01	SUPPORT, DIAL	1
		047-1714-00	BRACKET, SWITCH	1
		047-2115-00	BRACKET, SWITCH	1
		047-2208-02	PLATE, DIAL MOUNTING	1
	R2	076-0284-02	SHAFT, COUNTER WHEEL	2
		076-0299-00	COLLAR	2
		076-0298-00	SPACER, .187 Lg.	4
		076-0298-01	SPACER, .218 Lg.	12
	R2	076-0472-01	3/8" SWITCH SHAFT 1.015	2
	R2	076-0473-00	1/4" SWITCH SHAFT	2
		088-0136-00	FILTER, BLUE LAMP	2
	R2	088-0213-10	COUNTER WHEELS, KHz	2
	R2	088-0213-12	COUNTER WHEELS, COMM, MHz	2
		089-2005-37	NUT STANDARD HEX	4
		089-2076-30	NUT, 4-40	1
		089-2140-00	NUT ESNA	6
		089-5381-21	SCREW MACH. 2-56 × 1 5/16	4
		089-5857-04	SCREW SET 4-40 × 1/8 BRISTOL	4
	R2	089-5857-06	#4-40 × 3/16 SET SCREW	4
		089-5903-04	SCREW, 4-40 × 1/4 PHP	2
		089-5903-06	SCREW, 4-40 × 3/8 PHP	1
	R2	089-6289-03	#4-40 × 3/16 HEX HD SCREW	6
		089-8003-34	LOCKWASHER #4 SPLIT RING	1
		089-8023-30	FLAT WASHER	4
		089-8025-30	WASHER #4	1
R2		089-8079-10	WASHER, .25 I.D.	2
		090-0140-02	SOCKET, LAMP	1
		090-0160-00	SOCKET, LAMP	1
		091-0015-00	GROMMET	3
		091-0015-11	GROMMET	1
		091-0018-05	WASHER	2
		091-0068-04	WASHER, SHOULDER	1
C103		097-0056-33	CAPACITOR, ALUM. 100mf, 16V	1
C104		113-5151-01	CAPACITOR, D/C 150pf, 10%, X5F	1

Note: R indicates Revision. See Page 5-4A for Revision and New Parts.

PAGE 2

ASSEMBLY NO. 200-0253-01
DESCRIPTION SWITCHING HEAD
UNIT KY 195
REVISION 8
USED ON ASSEMBLY 069-1018-00
ASSEMBLY DRAWING NO. 300-0429-00/14

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
C105	113-5151-01	CAPACITOR, D/C 150pf, 10%, X5F	1
CR101	007-6033-00	DIODE, 1N270	1
CR102	007-6033-00	DIODE, 1N270	1
CR103	007-5016-00	DIODE, ZENER 5.1V, 5%, 1W	1
DS101	037-0007-10	LAMP, T 1 3/4, 14V WHITE	1
DS102	037-0007-10	LAMP, T 1 3/4, 14V WHITE	1
Q102	007-0184-01	TRANSISTOR, TA7557	1
Q104	007-0078-00	TRANSISTOR, 2N3415	1
Q105	007-0078-02	TRANSISTOR, 2N3416	1
R4 R111	136-2941-22	RESISTOR, 2.94K, 1%, 1/8W	1
R112	136-4020-22	RESISTOR, 402Ω, 1%, 1/8W	1
R113	136-4530-22	RESISTOR, 453Ω, 1%, 1/8W	1
R114	136-5110-22	RESISTOR, 511Ω, 1%, 1/8W	1
R4 R115	136-5620-22	RESISTOR, 562Ω, 1%, 1/8W	1
R116	136-6340-22	RESISTOR, 634Ω, 1%, 1/8W	1
R117	136-6980-22	RESISTOR, 698Ω, 1%, 1/8W	1
R118	136-7870-22	RESISTOR, 787Ω, 1%, 1/8W	1
R119	136-8660-22	RESISTOR, 866Ω, 1%, 1/8W	1
R120	136-6340-22	RESISTOR, 634Ω, 1%, 1/8W	1
R125	130-0680-33	RESISTOR, 68Ω, 5%, 1/2W	1
R129	130-0102-25	RESISTOR, 1000Ω, 10%, 1/4W	1
R130	130-0152-23	RESISTOR, 1.5KΩ, 5%, 1/4W	1
R131	130-0471-23	RESISTOR, 470Ω, 5%, 1/4W	1
R4 R132	133-5620-22	POTENTIOMETER, 1KΩ	1
R133	130-0102-25	RESISTOR, 1000Ω, 10%, 1/4W	1
R2 R135	136-2941-22	RESISTOR, 2.94K, 1%, 1/8W	1
R2 R136	136-4020-22	RESISTOR, 402Ω, 1%, 1/8W	1
R2 R137	136-4530-22	RESISTOR, 453Ω, 1%, 1/8W	1
R2 R138	136-5110-22	RESISTOR, 511Ω, 1%, 1/8W	1
R2 R139	136-5620-22	RESISTOR, 562Ω, 1%, 1/8W	1
R2 R140	136-6340-22	RESISTOR, 634Ω, 1%, 1/8W	1
R2 R141	136-6980-22	RESISTOR, 698Ω, 1%, 1/8W	1
R2 R142	136-7870-22	RESISTOR, 787Ω, 1%, 1/8W	1
R2 R143	136-8660-22	RESISTOR, 866Ω, 1%, 1/8W	1
R2 R144	136-6340-22	RESISTOR, 634Ω, 1%, 1/8W	1
S101	031-0104-00	SWITCH, WAFER	1

Note: R indicates Revision. See Page 5-4A for Revision and New Parts.

ASSEMBLY NO. 200-0253-01
DESCRIPTION SWITCHING HEAD
UNIT KY 195
REVISION 8
USED ON ASSEMBLY 069-1018-00
ASSEMBLY DRAWING NO. 300-0429-00/14

PAGE 3

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R4 S102	031-0107-00	SWITCH, WAFER	1
S103	031-0106-00	SWITCH, WAFER	1
S104	031-0105-00	SWITCH, WAFER	1
S105	031-0104-00	SWITCH, WAFER	1
R2 S106	031-0107-00	SWITCH, WAFER	1
S107	031-0106-00	SWITCH, WAFER	1
S108	031-0105-00	SWITCH, WAFER	1
R4	008-0001-01	SOLDER LUG	2
R4	008-0005-03	SOLDER LUG	7
R4	016-1004-00	THERMAL COMPOUND	AR
R4	016-1008-04	CLYPTAL, PURPLE	AR
R4	016-1016-00	LUBRICANT	AR
R4	025-0018-00	WIRE #26 BLK	.4
R4	025-0018-11	WIRE #26 BRN	.6
R4	025-0018-26	WIRE #26 RED/BLU	.8
R4	025-0018-88	WIRE #26 GRY	.7
R4	026-0001-00	BUSS WIRE #26	.4
R4	037-0007-10	LAMP T 1 3/4 14V WHT.	2
R4	150-0003-10	TEFLON TUBING #24	.5
R4	150-0020-10	SHRINK TUBING	.6

Note: R indicates Revision. See Page 5-4A for Revision and New Parts.

Parts List Revision Record

Assembly No: 200-0253-01 Manual Revision 2

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
ADDED		150-0005-10	#20 Teflon Tubing	.3
DELETED		089-8079-10	Washer, .25 I. D.	2
DELETED		029-0095-00	Gear Face	2
DELETED		076-0284-02	Shaft, Counter Wheel	2
DELETED	R136	136-4020-22	Res. 402 1% EW	1
DELETED	R137	136-4530-22	Res. 453 1% EW	1
DELETED	R138	136-5110-22	Res. 511 1% EW	1
DELETED	R139	136-5620-22	Res. 562 1% EW	1
DELETED	R140	136-6340-22	Res. 634 1% EW	1
DELETED	R144	136-6340-22	Res. 634 1% EW	1
DELETED	R141	136-6980-22	Res. 698 1% EW	1
DELETED	R142	136-7870-22	Res. 787 1% EW	1
DELETED	R143	136-8660-22	Res. 866 1% EW	1
DELETED		088-0213-01	Counter Wheels, KHz	2
DELETED		076-0472-01	3/8" Switch Shaft 1.015	2
DELETED		076-0473-00	1/4" Switch Shaft	2
DELETED		089-5857-06	#4-40X3/16 Set Screw	4
DELETED		089-6289-03	#4-40X3/16 Hex HD SCR	6
CHANGE	S106	200-0575-04	Switch Ass'y COMM	1
CHANGE	R135	136-2941-22	Res. 2.94K 1% QW	1
CHANGE	From	088-0213-02	Counter Wheel COMM MHz	2
	To	200-0578-00	Wheel Ass'y COMM MHz	2
ADD		200-0578-02	Gear Ass'y COMM	2
ADD		200-0578-01	Wheel Ass'y COMM KHz	2

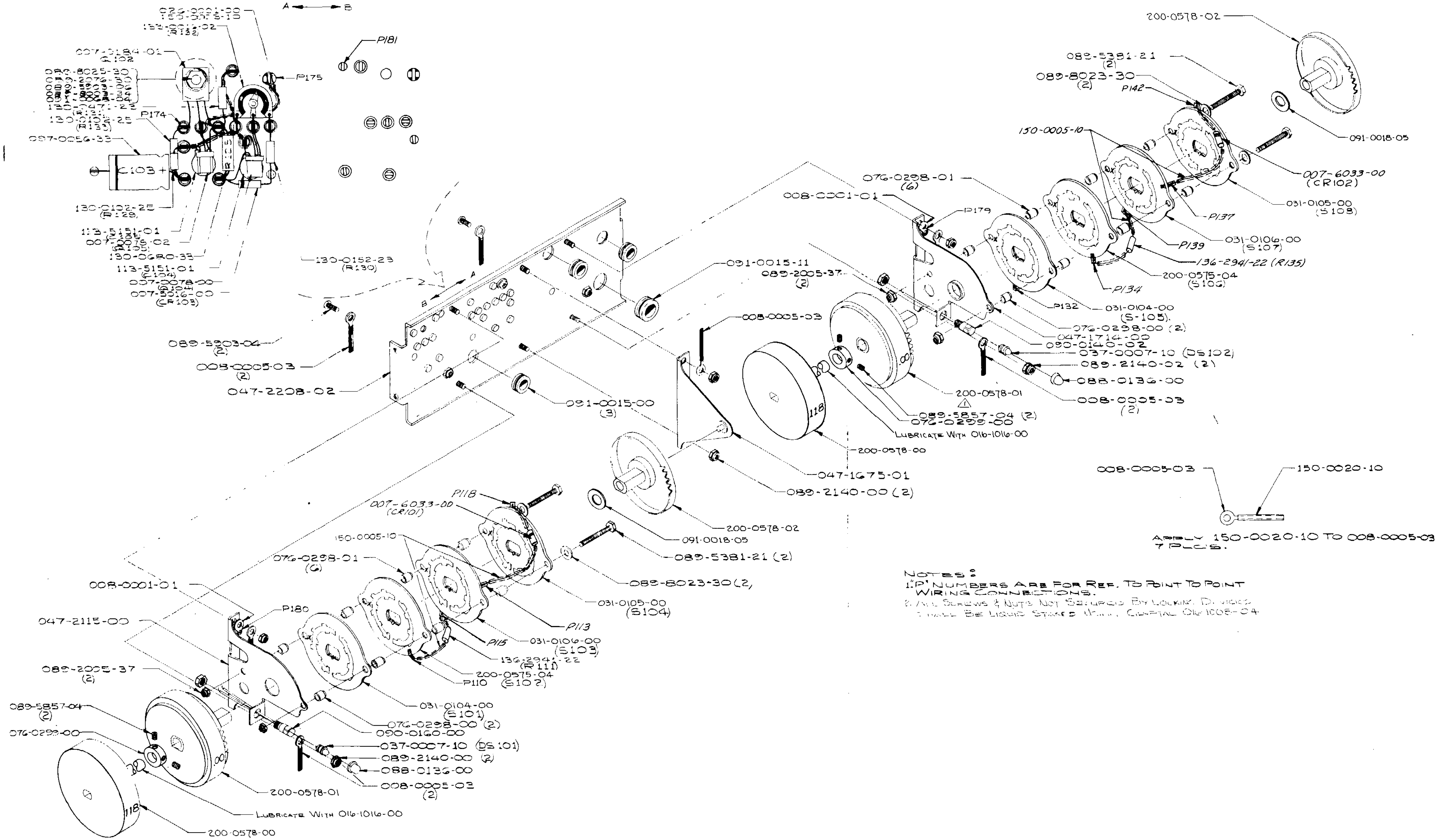
Assembly No: 200-0253-01 (B/M RL Rev. #8) Manual Revision 4

ADDED	008-0001-01	SOLDER LUG	2
ADDED	008-0005-03	SOLDER LUG	7
ADDED	016-1004-00	THERMAL COMPOUND	AR
ADDED	016-1008-04	GLYPTAL, PURPLE	AR
ADDED	016-1016-00	LUBRICANT	AR
ADDED	025-0018-00	WIRE #26 BLK	.4
ADDED	025-0018-11	WIRE #26 BRN	.6
ADDED	025-0018-26	WIRE #26 RED/BLU	.8
ADDED	025-0018-88	WIRE #26 GRY	.7
ADDED	026-0001-00	BUSS WIRE #26	.4
ADDED	037-0007-10	LAMP, T 1 3/4 14V WHT	2
ADDED	150-0003-10	TEFLON TUBING #24	.5
ADDED	150-0020-10	SHRINK TUBING	.6

Parts List Revision Record

Assembly No: 200-0253-01 (B/M RL Rev. #8) Manual Revision 4 (Cont'd)

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE	R111	136-2941-22	RES. 2.94K 1% QW	1
CHANGE	R132	133-0016-02	POT. 1K	1
DELETED	R115	136-5620-22	RES 562 1% EW	1
CHANGE	S102	200-0575-04	SWITCH ASS'Y. COMM	1

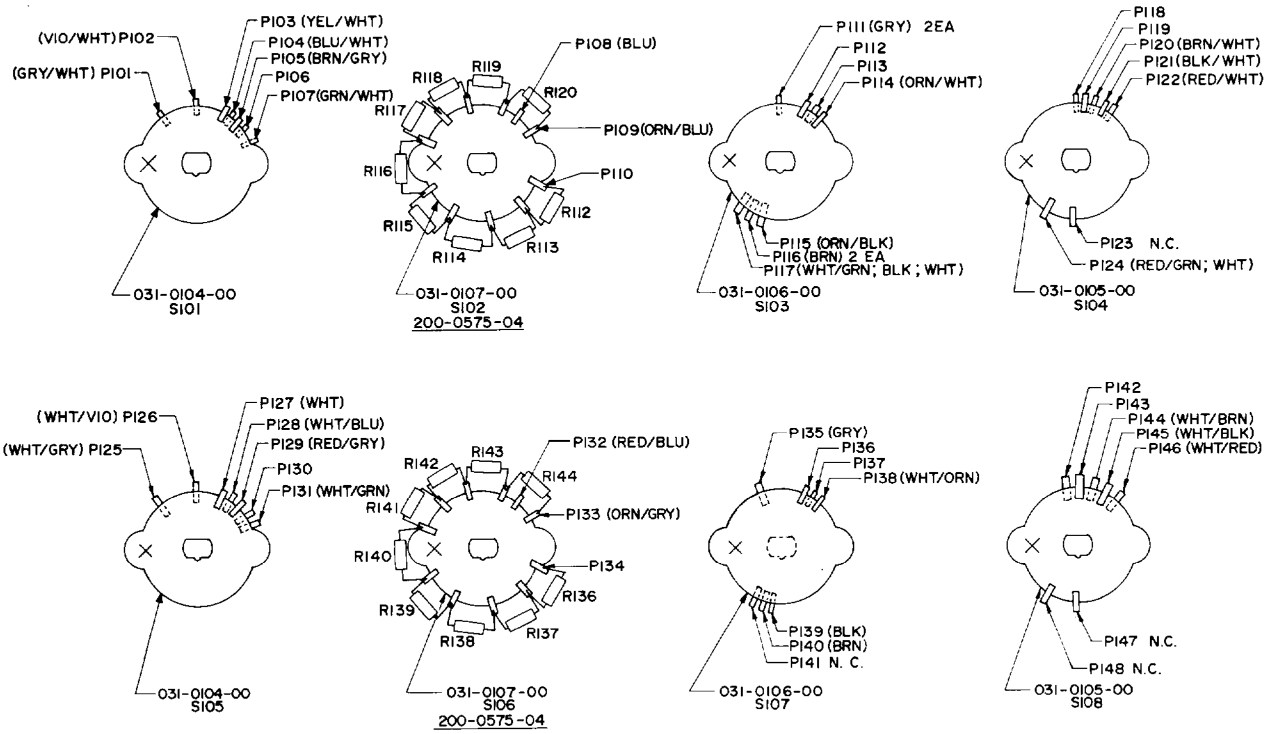


Apply 150-0020-10 To 008-0005-03
7 PLC'S.

Notes:
1. "P" Numbers Are For Ref. To Point To Point Wiring Connections.
2. All Screws & Nuts Not Secured By Locking Devices Shall Be Liquid Staked With Glyptal 016-1005-04.

FIGURE 5-1A SWITCHING HEAD SUB-ASSEMBLY
(Dwg. No. 300-0429-00 Rev. 2)

NOTES:
1. ▯ NEARSIDE TERM.
2. ⁞ FARSIDE TERM.
3. SWITCHES READ FROM LEFT SIDE OF UNIT



SWITCHING HEAD SUB ASS'Y WIRING CHART					
PART NO.	FROM	TO	LENGTH	COLOR	REMARKS
026-0001-00	P105& P106(S101)	P112 (S103)	1.0"	—//—	SLEEVED WITH (150-0003-10) .6 LG.
"	P112 (S103)	P118 & P119 (S104)	0.8"	—//—	" " " .3 "
"	P129& P130(S105)	P136 (S107)	1.0"	—//—	" " " .6 "
"	P136 (S107)	P142 & P143 (S108)	0.8"	—//—	" " " .3 "
REF.	DS101	P124 (S104)	3.8"	WHT	—//—
"	DS101	P117 (S103)	3.8"	BLK	—//—
"	DS102	P117 (S103)	8.0"	WHT	—//—
025-0018-88	P111 (S103)	P135 (S107)	7.7"	GRY	—//—
" " -11	P116 (S103)	P140 (S107)	6.6"	BRN	—//—
" " -26	P132 (S106	P502	8.6"	RED/BLU	TO FRONT PLATE (300-0431-00/03)
" " -00	P179 (GND)	P139 (S107)	3.8"	BLK	SEE SHT. 1 FOR CONNECTIONS

NOTE:
WIRES TO BE STRIPPED AND TINNED .200 FROM END.

FIGURE 5-1B SWITCHING HEAD SUB-ASSEMBLY
(Dwg. No. 300-0429-00 Sht. 2)

ASSEMBLY NO. 200-0327-00
DESCRIPTION SWITCHING MATRIX ASSY.
UNIT KY 195
REVISION 1
USED ON ASSEMBLY 069-1018-00
ASSEMBLY DRAWING NO. 300-0434-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	047-2362-02	CHASSIS, SWITCHING MATIRX	1
	076-0339-00	SPACER	1
	089-2076-30	NUT, #4-40	5
	089-5878-05	SCREW, #4-40 × 5/16 PHP SPRINGTITE	1
	089-8003-34	WASHER, SPLIT LOCK	5
CR201	007-6033-00	DIODE, 1N270	1
CR202	007-6033-00	DIODE, 1N270	1
CR203	007-6033-00	DIODE, 1N270	1
CR204	007-6033-00	DIODE, 1N270	1
CR205	007-6033-00	DIODE, 1N270	1
CR206	007-6033-00	DIODE, 1N270	1
CR207	007-6033-00	DIODE, 1N270	1
CR208	007-6033-00	DIODE, 1N270	1
CR209	007-6033-00	DIODE, 1N270	1
CR210	007-6033-00	DIODE, 1N270	1
CR211	007-6033-00	DIODE, 1N270	1
CR212	007-6033-00	DIODE, 1N270	1
CR213	007-6033-00	DIODE, 1N270	1
CR214	007-6033-00	DIODE, 1N270	1
CR215	007-6033-00	DIODE, 1N270	1
CR216	007-6033-00	DIODE, 1N270	1
CR217	007-6033-00	DIODE, 1N270	1
CR218	007-6033-00	DIODE, 1N270	1
R2 Q201	007-0119-00	TRANSISTOR, 2N4917	1
Q202	007-0078-00	TRANSISTOR, 2N3415	1
Q203	007-0078-00	TRANSISTOR, 2N3415	1
Q204	007-0078-00	TRANSISTOR, 2N3415	1
R201	130-0102-25	RESISTOR, 1KΩ, 1/4W, 10%	1
R202	130-0103-25	RESISTOR, 10KΩ, 1/4W, 10%	1
R203	130-0222-25	RESISTOR, 2.2KΩ, 1/4W, 10%	1
R204	130-0471-25	RESISTOR, 470Ω, 1/4W, 10%	1
R205	130-0471-25	RESISTOR, 470Ω, 1/4W, 10%	1

Note: R indicates Revision. See Page 5-10 for Revision and New Parts.

Parts List Revision Record

Assembly No: 200-0327-00

Manual Revision 2

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
Change	Q201	007-0238-00	Transistor, FPN4917	1

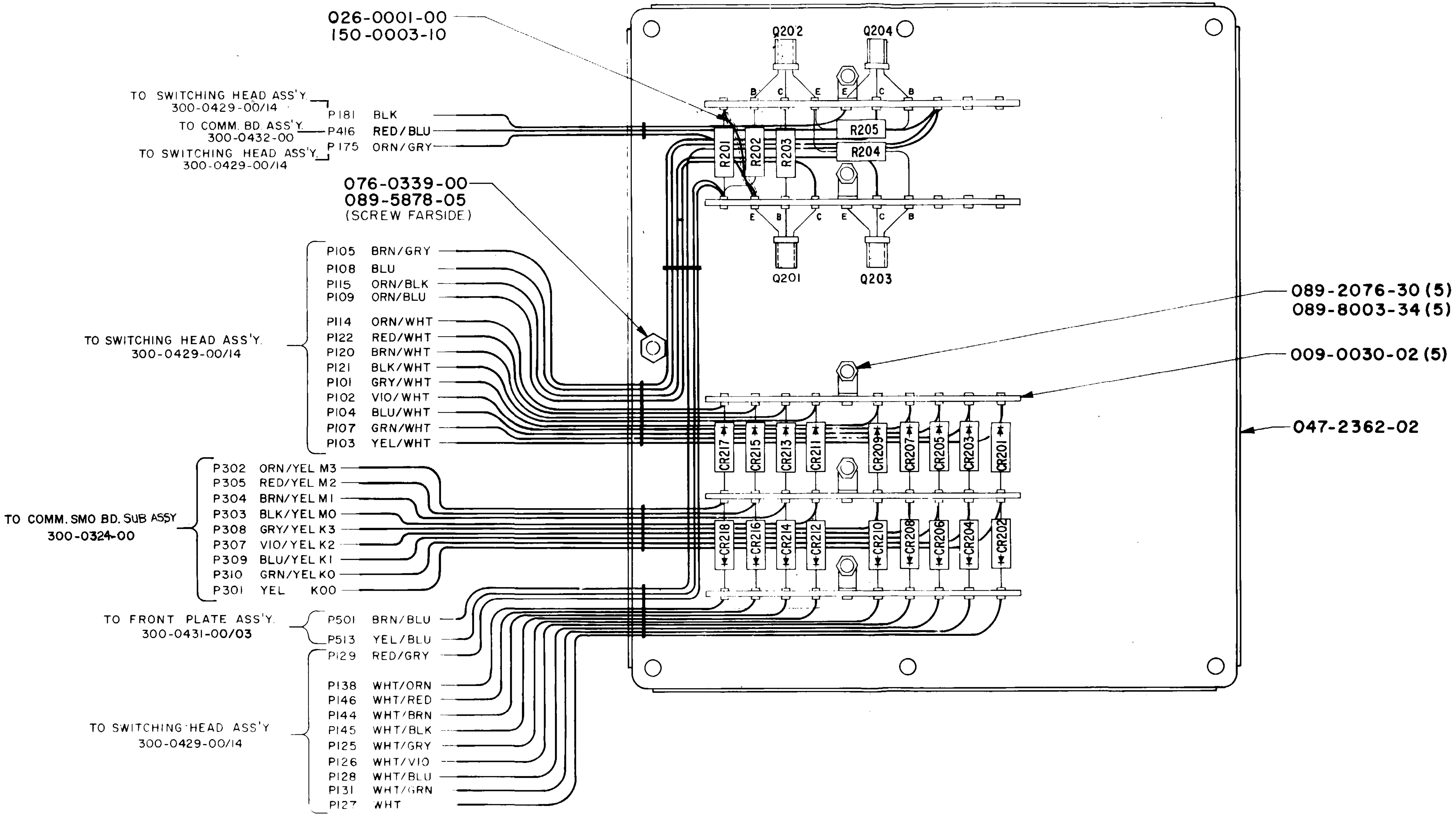


FIGURE 5-2 SWITCHING MATRIX ASSEMBLY
(Dwg. No. 300-0434-00 Rev. 1)

5. COMM SMO Board Sub-Assembly
See Pages 6-29 thru 6-38 in
KX 170A/KX 175 Maintenance Manual

6. COMM SMO Sub-Assembly
See Pages 6-39 and 6-41 in
KX 170A/KX 175 Maintenance Manual

7. Receiver Board Sub-Assembly
See Pages 6-42 thru 6-53 in
KX 170A/KX 175 Maintenance Manual

NOTE

See Figure 5-3 on following page.

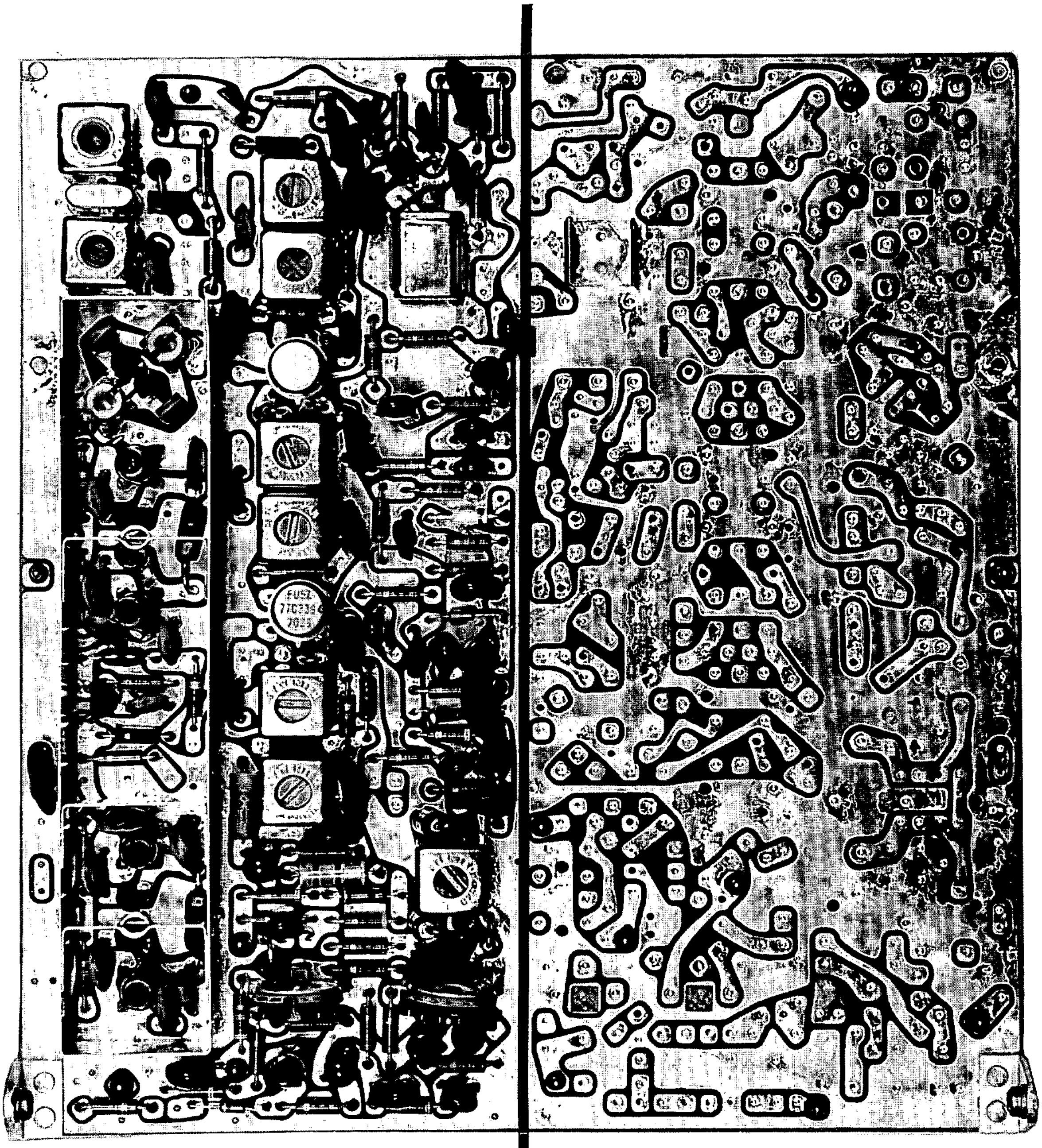
8. Transmitter Assembly
See Pages 6-54 thru 6-57 in
KX 170A/KX 175 Maintenance Manual

9. Rear Plate Assembly
See Pages 6-58 and 6-60 in
KX 170A/KX 175 Maintenance Manual

10. Audio Drive Board
See Pages 6-61 and 6-63 in
KX 170A/KX 175 Maintenance Manual

11. Rear Divider Sub-Assembly
See Pages 6-64 thru 6-67 in
KX 170A/KX 175 Maintenance Manual

12. CONN Cable Sub-Assembly
See Pages 6-68 thru 6-70 in
KX 170A/KX 175 Maintenance Manual



COMM RCVR COMPONENTS SAME AS
COMM RCVR IN KX170A/KX175

NAV RCVR COMPONENTS OMMITTED
IN KY195

FIGURE 5-3 RECEIVER BOARD SUB-ASSEMBLY
(Dwg. No. 696-6107-00)

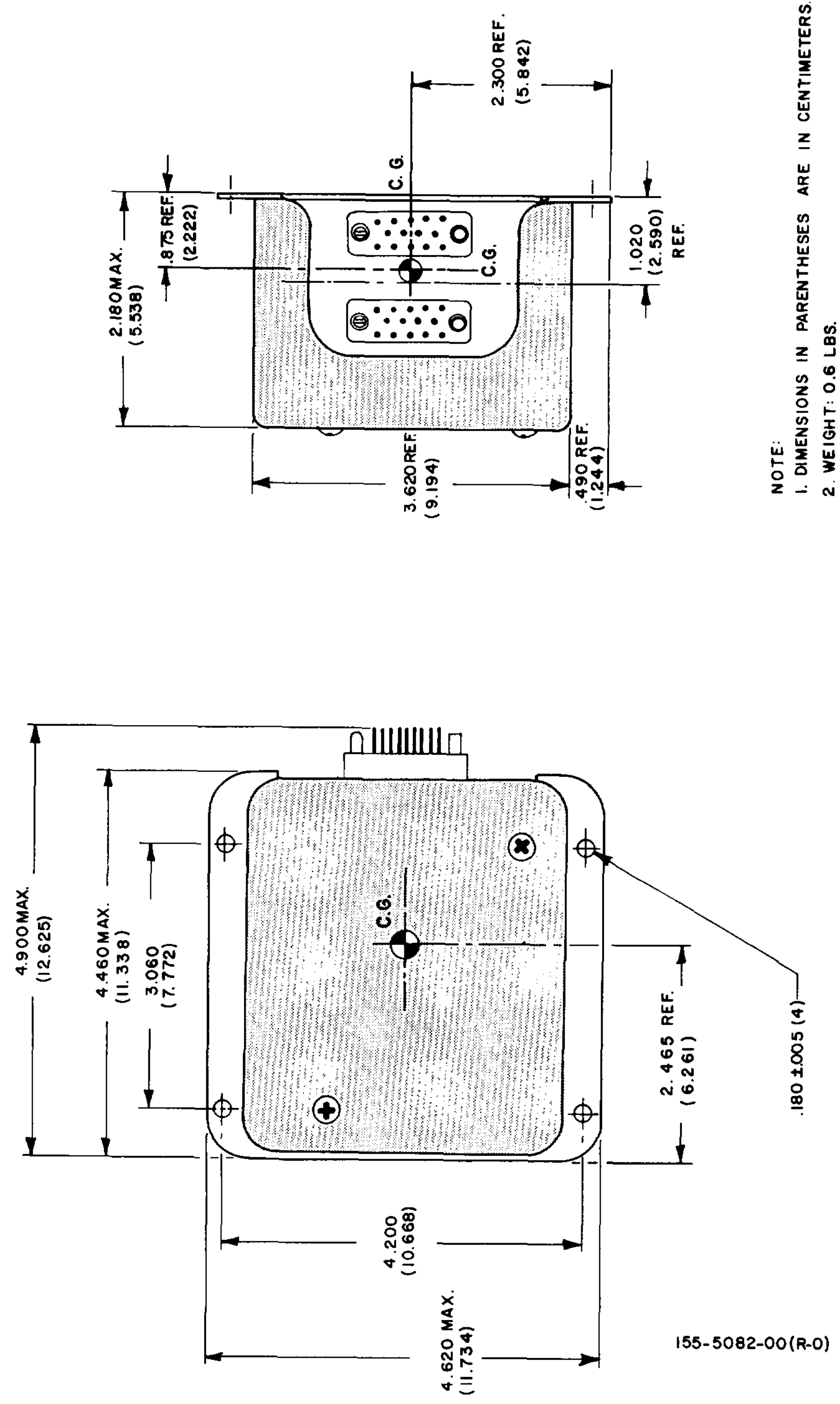
KING

KA 47

DME CODE CONVERTER

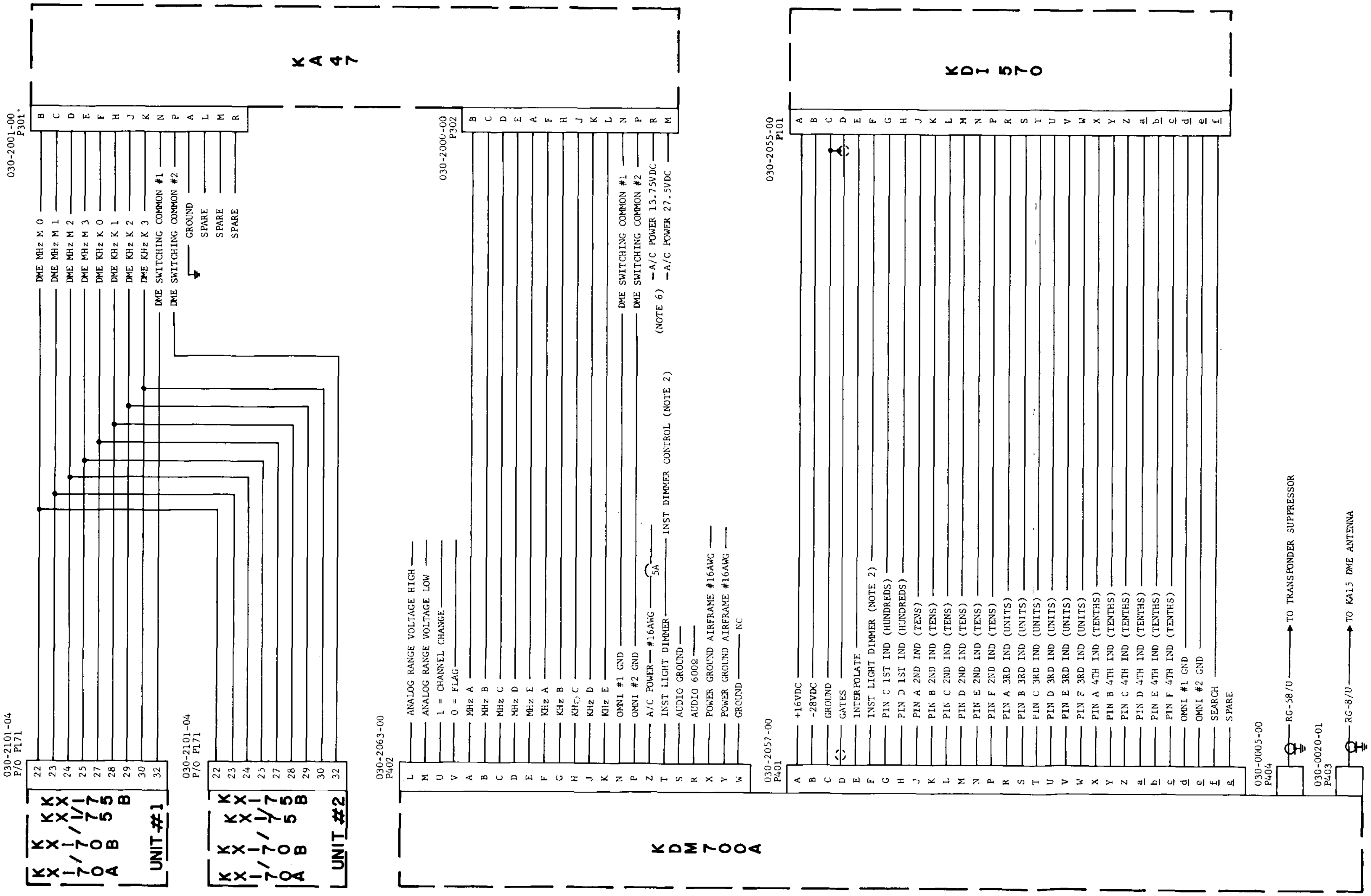
The purpose of the King KA 47 is to convert the King KN 65 shift code obtained from the King KX 170A/175 to the standard ARINC 2 out of 5 DME code used in the King KDM 700A. It is designed to be mounted next to the remote mounted DME equipment, and pin A from J301 should be grounded at the same point as the DME ground. The power requirement is either 13. 75VDC or 27. 5VDC at 225 ma.

Standard digital troubleshooting techniques may be used in troubleshooting the King KA 47.



NOTE:
1. DIMENSIONS IN PARENTHESES ARE IN CENTIMETERS.
2. WEIGHT: 0.6 LBS.

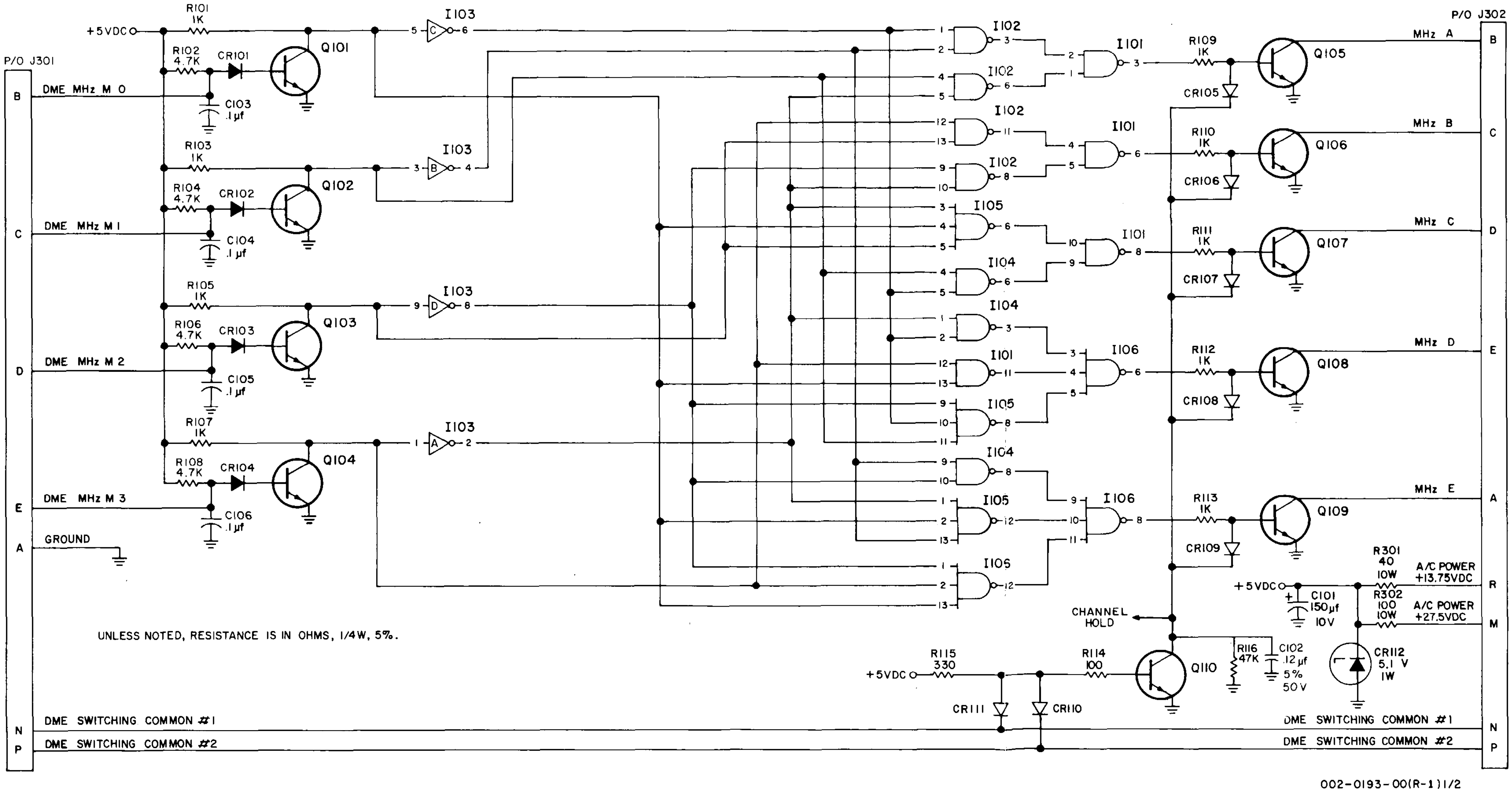
FIGURE 1 OUTLINE AND MOUNTING DIAGRAM



NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. INST LIGHT DIMMER CONTROL CAN RUN FROM PIN F OF KDI570 TO AIRCRAFT LIGHT DIMMER CONTROL.
3. PARTIAL INTERCONNECT OF KX170A/KX175/KX170B/KX175B SHOWN. REFER TO KX170A/KX175B INSTALLATION MANUAL (006-0057-XX), OR KX170B/KX175B INSTALLATION MANUAL (006-0085-XX) FOR COMPLETE INTERCONNECT INFORMATION.
4. IF CABLING BETEEN KDM700A AND KDI570 IS TO BE LONGER THAN 5 FEET, AND IS IN CLOSE PROXIMITY TO OTHER EQUIPMENT OR CABLES, IT IS RECOMMENDED THAT IT BE LACED OR SLEEVED SEPARATELY AND NOT INTERWOVEN WITH OTHER WIRING.
5. KA47 *SHOULD BE MOUNTED ADJACENT* TO THE DME AND THE GROUND WIRE OF THE KA47 *SHOULD BE GROUNDED* AT THE *SAME POINT* AS THE *DME GROUND.*
6. FOR 27.5VDC INSTALLATION, CONNECT PIN Z OF P402 (KDM700A) TO PIN M OF P302 (KA47). FOR 13.75VDC INSTALLATION, CONNECT PIN Z TO PIN R OF P302.
7. UNLESS NOTED, ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
8. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.

FIGURE 2 KA 47 INTERCONNECT DIAGRAM
(Dwg. No. 155-1102-00 R-2)



UNLESS NOTED, RESISTANCE IS IN OHMS, 1/4W, 5%.

FIGURE 3 KA 47 SCHEMATIC DIAGRAM MHz BOARD
(Dwg. No. 002-0193-00 R-3 1/2)

KA 47
KHz Board Schematic

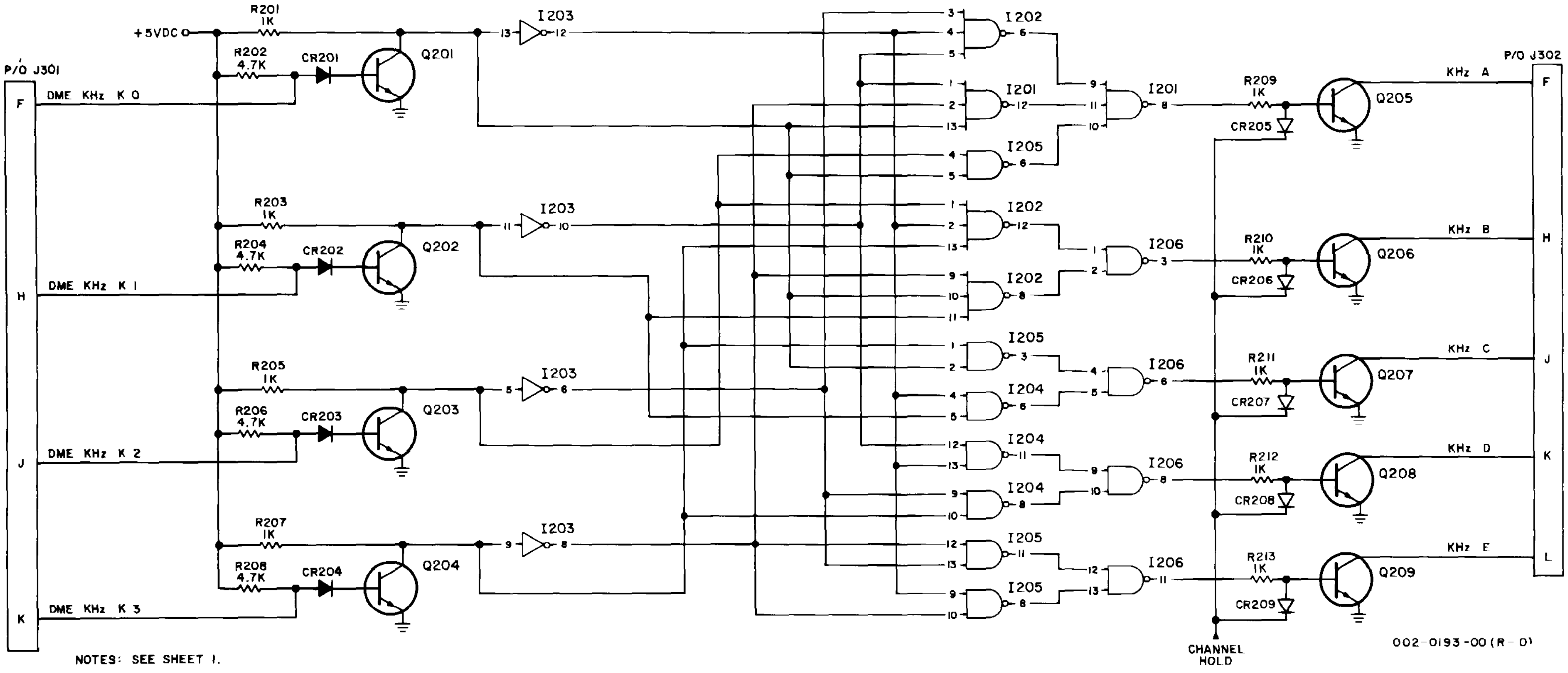


FIGURE 4 KA 47 SCHEMATIC DIAGRAM KHz BOARD

ASSEMBLY NO. 200-0348-00
DESCRIPTION MHZ CARD
UNIT KA47
REVISION 3
USED ON ASSEMBLY 071-0006-00
ASSEMBLY DRAWING NO. 300-0468-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	009-5179-00	PC BOARD	1
C 101	096-1030-25	CAP TANT 150μf 10V	1
CR101	007-6016-00	DIODE SIL 1N4154	1
CR102	007-6016-00	DIODE SIL 1N4154	1
CR103	007-6016-00	DIODE SIL 1N4154	1
CR104	007-6016-00	DIODE SIL 1N4154	1
CR105	007-6023-00	DIODE GER 1N277	1
CR106	007-6023-00	DIODE GER 1N277	1
CR107	007-6023-00	DIODE GER 1N277	1
CR108	007-6023-00	DIODE GER 1N277	1
CR109	007-6023-00	DIODE GER 1N277	1
CR110	007-6023-00	DIODE GER 1N277	1
CR111	007-6023-00	DIODE GER 1N277	1
R2 CR112	007-5011-13	DIODE ZENER 5.6V	1
I 101	120-0001-01	INT CKT SN5400	1
I 102	120-0001-01	INT CKT SN5400	1
I 103	120-0033-01	INT CKT SN5404	1
I 104	120-0001-01	INT CKT SN5400	1
I 105	120-0003-01	INT CKT SN5410	1
I 106	120-0003-01	INT CKT SN5410	1
Q101	007-0026-03	TSTR SIL 2N3416	1
Q102	007-0026-03	TSTR SIL 2N3416	1
Q103	007-0026-03	TSTR SIL 2N3416	1
Q104	007-0026-03	TSTR SIL 2N3416	1
Q105	007-0026-03	TSTR SIL 2N3416	1
Q106	007-0026-03	TSTR SIL 2N3416	1
Q107	007-0026-03	TSTR SIL 2N3416	1
Q108	007-0026-03	TSTR SIL 2N3416	1
Q109	007-0026-03	TSTR SIL 2N3416	1
Q110	007-0026-03	TSTR SIL 2N3416	1
R101	130-0102-23	RES F/C 1K 5% QW	1
R102	130-0472-23	RES F/C 4.7K 5% QW	1
R103	130-0102-23	RES F/C 1K 5% QW	1
R104	130-0472-23	RES F/C 4.7K 5% QW	1
R105	130-0102-23	RES F/C 1K 5% QW	1
R106	130-0472-23	RES F/C 4.7K 5% QW	1
R107	130-0102-23	RES F/C 1K 5% QW	1
R108	130-0472-23	RES F/C 4.7K 5% QW	1
R109	130-0102-23	RES F/C 1K 5% QW	1
R110	130-0102-23	RES F/C 1K 5% QW	1
R111	130-0102-23	RES F/C 1K 5% QW	1

Note: R indicates Revision. See Page 13 for Revision and New Parts.

ASSEMBLY NO. 200-0348-00
DESCRIPTION MHZ CARD
UNIT KA47
REVISION 3
USED ON ASSEMBLY 071-0006-00
ASSEMBLY DRAWING NO. 300-0468-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R112	130-0102-23	RES F/C 1K 5% QW	1
R113	130-0102-23	RES F/C 1K 5% QW	1
R114	130-0101-23	RES F/C 100 5% QW	1
R115	130-0331-23	RES F/C 330 5% QW	1

Note: R indicates Revision. See Page 13 for New Revision and New Parts.

Parts List Revision Record

Assembly No: 200-0348-00 Manual Revision 2

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGED	CR112	007-5016-00	Diode, Zener 5.1V	1
ADDED	R116	130-0473-23	Res, F/C, 47K, 5%, QW	1
ADDED	C102	105-0033-51	Cap., My., .12, 50V	1
ADDED	C103	114-7104-00	Cap., D/C .1μf, 12V	1
ADDED	C104	114-7104-00	Cap., D/C .1μf, 12V	1
ADDED	C105	114-7104-00	Cap., D/C .1μf, 12V	1
ADDED	C106	114-7104-00	Cap., D/C .1μf, 12V	1

ASSEMBLY NO. 200-0349-00
DESCRIPTION KHZ CARD
UNIT KA47
REVISION 2
USED ON ASSEMBLY 071-0006-00
ASSEMBLY DRAWING NO. 300-0469-00

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	009-5180-00	PC BOARD	1
CR201	007-6016-00	DIODE SIL 1N4154	1
CR202	007-6016-00	DIODE SIL 1N4154	1
CR203	007-6016-00	DIODE SIL 1N4154	1
CR204	007-6016-00	DIODE SIL 1N4154	1
CR205	007-6023-00	DIODE GER 1N277	1
CR206	007-6023-00	DIODE GER 1N277	1
CR207	007-6023-00	DIODE GER 1N277	1
CR208	007-6023-00	DIODE GER 1N277	1
CR209	007-6023-00	DIODE GER 1N277	1
I201	120-0003-01	INT CKT SN5410	1
I202	120-0003-01	INT CKT SN5410	1
I203	120-0033-01	INT CKT SN5404	1
I204	120-0001-01	INT CKT SN5400	1
I205	120-0001-01	INT CKT SN5400	1
I206	120-0001-01	INT CKT SN5400	1
Q201	007-0026-03	TSTR SIL 2N3416	1
Q202	007-0026-03	TSTR SIL 2N3416	1
Q203	007-0026-03	TSTR SIL 2N3416	1
Q204	007-0026-03	TSTR SIL 2N3416	1
Q205	007-0026-03	TSTR SIL 2N3416	1
Q206	007-0026-03	TSTR SIL 2N3416	1
Q207	007-0026-03	TSTR SIL 2N3416	1
Q208	007-0026-03	TSTR SIL 2N3416	1
Q209	007-0026-03	TSTR SIL 2N3416	1
R201	130-0102-23	RES F/C 1K 5% QW	1
R202	130-0472-23	RES F/C 4.7K 5% QW	1
R203	130-0102-23	RES F/C 1K 5% QW	1
R204	130-0472-23	RES F/C 4.7K 5% QW	1
R205	130-0102-23	RES F/C 1K 5% QW	1
R206	130-0472-23	RES F/C 4.7K 5% QW	1
R207	130-0102-23	RES F/C 1K 5% QW	1
R208	130-0472-23	RES F/C 4.7K 5% QW	1
R209	130-0102-23	RES F/C 1K 5% QW	1
R210	130-0102-23	RES F/C 1K 5% QW	1
R211	130-0102-23	RES F/C 1K 5% QW	1
R212	130-0102-23	RES F/C 1K %% QW	1
R213	130-0102-23	RES F/C 1K 5% QW	1

Note: R indicates Revision. See Page 15 for Revision and New Parts.

Parts List Revision Record

Assembly No: 200-0349-00 Manual Revision 2

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
ADDED	C201	114-7104-00	Cap. D/C, .1μf, 12V	1
ADDED	C202	114-7104-00	Cap. D/C, .1μf, 12V	1
ADDED	C203	114-7104-00	Cap. D/C, .1μf, 12V	1
ADDED	C204	114-7104-00	Cap. D/C, .1μf, 12V	1

ASSEMBLY NO. 071-0006-00
DESCRIPTION KA47 FINAL
UNIT KA47
REVISION 4
USED ON ASSEMBLY 071-0006-00
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	008-0004-00	LUG GROUND	1
	026-0003-00	BUSS WIRE	.1
	025-0018-00	WIRE CW26 BLK	1.7
	025-0018-16	WIRE CW26 BRN/BLU	.6
	025-0018-17	WIRE CW26 BRN/VIO	.5
	025-0018-18	WIRE CW26 BRN/GRY	.6
	025-0018-19	WIRE CW26 BRN/WHT	.5
	025-0018-20	WIRE CW26 RED/BLK	.4
	025-0018-22	WIRE CW26 RED	.4
	025-0018-26	WIRE CW26 RED/BLU	.6
	025-0018-27	WIRE CW26 RED/VIO	.5
	025-0018-28	WIRE CW26 RED/GRY	.6
	025-0018-29	WIRE CW26 RED/WHT	.5
	025-0018-33	WIRE CW26 ORN	.7
	025-0018-36	WIRE CW26 ORN/BLU	.6
	025-0018-37	WIRE CW26 ORN/VIO	.5
	025-0018-38	WIRE CW26 ORN/GRY	.6
	025-0018-39	WIRE CW26 ORN/WHT	.5
	025-0018-40	WIRE CW26 YEL/BLK	.7
	025-0018-44	WIRE CW26 YEL	.7
	025-0018-46	WIRE CW26 YEL/BLU	.6
	025-0018-47	WIRE CW26 YEL/VIO	.5
	025-0018-48	WIRE CW26 YEL/GRY	.6
	025-0018-49	WIRE CW26 YEL/WHT	.5
	025-0018-57	WIRE CW26 GRN/VIO	.5
	025-0018-58	WIRE CW26 GRN/GRY	.6
	025-0018-98	WIRE CW26 GRY	.9
	025-0018-99	WIRE CW26 WHT	.9
	030-1007-00	CLIP LOCK	4
	047-1855-01	COVER DUST	1
	047-2379-00	BASE PLATE	1
R2	057-1379-00	IDENT TAG	1
	076-0041-01	SPACER HEX 6-32 x .5" 1/2	4
	076-0041-04	SPACER HEX 6-32 x .625" 5/8	4
	076-0346-01	SPACER COVER	2
R2	089-2009-37	NUT 4-40	4
	089-5907-05	SCR PHP 6-32X5/16	2
	089-5907-13	SCR PHP 6-32X13/16	4
	089-5907-20	SCR PHP 6-32X1 1/4	2

NOTE: R1 indicates revision. See Page 18 for Rev. and New Parts

ASSEMBLY NO. 071-0006-00
DESCRIPTION KA47 FINAL
UNIT KA47
REVISION 4
USED ON ASSEMBLY 071-0006-00
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	089-6008-07	SCR FHP 4-40X7/16	4
	089-8109-34	WASHER 4-40	4
	200-0348-00	MHZ CARD ASSY	1
	200-0349-00	KHZ CARD ASSY	1
R1 J 301	030-2001-00	CONN MALE	1
R1 J 302	030-2000-00	CONN FEMALE	1
R 301	132-0103-09	RES 40Ω 10W 5%	1
R 302	132-0103-12	RES 100Ω 10W 5%	1

NOTE: R indicates revision. See Page 18 for Rev. and New Parts.

Parts List Revision Record

Assembly No: 071-0006-00 Manual Revision 1

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE	J301	030-2000-00	Conn. Female	1
CHANGE	J302	030-2001-00	Conn. Male	1

Assembly No: 071-0006-00 (B/MRL Rev. #4) Manual Revision 2

CHANGE		057-1379-01	Ident. Tag	1
CHANGE		089-2076-30	Nut 4-40	4
ADDED		089-8110-34	Washer, Lock #6	4

ASSEMBLY NO. 050-1239-00
DESCRIPTION INSTALLATION KIT
UNIT KA47
REVISION 0
USED ON ASSEMBLY 050-1239-00
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	030-1008-00	LEVER & PIVOT ASSY	4
	030-1009-00	CONN COVER	2
	030-2000-00	CONN FEMALE	1
	030-2001-00	CONN MALE	1

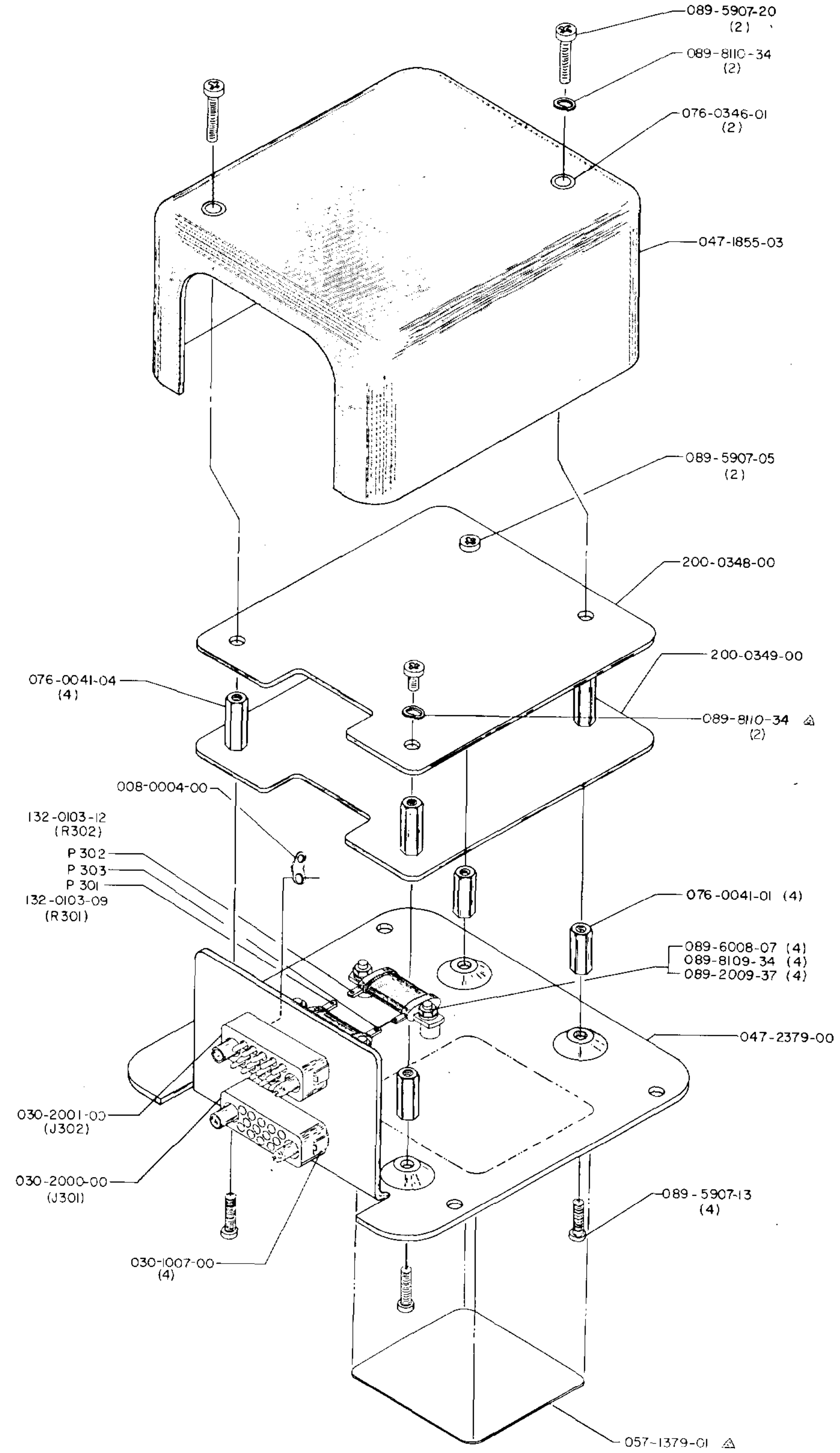
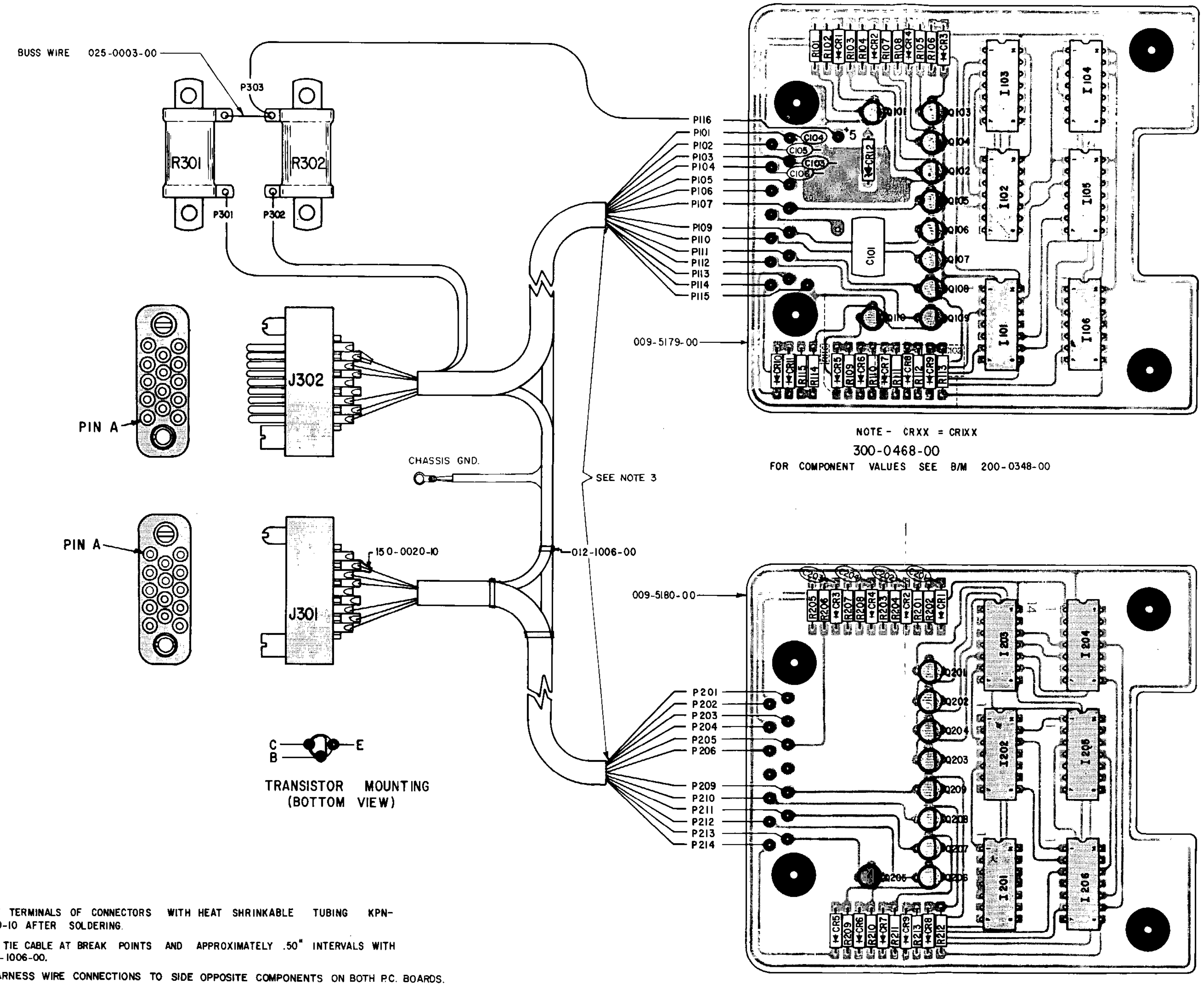


FIGURE 5 KA 47 FINAL ASSEMBLY
(Dwg. No. 300-0470-00 R-8)(Sht. 1 of 2)



KA 47
WIRING SCHEDULE

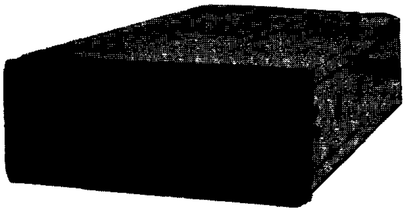
PART NO.	FROM	TO	COLOR	LENGTH
025-0018-33	P303	P116	ORN	8
-16	J301 - PIN B	P103	BRN/BLU	6 1/4
-26	- PIN C	P101	RED/BLU	6 1/4
-36	- PIN D	P102	ORN/BLU	6 1/4
-46	- PIN E	P104	YEL/BLU	6 1/4
-19	- PIN F	P201	BRN/WHT	5 1/2
-29	- PIN H	P203	RED/WHT	5 1/2
-39	△1 - PIN J	P204	ORN/WHT	5 1/2
-49	- PIN K	P202	YEL/WHT	5 1/2
-40	- PIN P	J302 PIN P	YEL/BLK	3
-44	J301 - PIN N	J302 PIN N	YEL	3
	J301 PIN A	CHASSIS GND.	BLK	3 1/2
-57	J302 - PIN A	P112	GRN/VIO	5 1/2
-17	- PIN B	P107	BRN/VIO	5 1/2
-27	- PIN C	PJ09	RED/VIO	5 1/2
-37	PIN D	P110	ORN/VIO	5 1/2
-47	- PIN E	P111	YEL/VIO	5 1/2
-18	PIN F	P213	BRN/GRY	6 1/4
-28	- PIN H	P212	RED/GRY	6 1/4
-38	- PIN J	P211	ORN/GRY	6 1/4
-48	- PIN K	P210	YEL/GRY	6 1/4
-58	- PIN L	P209	GRN/GRY	6 1/4
-44	- PIN N	P114	YEL	5 1/2
-40	J302 - PIN P	P113	YEL/BLK	5 1/2
-99	P205	P105	WHT	10 1/2
-88	P214	P106	GRY	10 1/2
-00	CHASSIS GND	P206	BLK	7 1/2
-00	CHASSIS GND.	P115 △1	BLK	8
-22	J302 - PIN R	P301	RED	4
-20	J302 - PIN M	P302	RED/BLK	4

NOTES:

1. INSULATE TERMINALS OF CONNECTORS WITH HEAT SHRINKABLE TUBING KPN-150-0020-10 AFTER SOLDERING.
2. LACE OR TIE CABLE AT BREAK POINTS AND APPROXIMATELY .50" INTERVALS WITH KPN 012-1006-00.
3. MAKE HARNESS WIRE CONNECTIONS TO SIDE OPPOSITE COMPONENTS ON BOTH P.C. BOARDS.

FIGURE 6 KA 47 COMPONENT LOCATION DIAGRAM
(Dwg. No. 300-0468-00 R-8)(Sht. 2 of 2)
0469

KING®



KX 170B/KX 175B
NAVIGATION RECEIVER/ COMMUNICATIONS TRANSCEIVER

INSTALLATION MANUAL
006-0085-01

REV. 1 JANUARY, 1976

THIS EQUIPMENT MANUFACTURED UNDER
THE FOLLOWING U. S. PATENT 3, 696, 422

KING
KX 170B/KX 175B
NAVIGATION RECEIVER/
COMMUNICATIONS TRANSCEIVER

TABLE OF CONTENTS

SECTION I GENERAL INFORMATION

SECTION II INSTALLATION

SECTION III OPERATION

SECTION IV KA 47

HISTORY OF REVISIONS

Rev. 1, January, 1976

Page	Reason for Change
Front Page	Rev. No. change and Warranty deleted
1-9	Part Number changes
2-1	Paragraph 2.3(b) changed
2-4A	Antenna Cable Assembly added
2-8A	Drawing of cooling diffuser added
2-8B	Installation drawing of Ram Air Kit added
2-9	Interconnect updated
2-13	Interconnect updated
2-17	Interconnect updated
2-19	Interconnect updated

SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the King Radio Corporation Silver Crown KX 170B/KX 175B, and interconnect information for various NAV/COMM system options.

1.2 PURPOSE OF EQUIPMENT

The King KX 170B / KX 175B NAV/COMM combines in a single panel mounted unit a 720 channel VHF COMM Transceiver and an independent 200 channel VHF NAV receiver. The NAV Receiver supplies VOR/LOC information to navigational converters and provides frequency selection for remote mounted Distance Measuring Equipment and Glideslope Receivers.

1.3 DESIGN FEATURES

1.3.1 KX 170B/KX 175B

A. Controls

1. On-Off switches are independent of volume control settings allowing the volume to remain at desired levels.

2. Separate NAV and COMM ON-OFF switches (KX 175B NAV and COMM are electrically independent).

3. Automatic squelch eliminates pilot responsibility for continuously monitoring squelch adjustments. Squelch threshold automatically adjusts to open on readable signals. Test position opens squelch to test COMM receiver sensitivity and to listen to extremely weak signals.

4. Ident-Voice switch filters station ident from receiver audio.

5. Frequency selector mechanism features human engineered concentric airline type drum readout, and blue-white . Glideslope and DME switching is provided.

B. Electronics

1. Varactor diode tuned filters eliminate use of mechanical tuning shafts and mechanisms.

2. Balanced mixers for superior intermodulation, cross modulation, and L. O. radiation performance provide true 1 + 1 operation.

3. Transistorized transmitter provides 5 watts minimum output power and long term reliability superior to tube designs.

4. The digital frequency synthesizers utilize state of the art integrated circuits to replace all but 6 crystals (KX 170B) and 7 crystals (KX 175B), providing improved mean time between failure.

5. Crystal filter selectivity both NAV and COMM.

6. Carrier to noise squelch with carrier squelch back up functionally described above.

7. Tight AGC (typically 0.5db from 10μv to 20,000μv) minimizes audio level variations.

C. Construction

1. Modular construction for ease of maintenance.

2. Rack mounted, removable from the front panel.

3. Anti-theft locking mechanism. (Optional)

4. Provisions for identifying radios as COMM 1, NAV 1 and COMM 2, NAV 2 in dual installations.

1.4 POWER REQUIREMENTS

The KX 170B/KX 175B requires 13.75 volts for proper operation. Aircraft having electrical power plants producing 27.5 volts require the installation of a voltage converter. The KA 39 Voltage Converter, designed to separately convert NAV and COMM 27.5 volts to 13.75 volts, may be conveniently remote mounted in the aircraft.

1.5 TECHNICAL CHARACTERISTICS

KX 170B TRANSCEIVER		
SPECIFICATION		CHARACTERISTIC
GENERAL		
MOUNTING:		Panel mounted, no shock mounting required.
SIZE	KX 170B NAV/COMM	6.312 X2.600X14.15 inches w/connectors. (16.03X6.60X35.94 centimeters.)
WEIGHT:	KX 170B NAV/COMM	7.0 lbs excluding external connectors and harness. (3.18Kg)
POWER REQUIREMENTS:		13.75V (or 27.5V with KA 39)
	COMM Receive	0.70 amps
	COMM Transmit (Tone)	4.5 amps (2.8 amps unmodulated)
	NAV Receiver	0.52 amps
	Lamps	0.16 amps (13.75Vdc), 0.08 amps (27.5Vdc)
	Max Total Current	5.1 amps (Transmit tone mod, NAV Rec. Lamps)

KX 170B TRANSCEIVER

SPECIFICATION	CHARACTERISTIC
COMM TRANSCEIVER	
CRYSTAL CONTROLLED:	720 channels
FREQUENCY RANGE:	118.000 to 135.975MHz with 25kHz spacing
FREQUENCY STABILITY:	±0.003%
TRANSMITTER	
VHF POWER OUTPUT:	5 watts minimum, 50 ohm load
MODULATION:	85% modulation capability with 90% limiting provided
MICROPHONE:	Dynamic mike containing transistorized pre-amp or carbon (must provide at least 120 mVRMS into 500Ω load.)
SIDETONE:	Adjustable up to 4mw into 500 ohm headphones
DUTY CYCLE:	1 minute on, 4 minutes off (20%)
RECEIVER	
SENSITIVITY:	1.5μv (soft) will provide a 6db minimum signal plus noise to noise ratio (1kHz, 30% mod)
SELECTIVITY:	Typical 6db at ±8kHz, 60db at ±35kHz
SPURIOUS RESPONSES:	Down at least 60db
SQUELCH:	Automatic squelch (carrier to noise) with manual disable and carrier squelch override.
AGC CHARACTERISTICS:	From 10μv to 20,000μv audio output will not vary more than 3db.
NAV RECEIVER	
CRYSTAL CONTROLLED:	200 channels.
FREQUENCY RANGE:	108.00 to 117.95MHz with 50kHz spacing.
SENSITIVITY:	
Navigation	1.5μv (soft) will provide a half-flag indication 1.0μv (soft) will provide a 6db $\frac{\text{signal + noise}}{\text{noise}}$ ratio.

KX 170B TRANSCEIVER

SPECIFICATION	CHARACTERISTIC
SELECTIVITY:	Typical 6db at ±19kHz 50db at ±50kHz
SPURIOUS RESPONSES:	Down at least 60db
IDENT FILTER:	Tone rejection, 15db, minimum
AGC CHARACTERISTICS:	From 10μv to 20,000μv audio output will not vary more than 3db.
NAV RECEIVER ACCURACY:	Two sigma limit, ±1.5°
NAV OUTPUT:	With LOC adjusted for 0.35Vrms, VOR = 0.5 Vrms (typical) into 20KΩ or greater load impedance.

DME CHANNELING:

	M_0	M_1	M_2	M_3		K_0	K_1	K_2	K_3		
108	-	-	0	-	.0X	0	0	-	-	.X0	-
109	-	-	-	0	.1X	0	0	0	-	.X5	0
110	0	-	-	-	.2X	0	0	0	0		
111	0	0	-	-	.3X	-	0	0	0		
112	0	0	0	-	.4X	-	-	0	0		
113	-	0	0	0	.5X	0	-	-	0		
114	0	-	0	0	.6X	-	0	-	-		
115	-	0	-	0	.7X	-	-	0	-		
116	0	-	0	-	.8X	-	-	-	0		
117	0	0	-	0	.9X	0	-	-	-		

NOTE: (-) = OPEN, (0) = DME COMMON.

ILS ENERGIZE:	The ILS energize wire is connected to the ILS common wire when the MHz selector is in either the 108, 109, 110, or 111 position AND SIMULTANEOUSLY the kHz selector is in either the 0.10, 0.15, 0.30, 0.35, 0.50, 0.55, 0.70, 0.75, 0.90 or 0.95 position.

SPECIFICATION	CHARACTERISTIC
GLIDESLOPE CHANNELING:	

	GS 108	GS 109	GS 110	GS 111
108	0	-	-	-
109	-	0	-	-
110	-	-	0	-
111	-	-	-	0
112	-	-	-	-
113	-	-	-	-
114	-	-	-	-
115	-	-	-	-
116	-	-	-	-
117	-	-	-	-

	GS 0.1	GS 0.3	GS 0.5	GS 0.7	GS 0.9
.0X	-	-	-	-	-
.1X	1	-	-	-	-
.2X	-	-	-	-	-
.3X	-	1	-	-	-
.4X	-	-	-	-	-
.5X	-	-	1	-	-
.6X	-	-	-	-	-
.7X	-	-	-	1	-
.8X	-	-	-	-	-
.9X	-	-	-	-	1

NOTE: (0) = ILS common, (-) = open, (1) = either KN 73 A+ (KN 73 Installations) or KX 170B/KX 175B A+ with 1KΩ source resistance (KI 211C/KI 212/KI 213/ KI 214 installations).

	AUDIO
AUXILIARY AUDIO INPUTS:	Two (2) 500 ohms with 30db isolation between any two.
INTERCOM INPUT:	One (1) Intercom Microphone Input. (Microphone must provide at least 120m Vrms into 500Ω load).
FREQUENCY RESPONSES:	Within 6db from 350Hz to 2500Hz.
HEADPHONE OUTPUT:	50mw into 500 ohm
SPEAKER OUTPUT:	4.5Vrms into auxiliary input produces 5 watts audio output.
KX 175B TRANSCEIVER	
TSO COMPLIANCE:	
COMM Transmit	C37b (DO-110, Class II)
COMM Receive	C38b (DO-109)
VOR	C40a (DO-114)
LOC	C36c (DO-131, Class C)
Environmental	DAPBAAXXXXXX
MOUNTING:	Panel mounted, no shock mounting required.
SIZE:	6.312 × 2.600 × 14.15 inches w/connectors. (16.03 × 6.60 × 35.94 centimeters)
WEIGHT:	7.0 lbs excluding external connectors and harness. (3.18Kg)

KX 175B TRANSCEIVER

SPECIFICATION	CHARACTERISTIC
POWER REQUIREMENTS:	13.75V (or 27.5V with KA 39)
COMM Receive	0.70 amps
COMM Transmit (Tone)	4.5 amps (2.8 amps unmodulated)
NAV Receive	0.52 amps
Lamps	0.16 amps (13.75Vdc), 0.08 amps (27.5Vdc)
Max. total current	5.1 amps (Transmit tone mod, NAV Rec, Lamps)
CRYSTAL CONTROLLED:	720 channels
FREQUENCY RANGE:	118.000 to 135.975MHz with 25kHz spacing
FREQUENCY STABILITY:	±0.003%
TRANSMITTER	
VHF POWER OUTPUT:	5 watts minimum, 50 ohm load
MODULATION:	85% modulation capability with 90% limiting, less than 15% distortion at 80% mod.
MICROPHONE:	Carbon or dynamic mike containing transistorized pre-amp (must provide at least 120mv$_{rms}$ into 500Ω load).
SIDETONE:	Adjustable up to 4mw into 500 ohm headphones
DUTY CYCLE:	1 minute on, 4 minutes off (20%)
RECEIVER	
SENSITIVITY:	1.5μv (soft) will provide a 6db minimum signal plus noise to noise ratio
SELECTIVITY:	Typical 6db at ±8kHz, 60db at ±20kHz
SPURIOUS RESPONSES:	Down at least 60db
SQUELCH:	Automatic squelch (carrier to noise) with manual disable and carrier squelch override.
AGC CHARACTERISTICS:	From 10μv to 20,000μv audio output will not vary more than 3db.
NAV RECEIVER	
CRYSTAL CONTROLLED:	200 channels
FREQUENCY RANGE:	108.00 to 117.95MHz with 50kHz spacing.

SPECIFICATION	CHARACTERISTIC
SENSITIVITY:	
Navigation	1.5μv (soft) will provide a half-flag indication 1.0μv (soft) will provide a 6db $\frac{\text{signal + noise}}{\text{noise}}$
SELECTIVITY:	Typical 6db at ±19kHz 75db at ±50kHz
SPURIOUS RESPONSES:	Down at least 60db
IDENT FILTER:	Tone rejection, 15db, minimum
AGC CHARACTERISTICS:	From 10μv to 20,000μv audio output will not vary more than 3db
ACCURACY:	Two sigma limit, ±1.0°
NAV OUTPUT:	With LOC adjusted for 0.35Vrms, VOR = 0.5Vrms (typical) into 20KΩ or greater load impedance.

DME CHANNELING:

	M_0	M_1	M_2	M_3
108	-	-	0	-
109	-	-	-	0
110	0	-	-	-
111	0	0	-	-
112	0	0	0	-
113	-	0	0	0
114	0	-	0	0
115	-	0	-	0
116	0	-	0	-
117	0	0	-	0

	K_0	K_1	K_2	K_3
.0X	0	0	-	-
.1X	0	0	0	-
.2X	0	0	0	0
.3X	-	0	0	0
.4X	-	-	0	0
.5X	0	-	-	0
.6X	-	0	-	-
.7X	-	-	0	-
.8X	-	-	-	0
.9X	0	-	-	-

	50kHz
.X0	1
.X5	0

NOTE: (-) = OPEN, (0) = DME COMMON.

ILS ENERGIZE:	The ILS energize wire is connected to the ILS common wire when the MHz selector is in either the 108, 109, 110, or 111 position AND SIMULTANEOUSLY the kHz selector is in either the 0.10, 0.15, 0.30, 0.35, 0.50, 0.55, 0.70, 0.75, 0.90 or 0.95 position.

SPECIFICATION	CHARACTERISTIC
GLIDESLOPE CHANNELING:	

	GS 108	GS 109	GS 110	GS 111		GS 0.1	GS 0.3	GS 0.5	GS 0.7	GS 0.9
108	0	-	-	-	.0X	-	-	-	-	-
109	-	0	-	-	.1X	1	-	-	-	-
110	-	-	0	-	.2X	-	-	-	-	-
111	-	-	-	0	.3X	-	1	-	-	-
112	-	-	-	-	.4X	-	-	-	-	-
113	-	-	-	-	.5X	-	-	1	-	-
114	-	-	-	-	.6X	-	-	-	-	-
115	-	-	-	-	.7X	-	-	-	1	-
116	-	-	-	-	.8X	-	-	-	-	-
117	-	-	-	-	.9X	-	-	-	-	1

	GS 50kHz
.X0	-
.X5	0

NOTE: (0) = ILS common, (-) = open, (1) = either KN 73 A+ (KN 73 Installations) or KX 170B, KX 175B A+ with 1KΩ source resistance (KI 211C/KI 212/KI 213/KX 214 installations).

AUDIO

AUXILIARY AUDIO INPUTS:	Two (2) 500 ohms with 30db isolation between any two.
INTERCOM INPUTS:	One (1) Intercom Microphone Input. (Microphone must provide at least 120mv into 500Ω load.
FREQUENCY RESPONSES:	Within 6db from 350Hz to 2500Hz.
HEADPHONE OUTPUT:	50mw into 500 ohm
SPEAKER OUTPUT:	4.5Vrms into auxiliary input produces 5 watts audio output.

KA 39 VOLTAGE CONVERTER

SIZE:	3.500 × 2.000 × 5.500 inches (8.889 × 5.18 × 13.87 centimeters)
WEIGHT:	1.1 lbs. excluding harness (.5Kg)

POWER:

	A	B
Input Volts	27.5vdc	27.5vdc
Output Volts	13.75vdc (nominal)	13.75vdc (nominal)
Input Current continuous		
Input Current 40% duty		---------
Output Current continuous	1.5A	0.75A
Output Current 40% duty	5.0A	---------

1.6 UNITS AND ACCESSORIES SUPPLIED

A. King KX 170B NAV/COMM (069-1020-00)

B. King KX 175B NAV/COMM (069-1019-00)

C. King KX 170B/KX 175B Installation Kit (050-1142-00) includes:

030-0101-00	Connector, Antenna (TED 9-30-4)	2
030-1019-00	Clamp, Cable Hall	2
030-2101-04	Connector, 42 pin (Amphenol 26-190-42)	1
047-1743-01	Plate, Connector Mounting	1
047-1851-00	Cover, Connector Mounting Plate	1
057-1214-00	Decal, COMM 1	1
057-1214-01	Decal, COMM 2	1
057-1214-02	Decal, NAV 1	1
057-1214-03	Decal, NAV 2	1
088-0136-01	Filter, Red Lamp	2
089-2188-22	E4 ESNA Nut	2
089-5523-05	Screw, #4-40 × 5/16 Fil HP	4
089-5903-05	Screw, #4-40 × 5/16 PHP	2
089-5907-05	Screw, #6-32 × 5/16 PHP	2
089-6008-04	Screw, #4-40 × 1/4 FHP	4
089-8025-30	Flat Washer	2
089-8094-30	Flat Washer	2
090-0019-07	Ring, Retainer	2

1.7 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

A. Communication and navigation antenna and cables.

B. Headphones and speaker:

1. Headphones: Low impedance types, 300 to 1,000 ohms.

2. Speaker: Voice coil impedance 3 to 6 ohms nominal.

C. KA 39 Voltage Converter, 27.5V to 13.75V (required in 27.5V installation only).

D. Microphone: Low impedance carbon, or dynamic with transistor preamp, such as King KA 14.

E. VOR/LOC converter and indicator. Various King Options include:

1. KI 201C VOR Indicator (VOR/LOC only)

2. KI 214 ILS Indicator (VOR/LOC Glideslope 40 Channel)

3. (a) KN 77 VOR/LOC Converter, with KNI 520 Navigation Indicator
   (b) KN 77 VOR/LOC Converter, with KPI 550A Pictorial Navigation System

4. (a) KN 73 Glideslope Receiver - KN 77 VOR/LOC Converter with KNI 520 Navigation Indicator
   (b) KN 73 Glideslope Receiver - KN 77 VOR/LOC Converter with KPI 550 Pictorial Navigation System

5. (a) KN 74 Area Navigation Computer with KI 213 CDI and Glideslope Receiver.
   (b) KN 74 Area Navigation Computer with KN 73 Glideslope Receiver and KPI 550A Pictorial Navigation System.

1.8 LICENSE REQUIREMENTS

The Federal Communications Commission requires that the operator of the transmitter of this equipment holds a Restricted Radio Telephone Operator Permit, or higher class license. A permit may be obtained by a U. S. citizen from the nearest field office of the FCC; no examination is required.

This equipment has been type accepted by the FCC and entered on their list of type accepted equipments as King KX 170B/KX 175B and must be identified as King KX 170B or King KX 175B.

–CAUTION–

The VHF transmitter in this equipment is guaranteed to meet Federal Communications Commission approval only when King crystals are used.

Use of other than King crystals is considered an unauthorized modification.

SECTION II

INSTALLATION

2.1 GENERAL

This section contains suggestions and factors to consider before installing the KX 170B/KX 175B NAV/COMM unit and KA 39 Voltage Converter (27.5V installations only). Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking each unit. Make a visual inspection of each unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place in the shipping container all packing materials for use in unit storage or reshipment. The KX 170B/KX 175B installation will conform to standards designated by the customer, installing agency and existing conditions as to unit location and type of installation.

2.3 KX 170B/KX 175B INSTALLATION

Listed below are factors and suggestions to consider before installing your KX 170B/KX 175B system. Close adherence to these suggestions will assure more satisfactory performance from your equipment.

(a) The KX 170B/KX 175B is mounted rigid in the aircraft panel. Mark and cut the mounting hole as shown in Figure 2-5. The purpose of the "behind aircraft panel mount cutout is to allow a margin of error in cutout size and prevent the mounting tray front edge from being visible. The mounting tray bottom lip should extend through the mounting hole flush with the instrument panel to insure proper plug pin engagement.

(b) Avoid mounting close to any high external heat source. Forced air cooling should be supplied for 3 or more radios in a stack.

(c) Remember to allow adequate space for installation of cables and connectors.

(d) Secure the mounting rack to instrument panel per Figure 2-5. The rear mounting bosses should be attached to the airframe by means of support brackets.

(e) Slide the KX 170B/KX 175B into the rack and secure by turning the locking screw on the front panel.

-CAUTION-

Do not force locking tab screw.

(f) An antitheft mechanism is available for the KX 170B/KX 175B (KPN 050-1326-00 short locking bar, 050-1326-01, long locking bar). This kit may be installed at the customer's option to provide a means of locking the radio to the instrument panel with a padlock located on the lower rear corner of the mounting tray.

Installation consists of riveting the bracket to the mounting tray as shown in Figure 2-5. After the radio installation is complete, the locking bar may be inserted and a small padlock affixed to deter theft.

(g) The installing agency will supply and fabricate all external cables. The plugs required are supplied by King Radio.

2.4 KA 39 INSTALLATION (For use in 27. 5 volt installations only)

(a) Select the KA 39 location considering good thermal conductivity to the airframe, convenient cable rounting. and separation from other heat sources. The KA 39 should be mounted no closer to the KX 170B/KX 175B than is necessary to good thermal isolation.

(b) Refer to Figure 2-4 for the KA 39 mounting dimensions.

(c) Secure the KA 39 firmly in place.

(d) The installing agency will supply and fabricate external cables.

2.5 ANTENNA INSTALLATION

(a) Conventional 50 ohm horizontally polarized NAV and vertically polarized COMM antennas are required with the KX 170B/KX 175B. Vertical bent whip antennas are not recommended. Wideband COMM antennas provide efficient operation over the COMM band. Antennas should be installed per manufacturers recommendations. Additional recommendations are as follows:

COMM ANTENNA

1. Mount antenna on flat metal surface or install a ground plane at least 18 inches square.
2. The antenna should be well removed from any projections and the engine(s) and propeller.
3. NAV and COMM Antennas must be well separated to minimize COMM interference to NAV while transmitting, (Minimum recommended separation is 30db).

NAV ANTENNA

1. The location should be well removed from other antenna, projections and engine(s). It should have a clear line of sight area if possible.
2. The antenna MUST BE mounted symmetrically with the centerline of the aircraft.
3. Avoid running other coaxial cables and wires with the NAV antenna cable.

(b) The antenna connectors on the KX 170B/KX 175B unit are identified on the rear die casting.

—NOTE—

With the KX 170B/KX 175B viewed from the rear, the NAV antenna connector is on the right and the COMM antenna connector is on the left. This means that the NAV frequency selector and NAV antenna are on opposite sides of the radio. The COMM frequency selector and COMM antenna connector are also on opposite sides of the radio.

-CAUTION-

Review the above information carefully. Interchanged antenna connections will cause erroneous NAV operation and in some installations could introduce 7 watts of transmitter power into a NAV receiver causing damage to that unit.

(c) Refer to Figure 2-3 for a dual omni antenna installation if two navigation receivers are used. VOR antenna duplexers normally cause a 6db signal loss.

(d) Refer to Figure 2-2 for the COMM and NAV antenna cable connector assembly. Solder tack the snap on shield to the connector base at two points to insure that a good electrical ground is made.

2.6 CABLING

(a) The length and routing of the external cables must be carefully studied and planned prior to installation. Avoid sharp bends and placing cables too near the aircraft control cables.

(b) Fabricate the external cables in accordance with the installation drawing that fulfills the system requirement.

—NOTE—

Use good quality stranded wire that will not support a flame and with at least 600 volt insulation. It is recommended that the mike audio line be in a shielded-twisted pair.

(c) Since other radio and navigation equipment will possibly utilize the same speaker circuits for muting, speaker selection and microphone switching must be devised by the installing agency. The KX 170B/KX 175B does not shunt the speaker line of other equipment when the off-on-test switch is turned "off".

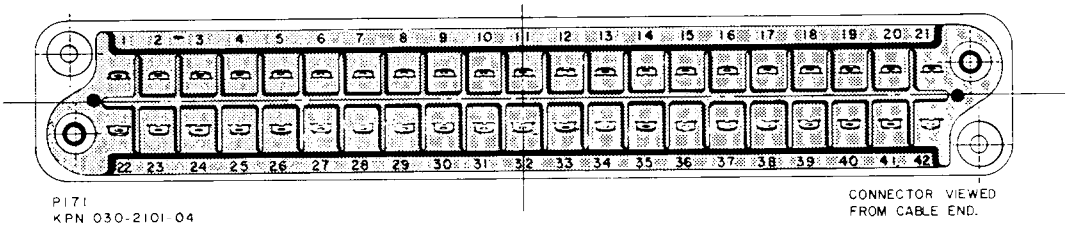
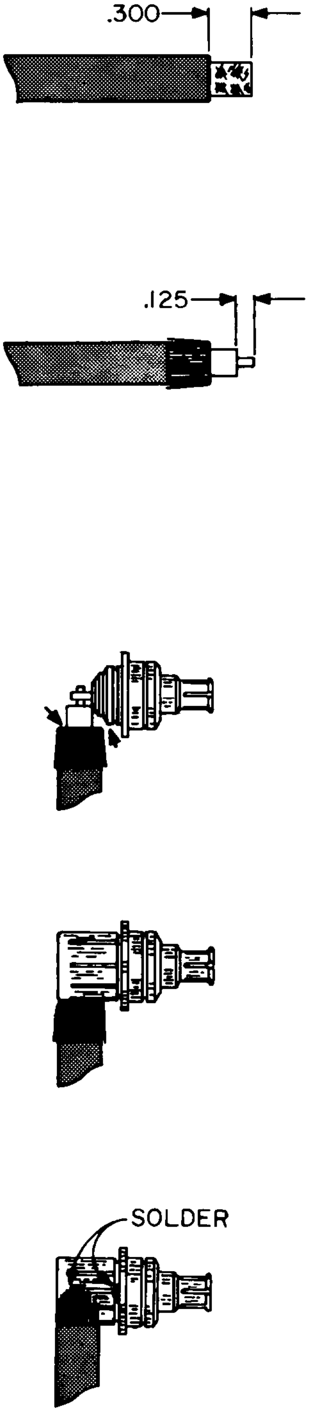


FIGURE 2-1 KX 170B/KX 175B CONNECTOR PIN LOCATIONS
(DWG. NO. 696-6002-00 R-1)



Trim coax cable outer insulation as shown.

Fold braid back over outer cover of coax. Do not cross strands.

Solder center conductor to center pin of conductor. Make sure front end of braid (Point of fold) is even with bottom of connector (Shown by arrows)

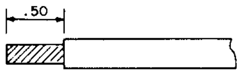
Slide connector cap, with clearance hole in position to clear dielectric, on to connector until it snaps in place.

Push braid forward and flatten against connector cap and solder.
Solder tac connector cap to connector in at least two places to insure good electrical contact.

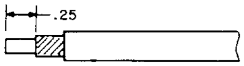
FIGURE 2-2 ANTENNA CABLE ASSEMBLY
(DWG. NO. 696-6003-00)

CONNECTOR ASSEMBLY INSTRUCTIONS

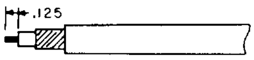
DOCUMENT 006-1058-00, OCT, 1972



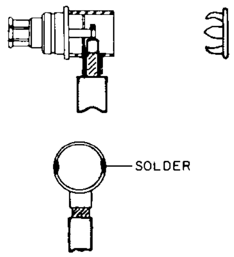
Trim coax outer insulation as shown.



Trim braid but not center conductor or insulation back 0.25".



Strip insulation back 0.125".



Insert cable through side wall of connector and solder center conductor to center pin of connector. Heat the outside of the connector sleeve and at the same time apply solder between braid and sleeve. Continue to apply heat until the solder flows. Insert connector cap into end of fitting and tack solder in 2 places.

FIGURE 2-2A ANTENNA CABLE ASSEMBLY

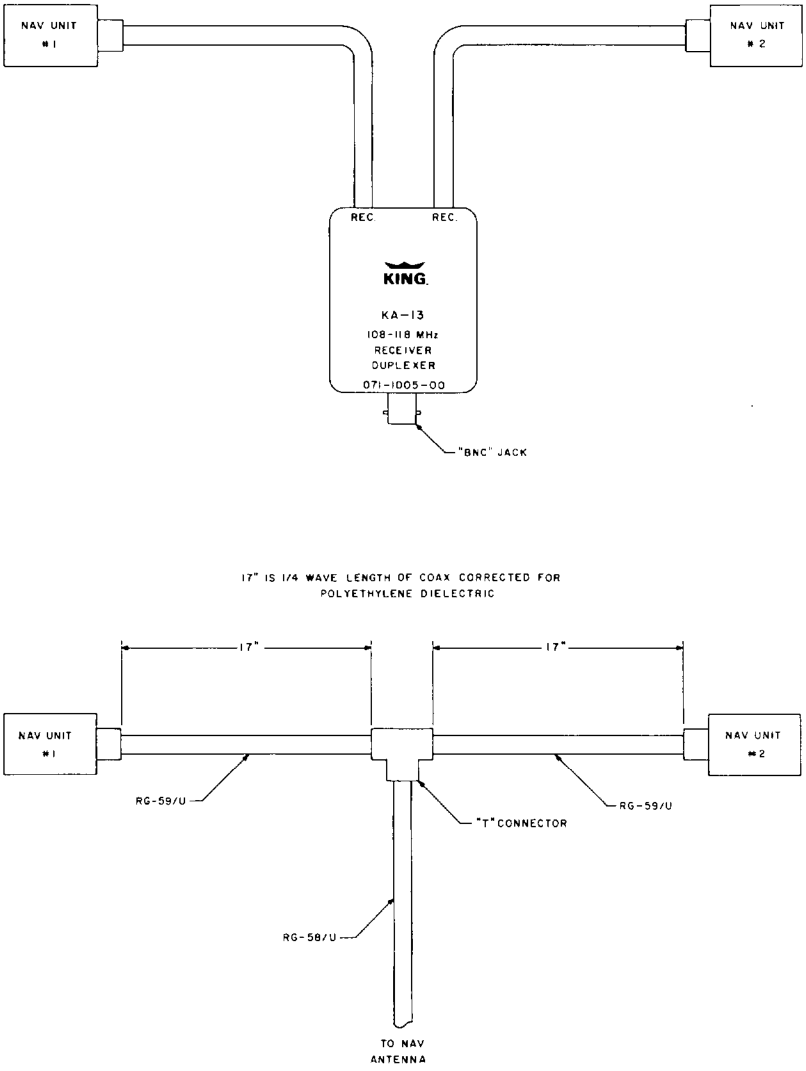
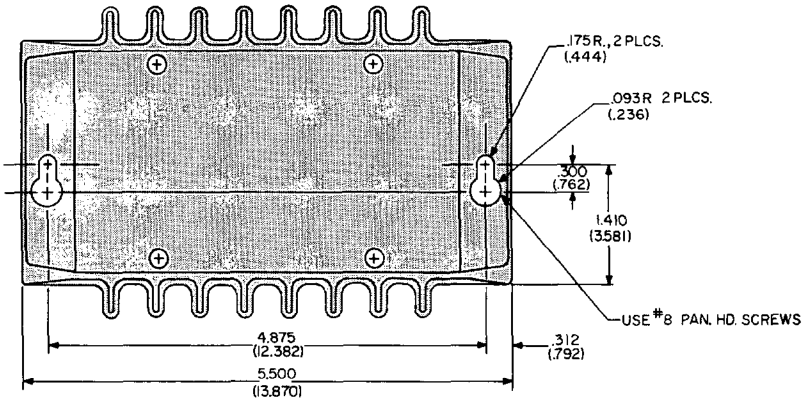


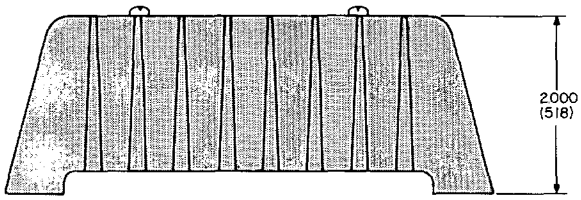
FIGURE 2-3 DUAL OMNI ANTENNA INSTALLATION
(DWG. NO. 696-6005-00)



NOTES:
1. ALL DIMENSIONS IN PARENTHESIS ARE IN CENTIMETERS.
2. WEIGHT: 1.1 lbs
3. TERMINALS WILL TAKE 16 TO 22 AWG WIRE.
4. TERMINALS ARE #5-40 X 1/4 BD. HD. SCREWS.

WARNING

DO NOT MOUNT IN CLOSE PROXIMITY
TO HEATER DUCT OR OTHER SOURCES OF HEAT



155-5076-00 (R-)

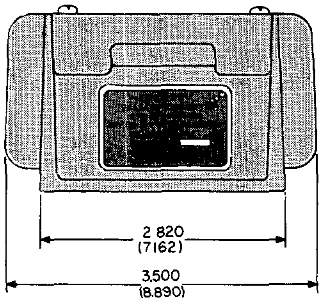
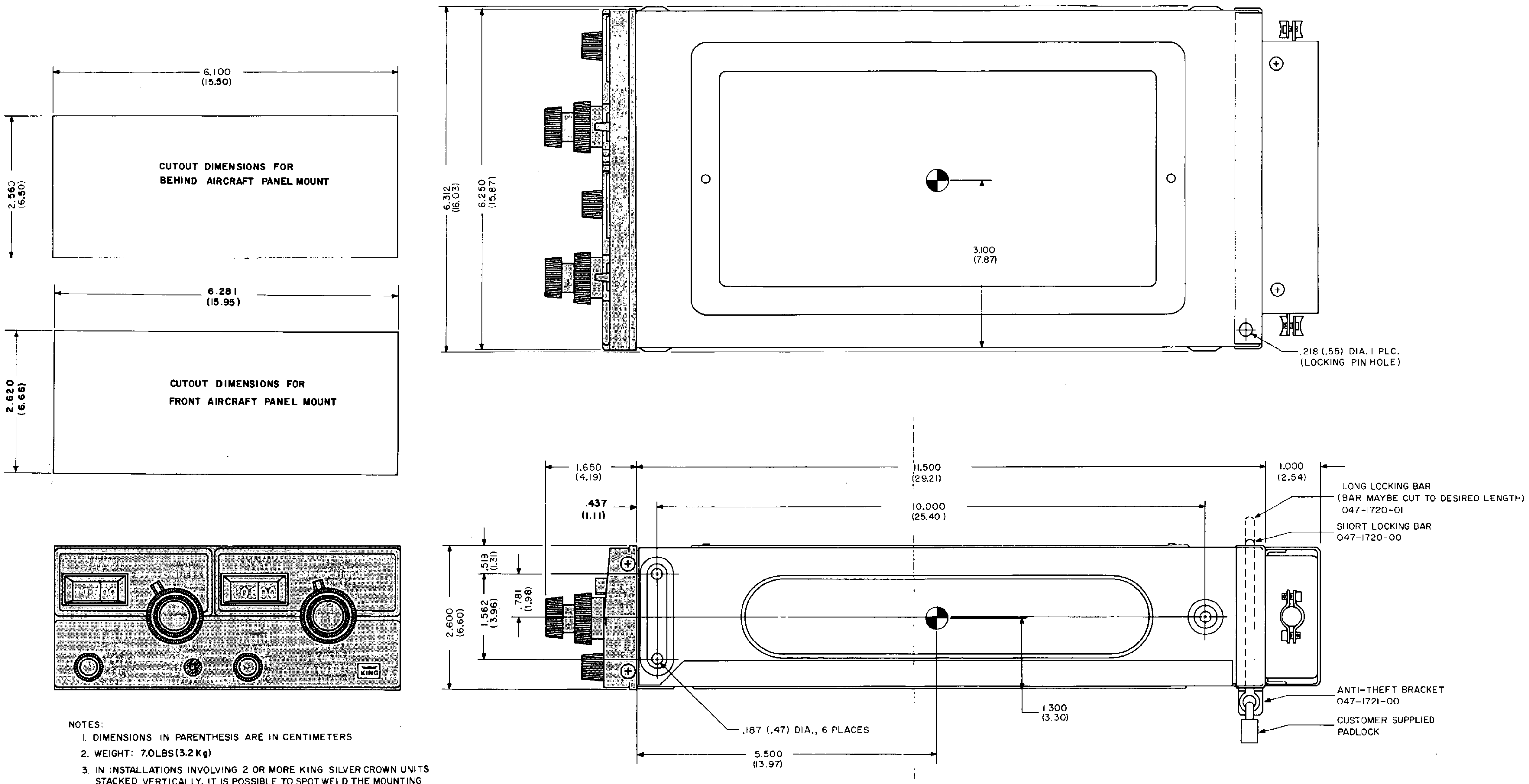
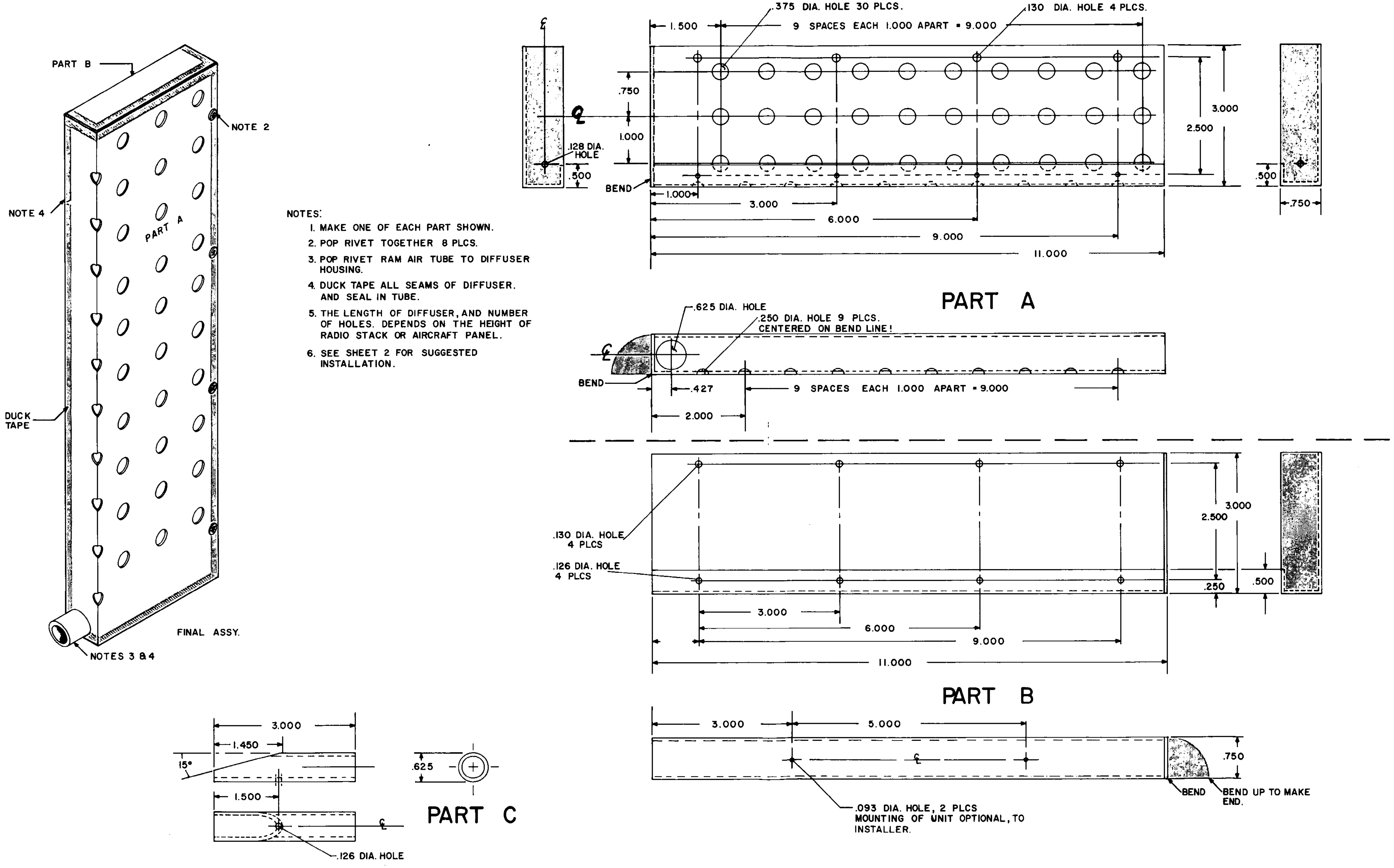


FIGURE 2-4 KA 39 VOLTAGE CONVERTER OUTLINE AND MOUNTING DRAWING
(DWG. NO. 155-5076-00 R-)



NOTES:
1. DIMENSIONS IN PARENTHESIS ARE IN CENTIMETERS
2. WEIGHT: 7.0LBS (3.2 Kg)
3. IN INSTALLATIONS INVOLVING 2 OR MORE KING SILVER CROWN UNITS STACKED VERTICALLY, IT IS POSSIBLE TO SPOT WELD THE MOUNTING TRAYS TOGETHER PRIOR TO INSTALLATION, THUS PROVIDING A RIGID TRAY ASS'Y.
4. REAR CONNECTOR MTG. BOX MAY BE REMOVED FROM TRAY FOR WIRING CONVENIENCE.
5. ANTI-THEFT MECHANISM KIT (KING PART NO. 050-1326-00 WITH SHORT LOCKING BAR, OR 050-1326-01 WITH LONG LOCKING BAR) FASTEN ANGLE (047-1721-00) TO MTG. TRAY WITH POP RIVETS (092-5021-00). USE SHORT LOCKING BAR FOR SINGLE INSTALLATIONS, LONG LOCKING BAR FOR MULTIPLE INSTALLATIONS. CUSTOMER MAY USE ANY PADLOCK HAVING 3/16"DIA. HASP OR SMALLER.

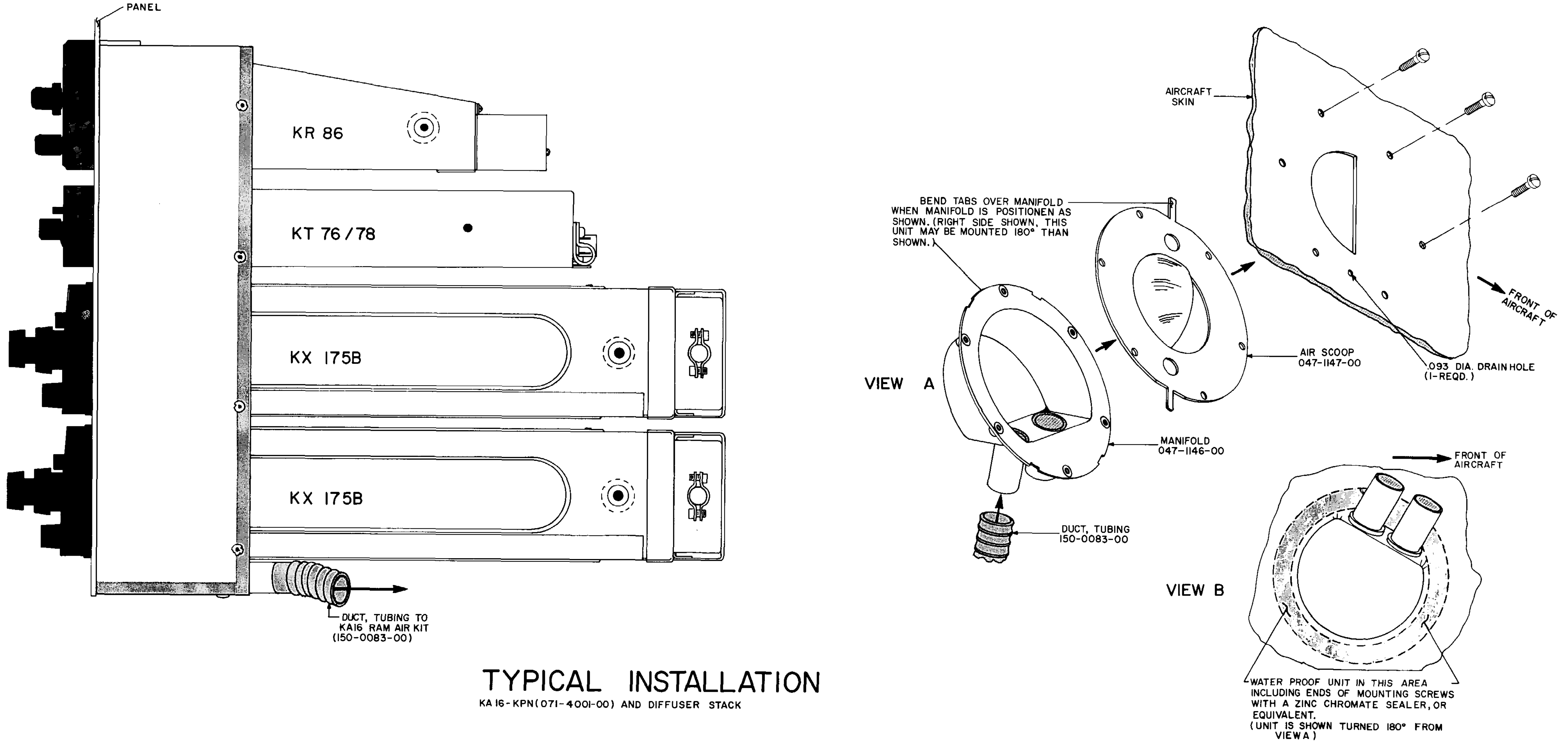
FIGURE 2-5 KX 170B/175B OUTLINE AND MOUNTING DRAWING
(DWG. NO. 155-5106-00 R-0)



NOTES:

1. MAKE ONE OF EACH PART SHOWN.
2. POP RIVET TOGETHER 8 PLCS.
3. POP RIVET RAM AIR TUBE TO DIFFUSER HOUSING.
4. DUCK TAPE ALL SEAMS OF DIFFUSER. AND SEAL IN TUBE.
5. THE LENGTH OF DIFFUSER, AND NUMBER OF HOLES. DEPENDS ON THE HEIGHT OF RADIO STACK OR AIRCRAFT PANEL.
6. SEE SHEET 2 FOR SUGGESTED INSTALLATION.

FIGURE 2-5A COOLING DIFFUSER FOR RADIO STACKS



TYPICAL INSTALLATION

KA16-KPN(071-4001-00) AND DIFFUSER STACK

FIGURE 2-5B KR 16 RAM AIR KIT AND DIFFUSER INSTALLATION

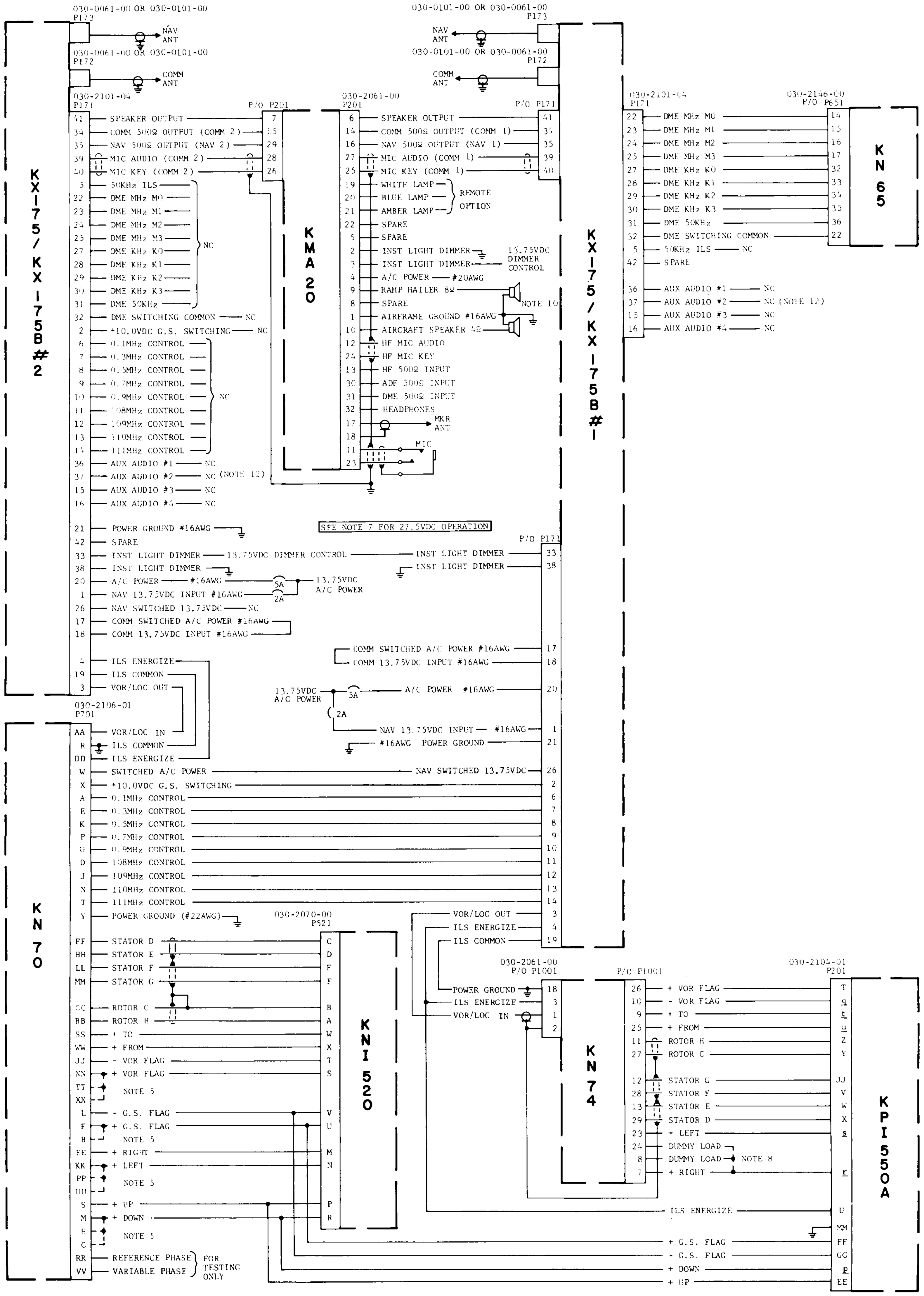


FIGURE 2-6 TSO'D SILVER CROWN SYSTEM INTERCONNECT
(DWG. NO. 155-1088-00 R-6)

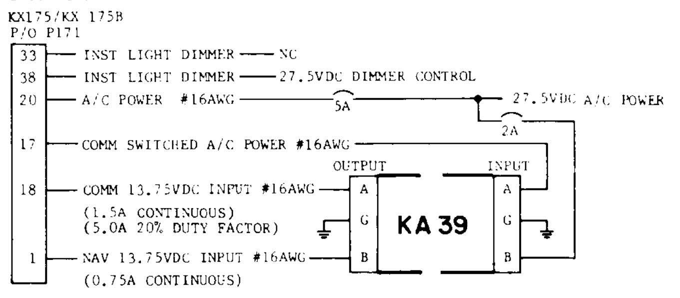
NOTES:

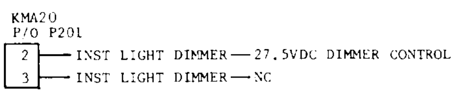
1. UNLESS NOTED, ALL WIRES #24AWG MINIMUM.
2. ALL ANTENNA COAX IS RG58A/U.
3. UNLESS OTHERWISE SPECIFIED, ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
4. THE KA47 MAY BE USED TO CONVERT KX175/KX175B DME SWITCHING OUTPUT TO CHANNEL 2 OUT OF 5CODE DME'S.
5. KN70 JUMPER PINS AS INDICATED FOR REQUIRED NUMBER OF EXTERNAL LOADS.

EXTERNAL LOADS	GLIDESLOPE		VOR/LOC	
	DEV	FLAG	DEV	FLAG
ONE	M H C	F B	KK PP UU	NN TT XX
TWO	M H	NONE	KK PP	NN TT
THREE	NONE		NONE	NONE

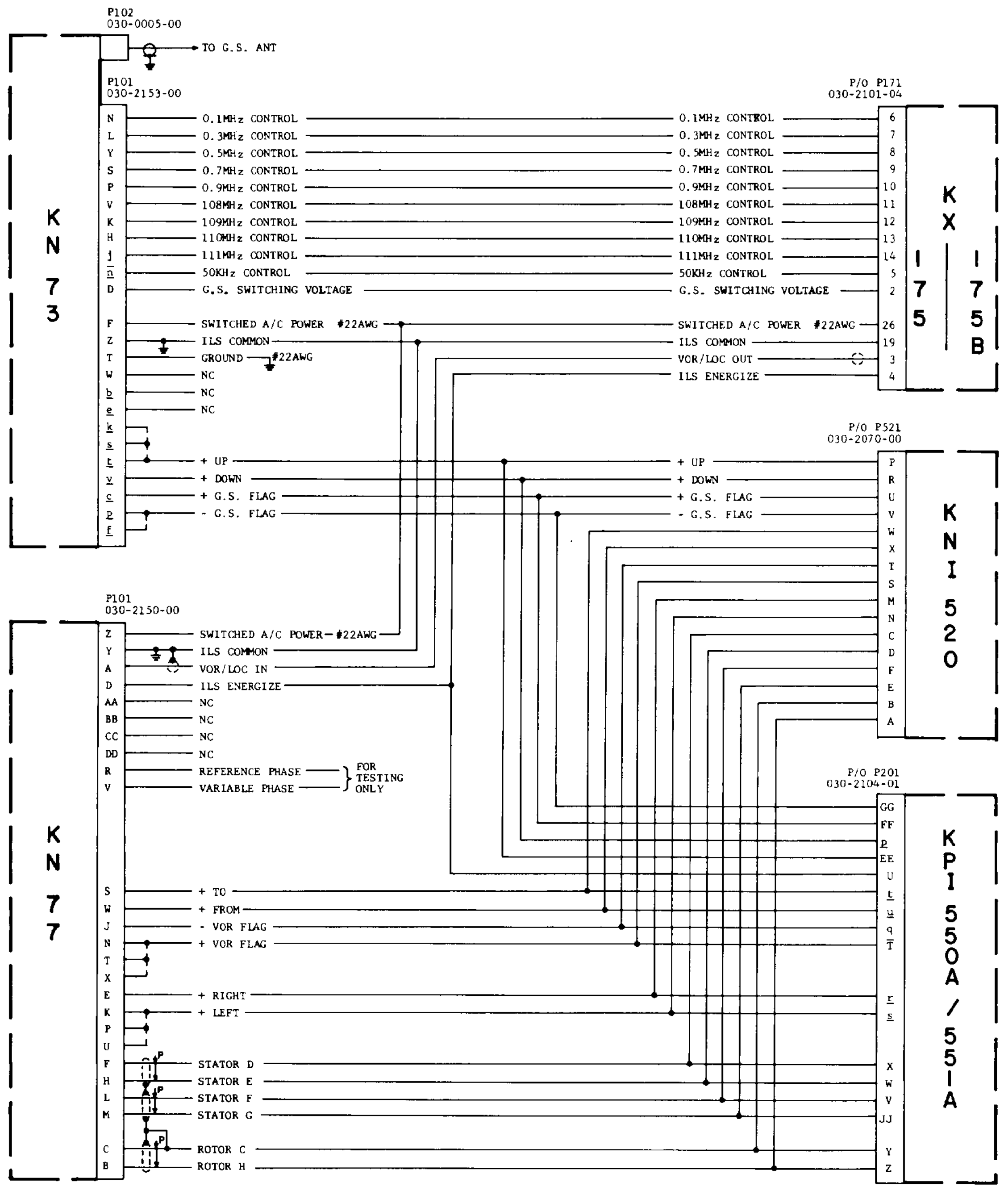
6. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.

7. 27.5VDC OPERATION





8. KN74 — FOR ONE INDICATOR JUMPER PINS 7, 8, AND 24.
FOR TWO INDICATORS JUMPER PINS 7 AND 8.
FOR THREE INDICATORS NO JUMPER REQUIRED.
9. KN65 DME INDICATOR (KI265) NOT SHOWN.
10. RAMP HAILER AND AIRCRAFT SPEAKER RETURN LEADS SHOULD BE CONNECTED TO PIN 1 AT KMA20.
11. EXTERNAL SWITCHING CAPABILITY: COMM - PIN 17 - NONE
NAV - PIN 26 - 300MA
12. AUXILIARY AUDIO #2 IS INTERCOM MIC INPUT ON KX175B.



NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #26AWG MINIMUM.
2. UNLESS NOTED, ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
3. JUMPER KN 77 PINS AS INDICATED FOR REQUIRED NUMBER OF EXTERNAL LOADS.

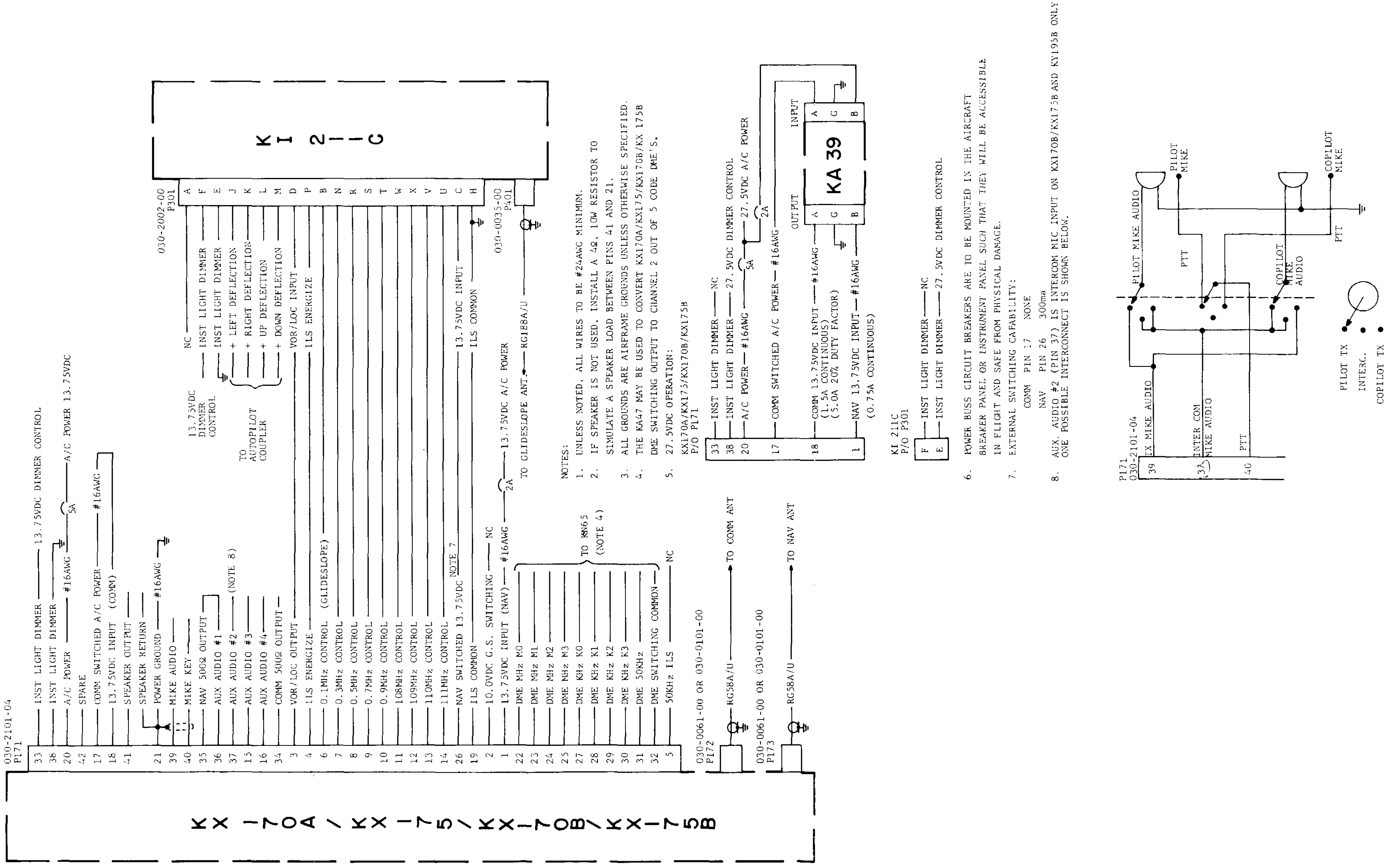
NUMBER OF EXTERNAL LOADS	VOR/LOC	
	DEV	FLAG
1	KPU	NTX
2	KP	NT
3	NONE	NONE

4. JUMPER KN 73 PINS AS INDICATED FOR REQUIRED NUMBER OF EXTERNAL LOADS.

NUMBER OF EXTERNAL LOADS	GLIDESLOPE	
	DEV	FLAG
1	tks	f p
2	t k	NONE
3	NONE	☒

5. RESOLVER PINS SHOWN CONNECTED TO BOTH KNI 520 AND KPI 550A ARE FOR REFERENCE ONLY. IN ACTUAL INSTALLATION ONLY ONE RESOLVER WILL BE WIRED TO KN 77.

FIGURE 2-7 KN 73/KN 77 INTERCONNECT
(DWG. NO. 155-1117-00 R-3)



NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. IF SPEAKER IS NOT USED, INSTALL A 4Ω, 10W RESISTOR TO SIMULATE A SPEAKER LOAD BETWEEN PINS 41 AND 21.
3. ALL GROUNDS ARE AIRFRAME GROUNDS UNLESS OTHERWISE SPECIFIED.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX175/KX170B/KX 175B DME SWITCHING OUTPUT TO CHANNEL 2 OUT OF 5 CODE DME'S.
5. 27.5VDC OPERATION:

KX170A/KX175/KX170B/KX175B
P/O P171

33	INST LIGHT DIMMER —— NC
38	INST LIGHT DIMMER —— 27.5VDC DIMMER CONTROL
20	A/C POWER — #16AWG — 5A — 27.5VDC A/C POWER (2A)
17	COMM SWITCHED A/C POWER — #16AWG
18	COMM 13.75VDC INPUT —— #16AWG (1.5A CONTINUOUS) (5.0A 20% DUTY FACTOR)
1	NAV 13.75VDC INPUT — #16AWG (0.75A CONTINUOUS)

KI 211C
P/O P301

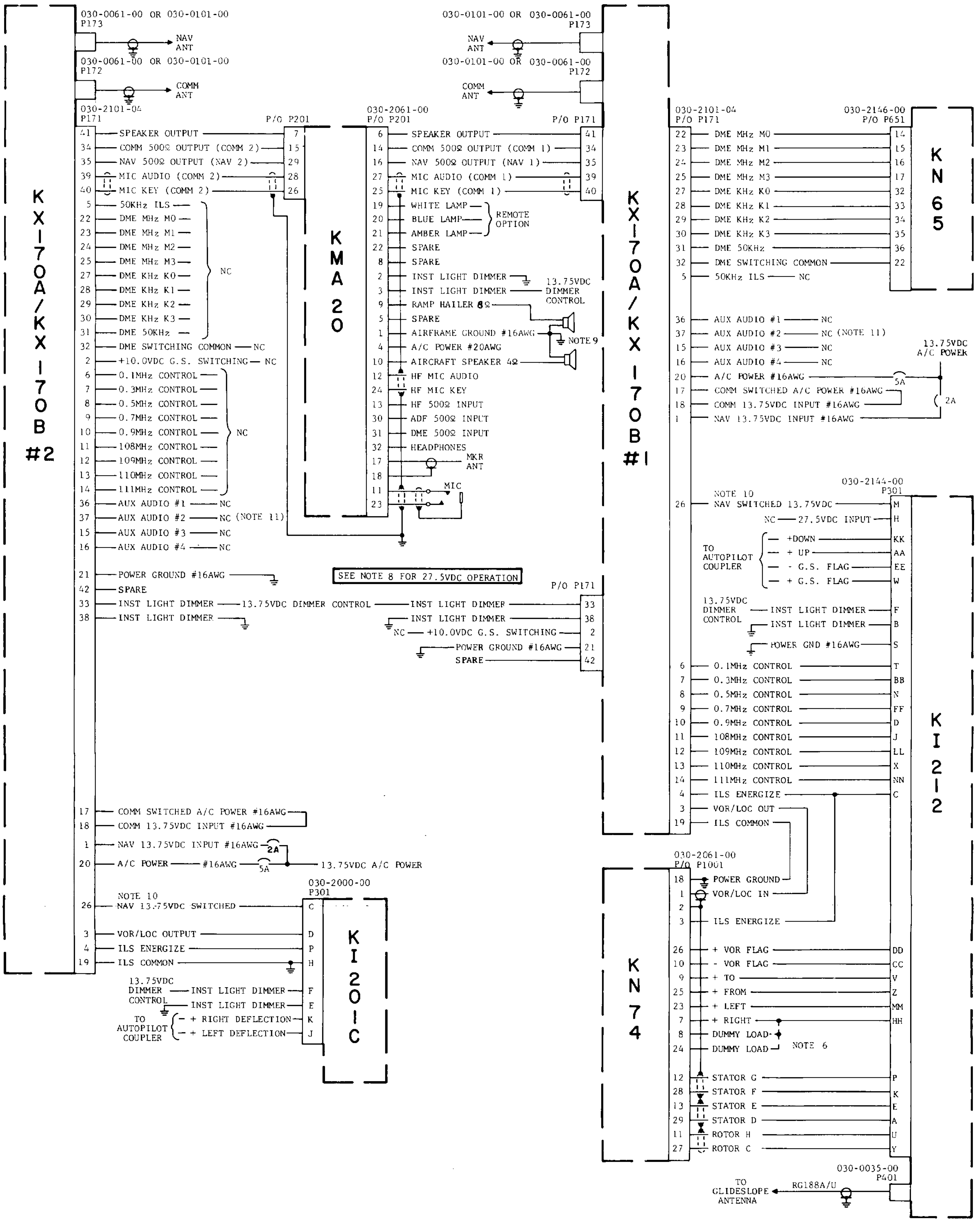
F	INST LIGHT DIMMER —— NC
E	INST LIGHT DIMMER —— 27.5VDC DIMMER CONTROL

6. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
7. EXTERNAL SWITCHING CAPABILITY:

COMM	PIN 17	NONE
NAV	PIN 26	300ma

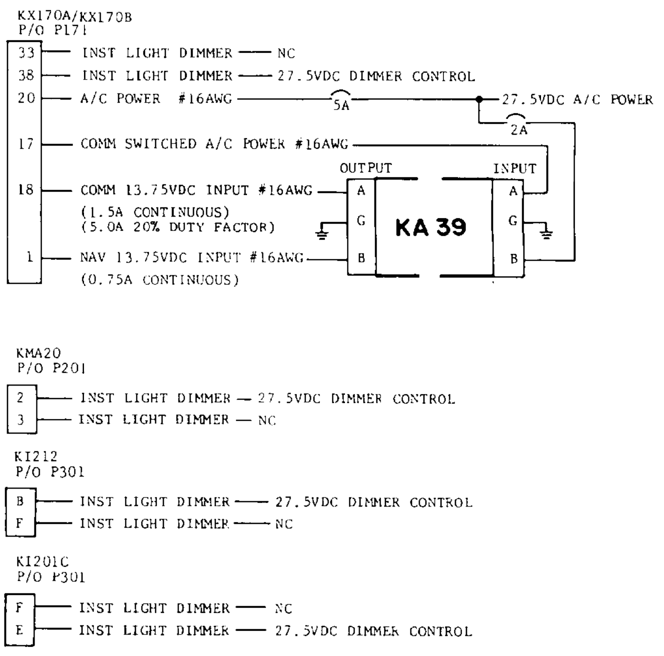
8. AUX. AUDIO #2 (PIN 37) IS INTERCOM MIC INPUT ON KX170B/KX175B AND KY195B ONLY. ONE POSSIBLE INTERCONNECT IS SHOWN BELOW.

FIGURE 2-8 KX 170B/175B INTERCONNECT
(DWG. NO. 155-1089-00 R-5)



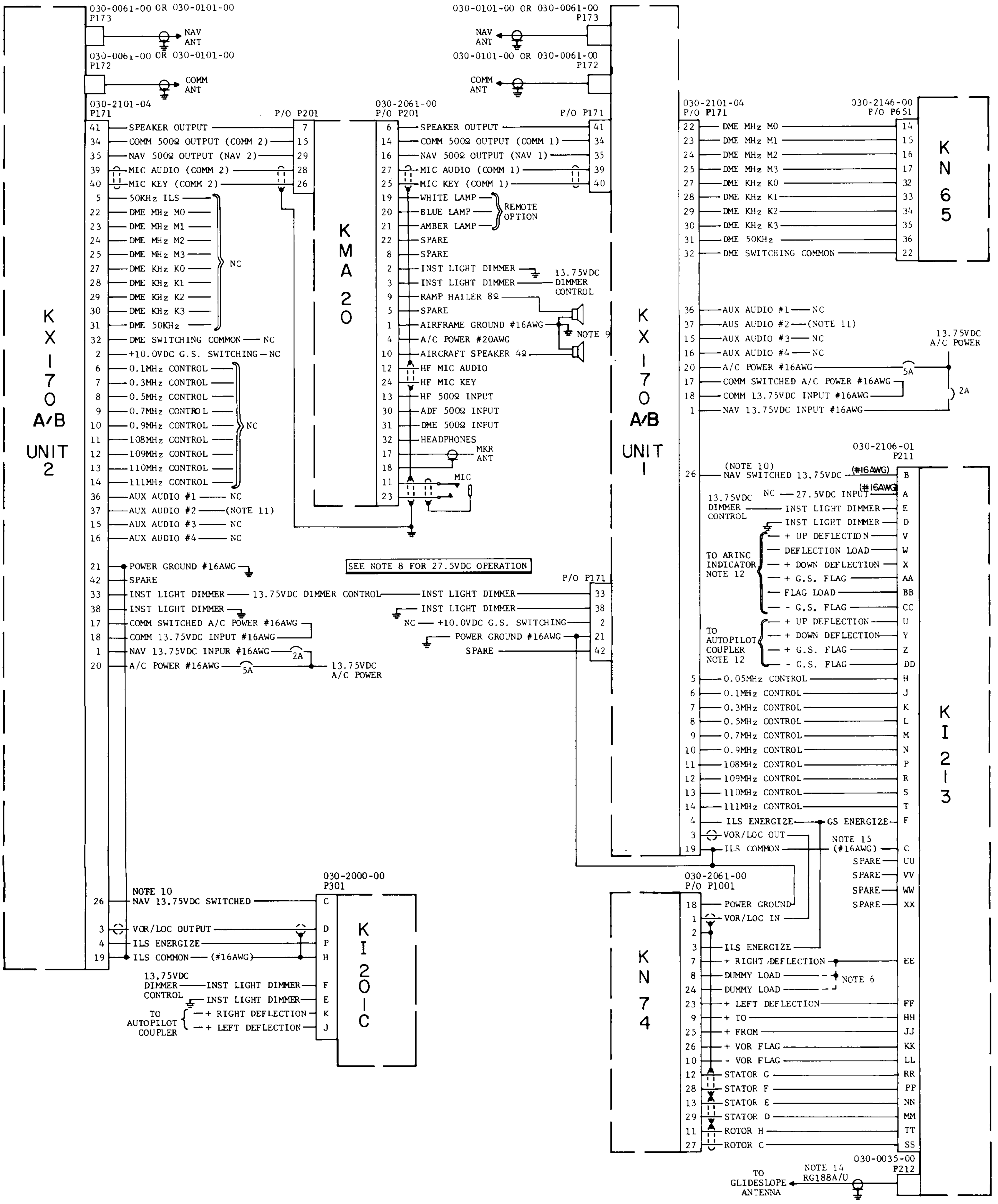
NOTES:

1. UNLESS NOTED. ALL WIRES #24AWG MINIMUM.
2. UNLESS NOTED, ALL ANTENNA COAX IS RG58A/U.
3. UNLESS SPECIFIED. ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX170B DME SWITCHING OUTPUT TO CHANNEL 2 OUT OF 5 CODE DME'S.
5. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
6. KN74: FOR ONE INDICATOR JUMPER PINS 7. 8. AND 24.
   FOR TWO INDICATORS JUMPER PINS 7 AND 8.
   FOR THREE INDICATORS NO JUMPER REQUIRED.
7. KN65 DME INDICATOR (KI265) NOT SHOWN.
8. 27.5VDC OPERATION



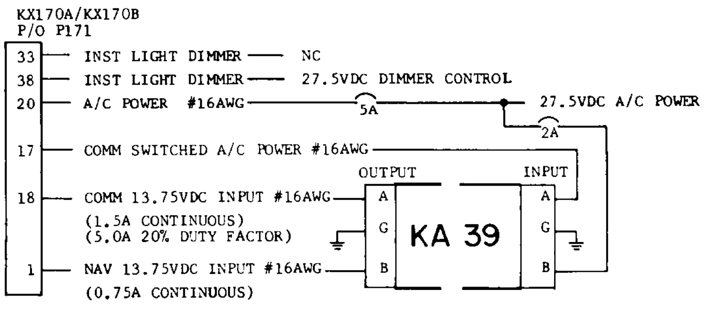
9. RAMP HAILER AND AIRCRAFT SPEAKER RETURN LEADS SHOULD BE CONNECTED TO PIN 1 AT KMA20.
10. EXTERNAL SWITCHING CAPABILITY: COMM - PIN 17 - NONE
    NAV - PIN 26 - 300MA
11. AUXILIARY AUDIO #2 IS INTERCOM MIC INPUT ON KX170B.

FIGURE 2-9 NON-TSO'D SILVER CROWN SYSTEM INTERCONNECT
(DWG. NO. 155-1090-00 R-8)



NOTES:

1. UNLESS NOTED; ALL WIRES #24AWG MINIMUM.
2. UNLESS NOTED; ALL ANTENNA COAX IS RG58A/U.
3. UNLESS SPECIFIED; ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX170B DME SWITCHING OUTPUTS TO CHANNEL THE KDM 700/A/705 DME'S.
5. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
6. KN74: FOR ONE INDICATOR JUMPER PINS 7, 8, AND 24.
   FOR TWO INDICATORS JUMPER PINS 7 AND 8.
   FOR THREE INDICATORS NO JUMPERS ARE REQUIRED.
7. KN65DME INDICATOR (KI265) NOT SHOWN.
8. 27.5VDC OPERATION:



9. RAMP HAILER AND AIRCRAFT SPEAKER RETURN LEADS SHOULD BE CONNECTED TO PIN 1 AT KMA20.
10. EXTERNAL SWITCHING CAPABILITY: COMM - PIN 17 - NONE
    NAV - PIN 26 - 300ma
11. AUX AUDIO #2 IS INTERCOM MIC INPUT ON KX170B.
12. THE KI213 HAS THE FOLLOWING EXTERNAL INDICATOR DRIVING CAPABILITY;

	VOR		GLIDESLOPE	
INDICATORS	FLAG	DEFLECTION	FLAG	DEFLECTION
ARINC	NONE	NONE	ONE JUMPER PINS AA & BB IF NOT USED	ONE JUMPER PINS V & W IF NOT USED
AUTOPILOT(HI Z)	NONE	NONE	ONE	ONE

13. COMPLETE INTERCONNECT INFORMATION FOR KN65 AND KN74 MAY BE FOUND IN THE RESPECTIVE INSTALLATION MANUALS.
14. GLIDESLOPE ANTENNA (KA 22 OR EQUIVALENT) MUST HAVE AIRFRAME GROUND.
15. ROUTE ILS COMMON AND POWER GROUND AWAY FROM COMM TRANSMITTER COAXIAL CABLES AND MAKE AIRFRAME GROUND NEAREST KX 170A/175/170B/175B. IF KA 39 IS USED, ROUTE OUTPUT PIN G WITH ILS COMMON AND POWER GROUND.

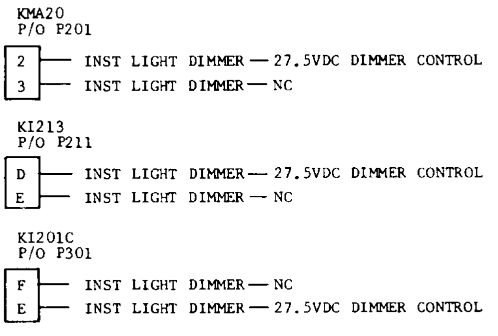
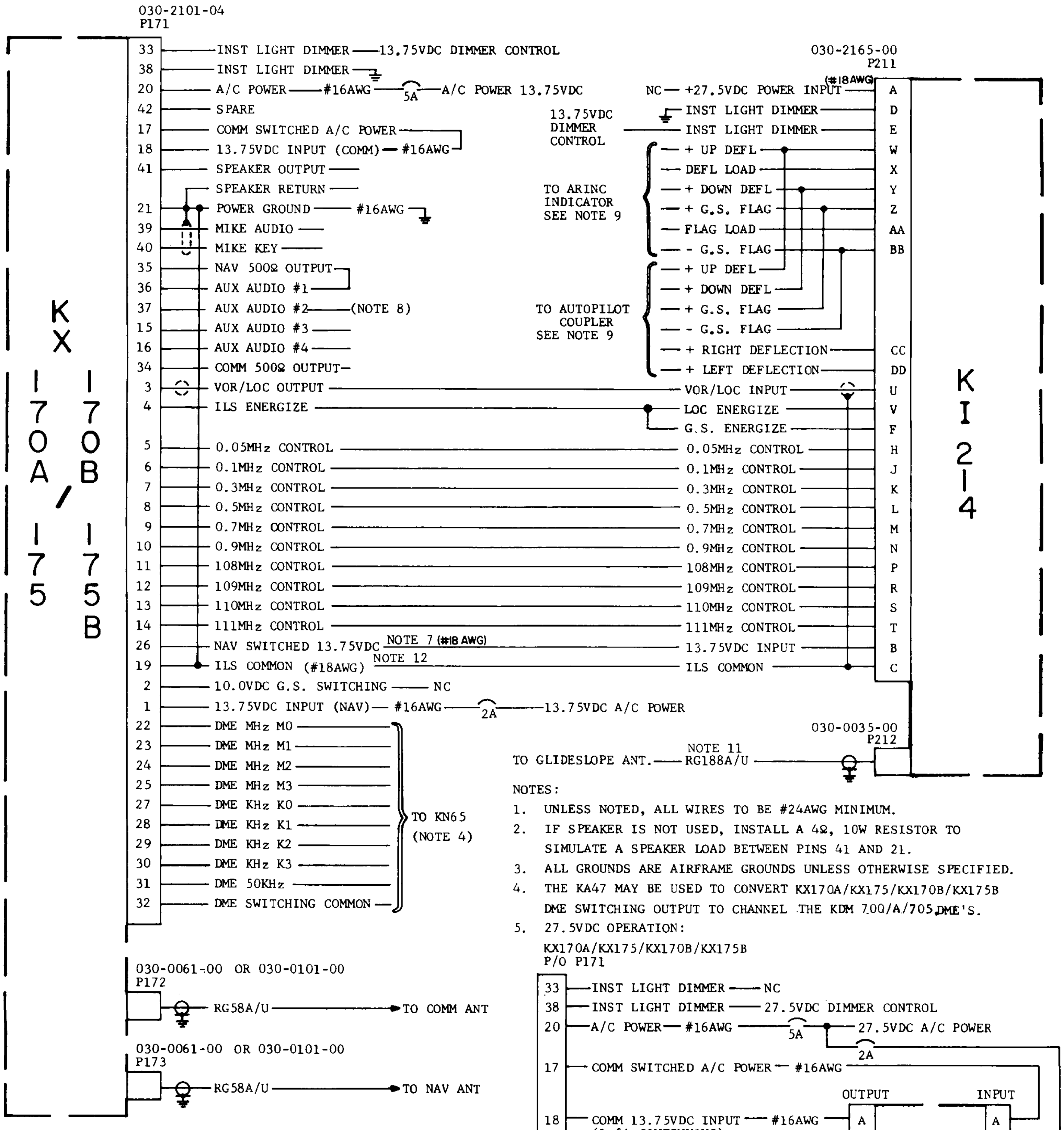
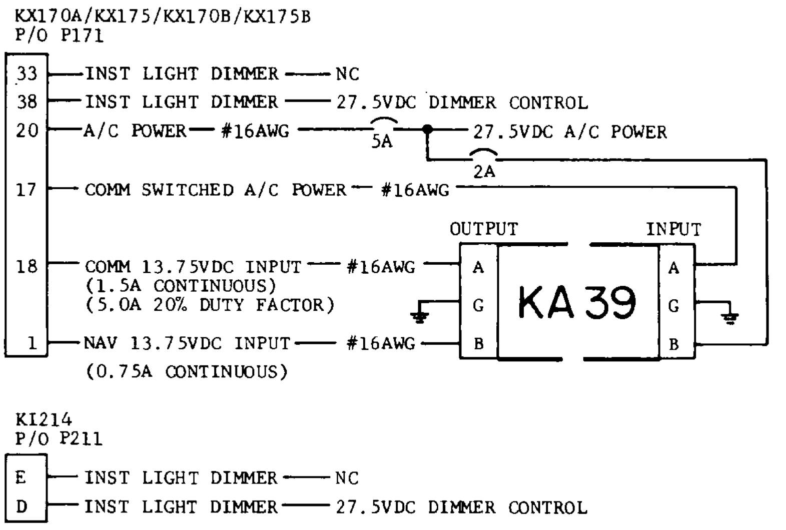


FIGURE 2-10 NOT TSO'S DUAL SILVER CROWN SYSTEM INTERCONNECT DIAGRAM
(DWG. NO. 155-1128-00 R-5)



NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. IF SPEAKER IS NOT USED, INSTALL A 4Ω, 10W RESISTOR TO SIMULATE A SPEAKER LOAD BETWEEN PINS 41 AND 21.
3. ALL GROUNDS ARE AIRFRAME GROUNDS UNLESS OTHERWISE SPECIFIED.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX175/KX170B/KX175B DME SWITCHING OUTPUT TO CHANNEL THE KDM 700/A/705 DME'S.
5. 27.5VDC OPERATION:



6. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
7. EXTERNAL SWITCHING CAPABILITY:

COMM	PIN 17	NONE
NAV	PIN 26	300ma

8. AUX AUDIO #2 IS INTERCOM MIC INPUT ON KX170B AND KX175B.
9. THE KI214 HAS THE FOLLOWING EXTERNAL INDICATOR DRIVING CAPABILITY:

	VOR		GLIDESLOPE	
INDICATORS	FLAG	DEFLECTION	FLAG	DEFLECTION
ARINC	NONE	NONE	ONE JUMPER PINS Z & AA IF NOT USED	ONE JUMPER PINS W & X IF NOT USED
AUTOPILOT(HI Z)	NONE	ONE	ONE	ONE

10. KI214 GLIDESLOPE AND LOCALIZER CAN BE ENERGIZED SIMULTANEOUSLY AS SHOWN OR ENERGIZED INDEPENDENTLY.
11. GLIDESLOPE ANTENNA (KA 22 OR EQUIVALENT) MUST HAVE AIRFRAME GROUND.
12. ROUTE ILS COMMON AND POWER GROUND AWAY FROM COMM TRANSMITTER COAXIAL CABLES AND MAKE AIRFRAME GROUND NEAREST KX 170A/175/170B/175B.
IF KA 39 IS USED, ROUTE OUTPUT PIN G WITH ILS COMMON AND POWER GROUND.

FIGURE 2-11 KX 170A/175/170B/175B/KI 214 INTERCONNECT DIAGRAM
(DWG. NO. 155-1129-00 R-4)

SECTION III

OPERATION

3.1 GENERAL

All controls required to operate the KX 170B/KX 175B are located on the unit front panel.

3.2 KX170B/KX 175B NAV/COMM CONTROLS

3.2.1 COMM ON-OFF TEST CONTROL

The ON-OFF-TEST control is located directly above the COMM channel selector. Power is supplied to the COMM when this control is either in the ON or TEST position. The TEST position is used to defeat the COMM automatic squelch for both test purposes and listening to extremely weak signals.

3.2.2 COMM VOLUME CONTROL

The Volume (VOL) control, located on the lower left side of the KX 170B/KX 175B is used to adjust the transceiver audio volume. The KX 170B/KX 175B system power ON/OFF switch is independent of this control, allowing the COMM volume to remain at a desired preset level.

3.2.3 COMM FREQUENCY SELECTOR

The two concentric knobs under the COMM frequency window are used to dial COMM frequencies. The larger knob selects MHz and the smaller knob selects kHz. The transceiver is inoperable in the two unused MHz positions between 118MHz and 135MHz. Clockwise rotation selects higher frequencies. The dial mechanism has no stops, permitting continuous rotation.

3.2.4 NAV OFF-VOICE-IDENT CONTROL

The OFF-VOICE-IDENT control is located directly above the NAV channel selector. Power is supplied to the NAV when this control is either in VOICE or IDENT position. NAV operation is independent of COMM. With the switch on IDENT, the ground station voice and identification tone are coupled to the aircraft speaker and/or headphone circuitry. With the switch on VOICE the identification tone is eliminated, permitting the pilot to monitor the VOR ground station for voice transmissions without receiving the VOR ident tone.

3.2.5 NAV VOLUME CONTROL

The navigation receiver volume (VOL) control, on the right side of the KX 170B/KX 175B is used to control the level of the audio and/or identification tone output from the navigation receiver. This control is also independent of the system power switch allowing the NAV volume to remain at a desired preset level.

3.2.6 NAV FREQUENCY SELECTOR CONTROLS

The two concentric knobs under the NAV frequency window are used to dial NAV frequencies. The larger knob selects MHz and the smaller knob kHz. Clockwise rotation selects higher frequencies. Remote DME, Glideslope, and ILS channeling are also performed by this control.

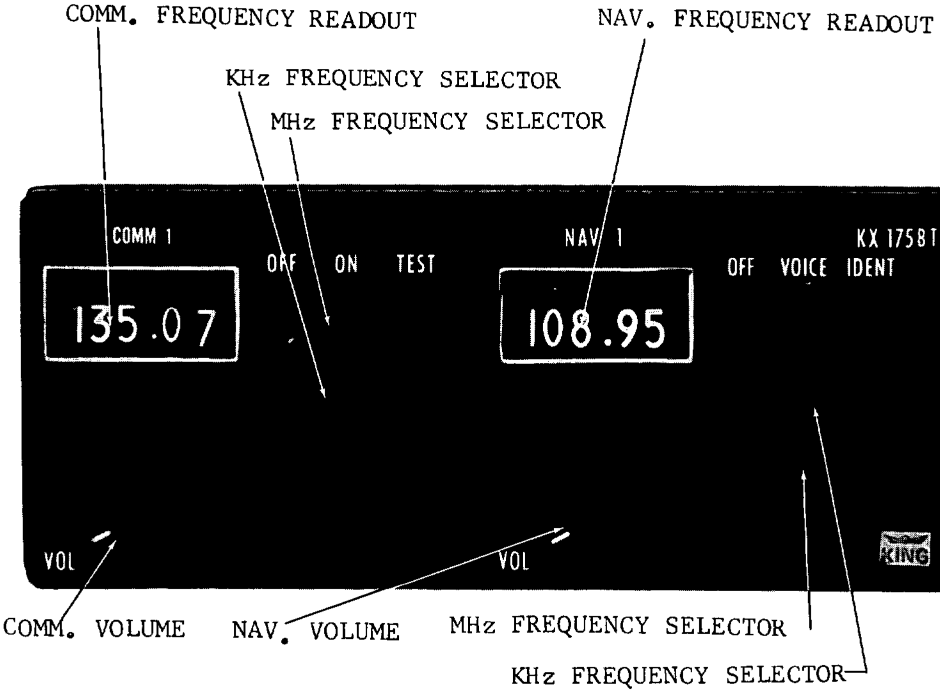


FIGURE 3-1 KX 170B/175B CONTROL FUNCTIONS

3.3 POST-INSTALLATION CHECKOUT

An operational performance flight test is recommended after the installation is completed to insure satisfactory performance of the equipment in its normal environment.

To check the communications transceiver, maintain an appropriate altitude and contact a ground station facility at a range of at least fifty nautical miles. Contact a ground station close in. Place the squelch knob in the test position and listen for any unusual electrical noise which would reduce the COMM receiver sensitivity by increasing the squelch threshold. If possible, verify the communications capability on both the HIGH and LOW ends of the VHF COMM band.

To check the VOR/ILS System select a VOR frequency within a forty nautical mile range. Listen to the VOR audio and insure that no electrical interference such as magneto noise is present. Check the tone identifier filter operation. Fly inbound or outbound on a selected VOR radial and check for proper LEFT-RIGHT and TO-FROM indications. Check the VOR accuracy.

—NOTE—

At low altitudes VOR ground station scalloping may be present.

Flight test the ILS operation by flying a simulated ILS approach. Check localizer LEFT-RIGHT deflection and, if applicable, glideslope deflection. Check the localizer accuracy in relation to the ILS runway. Check the glideslope accuracy in relation to the published ILS approach altitude.

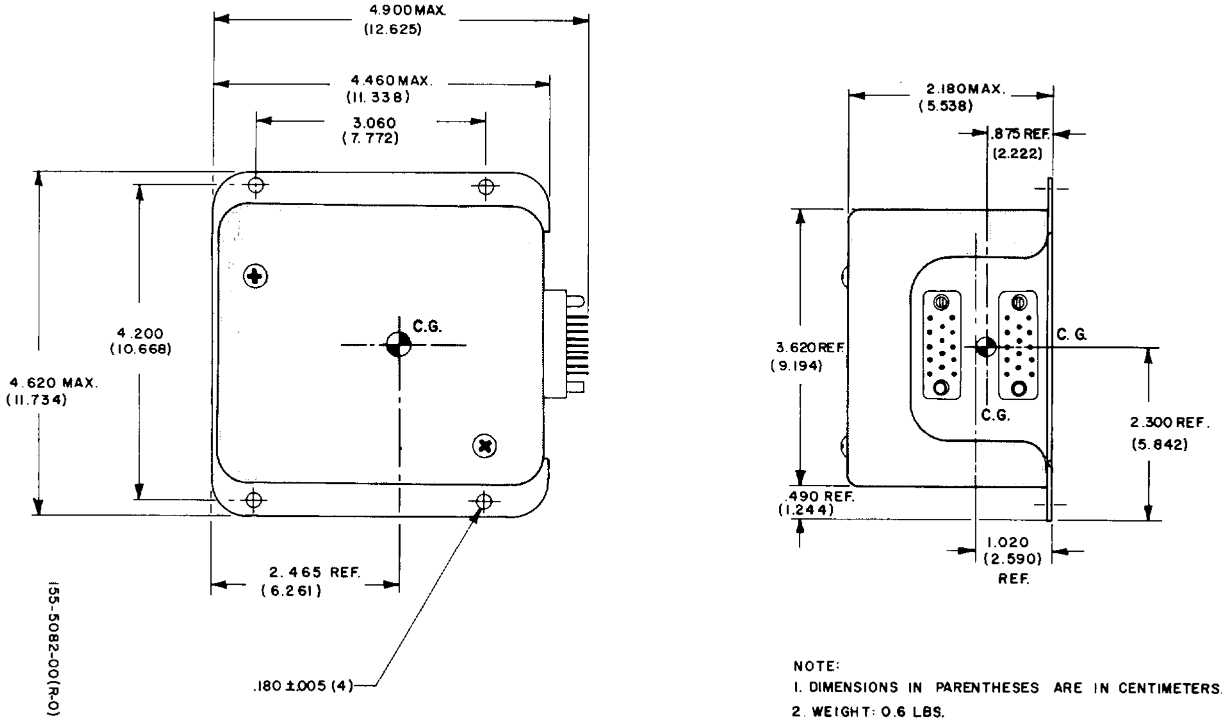
SECTION IV

KA 47

4.1 GENERAL

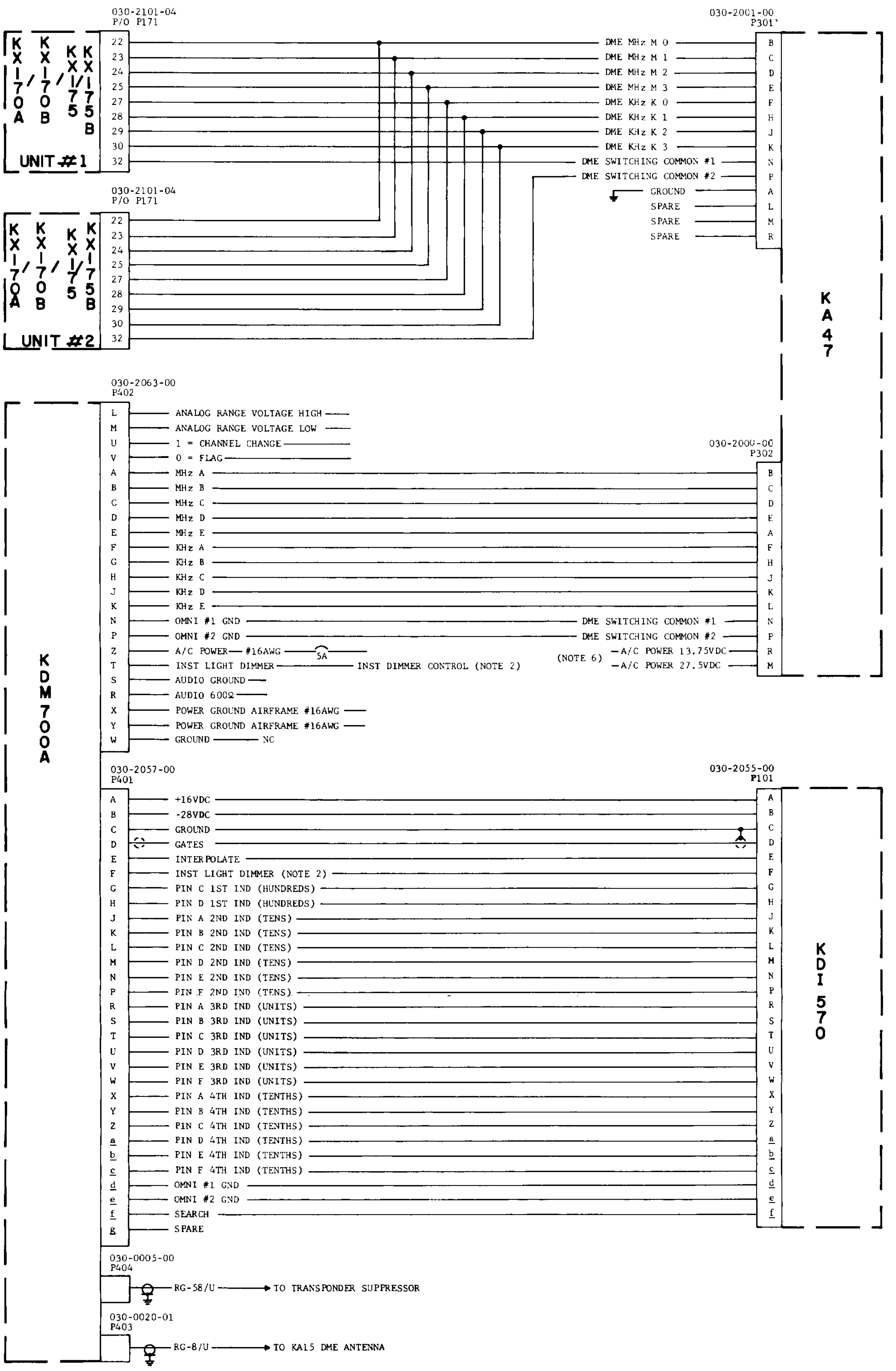
The purpose of the King KA 47 is to convert the King KN 65 shift code obtained from the King KX 170A/175/KX 170B/KX 175B to the standard ARINC 2 out of 5 DME code used in the King KDM 700A. It is designed to be mounted next to the remote mounted DME equipment, and pin A from J301 should be grounded at the same point as the DME ground. The power requirement is either 13.75VDC or 27.5VDC at 225 ma.

Standard digital troubleshooting techniques may be used in troubleshooting the King KA 47.



NOTE:
1. DIMENSIONS IN PARENTHESES ARE IN CENTIMETERS.
2. WEIGHT: 0.6 LBS.

FIGURE 4-1 OUTLINE AND MOUNTING DIAGRAM
(DWG. NO. 155-5082-00 R-0)



NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. INST LIGHT DIMMER CONTROL CAN RUN FROM PIN F OF KDI570 TO AIRCRAFT LIGHT DIMMER CONTROL.
3. PARTIAL INTERCONNECT OF KX170A/KX175/KX170B/KX175B SHOWN. REFER TO KX170A/KX175B INSTALLATION MANUAL (006-0057-XX), OR KX170B/KX175B INSTALLATION MANUAL (006-0085-XX) FOR COMPLETE INTERCONNECT INFORMATION.
4. IF CABLING BETEEN KDM700A AND KDI570 IS TO BE LONGER THAN 5 FEET, AND IS IN CLOSE PROXIMITY TO OTHER EQUIPMENT OR CABLES, IT IS RECOMMENDED THAT IT BE LACED OR SLEEVED SEPARATELY AND NOT INTERWOVEN WITH OTHER WIRING.
5. KA47 SHOULD BE MOUNTED ADJACENT TO THE DME AND THE GROUND WIRE OF THE KA47 SHOULD BE GROUNDED AT THE SAME POINT AS THE DME GROUND.
6. FOR 27.5VDC INSTALLATION, CONNECT PIN Z OF P402 (KDM700A) TO PIN M OF P302 (KA47). FOR 13.75VDC INSTALLATION, CONNECT PIN Z TO PIN R OF P302.
7. UNLESS NOTED, ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
8. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.

FIGURE 4-2 KA 47 INTERCONNECT DIAGRAM
(DWG. NO. 155-1102-00 R-2)

MAINTENANCE/OVERHAUL MANUAL

KX 170B/KX 175B
NAV/COMM
TRANSCEIVER

KING RADIO CORPORATION®

400 NORTH ROGERS ROAD OLATHE, KANSAS, U.S.A.

KING
KX 170B/KX 175B
NAVIGATION RECEIVER/
COMMUNICATIONS TRANSCEIVER

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KING

KX 170B/KX 175B
NAVIGATION RECEIVER/
COMMUNICATIONS TRANSCEIVER

KING

KX 170B/KX 175B
NAVIGATION RECEIVER/
COMMUNICATION TRANSCEIVER

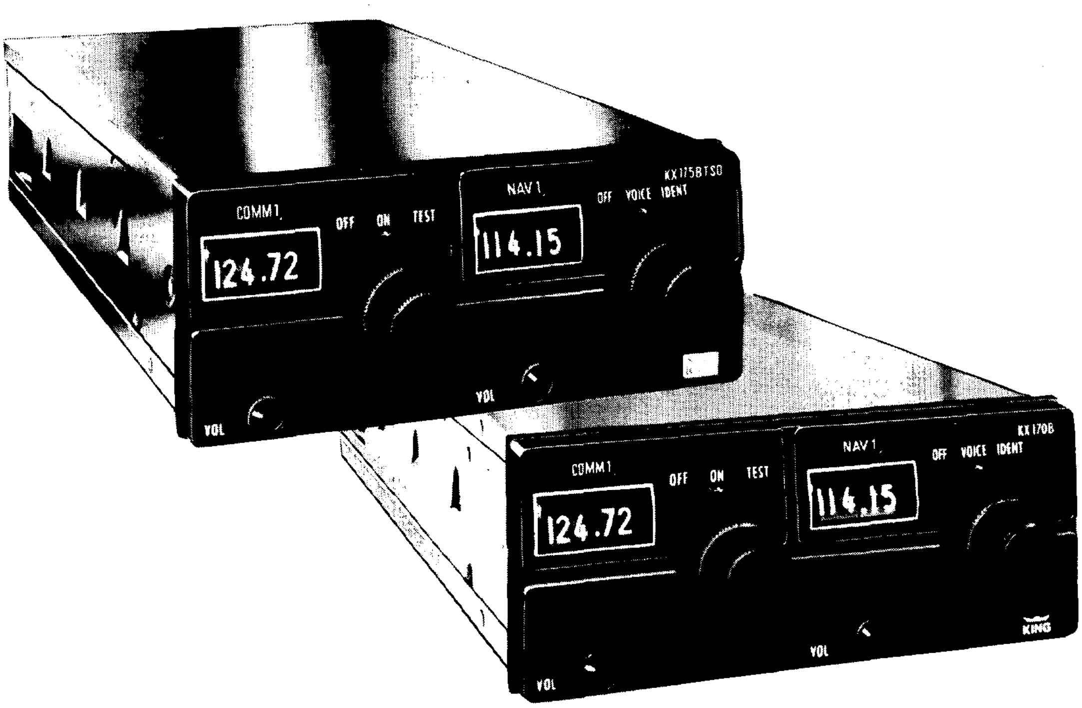


FIGURE I KX 170B/KX 175B
(Dwg. No. 696-6123-00)

SECTION IV

THEORY OF OPERATION

4.1 General

The KX 170B/KX 175B unit incorporates a 200 channel navigation receiver, a 720 channel communications transceiver and a 5 watt audio system.

For discussion purposes, the KX 170B/KX 175B system is split into subsystems and treated on the basis of block diagram theory and detailed circuit theory. Subsystems are defined as Frequency Synthesizers (COMM and NAV), COMM Transceiver and NAV Receiver.

4.2 Frequency Synthesizers

4.2.1 SMO BLOCK DIAGRAM

4.2.1.1 Simplified Block Diagram.

The KX 170B/KX 175B uses a stabilized master oscillator (SMO) for frequency generation. A feedback loop is used to slave a voltage controlled oscillator (VCO) to the selected multiple frequency of a crystal controlled reference oscillator. The simplified block diagram of Figure 4-1 illustrates the principle of operation of the COMM SMO and NAV SMO.

The VCO output frequency is divided by two, mixed with the High Frequency Crystal Oscillator, divided by N, and compared in frequency and phase with the Low Frequency Crystal Oscillator. The filtered error signal biases the VCO. The error signal is a high voltage when the VCO frequency is low and a low voltage when the VCO frequency is above the desired frequency. According to the VCO transfer function (Figure 4-2b) this error signal drives the VCO toward the selected frequency. When the VCO gets near the desired frequency, the loop captures the VCO and pulls it into phase lock ($f_{VCO} = f$ selected). In this condition the loop establishes an error signal that is a 25KHz square wave. The low pass filter recovers the dc component and biases the VCO to maintain the selected output frequency. The square wave duty factor, and thus the filtered D-C VCO bias voltage, varies according to the selected VCO frequency. Transfer functions of the various blocks are illustrated in Figure 4-2.

4.2.1.2 NAV SMO Block Diagram.

The NAV SMO is a 200 channel frequency synthesizer covering the band from 92.8125-102.7625MHz in 50KHz steps. The block diagram is the red shaded portion of Figure 5-24. The basic frequencies appearing in the NAV SMO are tabulated in Table 4-2 and also appear on the block diagram.

The VCO converts a dc bias voltage to a VHF frequency. The buffer amplifiers isolate the VCO from reverse conducted electrical interference signals and provide 10mw output levels for mixer injection. The Implicit Divide by Two circuit halves the VCO frequency. A mixer is used to heterodyne the halved VCO frequency and the High Frequency Reference Oscillator. The Mixer Low Pass Filter passes the difference frequency and filters any spurious mixer products. In the Squaring Amplifier the analog difference frequency is amplified and clipped to provide a 4.5V square wave. The Programmable Divider generates one output pulse for every N input pulses. Selection of the divide ratio, N, is determined by the wafer switch coding. The 400KHz Reference Oscillator is divided by 16 in the Phase and Frequency Comparator block to obtain a 25KHz reference. This block also compares the Programmable Counter output in frequency and phase with the 25KHz reference frequency and generates an appropriate feedback signal to slew the loop until

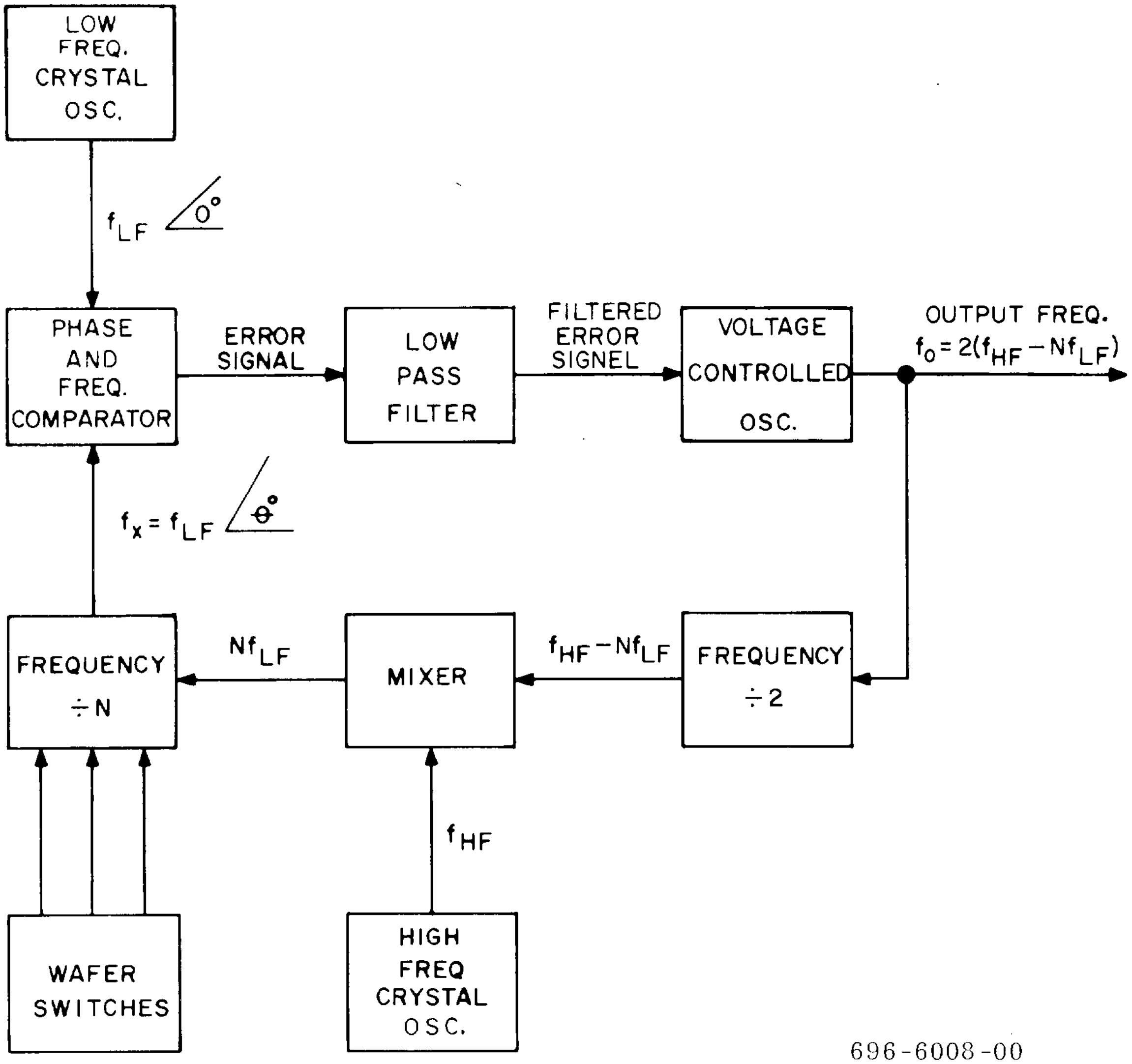


FIGURE 4-1 KX 170B/KX 175B SIMPLIFIED SMO BLOCK DIAGRAM
(Dwg. No. 696-6008-00)

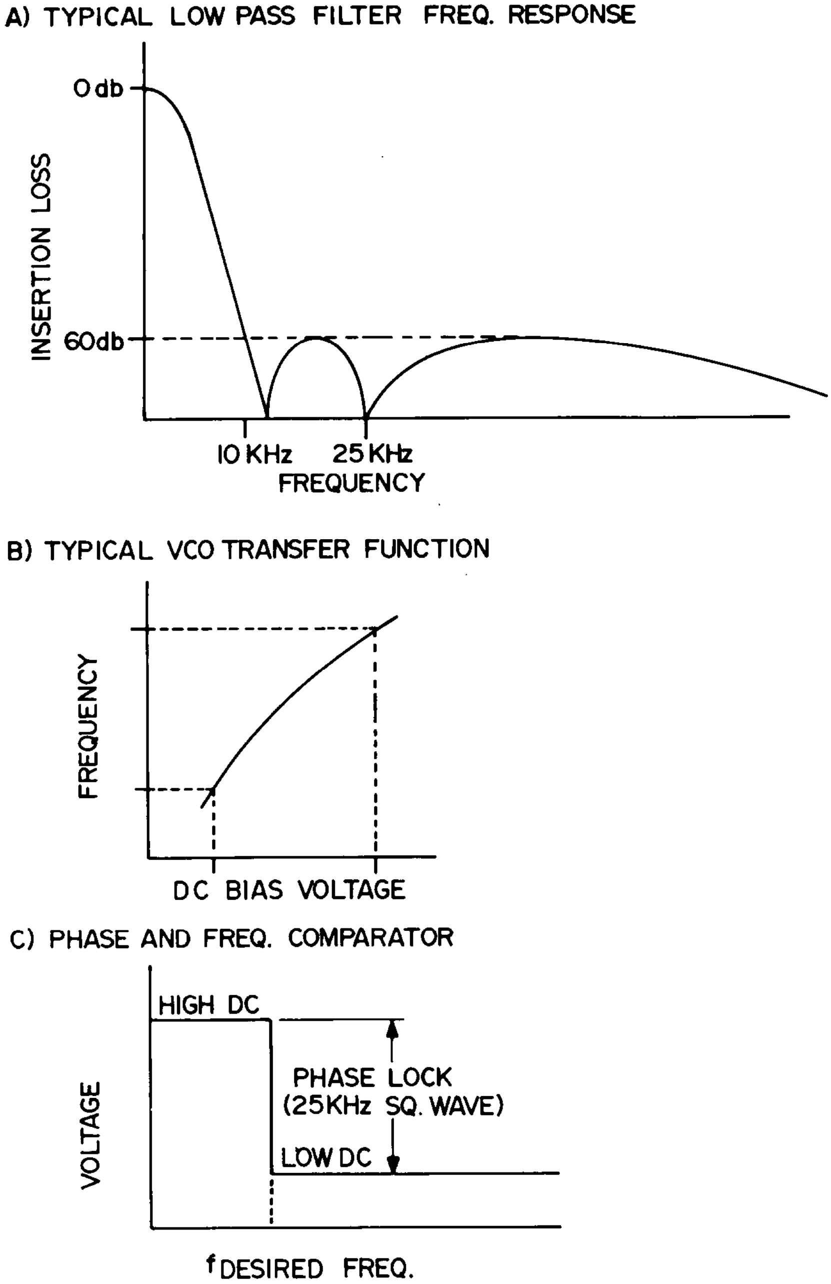


FIGURE 4-2 TYPICAL LOOP TRANSFER FUNCTIONS
(Dwg. No. 696-6108-00)

this variable frequency is locked to the 25KHz reference. The Voltage Translator shifts the level of the error voltage from the Phase and Frequency Comparator. The VCO Low Pass Filter is used to recover the D-C component of the phase detected, variable duty cycle, 25KHz square wave and to provide steady state and dynamic loop stabilization. The formula for the synthesized frequency is: $f_{VCO} = 2\ (53.93125 - .025N)$ MHz where N may be any number from 102 to 301.

4.2.1.3 COMM SMO Block Diagram.

The COMM SMO is a 720 channel, frequency synthesizer covering the band of frequencies from 118.000 to 135.975MHz in 25KHz steps. The block diagram is the red shaded portion of figure 5-25. The basic frequencies appearing in the COMM SMO are tabulated in Table 4-2 and also appear on the block diagram.

Basic theory of the NAV SMO (Section 4.2.1.2) applies to the COMM SMO. In order to obtain 720 channels and transmit-receive sidestep transitions, the COMM band is split into two 9MHz Bands (118.000 - 126.975MHz and 127.000 - 135.975MHz). Requirements for T/R switching are summarized in Table 4-1.

	Selected Band	Selected Band
	118.00-126.975MHz	127.00-135.975MHz
Transmit	VCO = 118.00-126.975MHz	VCO = 127.00-135.975MHz
Receive	VCO = 127.00-135.975MHz	VCO = 118.00-126.975MHz

TABLE 4-1 T-R SWITCHING REQUIREMENTS

NAV		COMM	
		SMO HIGH BAND	SMO LOW BAND
Selected Channel (50KHz steps NAV) (25KHz steps COMM	108.00 - 117.95MHz	118.00 - 126.975R MHz 127.00 - 135.975T	127.00 - 135.975R MHz 118.00 - 126.975T
VCO Frequency (50KHz steps NAV) (25KHz steps COM)	92.8125 - 102.7625MHz	127.000 - 135.975MHz	118.000 - 126.975MHz
Implicit ÷ 2 Freq. (25KHz steps NAV) (12.5KHz steps COM)	46.40625 - 51.38125MHz	63.500 - 67.9875MHz	59.000 - 63.4875MHz
H. F. REF Freq.	53.93125MHz	71.0375MHz	66.5375MHz
Mix Output Freq.	7.525 - 2.550MHz	7.5375 - 3.050MHz	7.5375 - 3.050MHz
Divide Ratio	301 - 102	301.5 - 122	301.5 - 122
L. F. REF Freq.	$\frac{400\text{KHz}}{16} = 25\text{KHz}$	$\frac{400\text{KHz}}{16} = 25\text{KHz}$	$\frac{400\text{KHz}}{16} = 25\text{KHz}$
Approx. VCO Bias	2.95 - 7.20 Volts	2.50 - 7.00 Volts	2.50 - 7.00 Volts
Approx. Receiver tuning Voltage.	2.95 - 7.20 Volts	2.95 - 7.80	
1st I. F. Freq.	15.1875MHz	9.0000MHz	
2nd I. F. Freq.	1.1857MHz	861.2500KHz	
2nd L. O. Freq.	14.0018MHz	8.13875MHz	

TABLE 4-2 FREQUENCIES APPEARING IN THE KX 170B/KX 175B

The phase locked loop synthesizes 360 channels in each 9MHz band and is switched between high and low bands with the High Reference Oscillator crystals and the VCO band switch. This system provides 720 channels with a 180 digit counter and fast T-R transitions without requiring special coding of the Programmable Divider. Note that the receiver uses a combination of high and low side injection and that the first I-F frequency is restricted to 9.0MHz.

The Out of Lock Disable block turns off the receiver buffer and transmitter buffer when the SMO is out of lock. The VCO is disabled in the two unused MHz positions of the frequency selector.

Formulas for the synthesized frequencies are:

(Low band) $f_{VCO} = 2\ (66.5375 - .025N)$ MHz

(High Band) $f_{VCO} = 2\ (71.0375 - .025N)$ MHz

where N is any selected number from 122 to 301.5.

4.2.2 SMO Circuit Theory

4.2.2.1 Balanced Mixer - NAV (COMM)

T206, T207, CR207 thru CR210 (T304, T306, CR309 thru CR310) and associated components form the balanced mixer. The balanced mixer configuration was chosen to minimize spurious generation and to provide isolation between the digital circuitry, the VCO, and the high reference oscillator.

4.2.2.2 Mixer Low Pass Filter - NAV (COMM)

C239, C240, and L204 (C375, C376, and L305) form the mixer low pass filter, which is used to remove high frequency mixer products.

4.2.2.3 Squaring Amplifier

Q208 and Q209 (Q312, and Q313) are used in a complementary configuration to provide wide band amplification and clipping. The output waveform is a 4 volt square wave.

4.2.2.4 400KHz Reference Oscillator - NAV (COMM)

Q210, Q211, Y202 (Q315, 316, Y303 - KX 175B Only) and associated components form the low frequency reference oscillator. The 400KHz reference signal is applied to both the NAV and COMM phase and frequency discriminator circuits.

4.2.2.5 Programmable Divider - NAV

The KX 170B/KX 175B NAV Programmable Divider is identical to the KX 170A/KX 175 NAV Programmable Divider. Refer to the KX 175 Maintenance Manual Section IV for NAV Programmable Divider Circuit Theory, and Figure 5-27 of this section for the NAV SMO schematic and component placement.

4.2.2.6 Programmable Divider (COMM Figure 5-29)

The programmable divider consists of an input inhibit circuit (25KHz Section, I309 and I303C) and three synchronous, cascaded counter blocks; divide by 2 (50KHz Section, I301), divide by 10 (100KHz Section, I303D, I304B, and I306), and divide by 15 (MHz Section, I302, I303A, and I304A). The divide by 2, 10 and 15 provides 300 counter states (2x10x15). The input inhibit provides one additional state by inhibiting the input for one pulse. Since one input pulse is used to strobe preset information into the registers, the counter has a total of 302 available states (2x10x15) +1+1. Each input pulse steps the counter to the next state. To divide by N, the counter is preset N states away from the load state. After N input pulses, the load state is reached and an output pulse is generated. The counter is preset and the cycle is repeated. To divide by N +.5, the sequence is the same as that above except that for every other output pulse, the input to the counter is inhibited for one input pulse. That is, the counter will alternately divide by N and N+1, the average result is N+.5. The division ratios for the COMM SMO are 301.5 to 122. The chart relating preset state and selected channel for the COMM SMO appears in Table 4-3.

N_1	MHz Preset	M_o	M_1	M_2	M3
280	118, 127	1	1	0	1
260	119, 128	1	1	1	0
240	120, 129	0	1	1	1
220	121, 130	0	0	1	1
200	122, 131	0	0	0	1
180	123, 132	0	0	0	0
160	124, 133	1	0	0	0
140	125, 134	0	1	0	0
120	126. 135	1	0	1	0
100		0	1	0	1
80		0	0	1	0
60		1	0	0	1
40		1	1	0	0
20		0	1	1	0
Load State		1	0	1	1

N_2	KHz Preset	K_{oo}	K_o	K_1	K_2	K3
20	.025	1	1	1	1	0
19	.075	0	1	1	1	0
18	.125	1	0	1	1	1
17	.175	0	0	1	1	1
16	.225	1	0	0	1	1
15	.275	0	0	0	1	1
14	.325	1	0	0	0	1
13	.375	0	0	0	0	1
12	.425	1	0	0	0	0
11	.475	0	0	0	0	0
10	.525	1	1	0	0	0
9	.575	0	1	0	0	0
8	.625	1	1	1	0	0
7	.675	0	1	1	0	0
6	.725	1	0	1	1	0
5	.775	0	0	1	1	0
4	.825	1	1	0	1	1
3	.875	0	1	0	1	1
2	.925	1	1	1	0	1
1(Load State)	.975	0	1	1	0	1

N_3	KHz Preset	K_{o1}
0.5	-.025	1
0.0	- 0.0	0

SELECTED FREQUENCY DIVISION(N) $=N_1+N_2+N_3+1$
TABLE 4-3

Figure 5-29 shows the integrated circuits as they appear on the COMM SMO Printed Circuit Board and the COMM SMO schematic. The counter timing diagram appears in figures 5-21 and 5-22.

With the KHz knob set to the .X25 or .X75 positions (K_{o1} =O, I303 Pin 8 =1), the operation of the KHz sections of the COMM and NAV Programmable Dividers are identical. I301B presets I301A when the counter reaches the load state. During normal operation the J inputs, pins 13 and 14 are high, the $\overline{K}$ input, pin 12 is high, and I301B remains with Q high regardless of the K_{oo} input to pin 11. When the load state is reached, pin 6 of I304 goes negative. If the preset input, I301 pin 11 is high, the preset clock-pulse will drive Q of I301B low. If the preset input, pin 11, has been low the next pulse would leave Q of I301B high. If pin 10 (Q) remains high then the K input to I301A remains high and I301A continues to act as a toggle flip-flop. However, if pin 10 goes low, I301A automatically shifts a high state to the Q output at pin 6. The divide by 2 function and the preset waveform are illustrated in Figure 5-21 and 5-22.

With the KHz knob set to the .X00 or .X50 positions (K_{o1} = 1), the operation of the divider is as follows. I309B divides the output of the programmable divider by 2. When I301B Q output (pin 9) goes to a "O", I309A is reset to $\overline{Q}$ ="1" (pin 6) and I303 pin 8 remains a "1". Operation of the divider is as described above. When the next divider output pulse occurs, I309B, Q (pin 9) output is clocked to a "1", I309A, $\overline{Q}$ remains at a "1" and I303 pin 8 goes to a "O" inhibiting I301. (J and K inputs = "O", therefore I301 will not change state). When the next input clock pulse occurs, I309A is toggled to $\overline{Q}$ = "O" and I303, pin 8 goes to a "1", enabling I301. The divider now returns to normal operation and the cycle is repeated. By inhibiting the divider for one clock pulse every other time the XXX. 5 average division ratios are accomplished.

The 9300 is a synchronous, 4 flip-flop shift register. Serial entry is available through the J-$\overline{K}$ inputs during positive clock transitions. Parallel entry is through P_0, P_1, P_2, and P_3 inputs when simultaneouslv: the Parallel Enable (PE) port is low and the clock pulse (Cp) makes a positive transition. Outputs $Q_0, Q_1, Q_2, Q_3, \overline{Q}3$ and an asynchronous master reset (MR) are externally available.

I303D and I306 (KHz 9300) are connected to provide a 10 state shift counter (100KHz portion of divider). I304B is used to monitor $\overline{Q}$ of I301A and Q_0, Q1 and Q_3 of I306. When the 4 inputs are high, the output goes low. The next clock pulse toggles I301A causing the output of I304B to go high providing the clock pulse to I302 (MHz 9300). I304B provides 1 output pulse for every 20 input pulses to I301A. See Figures 5-21 and 5-22.

I302 (MHz 9300) is wired to provide a 15 state counter. I304A monitors the inverted clock pulse and Q_0, Q_2, and Q_3 of I302. The counter load state occurs when all of these inputs are high. In the load state I304 pin 6 goes to a "O", providing a parallel enable to I301, I302, I306, and I309. The next clock pulse transition strobes in the preset information.

4.2.2.7 Phase and Frequency Comparator - COMM (NAV)

I310, I311, and I312 (I210, I211, I212) form the phase and frequency comparator. The schematic and component placement is shown in figure 5-29 (5-27) and the timing diagram in figure 5-23.

The 400KHz low frequency reference oscillator is divided by I310 (I210) to provide a 25KHz reference. I311 (I211) C and D form a set-reset flipflop. This flip flop is used to provide phase comparison of the programmable counter output and the 25KHz reference signal. When the system is phase locked, I311 (I211)A and I312 (I212) B form a pulse generator which triggers on the positive going edge of the reference 25KHz signal to set the set-reset flip flop and I311 (I211) B and I312 (I212)A form a pulse generator which triggers on the positive going edge of the variable divider output to reset the set-reset flip flop. The output of the set-reset flip flop during phase locked conditions is a square wave with a duty cycle proportional to the relative phase of the two input signals.
When the system is out of lock, the programmable divider output frequency (I312 pin 3 (I212 pin 3) will not equal 25KHz. If the frequency at I312 (I212) pin 3 is greater than 25KHz, I311 (I211) pin 11 will be low and the pulse width at I311 (I211) pin 5 will vary. If the frequency at I312 (I212) pin 3 is less than 25KHz, I311 (I211) pin 11 will be high and the pulse width at I311 (I211) pin 1 will vary.

The basic transfer function of the Phase and Frequency Comparator is illustrated in Figure 5-23. If power is turned on or channels are changed the appropriate high or low voltage is generated to sweep the VCO toward the selected channel frequency, whereupon the VCO is captured by the reference frequency with phase sensitive detector action.

4.2.2.8 Out of Lock TX Disable

When Q307 is biased off, the Transmit Buffer, Q306, and Receiver Buffer, Q303, are disabled. During proper phase lock operation, the base of Q307 is high, saturating the transistor and enabling the Transmit and Receive Buffers. If the loop fails to lock, either I312 (I212) pin 8 or 6 will go high (See Figure 5-23) and Q318 will saturate, grounding the base of Q307. This inhibits the Transmit and Receive Buffers.

4.2.2.9 Voltage Translation Circuit - COMM (NAV)

Q317 (Q212) and associated components amplify the output of the Phase and Frequency Comparator to obtain the proper voltage for the VCO control.

4.2.2.10 Low Pass Filter - COMM (NAV)

T307, T308 (T201, T208) and associated components form a 12.5KHz (25KHz) low pass filterto recover the DC component of the 25KHz square wave. This DC voltage is the VCO control voltage. R326, R327, and C347 (R208, R209, and C210) form a lag-lead network which provides loop stability.

4.2.2.11 Circuit Theory - SMO RF Circuits

Refer to KX 175 manual, paragraph 4.2.2.2 and figures 5-26 and 5-28 for VCO, Buffer Amplifier, Implicit Divide by 2, and NAV High Frequency Oscillator Circuit Theory.

4.2.2.12 COMM High Frequency Reference Oscillator

Q311, Y301, and Y302 form the COMM High Frequency Reference Oscillator. Y301 (71.0375MHz) and C334 are selected for the high SMO band (127.00 - 135.975MHz) and Y302 (66.5375MHz) and C332 are selected for the low SMO band (118.00 - 126.975MHz). See Table 4-2 for corresponding transmit and receive frequencies.

4.3 Comm Transceiver

4.3.1 BLOCK DIAGRAM THEORY (Figure 5-25)

The KX 170B/KX 175B COMM receiver section is a dual conversion, superheterodyne receiver with a 9.0MHz first I-F and a 861.25KHz second I-F frequency. 720 channels are synthesized at the first mixer. Low side injection is used for channels 127.000 - 135.975MHz and high side for 118.000 - 126.975MHz.

The received antenna signal is coupled to the preselector through a diode T/R switch. A 2-pole, varactor tuned, R-F filter couples the antenna to the R-F stage. A second varactor tuned filter couples the amplified R-F signal to the 1st mixer and supplies additional image and 1/2 I-F spurious rejection. The amplified R-F signal is mixed with the synthesized injection frequency in a balanced mixer. A two pole (KX 170B) or 6 pole (KX 175B) crystal filter couples the difference frequency to the second mixer and provides image and 1/2 I-F selectivity. The 8.13875MHz crystal controlled 2nd local oscillator develops injection for the 2nd mixer. The 2nd I-F contains two integrated circuit (I-C) amplifiers with three double-tuned interstage networks for additional receiver selectivity. An active detector/noise limiter provides audio gain, rate noise limiting, and 90% AM clipping of noise spikes. A two stage AGC amplifier is used to AGC the R-F stage, and the 1st I-C amplifier in the 2nd I-F strip.

The receiver is approximately 6db into AGC with no input signal. This eliminates conventional gainthreshold effects and establishes a constant "Signal plus noise" at the detector output. The detector noise bandwidth is approximately 15KHz. A noise filter passes white noise containing frequency components above 7KHz. The filtered noise is amplified and used to operate a squelch gate. When detected white noise drops below a preset threshold, the squelch gate opens. If a detected audio tone falls within the filter passband, it is treated as noise and blocks the squelch. A carrier squelch overcomes this problem by opening the squelch gate when the AGC exceeds a predetermined voltage. Receiver Audio passes through the volume control, an audio amplifier and is coupled to the audio summing junction.

The summing junction accepts four auxilary audio inputs including NAV and Intercom Microphone. A diode switch mutes the summing junction and connects the mike element to the audio power amplifier during transmit. Headphone/sidetone is capacitively coupled from the audio drive amplifier to the phone jack and is still operable with shorted audio output or R-F power transistors. The push-pull audio amplifier supplies 6 watts to the balanced primary of the output transformer. The secondary includes separate speaker and modulation windings.

The transmitter is a solid state, 4 stage, broadband, 30db gain, R-F power amplifier. Collector modulation is applied to the driver and final stages. The low pass filter provides harmonic spurious rejection. COMM SMO band switching, speaker/modulator, headphone/sidetone and antenna connections are controlled with a T/R relay. A series regulator supplies 8.5 volts to R-F/audio circuitry, and a zener regulator maintains 5.0 volts to digital circuitry used in the frequency synthesizers.

4.3.2 COMM TRANSCEIVER CIRCUIT THEORY

With the exception of the first I-F Filter, Audio Filter, Summing Junction T/R Switch, Audio Power Amplifier and Voltage Regulators, the KX 170B/KX 175B is identical to the KX 170A/KX 175 Refer to paragraph 4.3.2 of the KX 175 Maintenance Manual for COMM Transceiver Circuit Theory not covered in this section.

4.3.2.1 First I-F Filter (Figure 5-26)

The difference frequency (9MHz) is coupled through the crystal filter (FL403, KX 170B/FL405, FL406, FL407, KX 175B) and applied to the base of the 2nd mixer, Q413. Tuned circuits, T414 and T415 provide reactive tuning of the crystal filter.

4.3.2.2 Summing Junction T/R Diode Switch (Figure 5-28)

Resistor R703-707, R729 and R722 provide a summing junction. In the receive condition, CR701 is reverse biased and CR702 is forward biased, passing audio to the audio pre-driver stage, Q701. When the mike is keyed, the T/R relay grounds R721, which mutes CR702 audio and forward biases CR701 applying mike audio to Q701.

4.3.2.3 Audio Power Amplifier (Figure 5-28)

Transistors Q701-706 are connected in a conventional audio power amplifier configuration. Headphone sidetone is coupled from the primary of T701 through C717 and R730. Headphone sidetone is obtained by connecting R719 in series and variable resistor, R726, in shunt with the headphone during transmit.

4.3.2.4 COMM Voltage Regulator (Figure 5-30)

Transistors Q102 and Q105 form a series regulator element. Transistor Q104 compares the attenuated output voltage at the wiper of pot R132 with the reference voltage at the cathode of zener diode CR103. Additionally Q104 amplifies the error signal and provides negative feedback to the base of Q105. R134 and Q107 provide short circuit protection by limiting the regulator output current.

4.3.2.5 NAV Voltage Regulator (Figure 5-30)

Transistors Q101 and Q103 are connected to form a series pass element. Zener diode CR102, provides reference voltage to the series pass element. R128 and Q106 provide short circuit protection by limiting the regulator output current.

4.4 NAV Receiver (Figure 5-26)

The KX 170B/KX 175B NAV Receiver is identical to the KX 175 NAV Receiver. Refer to the KX 175 Maintenance Manual, paragraph 4.4 for KX 170B/KX 175B NAV Receiver Circuit Theory.

5.1 GENERAL MAINTENANCE

Maintenance information contained in this section includes inspection procedures, cleaning, semiconductor replacement, and troubleshooting procedures.

5.1.1 VISUAL INSPECTION

The following visual inspection procedures should be performed during the course of maintenance operations.

a. Inspect all wiring and coax cables for damaged insulation and proper termination (broken strands and solder joint).

b. Check connectors cable connections, making sure they are free from corrosion and are properly secured.

c. Check all components for evidence of overheating, discoloration, bulges or cracked housing.

d. Check all components for evidence of vibration, lead breakage and broken or insecure mounting.

e. Inspect relay and switch contacts for pits or arcing.

5.1.2 CLEANING

a. Using a clean lint-free cloth lightly moistened with an approved cleaning solvent remove the foreign matter from the equipment case and unit front panels. Wipe dry using a clean, dry, lint-free cloth.

b. Using a hand controlled dry air jet (not more than 15 psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.

c. Clean electrical contacts with a burnishing tool or cloth lightly moistened with an approved contact cleaner.

d. Clean the receptacles and plugs with a hand controlled dry air jet (not more than 25 psi) and a clean lint-free cloth lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

5.1.3 SEMICONDUCTOR REPLACEMENT

It is recommended that semiconductors not be tested or replaced until unsatisfactory performance is observed.

5.1.4 SEMICONDUCTOR MAINTENANCE

5.1.4.1 GENERAL

Due to the wide utilization of semiconductors in this electronic equipment, somewhat different techniques are necessary in maintenance procedures. In solid state circuits the impedance and resistances encountered are of much lower values than those encountered in vacuum-tube circuits. Therefore, a few ohms discrepancy can greatly affect the performance of the equipment. Also, coupling and filter capacitors are of larger values and usually are of the tantalum type. Hence, when measuring resistances, an instrument very accurate in the low resistance ranges must be used, and when measuring values of capacitors, an instrument accurate in the high ranges must be employed. Capacitor polarity must be observed when measuring resistance. More accurate measurements can be obtained if the semiconductors are removed or disconnected from the circuit.

—NOTE—

A reverse voltage in excess of .5VDC on any solid slug tantalum (King Family 096-1030-) will cause a cataistrophic failure. Therefore, any time trouble is located, be sure that all tantalum capacitors in the immediate area have not had excess reverse voltage.

5.1.4.2 SEMICONDUCTOR TEST EQUIPMENT

a. Damage to semiconductors by test equipment is usually the result of accidentally applying too much current or voltage to the elements. Common causes of damage from test equipment are discussed in the following paragraphs.

b. Transformerless Power Supplies. Test equipment with transformerless power supplies is one source of high current. However, this type of test equipment can be used by employing an isolation transformer in the AC power line.

c. Line Filter. It is still possible to damage semiconductors from line current, even though the test equipment has a power transformer in the power supply, if the test equipment is provided with a line filter. This filter may function as a voltage divider and apply half voltage to the semiconductor. To eliminate this condition, connect a ground wire from the chassis of the test equipment to the chassis of the equipment under test before making any other connections.

d. Low-Sensitivity Multimeters. Another cause of semiconductor damage is a multimeter that requires excessive current to provide adequate indications. Multimeters with sensitivities of less than 20,000-ohms-per-volt should not be used on semiconductors. A multimeter with low sensitivity will draw too much current through many types of small semiconductors, causing damage. When in doubt as to the amount of current supplied by a multimeter, check the multimeter circuits on all scales with an external, low-resistance multimeter connected in series with the multimeter leads. If more than one milliampere is drawn by the multimeter on any range, this range cannot be safely used on small semiconductors.

e. Power Supply. When using a battery-type power supply, always use fresh batteries of the proper value. Make certain that the polarity of the power supply is correct for the equipment under test. Do not use power supplies having poor voltage regulation.

5.1.5 SEMICONDUCTOR VOLTAGE AND RESISTANCE MEASUREMENTS

When measuring voltage or resistances in circuits containing semiconductor devices, remember that these components are polarity and voltage conscious. Since the values of capacitors used in semiconductor circuits are usually large (especially in audio, servo, or power circuits) time is required to charge these capacitors when an ohmmeter is connected to a circuit in which they appear. Thus, any reading obtained is subjected to error if sufficient time is not allowed for the capacitor to fully charge. When in doubt it may be best in some cases to isolate the components in question and measure them individually.

5.1.5.1 TESTING OF TRANSISTORS

a. A transistor checker should be used to properly evaluate transistors. If a transistor testor is not available, a good multimeter may be used. Make sure that the multimeter meets the requirements outlined in preceding paragraph (d). Always check the value of the bias resistors in series with the various transistor elements. A transistor is very sensitive to improper bias voltage; therefore, a short or open circuit in the bias resistance may damage the transistor. For this reason, do not troubleshoot by shorting the various points in the circuit to ground and listening for clicks.

—CAUTION—

> If a transistor is found to be defective, make certain that the circuit is in good operating order before installing a replacement transistor. If a short or a defective bias resistance exists in the circuit, putting in another transistor will most likely result in burning out the new component. Do not depend upon fuses to protect transistors.

b. PNP Transistor. To check a PNP transistor, connect the positive lead of the multimeter to the base of the transistor and the negative lead to the emitter. Generally, a resistance reading of 50,000 ohms or more should be obtained. Reconnect the multimeter with the negative lead to the base. With the positive lead connected to the emitter a resistance value of 500 ohms or less should be obtained. When the positive lead is connected to the collector a value of 500 ohms or less should be likewise obtained.

c. NPN Transistor. Similar tests made on an NPN transistor should produce the following results: With the negative lead of the multimeter connected to the base of the transistor the value of resistance between the base and the collector should be high. With the positive lead of the multimeter connected to the base, the value of resistance between the base and the emitter or base and the collector should be low. If these results are not obtained, the transistor is probably defective and should be replaced.

5.1.5.2 REPLACING TRANSISTORS

a. Never remove or replace a plug-in semiconductor with the supply voltage turned on. Transients thus produced may damage the semiconductor or others remaining in the circuit. If a semiconductor is to be evaluated in an external test circuit, be sure that no more voltage is applied to the semiconductor than normally is used in the circuit from which it came.

b. Use only a low heat soldering iron when installing or removing soldered-in-parts. Use care in the handling of printed circuit boards. When removing a part from a printed circuit board, first unbend the crimped leads. Use only the necessary amount of heat to unsolder the part. Clear excess solder from mounting eyelets, making sure that mounting holes are clear before installing new parts. When removing a transformer or other part having a multiple number of leads, straighten (unbend) all leads first and then heat leads one at a time, working around the part, until the part can be gently 'rocked out'.

c. When installing or removing a soldered-in semiconductor grasp the lead to which heat is applied between the solder joint and the semiconductor with long-nosed pliers. This will dissipate some of the heat that would otherwise conduct into the semiconductor from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be made quickly. Excessive heat will permanently damage a semiconductor.

d. When soldering is required to remove a component from a semiconductor socket, remove the semiconductor to prevent damage to the semiconductor.

3. In some cases, power transistors are mounted on heat-sinks that are designed to dissipate heat away from them. In some power circuits, the transistor must also be insulated from ground. Often, this insulating is accomplished by means of insulating washers made of fiber and mica. When replacing transistors mounted in this manner, be sure that the insulating washers are replaced in proper order. Before installing the mica washers, treat them with a film of silicone grease. This treatment helps in the transfer of heat. After the transistor is mounted, and before making any connections, check from the case of the transistor to ground with a multimeter to see that the insulation is effective.

5.1.5.3 DIGITAL INTEGRATED CIRCUITS

Precision voltage measurements are not needed in testing digital I. C. 's other than to see that the voltage is a HI level or a LO level. An oscilloscope with a calibrated vertical and horizontal axis is normally used in order to measure voltages of short duration or to measure the relationship of two voltage pulses.

5.1.5.4 TESTING OF DIGITAL INTEGRATED CIRCUITS

a. A Truth Table of the logic element under question is the primary tool to be used. When checking input and output levels of a logic element under question it should be remembered that an input or output may not agree with its truth table not because it has malfunctioned but because some other component connected to the same point has shorted to ground or to V_{CC}. This is not uncommon when an output of one element is connected to an input or output of another. It may be necessary to isolate the gate under question by unsoldering the necessary I. C. pins. A majority of digital I. C. failures can be grouped into three categories.

(1) Input(s) or output shorted to ground pin of I. C.
(2) Input(s) or output shorted to V_{cc} pin of I. C.
(3) Open input(s) or output.

An input or output shorted to ground would be a constant LO and an input or output shorted to V_{cc} would be a constant HI. An open input would not cause any change in the output state. An open output would be less than 0.5VDC.

b. Other failures common in digital I. C. 's are:

(4) Ground pin open.
(5) V_{cc} pin open.
(6) Inputs shorted together.

An open ground pin would not allow a LO on the output.
An open V_{cc} pin would not allow a HI on the output.
(Remember to isolate the device from other components connected to it). Two or more

inputs shorted together can be checked by grounding one of the inputs under question. If the other input also goes to ground they are probably shorted.

5.1.5.5 REPLACING INTEGRATED CIRCUITS

If an I. C. is known to be defective, the easiest way to remove it is to cut off each of its pins, remove the case, and then unsolder the remaining pins from the integrated circuit card one by one. This is preferable over removing the I. C. intact because attempts to remove an I. C. intact may result in damage to the printed circuit board. If it is desired to remove an I. C. intact, a soldering iron with a special tip may be used that will heat all the pins on the backside of the card at the same time. After removal the holes of the card should be cleaned of solder so that the replacement I. C. may be installed. Note the marking identation of the I. C. before removal, and replace the new one with the same orientation as the one removed.

-CAUTION-

> If an I. C. is found to be defective, verify that there is no greater than V_{cc} +10% on any of the I. C. holes on the board or a ground on an I. C. hole that should not be grounded, before installing a replacement I. C.

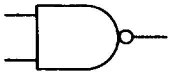
Never remove or replace a plug in I. C. with the supply voltage turned on. Transients thus produced may damage the I. C. or others remaining in the circuit. If an I. C. is to be evaluated in an external test circuit, be sure no more voltage is applied to the I. C. than normally is used in the circuit from which it came.

5.1.6 DIGITAL LOGIC FUNCTIONS

The KX 170B/KX 175B uses transistor-transistor logic only (TTL). The logic functions are shown in Figures 5-1 and 5-2

I. GATES

A. NAND

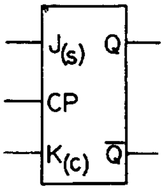


Inputs	Outputs
All high (1)	Low (0)
Any low (0)	High (1)

II. CLOCKED J-K FLIP FLOPS

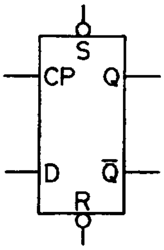
TTL

J	K	$\overline{K}$	Q after next clock pulse
0	0	1	Output unchanged
0	1	0	0
1	1	0	Output changes state
1	0	1	1



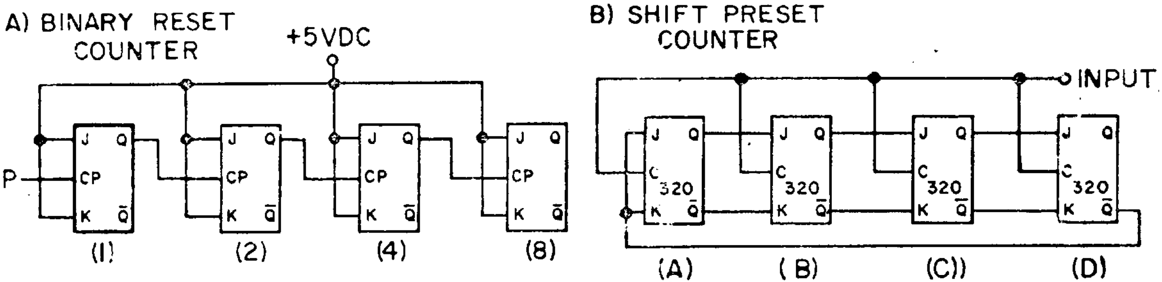
III. CLOCKED D FLIP FLOPS

S	R	D	Q	$\overline{Q}$	
1	1	0	0	1	After next clock pulse
1	1	1	1	0	
0	1	-	1	0	Independent of clock
1	0	-	0	1	



Change of state caused by clock pulse positive transition.

FIGURE 5-1 BASIC LOGIC FUNCTIONS
(Dwg. No. 696-6109-00)


A) BINARY RESET COUNTER

B) SHIFT PRESET COUNTER

WEIGHTED CODE		1	2	4	8
RESET STATE	0	0	0	0	0
SELECTED LOAD STATES	1	1	0	0	0
	2	0	1	0	0
	3	1	1	0	0
	4	0	0	1	0
	5	1	0	1	0
	6	0	1	1	0
	7	1	1	1	0
	8	0	0	0	1
	9	1	0	0	1
	10	0	1	0	1
	11	1	1	0	1
	12	0	0	1	1
	13	1	0	1	1
	14	0	1	1	1
	15	1	1	1	1

WEIGHTED CODE		A	B	C	D
SELECTED PRESET STATES	0	0	0	0	0
	1	1	0	0	0
	2	0	1	0	0
	3	1	0	1	0
	4	0	1	0	1
	5	0	0	1	0
	6	1	0	0	1
	7	1	1	0	0
	8	0	1	1	0
	9	1	0	1	1
	10	1	1	0	1
	11	1	1	1	0
	12	0	1	1	1
	13	0	0	1	1
LOAD STATE	14	0	0	0	1

FIGURE 5-2 RESET AND PRESET COUNTERS
(Dwg. No. 696-6016-00)

5.2 ALIGNMENT AND TEST PROCEDURE

The following test equipment, or equivalent, is required to properly align and test the KX 170B/ KX 175B System. All test equipment must be properly calibrated before alignment and tests are started.

a. Major Power Supply: Electro Model NFB

b. Auxiliary power Supply: Heath Model IP-20 0-10 Volts Adjustable

c. Digital Voltmeter: Eldorado Model 1820A

d. VTVM: Heath Model IM-13

e. Audio Wattmeter With Load: Eico Model 261

f. VHF Wattmeter with 50Ω Load: Bird Termaline Model 611

g. Frequency Counter: ELDORADO Model 1615 with option C.

h. VHF Signal Generator: Boonton Model 211A

i. HP Signal Generator: Hewlett Packard Model 606A

j. Audio Oscillator: Hewlett Packard Model 200CD

k. VOR/LOC Signal Generator: Collins Model 479S-3

l. Oscilloscope: 30MHz Dual Trace Minimum-Tektronix Model 454 Recommended.

m. VHF AM Detector: (See Figure 5-6)

n. KX 170B/KX 175B/KY 195B Bench Test Set (See Figure 5-8)

5.2.1 NAV SMO ALIGNMENT AND TEST

a. Remove the dust covers.

b. Remove three screws on each side of the COMM SMO tray and one screw at the front. Pivot the COMM SMO up and over the front of the radio.

c. Remove two screws in center area of NAV SMO cover and remove cover.

d. Connect a digital voltmeter to TP210 (5.1V).

e. Apply 13.75 volts to NAV Receiver (switch power on NAV only) and observe voltage at CR214, if greater than 5.75 volts, switch power off to avoid I. C. damage. If OK proceed to next step.

f. Connect a digital voltmeter to the anode lead of CR101 at NAV Voltage Regulator and observe an 8.3 ±.5 volts indication on voltmeter.

g. NAV Receiver power requirements are 13.75 volts input at .52 amp with no modulated RF signal present.

h. Set the NAV frequency selector to 117.950MHz.

i. Connect a digital voltmeter to TP 201 and adjust L201 for 7.200VDC tuning (VCO) voltage.

j. (Optional) NAV SMO frequency stability and tuning (VCO) voltage may be observed simultaneously by connecting a frequency counter to the coax side of C231 10pf disc capacitor) and connecting a digital voltmeter to the tuning voltage line (red wire at C258 feed thru capacitor).

Channel the NAV frequency selector through the following frequencies, comparing the frequency and tuning (VCO) voltage with Table 5-1.

Channel	SMO Frequency	Tuning (VCO) Voltage Typical
108.00	92.8125MHz	2.84VDC
109.00	93.8125MHz	3.15VDC
110.00	94.8125MHz	3.49VDC
111.00	95.8125MHz	3.85VDC
112.00	96.8125MHz	4.24VDC
113.00	97.8125MHz	4.66VDC
114.00	98.8125MHz	5.11VDC
115.00	99.8125MHz	5.59VDC
116.00	100.8125MHz	6.10VDC
117.00	101.8125MHz	6.66VDC
117.95	102.7625MHz	7.20VDC

TABLE 5-1 NAV CHANNEL-SMO FREQUENCY-VCO TUNING VOLTAGE

k. Replace NAV SMO cover and install the two screws previously removed.

5.2.2 COMM SMO ALIGNMENT AND TEST

a. Remove the two screws and top cover from the COMM SMO.

b. Temporarily remount COMM SMO with a screw in center at each side.

c. Connect a digital voltmeter at TP310 (5.1V).

d. Apply 13.75 volts to COMM Receiver (switch power on COMM only) and observe voltage at CR319, if greater than 5.75 volts, switch power off to avoid I. C. damage. If OK proceed to next step.

e. Connect a digital voltmeter to the anode lead of CR104 at COMM Voltage Regulator and adjust R132 for 8.500 VDC.

f. Recheck voltage at TP310 for 5.1 ±.5V, if out of tolerance switch power off and check.

g. COMM Receiver power requirements are 13. 75 volts input at . 70 amp with no modulated RF signal present.

h. Connect a digital voltmeter to TP301.

i. Set the COMM frequency selector to 126. 975MHz and adjust C315 for 7. 00VDC VCO tuning voltage at TP301.

j. Set the COMM frequency selector to 135. 975MHz and adjust C314 for 7. 00VDC VCO tuning voltage at TP301.

k. Recheck previous adjustments "i" and "j".

l. (Optional) COMM SMO frequency stability and VCO voltage may be observed simultaneously by connecting a frequency counter to TP303 and connecting a digital voltmeter to TP301.

Channel the COMM frequency selector through the following frequencies, comparing the frequency and VCO voltage with Table 5-2.

Channel	Receive SMO Frequency	VCO Voltage Typical
118. 00	127. 00MHz	2. 58VDC
119. 00	128. 00MHz	2. 93VDC
120. 00	129. 00MHz	3. 30VDC
121. 00	130. 00MHz	3. 71VDC
122. 00	131. 00MHz	4. 16VDC
123. 00	132. 00MHz	4. 66VDC
124. 00	133. 00MHz	5. 18VDC
125. 00	134. 00MHz	5. 77VDC
126. 00	135. 00MHz	6. 38VDC
126. 975	135. 975MHz	7. 00VDC
127. 00	118. 00MHz	2. 58VDC
128. 00	119. 00MHz	2. 93VDC
129. 00	120. 00MHz	3. 30VDC
130. 00	121. 00MHz	3. 71VDC
131. 00	122. 00MHz	4. 16VDC
132. 00	123. 00MHz	4. 66VDC
133. 00	124. 00MHz	5. 18VDC
134. 00	125. 00MHz	5. 77VDC
135. 00	126. 00MHz	6. 38VDC
135. 975	126. 975MHz	7. 00VDC

TABLE 5-2 COMM CHANNEL-RECEIVE SMO FREQUENCY-VCO TUNING VOLTAGE

m. Remove the temporary mounting screws and position COMM SMO cover in place with the two screws previously removed.

n. Mount the COMM SMO tray with three screws on each side and one screw at the front.

o. Connect the counter to point "Y" (Figure 5-4).

p. With the COM Frequency selector set to 122. 50MHz, adjust C334 in COMM SMO for 131. 500000MHz at point "Y".

q. With the COM Frequency selector set to 131. 50, adjust C332 in COM SMO for 122. 500000 MHz at point "Y".

5. 2. 3 NAV/COMM RECEIVER PRELIMINARY ALIGNMENT TEST

a. Remove the receiver board retaining screws (5 places) noting the position of the ground lug. Loosen the two hinge pivot screws. Pivot the board 90° and retighten the hinge pivot screws.

b. Connect a digital voltmeter to the COMM receiver tuning voltage (TP408) and verify the tuning voltage versus channel frequency of Table 5-3.

c. Connect a frequency counter to point "Y" of Figure 5-4 and verify the SMO frequency versus channel frequency of Table 5-3.

Channel	SMO Frequency	Tuning Voltage Typical
118. 00	127. 00MHz	2. 94VDC
119. 00	128. 00MHz	2. 94VDC
120. 00	129. 00MHz	3. 34VDC
121. 00	130. 00MHz	3. 34VDC
122. 00	131. 00MHz	3. 80VDC
123. 00	132. 00MHz	3. 80VDC
124. 00	133. 00MHz	4. 31VDC
125. 00	134. 00MHz	4. 31VDC
126. 00	135. 00MHz	4. 87VDC
126. 975	135. 975MHz	4. 87VDC
127. 00	118. 00MHz	4. 87VDC
128. 00	119. 00MHz	5. 50VDC
129. 00	120. 00MHz	5. 50VDC
130. 00	121. 00MHz	6. 20VDC
131. 00	122. 00MHz	6. 20VDC
132. 00	123. 00MHz	6. 99VDC
133. 00	124. 00MHz	6. 99VDC
134. 00	125. 00MHz	7. 86VDC
135. 00	126. 00MHz	7. 86VDC
135. 975MHz	126. 975MHz	7. 86VDC

TABLE 5-3 COMM CHANNEL-RECEIVE SMO FREQUENCY-TUNING VOLTAGE

d. Set NAV channel selector to 117. 95MHz and connect a digital voltmeter to the NAV receiver tuning voltage test point (TP401) and observe 7. 20VDC. If correct verify the tuning voltage versus channel frequency of Table 5-4. If not 7. 20VDC, L201 may be adjusted through access hole in bottom of NAV SMO tray. Refer to 5. 2. 1 for adjustment procedures.

e. Connect a frequency counter to point "X" of Figure 5-4 and verify the SMO frequency versus channel frequency of Table 5-4.

Channel	SMO Frequency	Receiver Tuning Voltage Typical
108.00	92.8125MHz	2.84VDC
109.00	93.8125MHz	3.15VDC
110.00	94.8125MHz	3.49VDC
111.00	95.8125MHz	3.85VDC
112.00	96.8125MHz	4.24VDC
113.00	97.8125MHz	4.66VDC
114.00	98.8125MHz	5.11VDC
115.00	99.8125MHz	5.59VDC
116.00	100.8125MHz	6.10VDC
117.00	101.8125MHz	6.66VDC
117.95	102.7625MHz	7.20VDC

TABLE 5-4 NAV CHANNEL-SMO FREQUENCY-RECEIVER TUNING VOLTAGE

5.2.4 NAV RECEIVER ALIGNMENT (KX 170B/KX 175B)

—NOTE—

DO NOT attempt to align the NAV Receiver without first reading the alignment procedure in full.

5.2.4.1 PRELIMINARY PROCEDURE

a. Test points and alignment references maybe located on Figure 5-4, and 5-26.

b. Apply 13.75VDC to unit and place the NAV "OFF-VOICE-IDENT" switch in the "IDENT" position.

c. Set the NAV frequency selector to 108.00MHz.

d. Connect a digital voltmeter to TP406 (NAV AGC test point).

e. Set the RF signal generator output for 10μv hard at a frequency of 108.000MHz (use frequency counter) and connect to NAV antenna input connector.

5.2.4.2 ALIGNMENT PROCEDURE

a. Preliminary - If receiver is badly out of alignment, peak all tuning adjustments (2nd IF, 1st IF and RF).

b. Loading and tuning is necessary to obtain desired bandpass characteristics.

5.2.4.3 2nd I.F. ALIGNMENT

a. Load point N (T409) with 3.3KΩ and peak (T410)

b. Load point M (T410) with 3.3KΩ and peak (T409)

c. Load point P (T407) with 3.3KΩ and peak (T408)

d. Load point O (T408) with 3. 3KΩ and peak (T407)

e. Load point R (T405) with 3. 3KΩ and peak (T406)

f. Load point Q (T406) with 3. 3KΩ and peak (T405)

5. 2. 4. 4 1st I. F. ALIGNMENT (KX 170B Only)

a. Load point T (T403) to ground with 3. 3K and peak (T404).

b. Load point S (T404) to ground with 3. 3K and peak (T403).

1st I. F. ALIGNMENT (KX 175B Only)

Repetitively peak (T403) and T404) until no further improvement.
(No load used.)

5. 2. 4. 5 PRESELECTOR ALIGNMENT

a. Load point W (L401) to ground with 220Ω and repetitively peak (L403) and (L405) until no further improvement.

b. Load point V (L403) to ground with 220Ω and peak (L401).

5. 2. 4. 6 AUDIO FILTER L406 ADJUSTMENT

a. RF input, 30% externally modulated with 6. 48kHz audio signal. (Use frequency counter).

b. Adjust L406 for minimum audio output.

5. 2. 4. 7 IDENT FILTER L703 ADJUSTMENT (Figure 6-8)

a. Set the NAV "OFF-VOICE-IDENT" switch in the "VOICE" position. RF input, 30% externally modulated with 1020Hz audio signal. (Use frequency counter.)

b. Adjust L703 for minumum audio output.

5. 2. 4. 8 VOR/LOC OUTPUT LEVEL ADJUSTMENT R425 (See Notes)

a. Modulate the VHF generator with a Standard LOC Modulation Signal from the VOR/LOC generator.

b. Connect an RMS A-C voltmeter at TP407 (VOR/LOC output).

c. VOR/LOC output must be loaded with a 47K ohm resistor.

d. Adjust R425 for 0. 35 volt RMS LOC output at TP407 (VOR/LOC output).

5.2.5 COMM RECEIVER ALIGNMENT (KX 170B/KX 175B/KY 195B)

-NOTE-

Do Not attempt to align the COMM receiver without first reading the alignment procedure in full! Do Not depress the mike button when signal generator is connected to the antenna connector!

5.2.5.1 PRELIMINARY PROCEDURE

a. Test points and alignment references may be located on Figures 5-4, 5-26 and 5-26A.

b. Apply 13.75VDC to unit and place the "OFF-ON-TEST" switch in the "TEST" position (squelch open).

c. Set the COMM frequency selector to 126.70MHz.

d. Connect a digital voltmeter to TP411 (COMM AGC test point).

e. Set the RF signal generator output for 20μv hard at a frequency 9.00MHz below the frequency measured at point "Y" (use frequency counter) and connect to COMM antenna input connector.

5.2.5.2 ALIGNMENT PROCEDURE

a. Preliminary-If receiver is badly out of alignment, peak all tuning adjustments (2nd IF, 1st IF and RF).

b. Loading and tuning is necessary to obtain desired bandpass characteristics.

5.2.5.3 2nd I. F. ALIGNMENT

a. Load point B (T420) with 3.3KΩ and peak (T421).

b. Load point A (T421) with 3.3KΩ and peak (T420).

c. Load point D (T418) with 3.3KΩ and peak (T419).

d. Load point C (T419) with 3.3KΩ and peak (T418).

e. Load point F (T416) with 3.3KΩ and peak (T417).

f. Load point E (T417) with 3.3KΩ and peak (T416).

5.2.5.4 I. F. ALIGNMENT

Repetitively peak T414 and T415 until no further improvements is noted, (no load used).

5.2.5.5 PRESELECTOR ALIGNMENT

a. Load point J (L411) to ground with 220Ω and peak (L413).

b. Load point I (L413) to ground with 220Ω and peak (L411).

c. Load point L (L407) to ground with 220Ω and peak (L409).

d. Load point K (L409) to ground with 220Ω and peak (L407).

5. 2. 5. 6 NOISE AMPLIFIER L414 ADJUSTMENT

a. Signal Generator R-F, 85% externally modulated with a 8. 0kHz audio signal.

b. Connect oscilloscope probe at collector of noise amplifier Q419.

c. Adjust L414 for maximum amplitude and, or maximum clipping observed on oscilloscope.

5. 2. 5. 7 CARRIER/NOISE SQUELCH ADJUST R483

a. Set the COMM "OFF-ON-TEST" switch to the "ON" position (squelch operative).

b. Set the COMM Frequency selector to 118. 00MHz.

c. Set the RF signal generator to 118. 00MHz modulated 30% with a 1000Hz audio signal, to 3 hard μv output.

d. Adjust R483 to the squelch threshold.

5. 2. 5. 8 CARRIER SQUELCH ADJUST R495

a. The COMM "OFF-ON-TEST" switch remains in the "ON" position.

b. Set the COMM Frequency selector to 126. 70MHz.

c. Set the R-F signal generator to 126. 70MHz, 85% externally modulated with a 8. 0kHz audio signal, to25 μv hard output.

d. Adjust R495 to the squelch threshold.

5. 2. 5. 9 AUDIO FILTER ADJUST

a. The COMM "OFF-ON-TEST" switch remains in the "ON" position.

b. The COMM Frequency Selector remains at 126. 70MHz.

c. Set the RF Signal generator to 126. 7MHz, 30% externally modulated with a 4kHz audio signal, to 100μv hard output.

d. Adjust L416 for minimum audio output.

5. 2. 6 TRANSMITTER ALIGNMENT

5. 2. 6. 1 TRANSMITTER POWER AMPLIFIER ALIGNMENT

a. Remove the top dust cover (4 screws).

b. Remove the transmitter cover (4 screws).

c. Connect the bench test set for COMM transmitter tests (Figure 5-8) and apply 13. 75 volts.

d. Set the COMM frequency selector to 126. 70MHz and depress the microphone key.

e. Using a nonmetallic tuning tool, adjust trimmer capacitors C610, C619 and C622 for maximum CW power.

f. Check the output power at the band edges (118. 00, 135. 975MHz) for symmetrical roll-off.

g. Repeak C622 as necessary to equalize the power at the band edges.

5. 2. 6. 2 MICROPHONE GAIN ADJUST R709

a. Obtain a Standard Modulation Signal for mike audio input. (See Note)

b. Simultaneously key the transmitter, apply a Standard Modulation Signal and observe the detector waveform on the oscilloscope.

c. Adjust the mike gain control (R709) so that modulation peaks are on the threshold of clipping.

5. 2. 6. 3 COMM Transmitter power requirements are 13. 75 volts input at 2. 8 amp unmodulated and 4. 5 amps tone modulated.

5. 2. 6. 4 SIDETONE LEVEL ADJUST R726

a. Simultaneously key the transmitter and apply a Standard Modulation Signal. (See Note)

b. Adjust the sidetone level control, R726 for 1. 0 milliwatt undistorted output, across a 600 ohm load at COMM 500 ohm output.

5. 2. 7 NOTES: STANDARD SIGNALS

1. A standard omni signal is an R. F. carrier amplitude modulated simultaneously with (a) 30% by a 9960Hz subcarrier which is, in turn, frequency modulated at a deviation ratio of 16 by a 30Hz reference phase signal, (b) 30% by a 30Hz variable signal and (c) 15% by an optional Ident tone signal.

2. A standard localizer test signal is an R. F. carrier amplitude modulated simultaneously with (a) 90 ±. 3% and 150 ±. 3%Hz signals so that the sum of their separate modulation percentages equals 40 ±2%, and (b) an optional 1020Hz, 15% Ident tone.

3. All Navigation Receiver measurements (both Omni and Localizer) are to be made only after the VOR/LOC output level of the KX 170B/KX 175B has been properly set. With the KX 170B/KX 175B connected to either a KI 201C or KI 211C and a standard LOC signal of 1000μv (hard) applied and the receiver adjusted for 0. 35VRMS LOC output. This output level is correct for both omni and localizer operation.

4. A transmitter standard modulation signal is a 1kHz tone with 0. 4 VRMS open circuit voltage as illustrated in the test circuit (Figure 5-3).

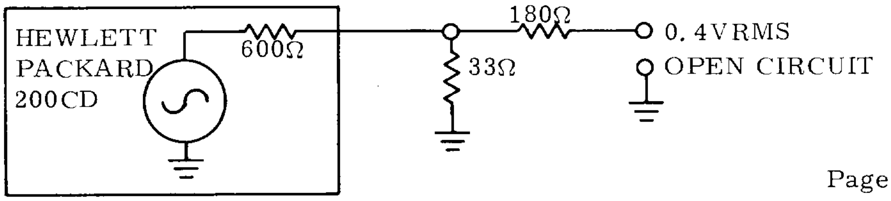


FIGURE 5-3 TEST CIRCUIT
(DWG. NO. 696-6032-00)

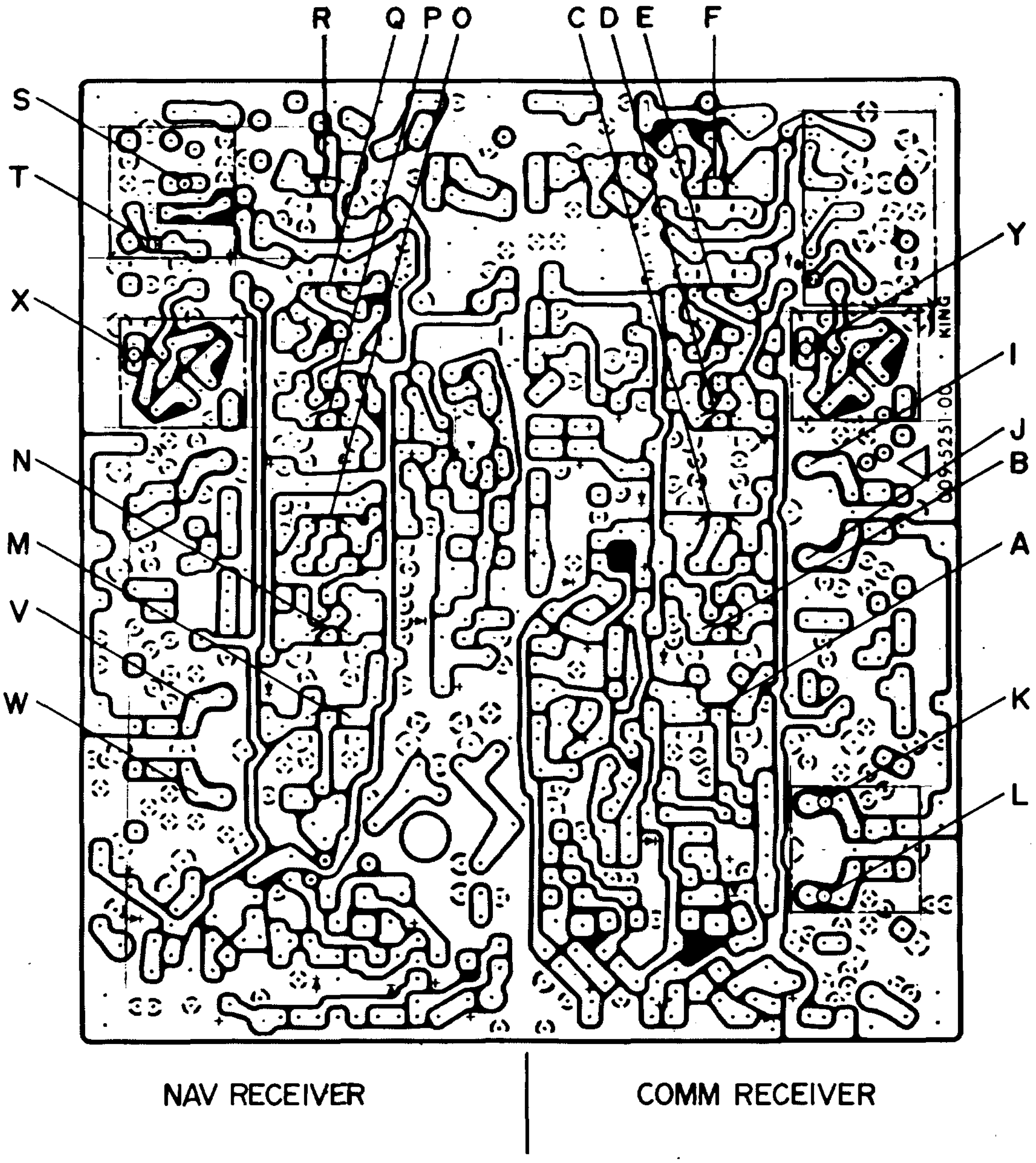
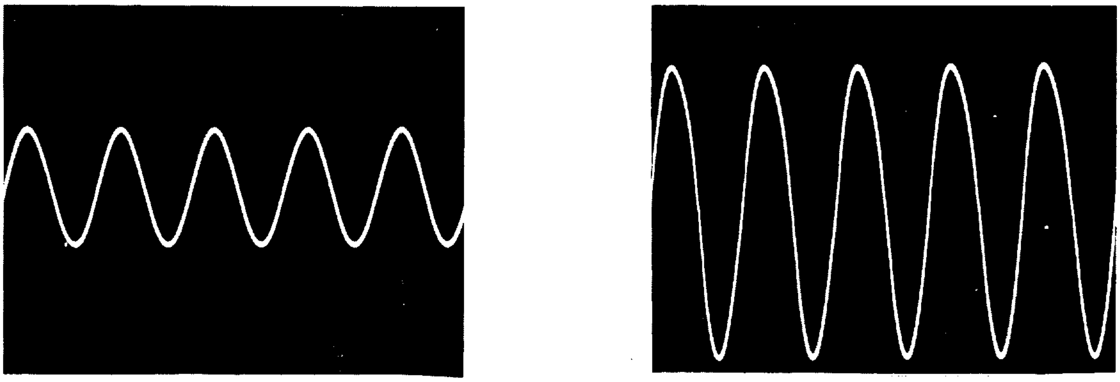
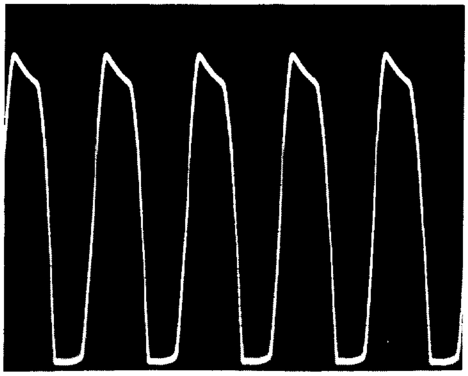


FIGURE 5-4 RECEIVER ALIGNMENT LOADING POINTS
(Dwg. No. 001-0131-00 Sht. 16 of 19)



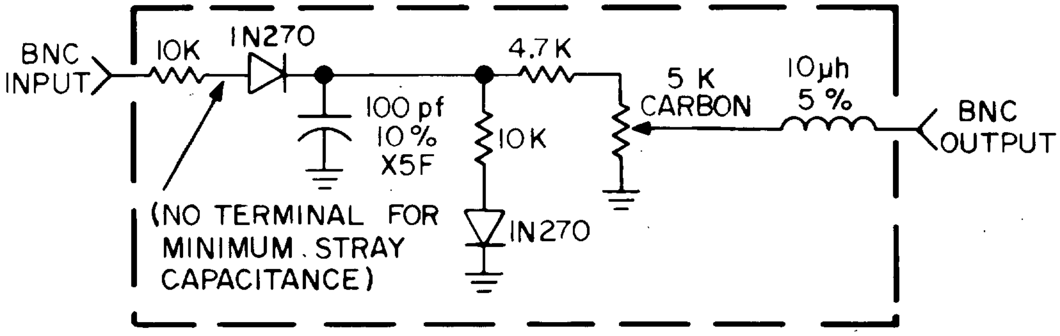
a) Under Modulation

b) Proper Modulation Level



c) Excessive Modulation Level

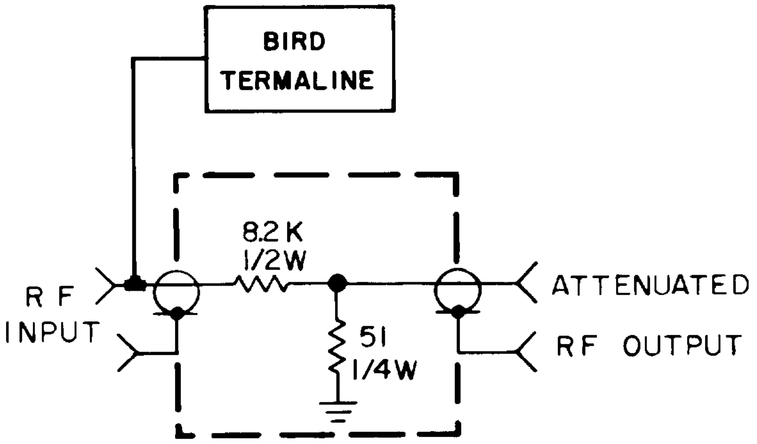
FIGURE 5-5 MICROPHONE GAIN ADJUST DETECTOR WAVEFORMS
(Dwg. No. 696-6048-00)



1. ALL LEADS SHOULD BE SHORT AS POSSIBLE.
2. DETECTOR SHOULD BE HOUSED IN SMALL SHIELDED MINIBOX.
3. ALL RESISTORS ARE 1/4W, 5% CARBON.

696-6049-00

FIGURE 5-6 DETECTOR SCHEMATIC DIAGRAM
(Dwg. No. 696-6049-00)



696-6050-00

FIGURE 5-7 RF ATTENUATOR SCHEMATIC DIAGRAM
(Dwg. No. 696-6050-00)

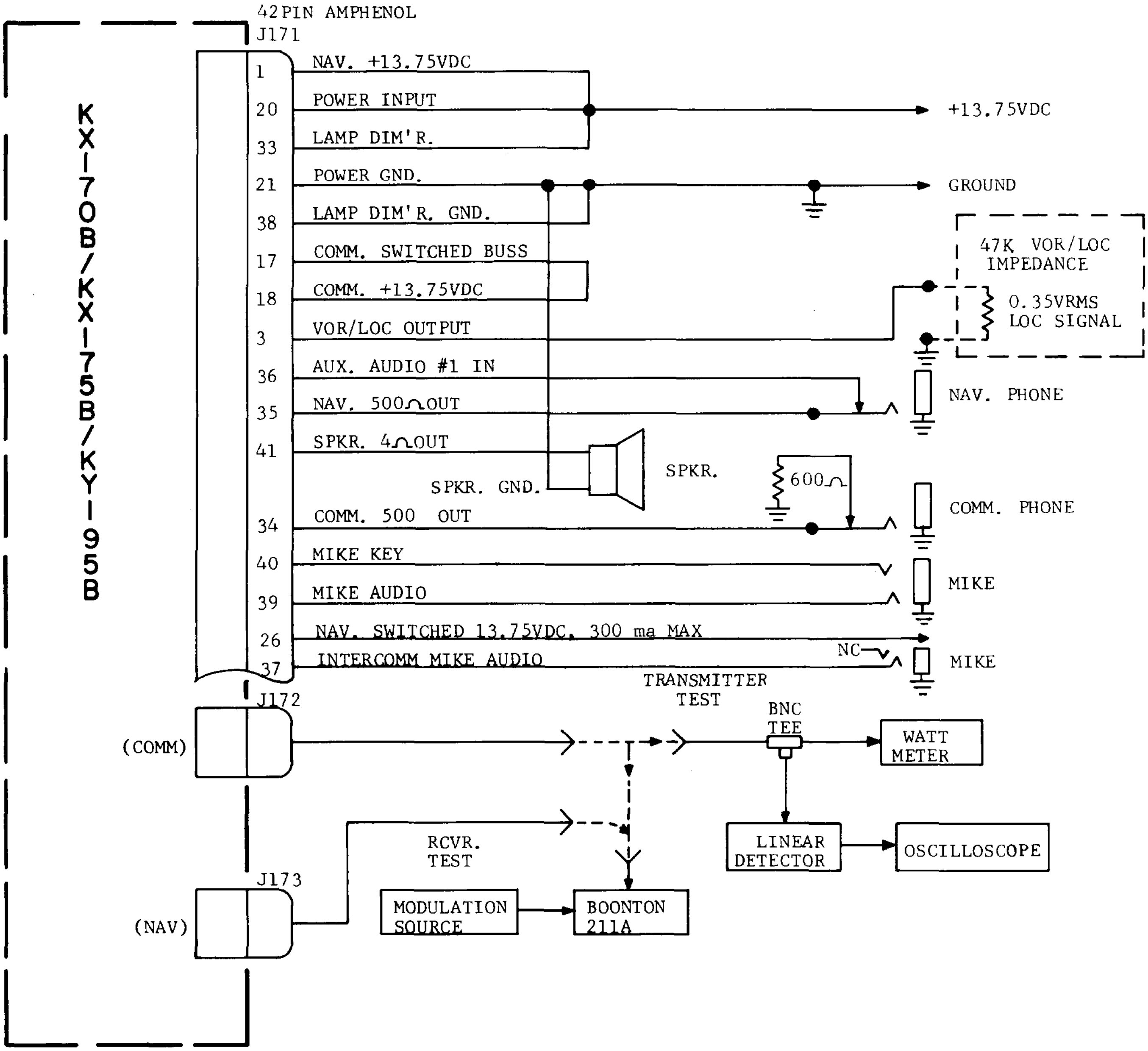


FIGURE 5-8 KX 170B/KX 175B BENCH TEST SETUP
(Dwg. No. 696-6051-01)

5.2.8 KX 170B/KX 175B & Test Data

(Refer to the Installation Manual for Technical Characteristics)

Serial No. ____________

COMMUNICATIONS TRANSCEIVER

Date ____________

Preliminary Visual Inspection:

a. Hardware: ________ (ok) b. Paperwork ________ (ok)

Input Voltage: ______ VDC

1. Receiver Sensitivity:

a. s+n/n:
118.00MHz ______ db
119.95MHz ______ db
126.70MHz ______ db
134.00MHz ______ db
135.97MHz ______ db

b. Quieting: ______ db (frequency =126.7)

2. AGC Characteristics: ______ db (frequency = 126.7)

3. Selectivity:

a. 6db Bandwidth: 126.70MHz: Above ______ kHz Below ______ kHz

60db Bandwidth: 126.70MHz: AGC reference voltage ______ VDC
Above ____ kHz Below ______ kHz

Adjacent Channel: 126.725MHz: ______ db 126.675MHz ______ db

Adjacent 50kHz Channel: 126.75MHz ______ db 126.65MHz ______ db (KX 170B)

4. Manual Gain Control: ______ mw max. ______ watts min.

Transmitter Frequency Stability after a two hour off period at +25°C the allowable tolerance is ±0.600KHz:

118.000 ________ kHz
119.025 ________ kHz
120.050 ________ kHz
121.075 ________ kHz
122.100 ________ kHz
123.225 ________ kHz
124.350 ________ kHz
125.475 ________ kHz
126.975 ________ kHz
127.000 ________ kHz
128.500 ________ kHz
129.625 ________ kHz
130.750 ________ kHz
131.875 ________ kHz
132.900 ________ kHz
133.925 ________ kHz
134.950 ________ kHz
135.975 ________ kHz

5. Headphone Audio: ______ mw

6. Squelch:
a. Carrier/Noise Squelch set for ______ μv (2.7.1)
b. Carrier /Squelch set for ______ μv. (2.7.2)
c. Squelch Test ______ (ok) (2.7.5)

7. Aux. Audio: #1________watts min.
#2________watts min.
#3________watts min.

8. Intercom:________watts min. 5 Watts Min With Standard Mic Signal.

Transmitter:

1. Power Out:

118.00MHz________watts 126.45MHz________watts 135.975MHz________watts

Low Voltage:

118.00MHz________watts 126.45MHz________watts 135.975MHz________watts

2. Modulation: Capabilities

a. Microphone: Input________VRMS

b. 118.00MHz________% 126.50MHz________%
127.50MHz________% 135.975MHz________%

c. Sidetone: ________mw min. ________mw max.
________mw final adjust

Hardware________ok
Paperwork________ok
Glyptol__________ok
Test Stamp________ok

Tested by______________
Inspected by____________

KING
KX 170B/KX 175B
NAVIGATION RECEIVER/
COMMUNICATIONS TRANSCEIVER

NAVIGATION RECEIVER

Serial #__________
Date_____________

Preliminary Visual Inspection

a. Hardware________(ok) b. Paperwork________(ok)

Input voltage________VDC.

OMNI

1. SMO Test: All channels checked__________(ok)

108.00________MHz (frequency) 117.95________MHz (frequency)
(92.8125MHz ±2kHz) (102.7625MHz ±2kHz)

2. LOC Input Level: Set for ________VRMS

3. AGC Characteristic: _______degrees

4. Course Accuracy: A_______0, B_______0.

5. Sensitivity: 117.95MHz________μv.

LOCALIZER

1. Sensitivity: 108.10MHz________μv.

2. Centering Accuracy: A________, B________needles width.

3. Low Voltage Characteristic: ________needles width.

AUDIO

1. Sensitivity:

108.10MHz________db 117.95MHz________db

2. Quieting: 117.95MHz________db

3. AGC Characteristic: 117.95MHz________db

4. Audio Output:

__________watts min. undistorted _________mw max. fully CCW

4.1 Headphone Output: _________________mw.

5. Ident/Voice: _____________db tone ratio

6. Selectivity:

6db Bandwidth 112. 50MHz reference, +__________kHz -__________kHz
Bandwidth at 112. 50MHz reference AGC Ref. Voltage
112. 55MHz_________db 112. 45MHz_________db

MECHANICAL:

1. Numberal Alignment: _________(ok)
2. DME Switching: MHz_________(ok) kHz_________(ok)
3. Glideslope Switching: MHz_________(ok) kHz_________(ok)
4. ILS Energize: _________(ok)
5. 50kHz ILS: _________(ok)
6. Pilot Lamps: _________(ok)

Hardware_________(ok)
Paperwork_________(ok)
Glyptol_________(ok)
Test Stamp_________(ok)

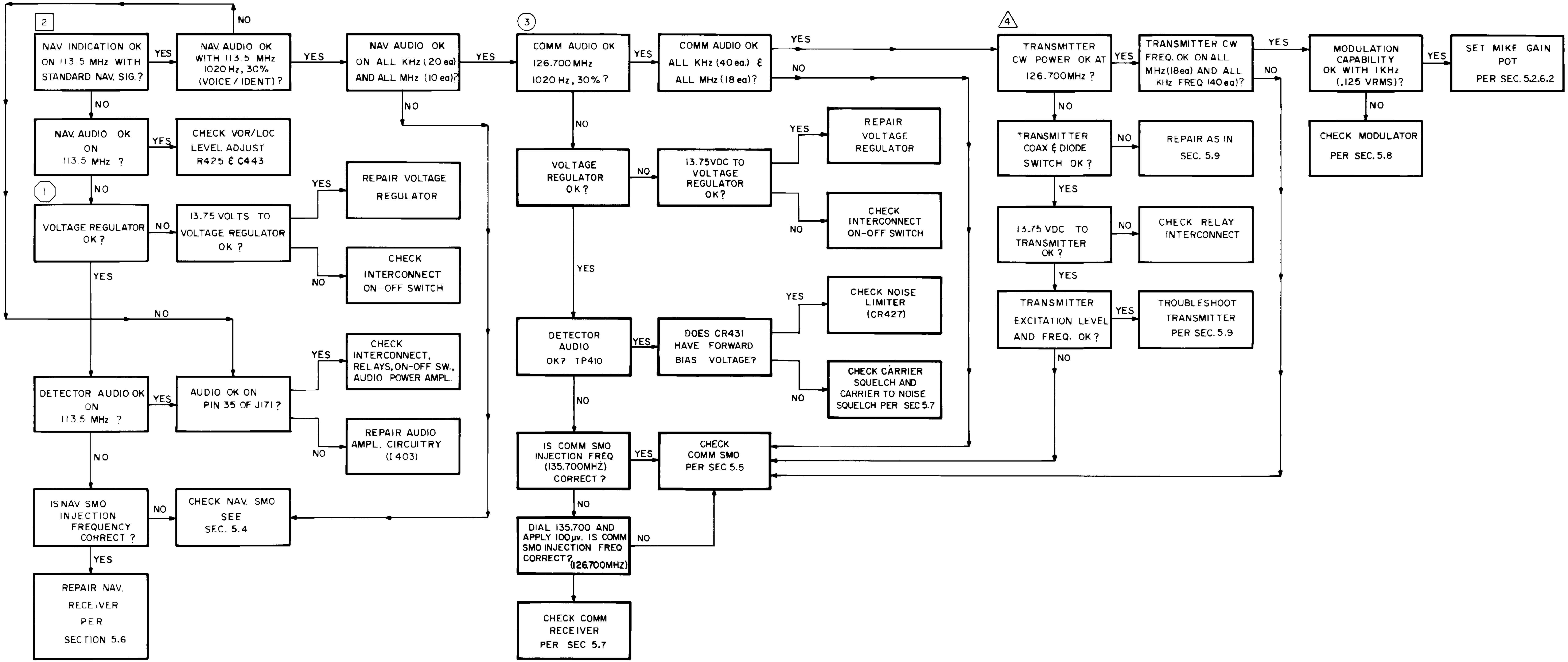


FIGURE 5-9 TROUBLESHOOTING FLOW CHART
(Dwg. No. 696-6110-00)

5.3 TROUBLESHOOTING THE KX 170B/KX 175B

Figure 5- 9 is a troubleshooting flow chart designed to aid the technician in sectionalizing or localizing sources of trouble. NAV and COMM block diagrams Figure 5-24 and 5-25 appearing at the end of Section 5 may also aid in localizing the malfunction. The troubleshooting charts (Table 5-5 thru 5-9) are given as a quick guide in pinpointing probable problem areas along with their associated remedies. A list of possible SMO malfunctions is given in the Preliminary Evaluation section of the respective SMO discussions (NAV SMO, Section 5. 4, COMM SMO, Section 5. 5).

Individual circuit tracing and isolation of a defective component is most easily accomplished by use of the individual troubleshooting sections, along with appropriate schematic diagrams appearing at the end of Section 5.

TABLE 5-5 NAV SMO TROUBLE CHART

INDICATION	PROBABLE CAUSE	REMEDY
Low or no output from Receiver Buffer	Voltage Regulated Supply (8.5 and 5.0 volts) component failure.	Check Q101, Q103 and CR214 voltages and associated components.
	Receiver Buffer component failure	Check Q202 voltages and associated components.
Correct output on lower frequencies only.	VCO adjusted incorrectly.	Check VCO adjustment L201. See Alignment Procedure.
Frequency incorrect on some positions of NAV MHz and KHz frequency control.	Switching wafer defective.	Check switch wafer S107 rear for MHz error. See Table 4-3. (KX 170A/175 Manual)
		Check switch wafer S105 for KHz error. See Table 4-3. (KX 170A/KX 175 Manual)
	Programmable Divider component failure.	Check I201, I202, I203, I304 and I206. See Troubleshooting Procedure.
Frequency error and/or jitter in Receiver Buffer output.	Phase and Frequency comparator component failure.	Check I210, I211, and I212 voltages and associated components.
		Check output at R215 with an oscilloscope and observe waveform when switching NAV MHz frequency control.
Frequency error in Receiver Buffer output.	Low Reference Oscillator 400KHz component failure.	Check Q210 and Q211 voltages and associated components.
		Check Y202 frequency at TP205
	High Reference Oscillator 53.93125MHz component failure.	Check Q207 voltages and associated components.
		Check Y201 frequency at junction of R230 and R231.

TABLE 5-5 NAV SMO TROUBLE CHART (Cont)

INDICATION	PROBABLE CAUSE	REMEDY
	Divide by 2 Mixer and amplifier component failure.	Check Q206 voltages and associated components. Check for frequency input at TP203 and for divide by 2 frequency output at TP204.
	Squaring Amplifier component failure.	Check Q208 and Q209 voltages and associated components. Use an oscilloscope and check for an essentially square wave output at TP206.
	Voltage Translator component failure.	Check Q212 voltages and associated components. Connect oscilloscope to TP202 and observe waveforms when switching NAV MHz frequency control.
	VCO Low Pass Filter component failure.	Check at TP201 for a dc voltage change as the NAV MHz frequency control is switched.

TABLE 5-6 COMM SMO TROUBLE CHART

INDICATION	PROBABLE CAUSE	REMEDY
Low or no output from Receiver Buffer	Voltage Regulated Supply (8.5 and 5.0 volts) component failure.	Check Q102, Q105, Q104 and CR319 voltages and associated components.
	Receiver Buffer component failure.	Check Q303 voltage and associated components.
Receiver Buffer output but no Transmit Buffer output in Transmit condition.	Transmit Buffer component failure.	Check Q306 voltages and associated components.
	Transmit Enable Switch component failure.	Check Q305 voltages and associated components.
	Out of Lock Disable	Check Q307 and input to R323 with an oscilloscope.
Transmit Buffer output in Receiver Condition	Transmit Enable Transistor open.	Check Q305 voltages.

TABLE 5-6 COMM SMO TROUBLE CHART (Cont)

INDICATION	PROBABLE CAUSE	REMEDY
Receiver Buffer and/or Transmit Buffer, frequency incorrect from 118.00 to 126.95MHz but OK from 127.00 to 135MHz or vice versa.	COMM MHz HI-LO switch Wafer	Check switch wafer S103
	Transmit-Receive Relay	Check relay K701.
	High Reference Crystals	Check Y301 and Y302 and associated components. Check switching diodes CR313, CR314, CR321, and CR322 bias voltages.
	HI-LO VCO Switch	Check switching diodes CR301 and CR302 bias voltages.
	VCO adjusted incorrectly.	Check VCO adjustments C314 and C315. See Alignment Procedure.
Frequency incorrect on some positions of COMM MHz and/or KHz frequency control.	Switching Wafer defective.	Check switch wafer S103 for MHz error. Check switch wafer S101 and S102 for KHz error. See Table 4-3.
	Programmable Divider component failure.	Check I301, I302, I303, I304, I306 and I309. See Troubleshooting Procedure.
Frequency incorrect on XXX.X0 or XXX.X5 Positions	Programmable Divider Component Failure	Check I309 and I303C See Troubleshooting Procedure.
Stable frequency error in Receiver and Transmit Buffer output.	Low Reference Oscillator 400KHz, (in NAV SMO KX 170B) (in COMM SMO KX 175B).	Check for 400KHz input to TP305 (from NAV SMO KX 170B) (Q315 and Q316 voltages and associated components KX 175B).
	High Reference Oscillator component failure.	Check Q311 voltages and associated components. Check output at junction of CJ301 and CJ302.
Frequency error and/or jitter in Receiver and Transmitter Buffer output.	Phase and Frequency Comparator component failure.	Check I310, I311, and I312 voltages and associated components.

TABLE 5-6 COMM SMO TROUBLE CHART (Cont).

INDICATION	PROBABLE CAUSE	REMEDY
		Check output at R323 with an oscilloscope and observe waveform when switching COMM MHz frequency control.
Frequency error and/or jitter in Receiver and Transmitter Buffer output.	Low Reference Oscillator 400KHz (in NAV SMO KX 170B) (in COMM SMO KX 175B)	Check for 400KHz input to TP305.
	High Reference Oscillator component failure.	Check Q311 voltages and associated components. Check output at junction of CJ301 and CJ302.
	Divide by 2 Mixer and amplifier component failure.	Check Q310 voltages and associated components. Check for frequency input at Q304 collector and for divide by 2 frequency output at TP304.
	Squaring Amplifier component failure.	Check Q312 and Q313 voltages and associated components Use an oscilloscope and check for an essentially square wave output at TP305.
	Voltage Translator component failure.	Check Q317 voltages and associated components. Connect oscilloscope to TP302 and observe waveform when switching COMM MHz frequency control.
	VCO Low Pass Filter Component Failure	Check at TP301 for a dc voltage change as the COMM MHz frequency control is switched.

TABLE 5-7 NAV RECEIVER TROUBLE CHART

See Table 5-7 of KX 170A/KX 175 Maintenance/Overhaul Manual

TABLE 5-8 COMM RECEIVER TROUBLE CHART

See Table 5-8 of KX 170A/KX 175 Maintenance/Overhaul Manual

TABLE 5-9 COMM TRANSMITTER TROUBLE CHART

See Table 5-9 of KX 170A/KX 175 Maintenance/Overhaul Manual

5.4 TROUBLESHOOTING THE NAV SMO

The KX 170B/KX 175B NAV SMO analog circuitry is identical to that of the KX 170A/KX 175 . See the KX 175 Maintenance Manual for troubleshooting procedures not covered in this section.

5. 4. 1 PRELIMINARY EVALUATION (Figure 5-27)

See paragraph 5. 5. 1 of KX 175 Manual.

5. 4. 2 NAV SMO DIAGNOSTIC PROCEDURE

If the tests of 5. 4. 1 substantiate the NAV SMO failure, proceed as follows:

A. Open the loop.

B. High Reference Oscillator

C. Low Reference Oscillator

D. VCO and Receiver Buffer

E. Divide by 2

F. Mixer

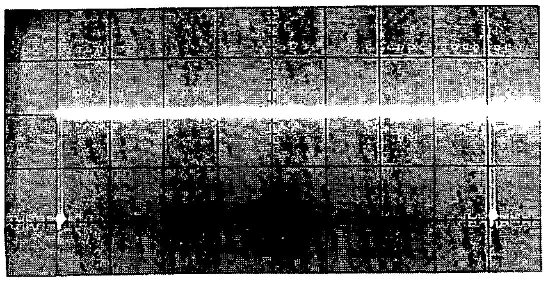
G. Squaring Amplifier

See Paragraph 5. 5. 2, A through G of KX 175 Manual.

H. Does the Programmable Divider Provide Proper Frequency Division?

Maintain the channel setting and the VCO tuning voltage of Steps D through G. Attach the oscilloscope probe to Pin 9 of I202 or I206 to monitor the counter output. The waveform of Figure 5-10 should be obtained. Note the pulse period of approximately 40μsec. Dial the ten MHz positions, leaving the VCO bias unchanged, and look for the counter output pulse rate to increase uniformly as lower channel frequencies are dialed. Return the MHz dial to the 116MHz position and dial through the twenty KHz positions. Observe a gradual advance in output pulse rate as numbers are dialed from the 0. 95 to . 00 using counterclockwise rotation.

If erroneous operation of the Programmable Counter is observed, service the counter using the procedure of Section 5. 4. 3.



Horizontal: 5μsec/div
Trace: I202 or I206 Pin 9
Vertical: 2V/div

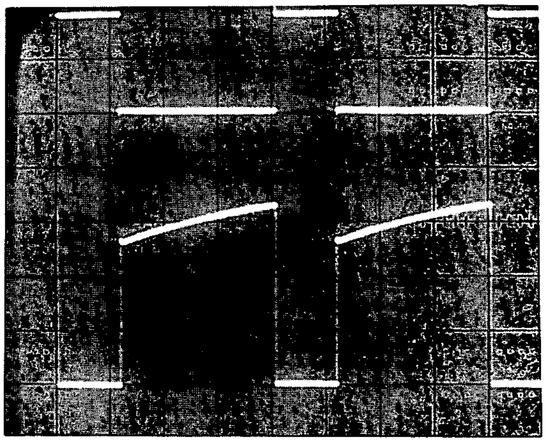
FIGURE 5-10 PROGRAMMABLE DIVIDER OUTPUT
(Dwg. No. 696-6111-00)

I. Is the Phase and Frequency Comparator Operational?

Connect the oscilloscope probe to the junction of Pins 4, 9 and 11 of I211 and R215 to monitor the Phase and Frequency Comparator output. With the channel selector at 116. 70MHz, vary the VCO bias voltage above and below 6. 50 volts. The output voltage on the scope should be dominately low when the VCO bias is low, and high when the VCO bias is high. Waveforms are illustrated in the Phase and Frequency Comparator Timing Diagrams of Figure 5-23. If a malfunction is noted, troubleshoot the circuit as illustrated in Section 5. 4. 4.

J. Does the Voltage Translator Operate Properly?

Repeat the test of Step I but with the oscilloscope probe attached to TP202. Waveforms are illustrated in Figure 5-11. Service the circuit as required using the reference information of Section 5. 4. 8.



Horizontal: 10μsec/div
Upper Trace: Comparator Output
(Pins 4, 9, & 11 of I211)
Upper Vertical: 5V/div

Lower Trace: Translator Output (TP202)
Lower Vertical: 2V/div

FIGURE 5-11 VOLTAGE TRANSLATOR
(Dwg. No. 696-6112-00)

K. What if no Problems are Observed?

Troubleshoot the remaining block, the VCO Low Pass Filter per the discussion of Section 5. 4. 7.

5.4.3 PROGRAMMABLE DIVIDER, NAV (Figure 5-27)

The Programmable Divider consists of integrated circuits I201, I202, I204, I206 and gates A and D in I203. Reference material includes the divider theory of Section 4 and the Timing Diagram of Figure 5-20.

5.4.3.1 Troubleshooting Procedure.

I. Test Setup

A. Open either end of L204, the Mixer Low Pass Filter choke.

B. Use a coaxial pigtail to connect an HP 606A, or equivalent, to the tie point of C240 and C241.

II. Equipment Adjustments

A. Using a frequency counter, set the 606A, to a CW frequency of 3.175MHz.

B. Adjust the HP 606A CW level to obtain a crisp square wave (0 volts base line, 4 volts peak line) at TP206, when viewed by a 30MHz bandwidth or wider oscilloscope.

C. Dial the NAV channel selector to 116.70MHz.

III. Observations

A. Use a 30MHz bandwidth (or wider) oscilloscope. Provide external sync from the leading edge of the pulse appearing at I202 or I206 Pin 9.

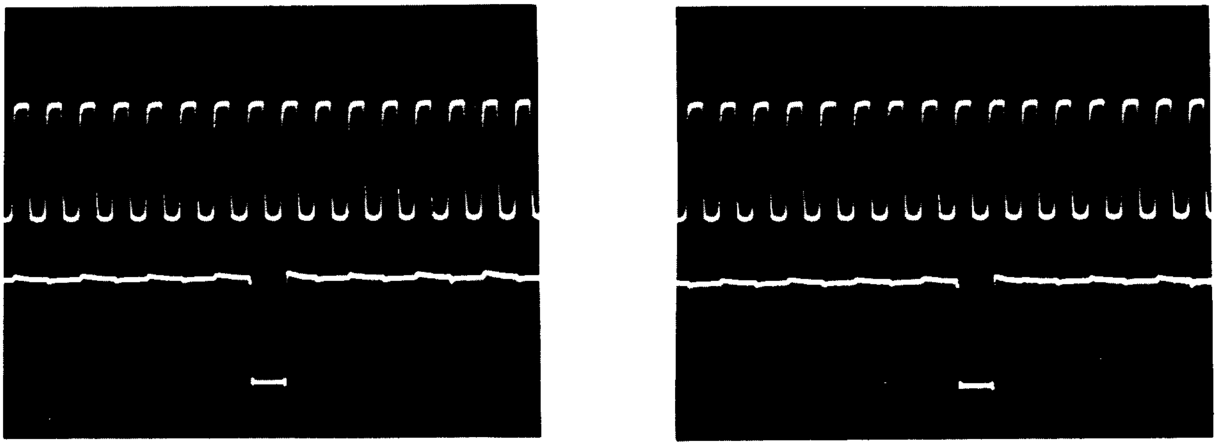
B. Compare the waveform at Pin 6 of I204 to the timing diagrams. (Figure 5-20) The desired output is a pulse train with a 4 volt reference level, a 40μsec period (25KHz rep rate), negative pulse width of approximately 210nsec, and 0 volts negative excursion.

C. If the desired oscilloscope trace was obtained in B, the counter is operational at 116.70MHz. Dial 117.950MHz. With the oscilloscope sync as in A, simultaneously monitor TP206 and Pin 9 of I202 or I206. Note the relationship of the pulses as the dial is rotated sequencially to the next lowest channel. The output pulse (Pin 9 of I202 or I206) should step 1 input pulse increment with each 50KHz step in dialing. See Figure 5-12. If the counter meets the above requirements it is operational.

D. Failure to meet the requirements of Step B requires a complete check of the I-C input/output timing as defined in the Timing Diagram (Figure 5-20).

E. Failure to meet the requirements of Step C implies a problem with the preset function of the Programmable Divider. Make a complete check of the divider flip-flops immediately preceding and following the preset enable pulse (negative pulse on pin 6 of I204. The desired preset states are defined in Table 4-3 (KX 175 Manual) where 0 is ground and 1 is 5 volts, and should occur immediately following the preset enable pulse. Also review Figure 5-20.

F. Replace components and make repairs as necessary to obtain the desired counter operation.



Selected Freq. =116.70MHz

Selected Freq. =116.65MHz

Vertical: Top-2V/div (TP206)
Bottom- 2V/div (Pin 9 of I202 or I206)
Horizontal: 0.5μsec/div Expanded X 10

FIGURE 5-12 PROGRAMMABLE DIVIDER
(Dwg. No. 696-6113-00)

5.4.4 PHASE AND FREQUENCY COMPARATOR (Figure 5-27)

The Phase and Frequency Comparator consists of I211 and I212. Reference information sources include the Phase and Frequency Comparator Timing Diagram (Figure 5-23) and the theory of section 4.2.

—NOTE—

If the COMM SMO is operating properly it may be used to provide supplementary information using comparison techniques.

5.4.4.1 Troubleshooting Procedure

A. Connect an external power supply to the VCO bias test point TP201.

B. Set the NAV Frequency Selector to 116.70MHz.

C. Monitor the Comparator output (Pins 4, 9, or 11 of I211) on an oscilloscope.

D. Adjust the VCO bias voltage low (less than 6.50 volts) and look for a low output voltage (around .2 volts). Refer to Figure 5-23 for the appropriate timing diagram.

E. Adjust the VCO bias voltage high (greater than 6.50 volts) and look for a high voltage output voltage (near 4.0V). Refer to Figure 5-23 for the appropriate timing.

F. Failure to meet the conditions of Steps C and D requires a systematic comparison of the input (output) relationships obtained to those appearing in either the Timing Diagram or the functioning COMM SMO.

5.4.5 LOW REFERENCE OSCILLATOR (Figure 5-27 NAV) (5-29, COMM)

The Low Reference Oscillator consists of transistors Q210 (Q315) and Q211 (Q316), with crystal Y202 (Y303) as the frequency determining element. The Low Reference Oscillator serves both the NAV and COMM SMO's. (KX 170B only).

5.4.5.1 Troubleshooting Procedures.

Using an oscilloscope check TP205 (TP305) for a square wave output (See Figure 5-15). Capacitively couple a frequency counter to TP205 (TP305) and check for 400KHz. Check Q210 (Q315) and Q211 (Q316) and the associated circuitry. See Figure 5-27 and 5-29 for typical D-C operating voltage levels.

5.4.6 VOLTAGE CONTROLLED OSCILLATOR (VCO) (Figure 5-27)

The Voltage Controlled Oscillator (Q201) is a Colpitts oscillator. Frequency determining elements include CR201, L201, C204 and C205. Basic theory appears in Section 4.2.2.2.

5.4.6.1 Troubleshooting Procedure.

Compare the supply and bias voltages for Q201 with those appearing in Figure 5-27 and replace components as necessary to obtain proper bias. Apply a 7.2 volt tuning bias voltage, from a low impedance source, to TP201 and use a frequency counter to monitor the frequency at the collector of Q201. Adjust L201 to obtain a frequency of approximately 102.7625. The VCO frequency should vary proportionately as the tuning voltage is varied. If erratic or erroneous operation is obtained, check the frequency determining elements. Failure of the VCO to oscillate implies an open varactor diode (CR201), an open trimmer coil (L201), or a bad transistor (Q201).

5.4.7 VCO LOW PASS FILTER (Figure 5-27)

The VCO Low Pass Filter consisting of T201, T208, C211, C212, C213 and C271 is a low pass filter designed to recover the D-C voltage from the output of the 25KHz Voltage Translator. It has been factory adjusted and no attempt should be made to readjust in the field.

5.4.7.1 Troubleshooting Procedure. Using an oscilloscope, check wave form of the input at TP202. Using a D-C voltmeter, check for a D-C voltage at TP201 (7.20VDC at 117.95MHz to 2.84VDC at 108.00MHz).

5.4.8 25KHz VOLTAGE TRANSLATOR (Figure 5-27)

The Voltage Translator consists of transistor Q202 which shifts the error voltage level from the Phase and Frequency Comparators to a level sufficient to operate the VCO.

5.4.8.1 Troubleshooting Procedure. Using an oscilloscope trace the input signal from R215 to the output of TP202. See Figure 5-27 for typical D-C operating voltage levels.

5.4.9 RECEIVER BUFFER (Figure 5-27)

The Receiver Buffer consists of transistor, Q202, with output transformer, T202.

5.4.9.1 Troubleshooting Procedure. Using an oscilloscope, trace the input signal from C216 to the output at Pin 2 of T202. See Figure 5-27 for typical D-C operating voltage levels.

5. 4. 10 VCO BUFFER (Figure 5-27)

The VCO Buffer consists of transistor Q203 with output transformer T203.

5. 4. 10. 1 Troubleshooting Procedure. Using an oscilloscope, trace the input signal from C220 to the output at T203. See Figure 5-27 for typical D-C operating voltage levels.

5. 4. 11 HIGH REFERENCE OSCILLATOR (Figure 5-27)

The High Frequency Oscillator consists of transistor Q207 connected in a typical Colpitts configuration with crystal Y201 determining the operating frequency.

5. 4. 11. 1 Troubleshooting Procedure. Check Pin 6 of T207 for oscillator output. Check supply and biasing voltage (See Figure 5-27 for typical D-C operating voltage levels.)

5. 4. 12 IMPLICIT DIVIDE BY 2 CIRCUIT (Figure 5-27)

The Implicit Divide by 2 circuit consists of balanced mixer CR203, CR204, CR205 and CR206 and amplifier Q206. For circuit theory refer to Section 4. 2.

5. 4. 12. 1 Troubleshooting Procedure. Using an oscilloscope verify the output of VCO Buffer at Pin 6 of T204. See Figure 5-27 for typical D-C operating voltage levels.

5. 4. 13 2ND MIXER (Figure 5-27)

This is a balanced mixer consisting of transformer T206 and T207 with diodes CR207, CR208, CR209 and CR210.

5. 4. 13. 1 Troubleshooting procedure. With the power removed from the KX 170B/KX 175B and using an ohmmeter, check all diodes for a possible open. Check all transformer windings for D-C continuity.

5. 4. 14 MIXER LOW PASS FILTER (Figure 5-27)

The Mixer Low Pass Filter is a basic pi-section low pass filter consisting of inductor L204 and capacitors C239 and C240.

5. 4. 14. 1 Troubleshooting Procedure. Using an oscilloscope trace the signal from the output of the 2nd Mixer (Pin 2 of T206) to the input of the Squaring Amplifier (base Q208).

5. 4. 15 SQUARING AMPLIFIER (Figure 5-27)

The Squaring Amplifier consists of transistors Q208 and Q206.

5. 4. 15. 1 Troubleshooting Procedure. Using an oscilloscope check for Mixer output at the base of Q208. Check TP206 for a 4 volt square wave output. Check transistor Q208 and Q209 and associated circuitry. See Figure 5-27 for typical D-C operating voltage levels (with the base of Q208 bypassed).

5.5 TROUBLESHOOTING THE COMM SMO

The COMM SMO synthesizes 720 frequencies, providing a power level of 10mw into a 50Ω load. The relationship of channel frequency to synthesized frequency is illustrated in Table 5-10. Theory of Operation is presented in Section 4.

LO BAND		HI BAND	
Selected Channel (MHz)	Synthesizer Frequency Receiver (MHz)	Selected Channel (MHz)	Synthesizer Frequency Receiver (MHz)
118.00	127.000	127.00	118.000
118.02	127.025	127.02	118.025
118.05	127.050	127.05	118.050
118.07	127.075	127.07	118.075
118.10	127.100	127.10	118.100
118.12	127.125	127.12	118.125
118.15	127.150	127.15	118.150
118.17	127.175	127.17	118.175
118.20	127.200	127.20	118.200
118.22	127.225	127.22	118.225
118.25	127.250	127.25	118.250
118.27	127.275	127.27	118.275
118.30	127.300	127.30	118.300
118.32	127.325	127.32	118.325
118.35	127.350	127.35	118.350
118.37	127.375	127.37	118.375
118.40	127.400	127.40	118.400
118.42	127.425	127.42	118.425
118.45	127.450	127.45	118.450
118.47	127.475	127.47	118.475
118.50	127.500	127.50	118.500
118.52	127.525	127.52	118.525
118.55	127.550	127.55	118.550
118.57	127.575	127.57	118.575
118.60	127.600	127.60	118.600
118.62	127.625	127.62	118.625
118.65	127.650	127.65	118.650
118.67	127.675	127.67	118.675
118.70	127.700	127.70	118.700
118.72	127.725	127.72	118.725
118.75	127.750	127.75	118.750
118.77	127.775	127.77	118.775
118.80	127.800	127.80	118.800
118.82	127.825	127.82	118.825
118.85	127.850	127.85	118.850
118.87	127.875	127.87	118.875
118.90	127.900	127.90	118.900
118.92	127.925	127.92	118.925
118.95	127.950	127.95	118.950
118.97	127.975	127.97	118.975
119.97	128.975	128.97	119.975
120.97	129.975	129.97	120.975
121.97	130.975	130.97	121.975
122.97	131.975	131.97	122.975
123.97	132.975	132.97	123.975
124.97	133.975	133.97	124.975
125.97	134.975	134.97	125.975
126.97	135.975	135.97	126.975

TABLE 5-10 COMM SMO SYNTHESIZER FREQUENCIES

5. 5. 1 PRELIMINARY EVALUATION (Figure (5-29)

A. Verify the COMM SMO failure!

1. Perform the alignment procedure of Section 5.2.2.
2. Does the COMM SMO supply 10mw to a 50 ohm load?
3. Is the synthesized frequency correct when dialing through all KHz (40 ea.) and all MHz (18 ea.) positions with both clockwise and counterclockwise rotation.

B. Is the failure external from the COMM SMO enclosure?

1. Check all power and control lines to the COMM SMO for proper operation. Wire color and feedthru assignment are shown in Figure 5-29. Control wire functions are defined in Table 4-3 where "0" is ground and "1" is 5VDC.
2. Does the NAV SMO supply a 400KHz reference to the COMM SMO? (KX 170B Only)

5.5. 2 COMM SMO DIAGNOSTIC PROCEDURE

If the tests of 5. 5. 1 substantiate the COMM SMO failure, proceed as follows:

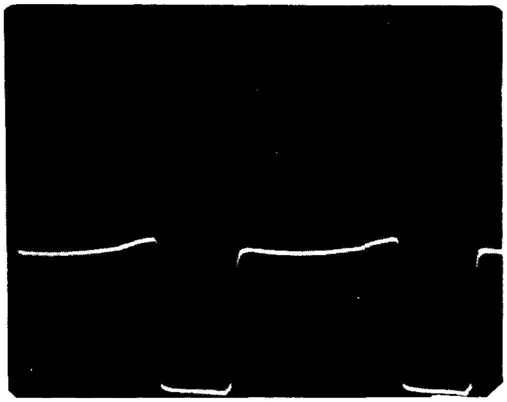
A. Is the High Reference Oscillator operating properly?

Using a 1Kpf coupling capacitor connect a VHF freqency counter to the junction of CJ301 and CJ302 in the High Reference Oscillator and check for 71.0375 ± 1KHz when a low band (118.00-126.975MHz) frequency, or 66.5375 ±1KHz when a high band 127.00-135.975MHz frequency has been selected on the COMM frequency dial. If the oscillator is inoperative or off frequency, refer to Section 5. 5. 10 for servicing information.

B. Is the Low Reference Oscillator Operational?

Connect a frequency counter to TP305 and measure 400,000 (+20, -10)Hz. Remove the counter, connect an oscilloscope to TP305 and observe the waveform. The proper waveform is shown in Figure 5-13 below.

Horizontal: 0. 5μsec/div
Vertical: 1V/CM
Selected Freq.: 126.70MHz



If an incorrect waveform is observed, refer to Section 5.4. 5 for servicing instructions.

FIGURE 5-13 LOW REFERENCE OSCILLATOR OUTPUT

(Dwg. No. 696-6061-00)

C. Open the loop.

—NOTE—

To properly troubleshoot the COMM SMO it is imperative that the feedback loop be disabled. This is accomplished very simply by applying a positive, adjustable D-C voltage from a low impedance source to TP 301, the VCO bias point.

D. Does the VCO and Receiver Buffer perform properly?

Dial 126.70MHz on the COMM frequency selector, and adjust the VCO bias voltage to 6.85V. Connect a VHF counter to the Receiver Buffer, TP303, and adjust C315 to obtain a frequency of approximately 135.70MHz.

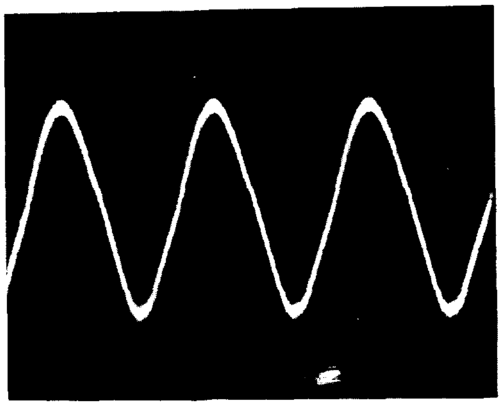
Change the COMM frequency selector dial to 135.70MHz and adjust C314 to obtain a frequency of approximately 126.70MHz. Erratic or improper tuning, or low output should be corrected by troubleshooting the VCO and/or VCO Buffer as outlined in Sections 5.5.5 and 5.5.9.

E. Is the Implicit Divide by 2 halving the VCO frequency?

Without altering the tuning voltage or the channel frequency setting, connect the VHF counter to TP304 and read a frequency of approximately 63.35MHz. Change the COMM frequency selector dial back to 126.70MHz and read a frequency of approximately 67.85MHz on the counter. If a malfunction is observed, the circuit may be serviced using the troubleshooting instructions of Section 5.5.11.

F. Is the Mixer Working Properly?

With 126.70 selected and 6.85VDC bias applied to the VCO, as in previous steps, connect an oscilloscope to the junction of L305, C376 and C377. The waveform should be one of the



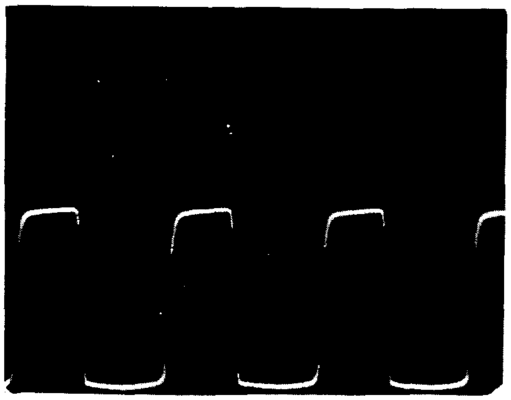
Horizontal:	0.1μsec/div
Vertical:	.05V/div
Selected Freq:	126.70MHz

FIGURE 5-14 MIXER OUTPUT
(Dwg 696-6062-00)

Failure to obtain the desired trace would indicate a malfunction in the Mixer circuit which can be serviced using the troubleshooting information of Section 5.5.12.

G. Is the Squaring Amplifier Working Properly?

With the VCO oscillating at 135.70MHz (COMM frequency selector 126.70MHz), monitor the Squaring Amplifier output, TP306, with an oscilloscope having a bandwidth of at least 30MHz. If the reference oscillator is functioning properly, the waveform will appear as in Figure 5-15. If not, troubleshoot the squaring amplifier as in Section 5.5.14.



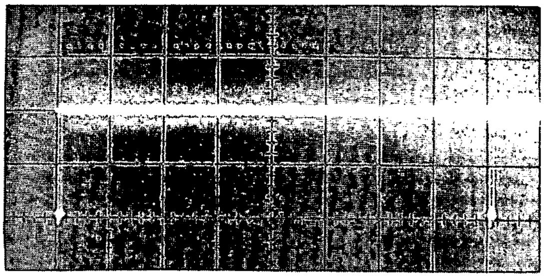
Horizontal: 0.1µsec/div
Vertical: 1V/div
Selected Freq.: 126.70MHz

FIGURE 5-15 SQUARING AMPLIFIER OUTPUT
(Dwg 696-6063-00)

H. Does the Programmable Divider provide proper frequency division?

Maintain the channel setting and the VCO tuning voltage of steps D through G. Attach the oscilloscope probe to the junction of I304, pin 6; I302, pin 9; I306, pin 9, and I312, pin 3 to monitor the counter output. The waveform of Figure 5-16 should be obtained. Note the pulse period of 40µsec. Dial the eighteen MHz positions, leaving the VCO bias unchanged, and look for the counter output pulse rate to increase uniformly as lower channel frequencies are dialed. Return the MHz dial to the 126MHz position and dial through the forty KHz positions. Observe a gradual decrease in output pulse rate as numbers are dialed from the 0.97 to 0.00 using counterclockwise rotation.

If erroneous operation of the Programmable Counter is observed, service the counter using the procedure outlined in Section 5.5.3.



Horizontal; 5μsec/div
Vertical: 2.0V/div
Selected Freq.: 126.7 MHz

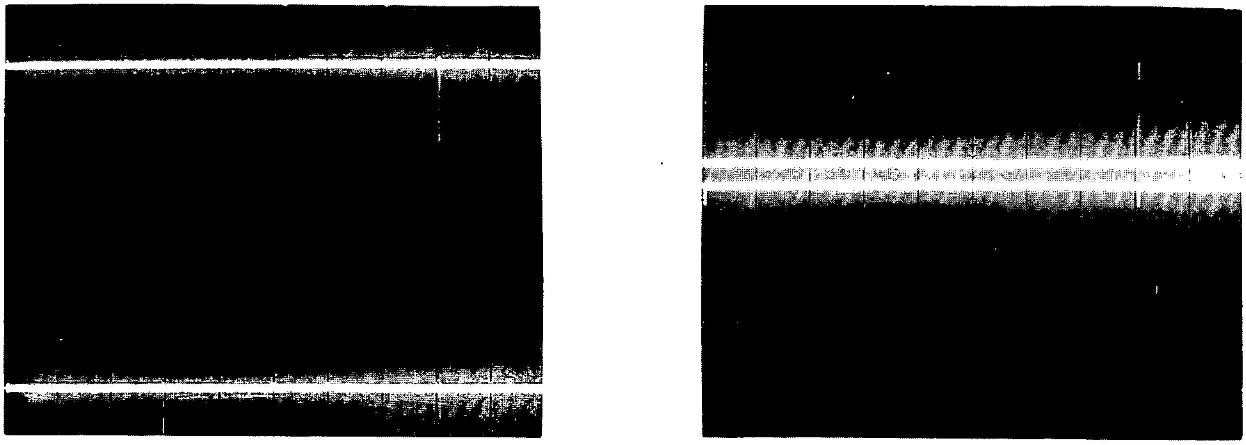
FIGURE 5-16 PROGRAMMABLE DIVIDER OUTPUT
(Dwg 696-6064-00)

I. Is the Phase and Frequency Comparator Operational?

Connect the oscilloscope probe to the tie point of Pins 4, 9, and 11 of I311 and R333 to monitor the Phase and Frequency Comparator output. With the COMM channel selector at 126.70MHz, vary the VCO bias above and below 6.85 volts. The output voltage on the scope should be dominately low when the VCO bias is low, and high when the VCO bias is high. Waveforms are illustrated in the Phase and Frequency Comparator timing diagrams of Figure 5-23. If a malfunction is noted, troubleshoot the circuit as instructed in Section 5.5.4.

J. Does the Voltage Translator Operate Properly?

Repeat the test of Step I but with the oscilloscope probe attached to TP302. Waveforms are illustrated in Figure 5-17 and 5-23. Troubleshoot the circuit as required using the information given in Section 5.5.7.



(a) VCO frequency and bias voltage high

(b) VCO frequency and bias voltage low.

Horizontal: 5μsec/div
Vertical: 2V/div
Selected Freq: 126.70MHz

Upper Trace: Comparator Output I 311, Pins 4, 9, or 11
Lower Trace: Translator Output TP 302

FIGURE 5-17 VOLTAGE TRANSLATOR
(Dwg 696-6114-00)

K. What if no Problems are Observed?

Service the remaining block, the VCO Low Pass Filter. Compare waveform of the input at TP302. Using a DC Voltmeter check the DC voltage at TP301 (7.00 VDC at 135.975 and 126.975MHz, 2.58 VDC at 118.000 and 127.000MHz). (See Figure 5-19)

5.5.3 PROGRAMMABLE DIVIDER, COMM (Figure 5-29)

The Programmable Divider consists of integrated circuits I301, I302, I304, I306, I309, and gates A and D in I303. Reference material includes the divider theory of Section 4.2 and the Timing Diagram of Figure 5-21 and 5-22.

5.5.3.1 Troubleshooting Procedure

I. Test Setup.

A. Open either end of L305, the Mixer Low Pass Filter choke.
B. Use a coaxial pigtail to connect an H/P 606A or equivalent, to the tie point of C376 and C377.

II. Equipment Adjustments.

A. Using a frequency counter, set the 606A to a CW frequency of 3.175MHz.

B. Adjust the H/P 606CW level to obtain a crisp square wave (0 volts base line, 4 volts peak line) at TP306, when viewed by an oscilloscope having a 30MHz or wider bandwidth.

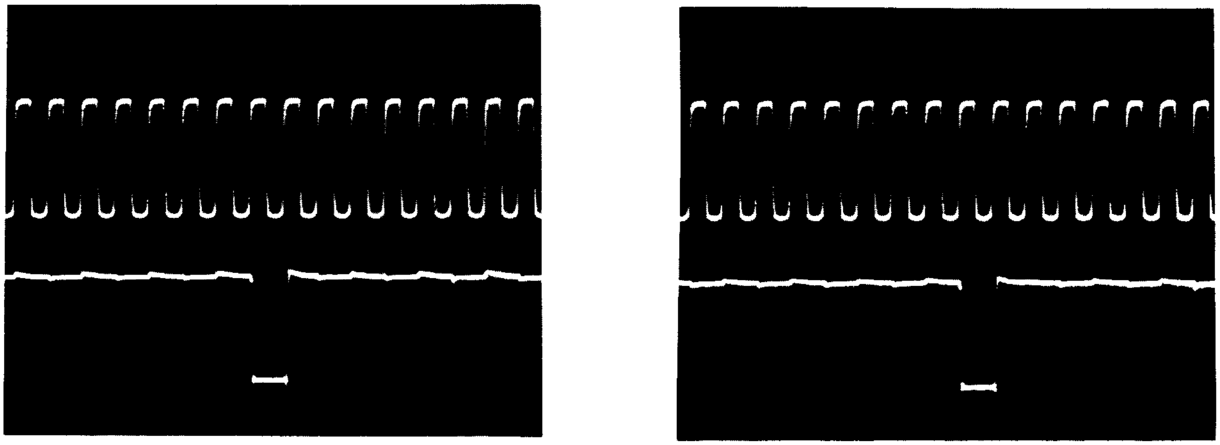
C. Dial the COMM channel selection to 126.70 MHz.

III. Observations

A. Use a 30MHz bandwidth (or wider) oscilloscope. Provide external sync from the leading edge of the pulse appearing at the junction of I304Pin6, I302 and I306Pin9 and I312Pin3.

B. Compare the waveform at Pin 6 of I304 to the equivalent point in the NAV SMO or to 'the timing diagram (See Figure 5-21 and 5-22). The desired output is a pulse train with a 40 μsec. period (25KHz rep. rate), at 0 volts base line, +4.0 volt level.

C. If the desired oscilloscope trace was obtained in B, the counter is operational at 126.70MHz. Dial 135.97 MHz. With the oscilloscope sync as in Step A above, simultaneously monitor TP306 and Pin 9 of I306. Observe the second pulse after the sync pulse. Note the relationship of the pulses as the dial is rotated sequentially to the next lowest channel (counter-clockwise). The second output pulse after the sync pulse should move 1 input pulse increment (Top Trace Figure 5-18) with each 25KHz step that is dialed (See Figure 5-18). If the counter meets the above requirements it is operational. It is recommended that Pages 4-6 through 4-8 paragraph 4.2.2.6 be studied at this time.



f = 126.70

f = 126.675MHz

Top - (TP 306)
Bottom - Counter Output - Second output after sync.
Vertical - 2V/div
Horizontal 10μsec/Div Expanded X10
FIGURE 5 - 18 PROGRAMMABLE DIVIDER
(Dwg. No. 696-6115-00)

D. Failure to meet the requirements of Step B requires a complete check of the I-C input/output timing as defined in the timing diagram (Figure 5-21 and 5-22).

E. Failure to meet the requirements of Step C implies a problem with the preset function of the Programmable Divider. A complete check of the divider flip-flops immediately preceding and following the preset enable pulse (negative pulse on Pin 6 of the I304). The desired preset states are defined in Table 4-3, where 0 is ground and 1 is 5 volts and should occur immediately following the preset enable pulse.

F. Replace components and make repairs as necessary to obtain the desired counter operation.

5.5.4 PHASE AND FREQUENCY COMPARATOR (Figure 5-29)

The Phase and Frequency Comparator consists of I311 and I312. Reference information sources include the Phase and Frequency Comparator Timing Diagram (Figure 5-23) and the theory of section 4.2.

—NOTE—

If the NAV SMO is operating properly it may be used to provide supplementary information using comparison techniques.

5.5.4.1 Troubleshooting Procedure

A. Connect an external power supply to the VCO bias test point TP301.

B. Monitor the Comparator output (Pins 4, 9, or 11 of I311 on an oscilloscope.

C. Adjust the VCO bias voltage low (less than 6.50 volts 122.50) and look for a low output voltage (around .2 volts.) Refer to Figure 5-23 for the appropriate timing diagram.

D. Adjust the VCO bias voltage high (greater than 6.50 volts) and look for a high voltage output voltage (near 4.5V). Refer to Figure 5-23 for the appropriate timing diagram.

E. Failure to meet the conditions of Steps C and D requires a systematic comparison of the input (output) relationships obtained to those appearing in either the Timing Diagram or the functioning NAV SMO.

5.5.5 VOLTAGE CONTROLLED OSCILLATOR (VCO) (Figure 5-29)

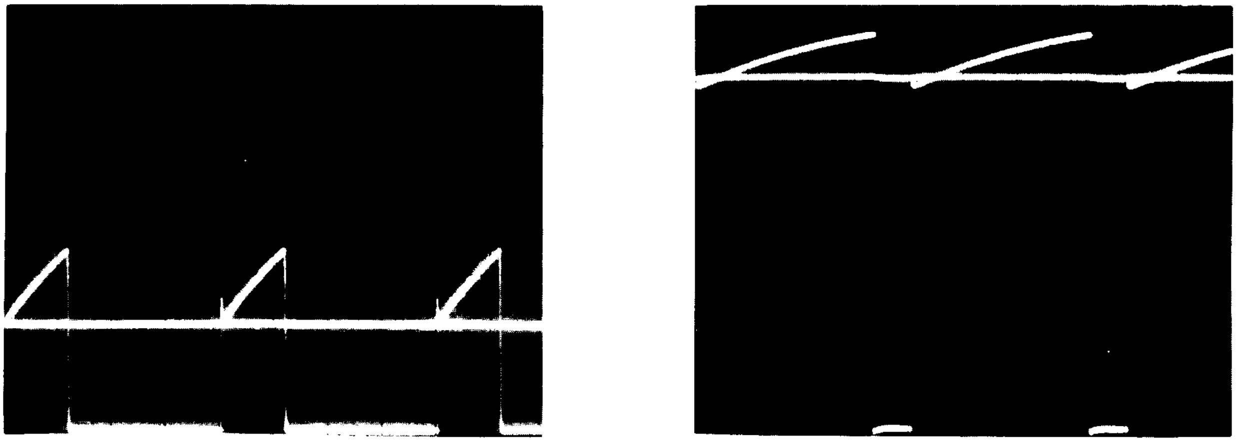
The Voltage Controlled Oscillator (VCO) consists of transistor Q302, Varactor diode CR303, with frequency adjust capacitors C314 and C315 and HI-LO VCO switching transistor Q301. Diodes CR301 and CR302 disable the VCO transistor Q302 when the COMM frequency selector wafter is dialed to a nonvalid COMM channel. In the low portion of the COMM band (118.00-126.975MHz), the Hi line is grounded on receive and the "Lo" line is grounded on transmit. Therefore, in receive the "Hi" line forward biases CR301 applying bias to Q302 for normal operation. CR302 is reverse biased by R346 (High Reference Oscillator Section). In the high portion of the COMM band (127.00-135.975MHz) the "Lo" line is grounded on receive and the "Hi" line is grounded on transmit. Therefore, in receive the "Lo" line, forward biases CR302 which again applies bias to Q302. At the same time, the "Lo" line enables VCO switch Q301, placing trimmer C314 in parallel with C315. CR301 is reverse biased by R347 (High Reference Oscillator Section).

5.5.5.1 Troubleshooting Procedure. Check the supply and bias voltages of Q302. Check for proper operation of the Hi-Lo switching wafer and associated diodes CR301 and CR302. Make repairs as necessary to obtain proper operating conditions. Supply a 7.0 volt bias voltage from a low impedance source to TP301 and monitor the VCO output frequency by capacitively coupling a frequency counter to the collector of Q302 with a 100pf diskcap. With the frequency selector at 126.97MHz adjust C315 to get a frequency of approximately 135.975MHz. If this is unattainable, verify that Q301, is turned off and check the frequency determining elements, C317, C387, C315, C343, L301, and CR303. Dial 135.97MHz and adjust C314 to obtain a VCO frequency of 126.975MHz. If erratic or erroneous operation is noted, check the frequency determining components and verify that Q301 is saturated. If the VCO failes to operate, check L301 and CR303 and Q302. Check the VCO for a proportional change in frequency with tuning voltage changes on the low and high bands.

5.5.6 VCO LOW PASS FILTER (Figure 5-29)

The VCO Low Pass Filter consisting of T307, T308, C348, C349, C350, C390, and C392 is an elliptic low pass filter designed to recover D-C voltage from the output of the 25KHz Voltage Translator. It has been factory adjusted and no attempt should be made to readjust in the field.

5.5.6.1 Troubleshooting Procedure. Using an oscilloscope, check for a square wave input at TP302. Using a D-C voltmeter, check for a D-C voltage at TP301 (7.00V DC at 126.97MHz to 2.58V DC at 118.00MHz). (See Figure 5-19)



f = 118.00, 127.00MHz

f = 126.975, 135.975MHz

TP301 and TP302
Vertical 1 V/Division
Horizontal 10μs/Division

FIGURE 5-19 LOW PASS FILTER
(Dwg. No. 696-6116-00)

5.5.7 25KHz VOLTAGE TRANSLATOR (Figure 5-29)

The Voltage Translator consists of transistor Q317 which shifts the error voltage level from the Phase and Frequency Comparator to a level sufficient to operate the VCO.

5.5.7.1 Troubleshooting Procedure. Using an oscilloscope, trace the input signal from pins 4, 9, or 11 of I311 to the output at TP302. See Figure 5-29 for typical D-C operating voltage levels.

5.5.8 RECEIVER BUFFER (Figure 5-29)

The Receiver Buffer consists of transistor Q303 with output transformer T301.

5.5.8.1 Troubleshooting Procedure. Using an oscilloscope, trace the input signal from R309 to the output at TP303. See Figure 5-29 for typical D-C operating voltage levels.

5.5.9 TRANSMIT BUFFER/TX ENABLE SWITCH/OUT OF LOCK TX DISABLE

The Transmit Buffer consists of Q306 with output transformer T305. It provides drive to the transmitter only when both the Tx Enable Switch, Q305, is turned off and the Out of Lock Disable switch Q307 is saturated providing an emitter current path to ground.

5.5.9.1 Troubleshooting Procedure. Key the transmitter and use an oscilloscope to track the signal from T301 to Pin 2 of the output transformer T305. Using a D-C voltmeter, check the Tx enable switch Q305 for proper operation (Saturated in receive, open in transmit) and check the Out of Lock Disable Q307 for proper operation (saturated-bringing the emitter resistors of Q303 and Q306 to ground. See Figure 5-29 for typical D-C operating voltage levels.

5.5.10 HIGH REFERENCE OSCILLATOR (Figure 5-29)

The High Reference Oscillator consists of transistor Q311 operating in a typical Colpitts configuration. Crystals Y301 and Y302 determine the operating frequency. In the low portion of the COMM band (118.00-126.975MHz), Y301 is used on receive and Y302 is used on transmit. In the high portion of the COMM band (127.00-135.975MHz), Y302 is on receive and Y301 on transmit.

5.5.10.1 Troubleshooting Procedure. Check the oscillator output at Pin 6 of T306. The following table gives the desired functions under the various conditions encountered.

Low Band	(118.00- 126.975MHz)	High Band	(127.00- 135.975MHz)
Receive	f = 71.0375MHz	Receive	f = 66.5375MHz
	"Lo" +8.5V		"Lo" GND
	"Hi" GND		"Hi" +8.5V
	CR314, CR321 Reverse Biased		CR314, CR321 Forward Biased
	CR313, CR322 Forward Biased		CR313, CR322 Reverse Biased
Transmit	f = 66.5375MHz	Transmit	f = 71.025MHz
	"Lo" GND		"Lo" +8.5V
	"Hi" +8.5V		"Hi" GND
	CR314, CR321 Forward Biased		CR314, CR321 Reverse Biased
	CR313, CR322 Reverse Biased		CR313, CR322 Forward Biased

TABLE 5-11 HIGH REFERENCE OSCILLATOR TROUBLESHOOTING TABLE

Check supply and biasing voltages (See Figure 5-29 for typical D-C operating voltage levels).

5.5.11 IMPLICIT DIVIDE BY 2 CIRCUIT (5-29)

The Implicit Divide by 2 circuit consists of balanced mixer CR305, CR306, CR307 and CR308 and amplifier Q310. For circuit theory refer to Section 4.2.

5.5.11.1 Troubleshooting Procedure. Using an oscilloscope verify output from VCO Buffer at Pin 6 of T302. Check for signal at the base of Q310 and track through the amplifier section working toward TP304. See Figure 5-29 for typical D-C operating voltage levels. Refer to 5.4.12.1 and 5.4.13.1 for procedure for isolating amplifier and mixer failures.

5.5.12 2ND MIXER (Figure 5-29)

This is a balanced mixer consisting of transformers T304 and T306 and diodes CR309, CR310, CR311 and CR312.

5.5.12.1 Troubleshooting Procedure. With the power removed from the KX 170B/KX 175B using an ohmmeter check all diodes for a possible open. Check all transformer windings for D-C continuity.

5.5.13 MIXER LOW PASS FILTER (Figure 5-29)

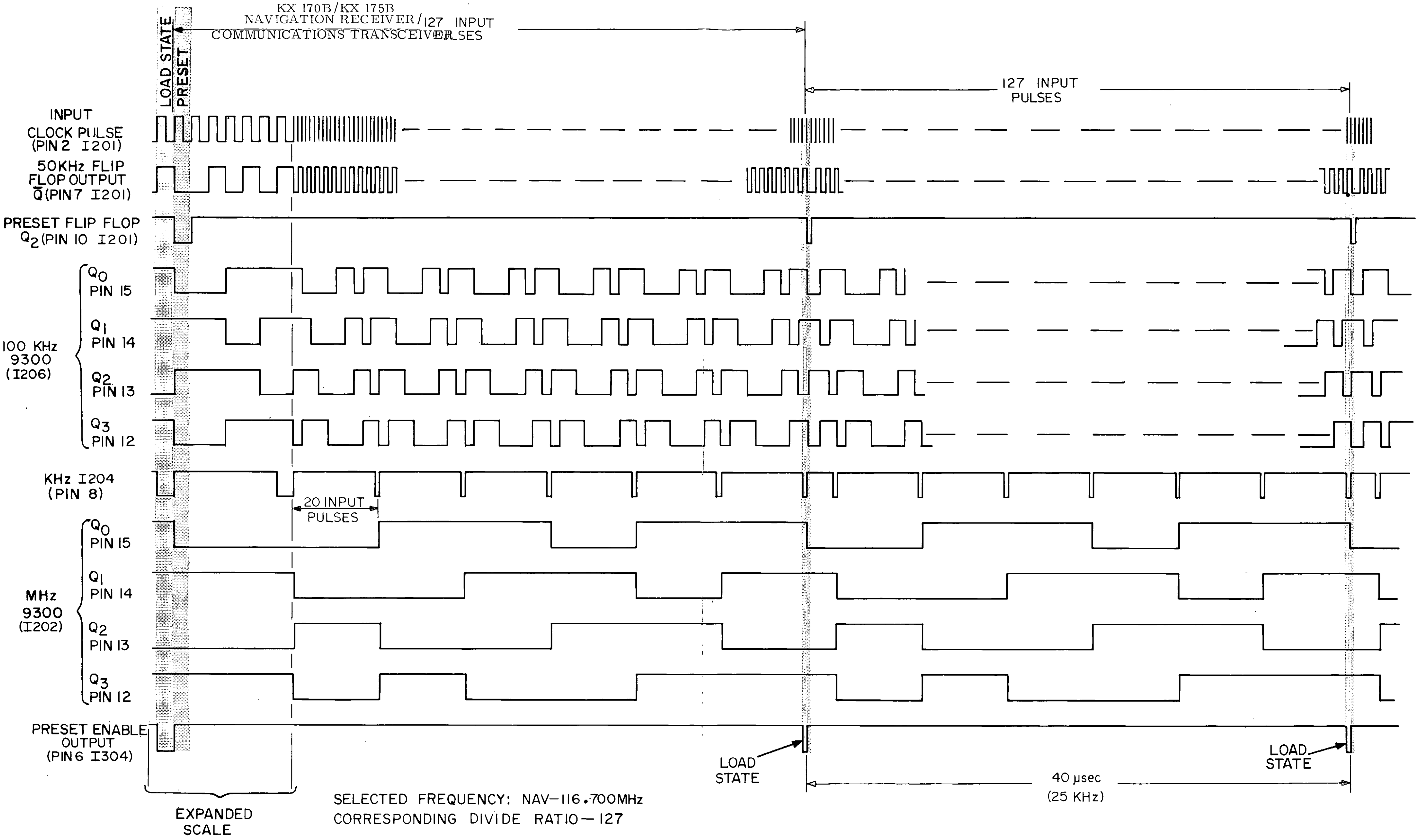
The Mixer Low Pass Filter is a basic pi-section low pass filter consisting of inductor L305 and capacitors C375 and C376.

5.5.13.1 Troubleshooting Procedure. Using an oscilloscope trace the signal from the output of the Second Mixer (Pin 2 of T304) to the input of the Squaring Amplifier (base of Q312).

5.5.14 SQUARING AMPLIFIER (Figure 5-29)

The Squaring Amplifier consists of transistors Q312 and Q313.

5.5.14.1 Troubleshooting Procedure. Using an oscilloscope check for mixer output signal at the base of Q312. Check TP306 for a 4 volt square wave output. Check transistors Q312 and Q313 and associated circuitry (See Figure 5-29 for typical D-C operating voltage levels).



SELECTED FREQUENCY: NAV–116.700MHz
CORRESPONDING DIVIDE RATIO—127

FIGURE 5-20 NAV PROGRAMMABLE DIVIDER TIMING DIAGRAM
(Dwg. No. 696-6117-00)

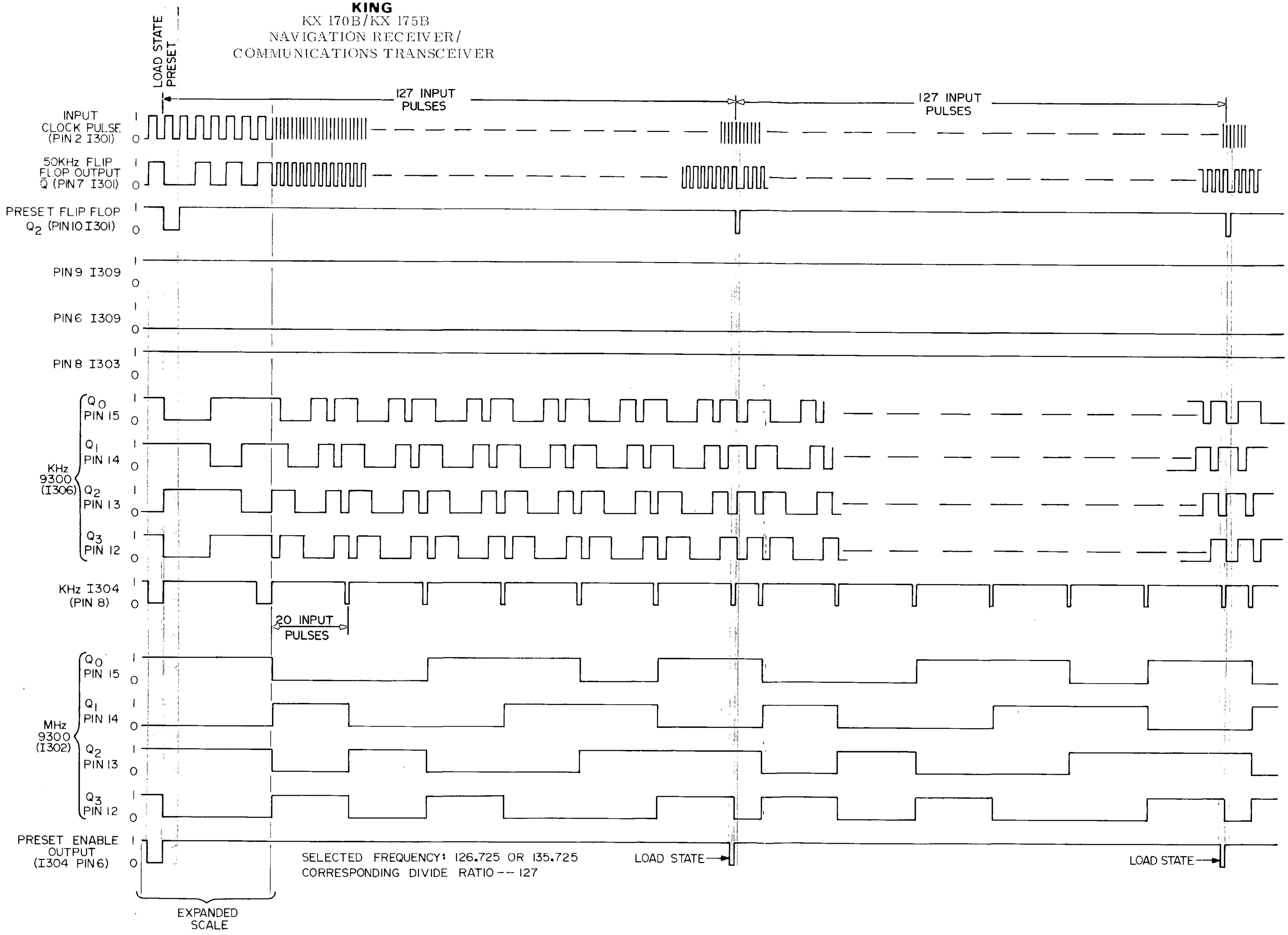


FIGURE 5-21 COMM PROGRAMMABLE DIVIDER TIMING DIAGRAM
(Dwg. No. 696-6118-00)

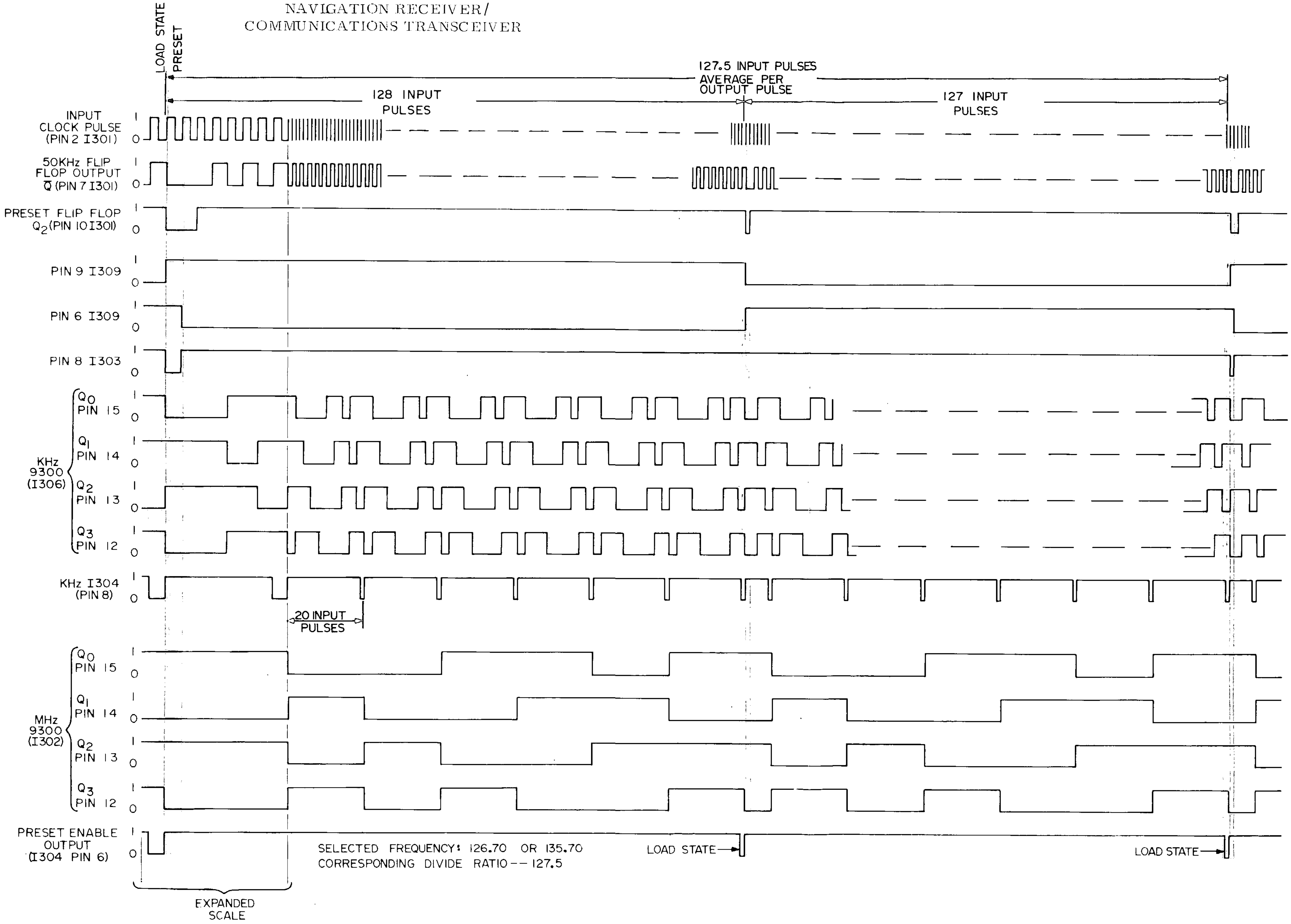


FIGURE 5-22 COMM PROGRAMMABLE DIVIDER TIMING DIAGRAM
(Dwg. No. 696-6119-00)

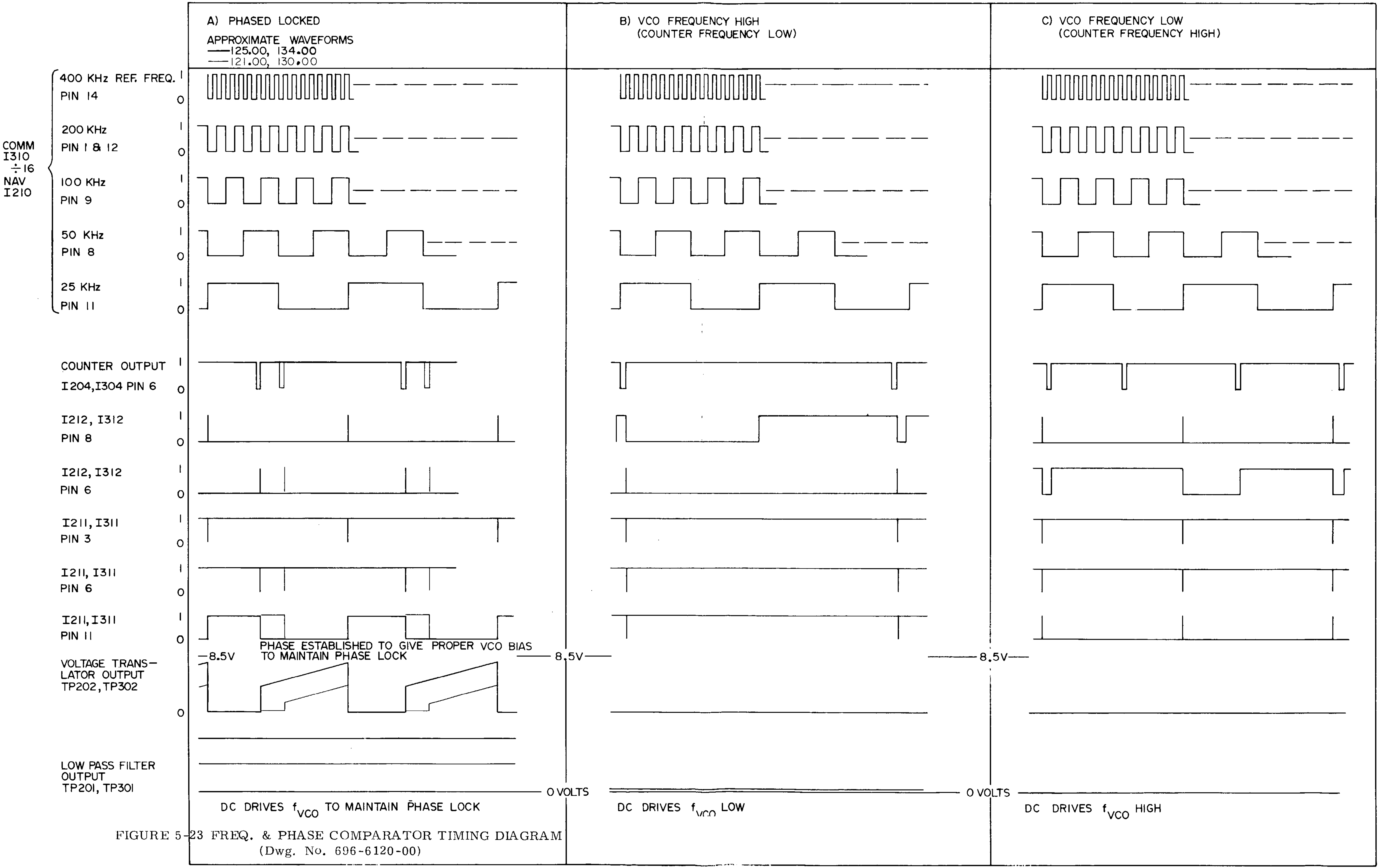


FIGURE 5-23 FREQ. & PHASE COMPARATOR TIMING DIAGRAM
(Dwg. No. 696-6120-00)

5.6 TROUBLESHOOTING THE NAV RECEIVER

The KX 170B/KX 175B NAV Receiver is identical to the KX 170A/KX 175 NAV Receiver. See Section 5.7 of the KX 175 Manual for troubleshooting procedures.

5.7 TROUBLESHOOTING THE COMM RECEIVER

The KX 170B/KX 175B COMM Receiver is identical to the KX 170A/ KX 175 COMM Receiver with the exception of the First I. F. crystal filter and audio filter C513, C514, C515, and L415. See Section 5.8 of the KX 175 Manual for troubleshooting procedures.

5.8 TROUBLESHOOTING THE AUDIO AMPLIFIER

The KX 170B/KX 175B audio amplifier is similar to the KX 170A/KX 175 audio amplifier with the exception of the Intercom Mic input. See Section 5.9 of the KX 175 Manual and figure 5-28 of the KX 175B Manual for troubleshooting procedures.

5.9 TROUBLESHOOTING THE TRANSMITTER

The KX 170B/KX 175B Transmitter is identical to the KX 170A/KX 175 Transmitter. See Section 5.10 of the KX 175 Manual for troubleshooting procedures.

5.10 TROUBLESHOOTING THE REGULATORS

5.10.1 COMM 8.5 VOLT REGULATOR (Figure 5-30)

A complementary configuration using two transistors (Q102 and Q105) as a series pass element was selected to enhance low supply voltage operation. Transistor Q104 provides negative feedback to the base of Q105. Transistor Q107 and R134 provide short circuit protection for the regulator.

5.10.1.1 Troubleshooting Procedure. If no output, check for 13.75V input on orange-white wire. If 13.75V is present, disconnect the orange-grey wires (3 total) and the white (2) wires. Check the collector of Q102 for 8.5V. If this has corrected the problem, replace wires one at a time to isolate the shorted assembly. Erroneous or erratic adjustment, necessitates checking R130-R132, CR103 and R125.

If output is high (13.75V), check for shorted transistor Q102, Q105 or an open connection to Q104.

5.10.2 8.5V NAV REGULATOR (Figure 5-30)

The 8.5V NAV regulator is a conventional series regulator consisting of a series control transistor pair Q101 and Q103 and reference element CR102. Transistor Q106 and R128 provide short circuit protection for the regulator.

5.10.2.1 Troubleshooting Procedure. If no output, check for 13.75V input on yellow/white wire. If 13.75V is present, disconnect the grey (3 total) wires, and white (2) wires, and check the collector of Q101 for 8.5V. If this has corrected the problem, replace wires one at a time to isolate the shorted assembly. Check the voltage at zener diode CR102 (approximately 9.1V). If output is high, check for shorted transistor Q101 or Q103 or open connection on zener CR102.

5.11 TROUBLESHOOTING THE KA 39 VOLTAGE REGULATOR

See Section 5.12 of KX 175 Manual

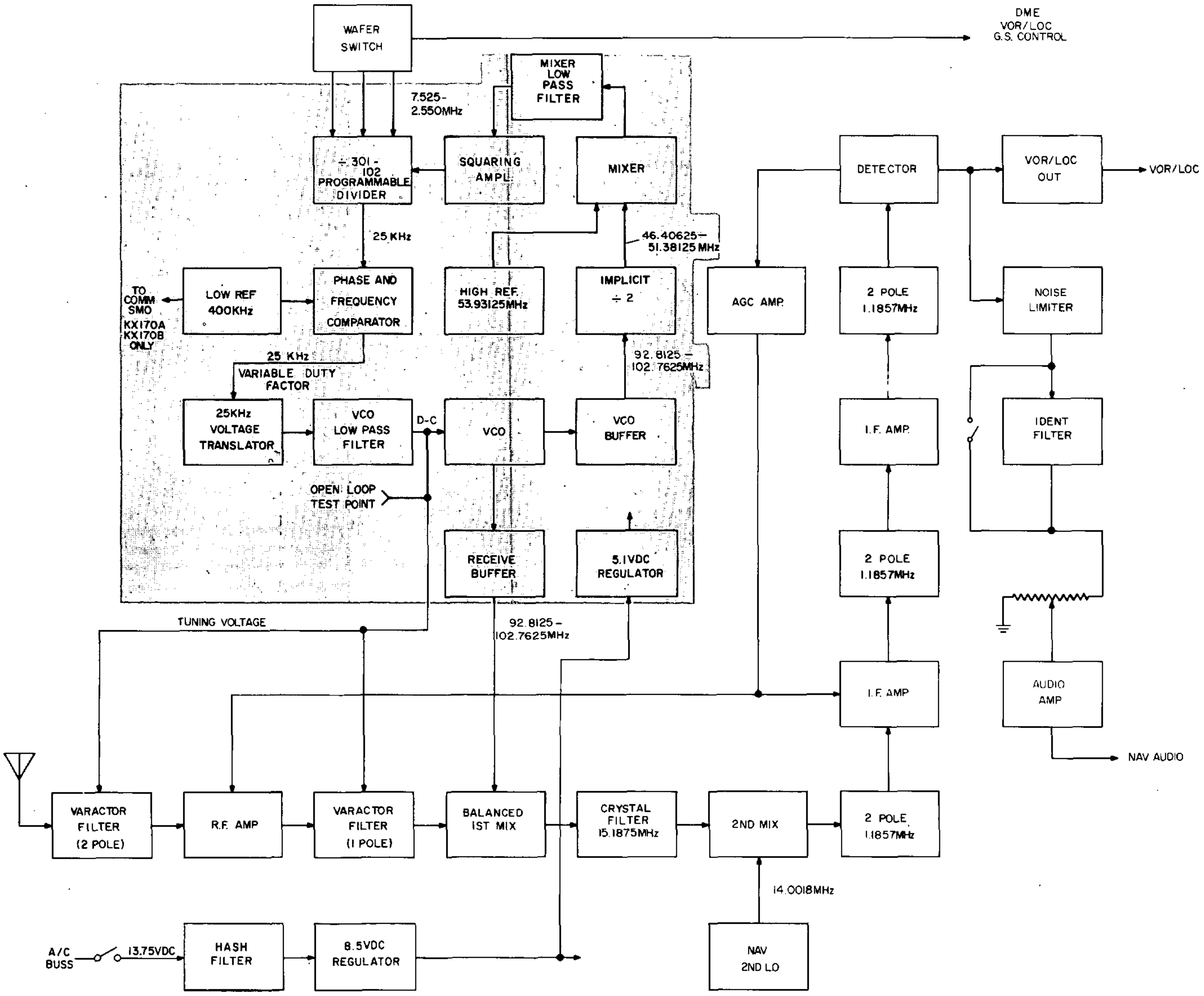


FIGURE 5-24 NAV BLOCK DIAGRAM
(Dwg. No. 696-6121-00)

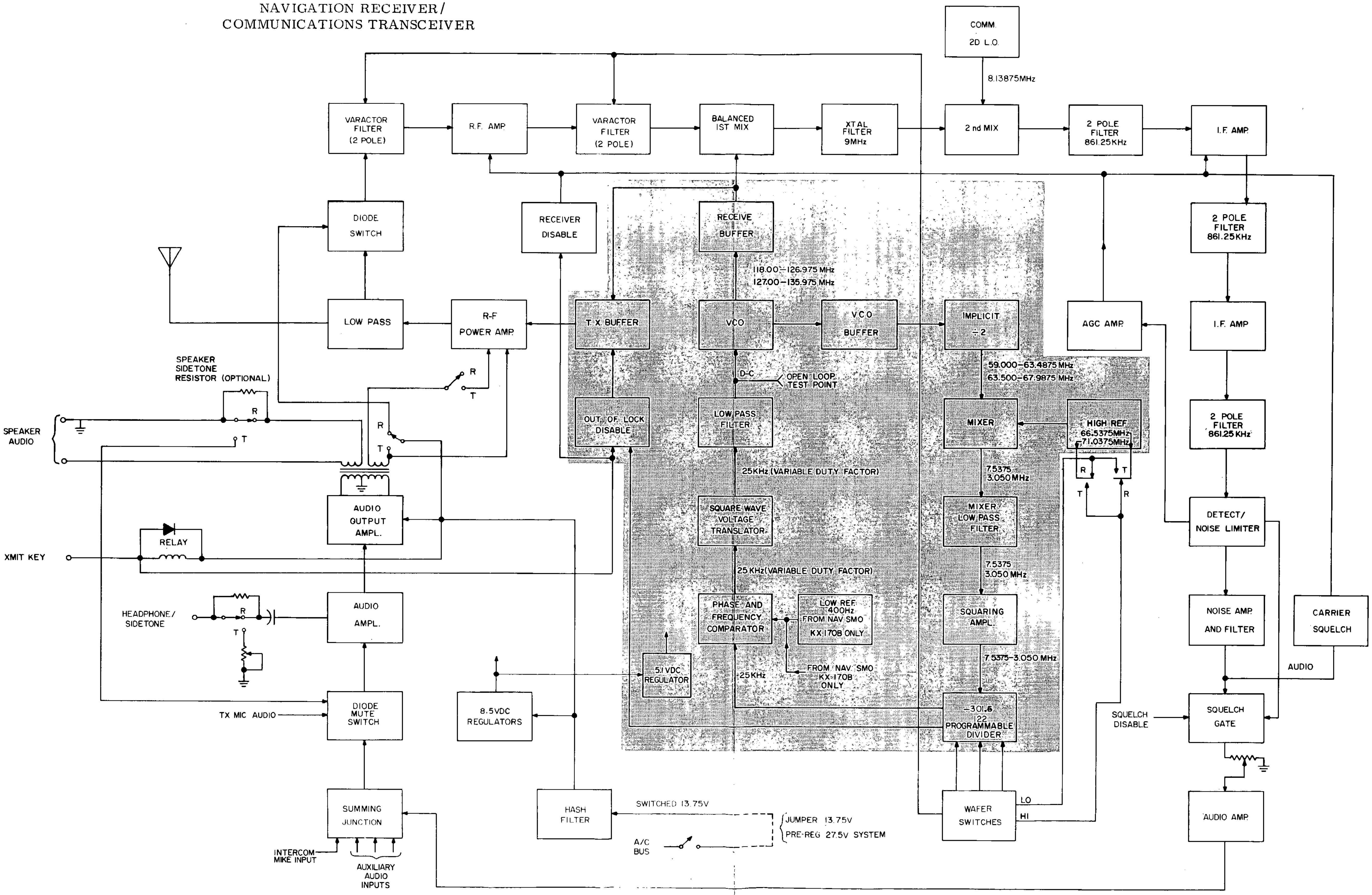
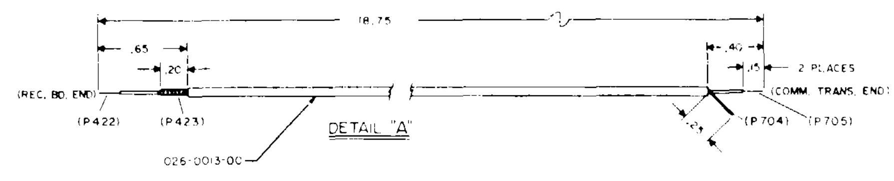
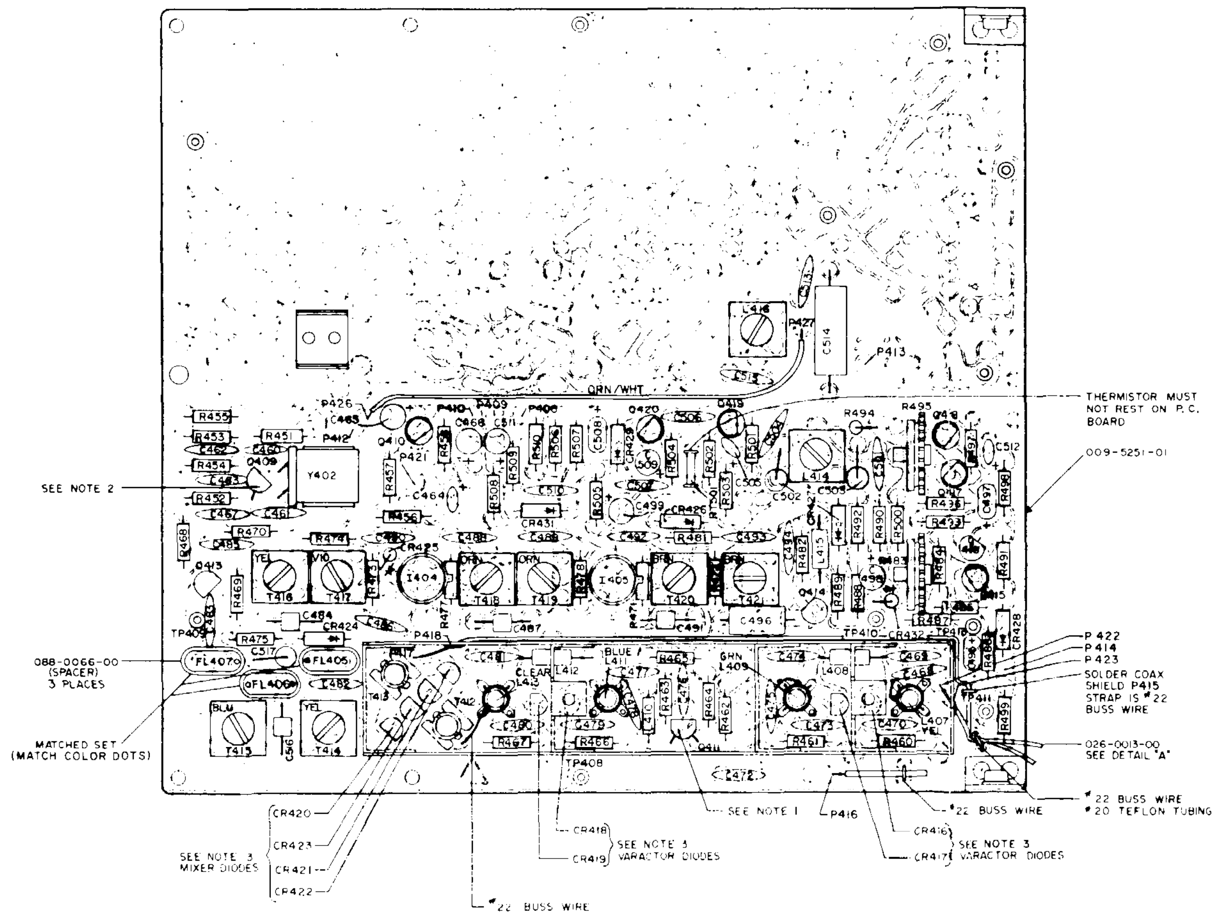
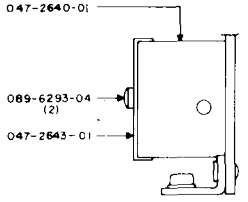


FIGURE 5-25 COMM BLOCK DIAGRAM
(Dwg. No. 696-6122-00)

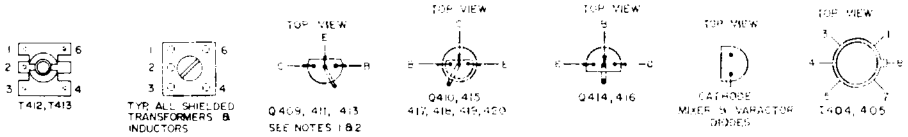




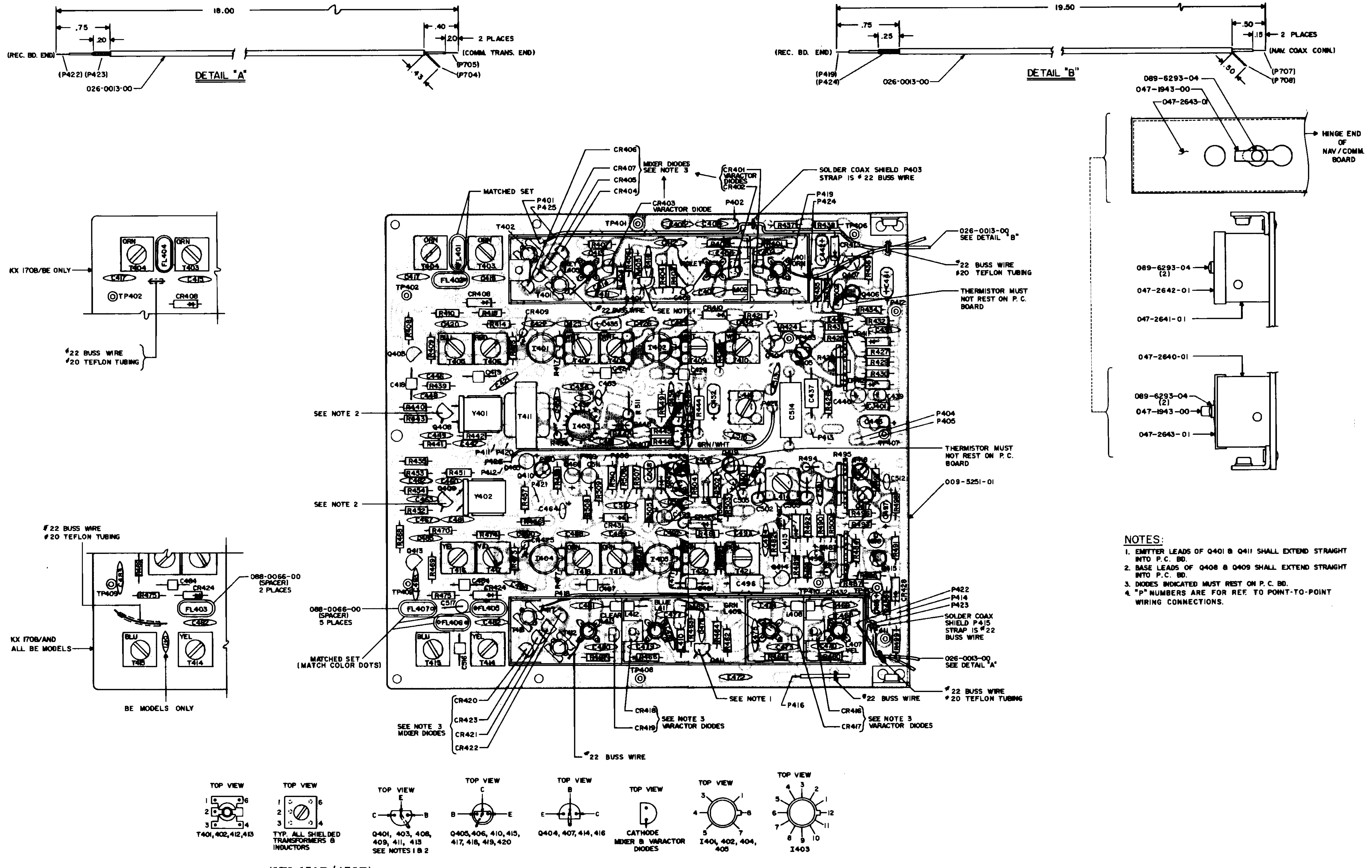


NOTES:

1. EMITTER LEAD OF Q411 SHALL EXTEND STRAIGHT INTO P.C. BD.
2. BASE LEAD OF Q409 SHALL EXTEND STRAIGHT INTO P.C. BD.
3. DIODES INDICATED MUST REST ON P.C. BD.
4. "P" NUMBERS ARE FOR REF. TO POINT-TO-POINT WIRING CONNECTIONS.



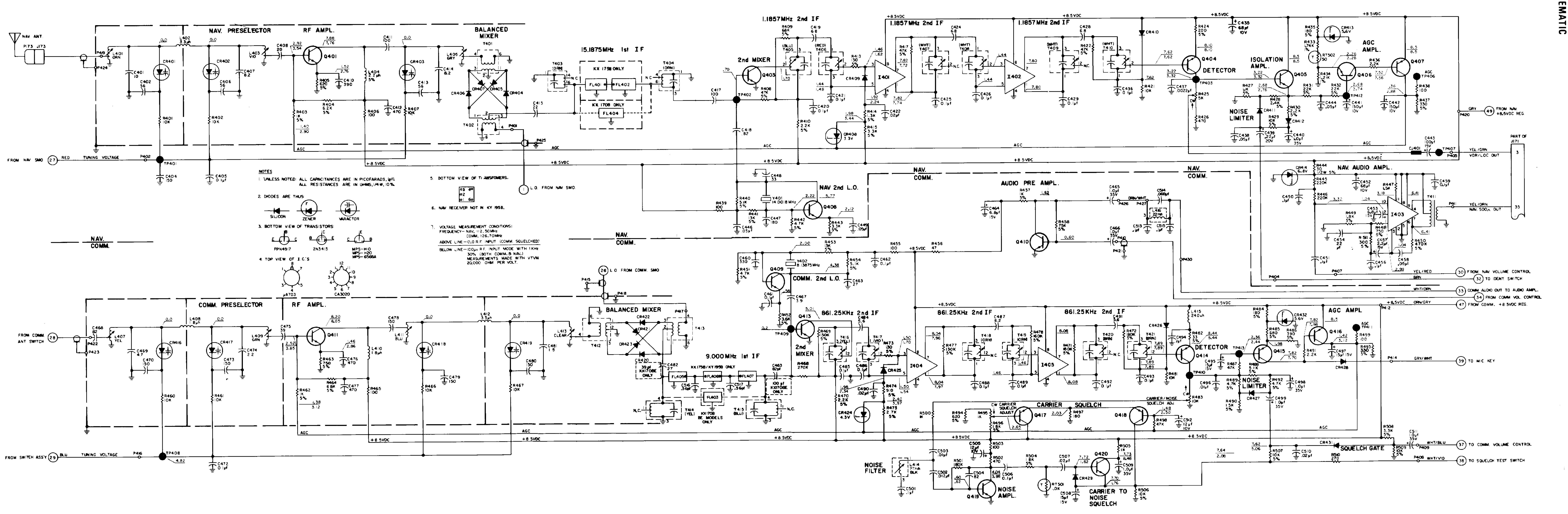
(KY 195B)
FIGURE 5-26 COMM BOARD ASSEMBLY
(Dwg. No. 300-0653-00 Rev. 1)



NOTES:

1. EMITTER LEADS OF Q401 & Q411 SHALL EXTEND STRAIGHT INTO P.C. BD.
2. BASE LEADS OF Q408 & Q409 SHALL EXTEND STRAIGHT INTO P.C. BD.
3. DIODES INDICATED MUST REST ON P.C. BD.
4. "P" NUMBERS ARE FOR REF. TO POINT-TO-POINT WIRING CONNECTIONS.

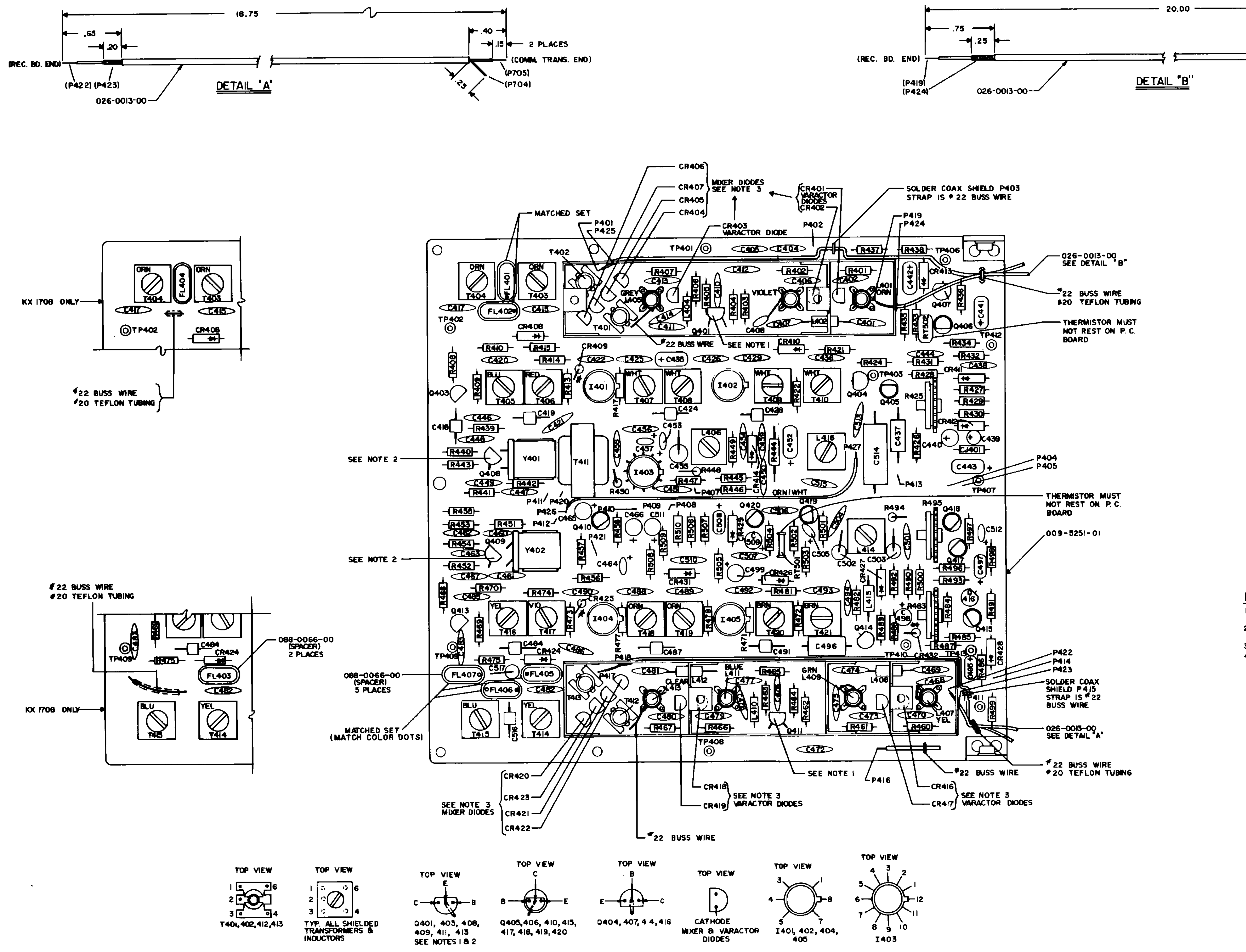
NAV/COMM RECEIVER
SCHEMATIC



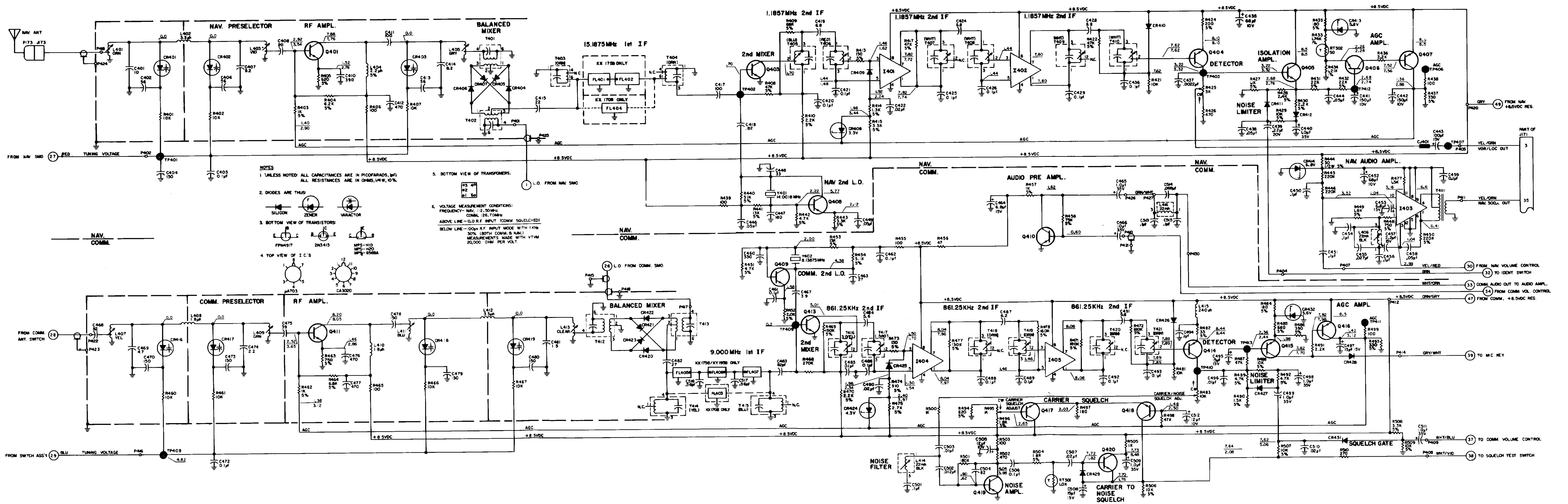
NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4 W, 10%.
2. DIODES ARE THUS:
SILICON ZENER VARACTOR
3. BOTTOM VIEW OF TRANSISTORS:
FPN4917 2N3415 MPS-H10 MPS-H20 MPS-6568A
4. TOP VIEW OF I.C.'S
μA703 CA3020
5. BOTTOM VIEW OF TRANSFOMERS.
6. NAV RECEIVER NOT IN KY 195B.
7. VOLTAGE MEASUREMENT CONDITIONS:
FREQUENCY— NAV. 112.50MHz
COMM. 126.70MHz
ABOVE LINE— 0.0 R.F. INPUT (COMM. SQUELCHED)
BELOW LINE— 100μv R.F. INPUT MODE WITH 1KHz 30% (BOTH COMM. & NAV.) MEASUREMENTS MADE WITH VTVM 20,000 OHM PER VOLT.

(KX 170B/175B)
FIGURE 5-26A NAV/COMM RECEIVER SCHEMATIC & ASSEMBLY
(Dwg. No. 002-0234-01) (R-7)
(Dwg. No. 300-0652-00) (R-4)

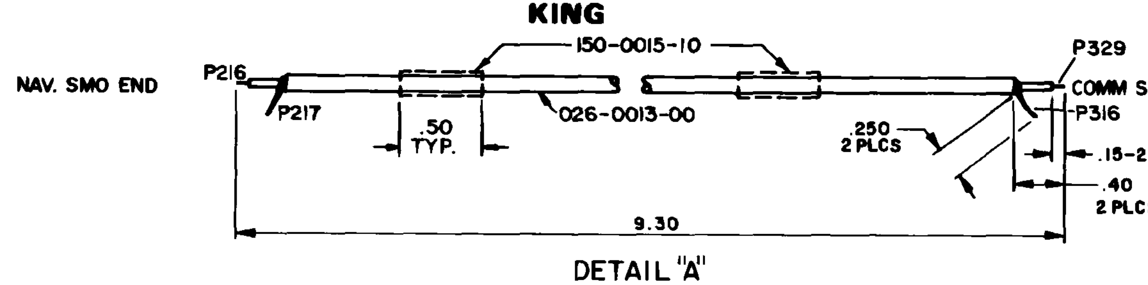


NOTES:
1. EMITTER LEADS OF Q401 & Q411 SHALL EXTEND STRAIGHT INTO P.C. BD.
2. BASE LEADS OF Q408 & Q409 SHALL EXTEND STRAIGHT INTO P.C. BD.
3. DIODES INDICATED MUST REST ON P. C. BD.
4. "P" NUMBERS ARE FOR REF. TO POINT-TO-POINT WIRING CONNECTIONS.

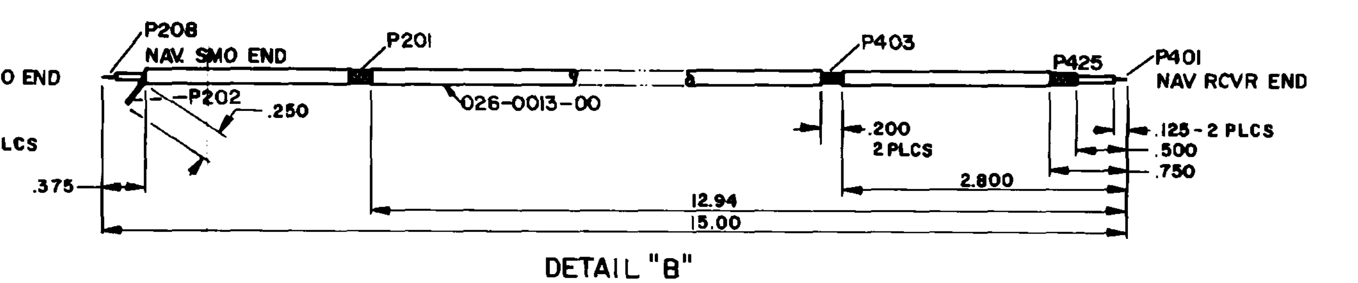


(KX 170B/175B)
FIGURE 5-26A NAV/COMM RECEIVER SCHEMATIC & ASSEMBLY
(Dwg. No. 002-0234-01)
(Dwg. No. 300-0652-00)

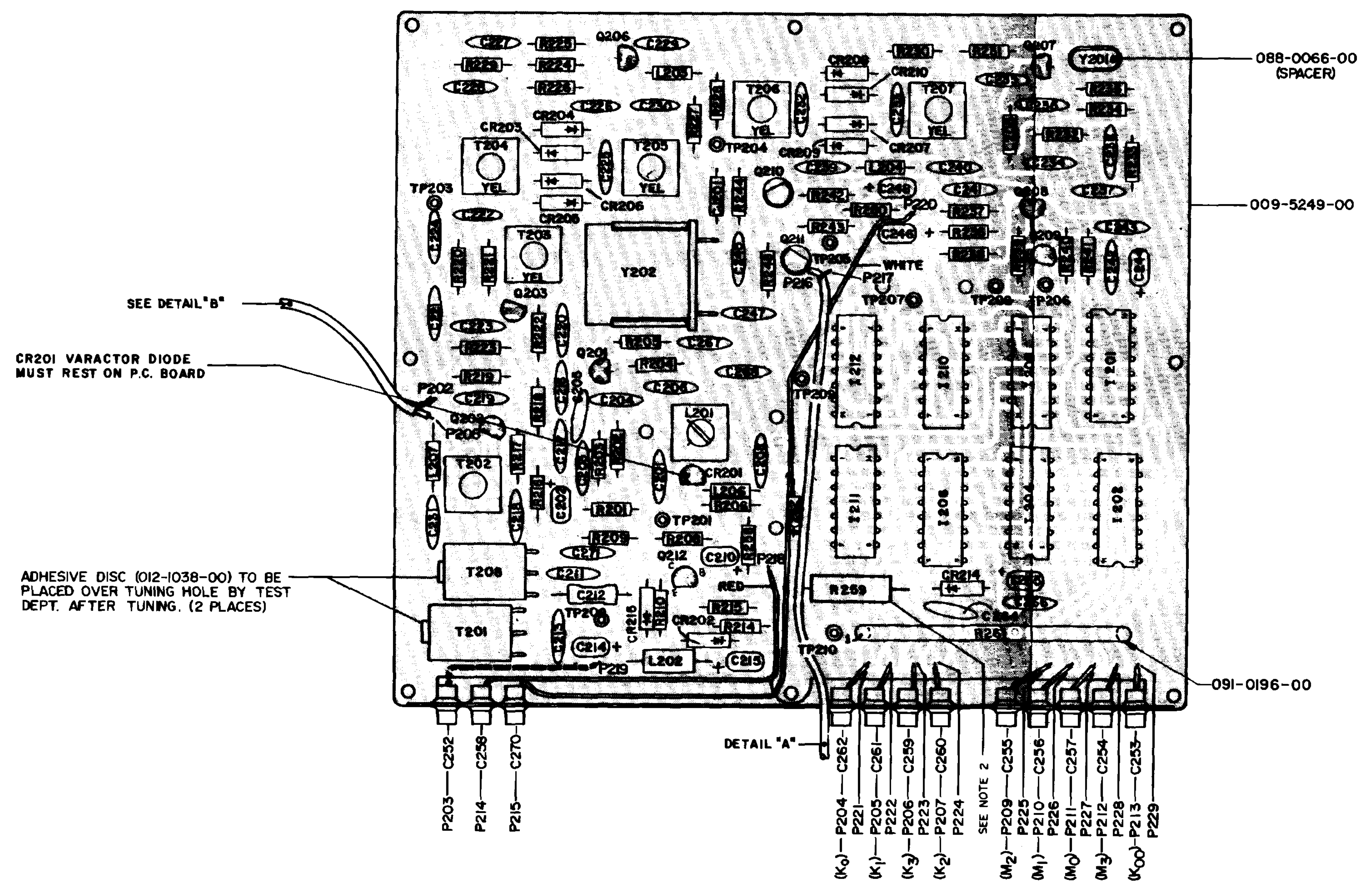
KING



DETAIL "A"
(KX 170B ONLY)



DETAIL "B"

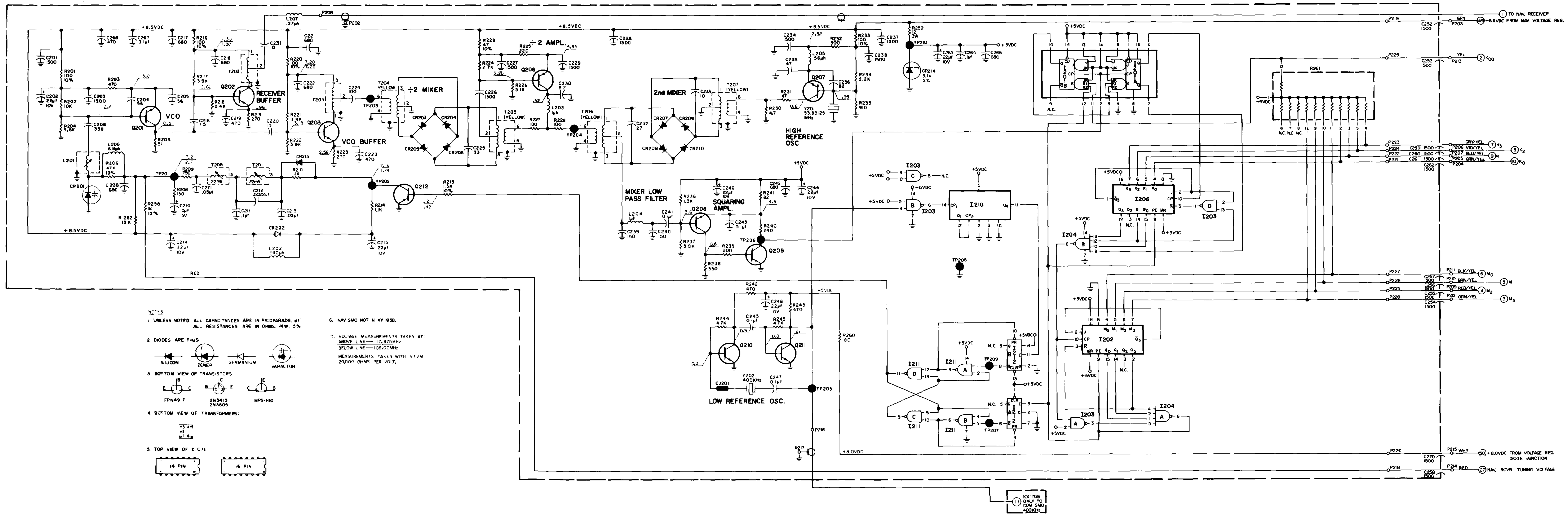


NAV. SMO SUB-ASSY WIRING CHART						
KPN	FROM	TO	LENGTH	COLOR	REMARKS	LENGTH
026-0001-00	P203	P219		BUSS	SLEEVE WITH 150-0003-10	
↑	P204	P221		↑	↑	
│	P205	P222		│	│	
│	P206	P223		│	│	
│	P207	P224		│	│	
│	P209	P225		│	│	
│	P210	P226		│	│	
│	P211	P227		│	│	
↓	P212	P228		↓	↓	
026-0001-00	P213	P229		BUSS	SLEEVE WITH 150-0003-10	
025-0018-99	P215	P220		WHT		
025-0018-22	P214	P218		RED		

NOTES:

1. "P" NUMBERS ARE FOR REF. TO POINT-TO-POINT WIRING CONNECTIONS.
2. BODY OF R259 TO BE .10 TO .15 ABOVE SURFACE OF BD.

NAV SMO SCHEMATIC



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, pf
ALL RESISTANCES ARE IN OHMS, 1/4W, 5%
2. DIODES ARE THUS:
SILICON ZENER GERMANIUM VARACTOR
3. BOTTOM VIEW OF TRANSISTORS
FPN4917 2N3415 2N3605 MPS-H10
4. BOTTOM VIEW OF TRANSFORMERS:
5. TOP VIEW OF I.C.'s
14 PIN 16 PIN
6. NAV SMO NOT IN KY 195B.
7. VOLTAGE MEASUREMENTS TAKEN AT:
ABOVE LINE—117.975MHz
BELOW LINE—108.00MHz
MEASUREMENTS TAKEN WITH VTVM 20,000 OHMS PER VOLT.

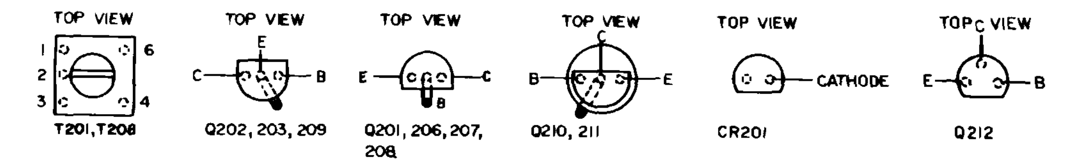
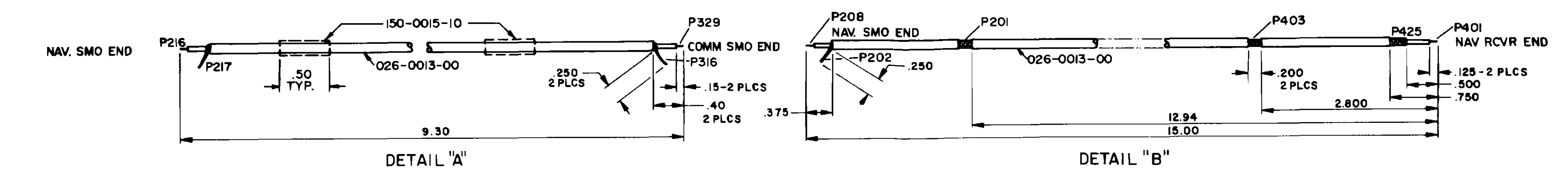
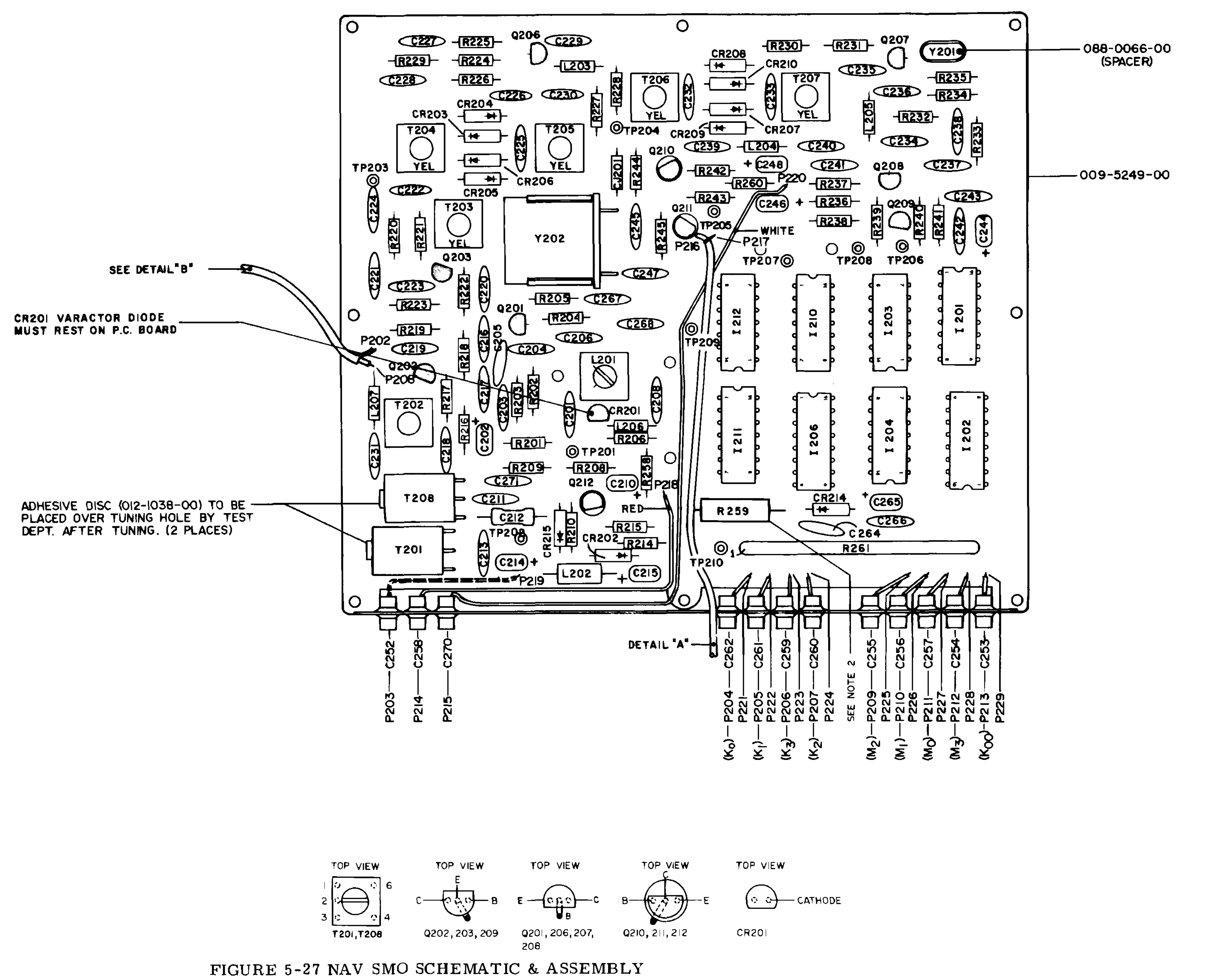


FIGURE 5-27 NAV SMO SCHEMATIC & ASSEMBLY
(Dwg. No. 002-0234-02) (R-5)
(Dwg. No. 300-0659-00) (R-4)



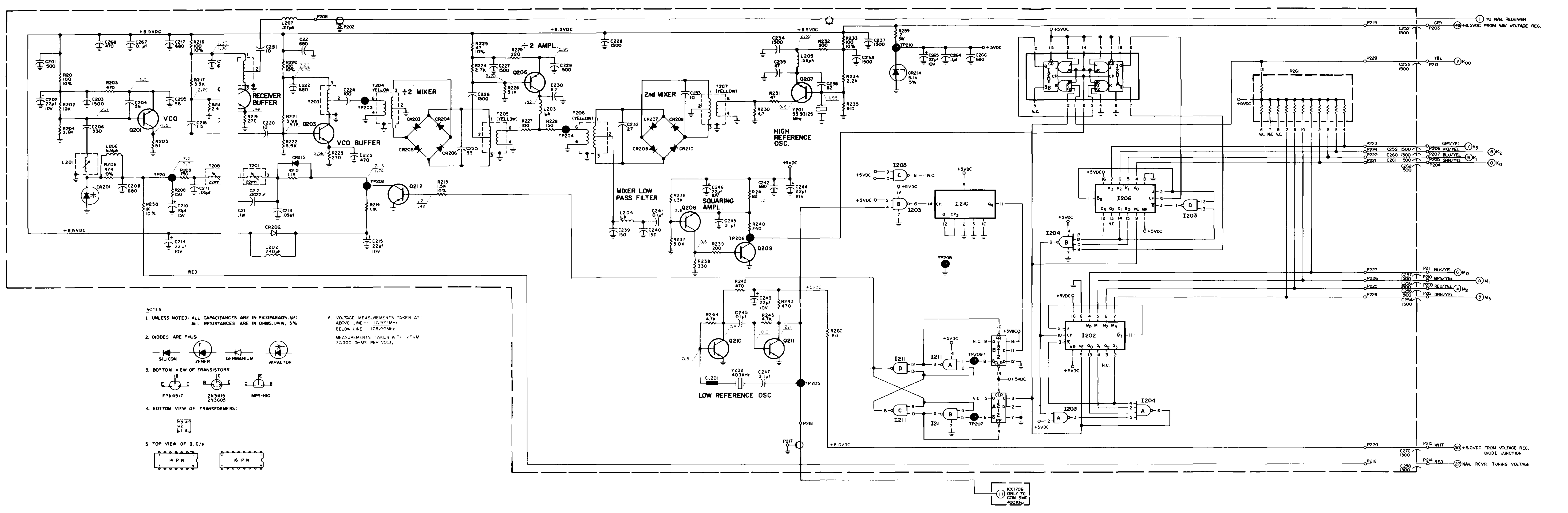


NAV. SMO SUB-ASSY WIRING CHART						
KPN	FROM	TO	LENGTH	COLOR	REMARKS	LENGTH
026-0001-00	P203	P219		BUSS	SLEEVE WITH 150-0003-10	
↕	P204	P221		↕	↕	
	P205	P222				
	P206	P223				
	P207	P224				
	P209	P225				
	P210	P226				
	P211	P227				
	P212	P228				
026-0001-00	P213	P229		BUSS	SLEEVE WITH 150-0003-10	
025-0018-99	P215	P220		WHT		
025-0018-22	P214	P218		RED		

NOTES:

1. "P" NUMBERS ARE FOR REF. TO POINT-TO-POINT WIRING CONNECTIONS.
2. BODY OF R259 TO BE .10 TO .15 ABOVE SURFACE OF BD.

NAV SMO SCHEMATIC

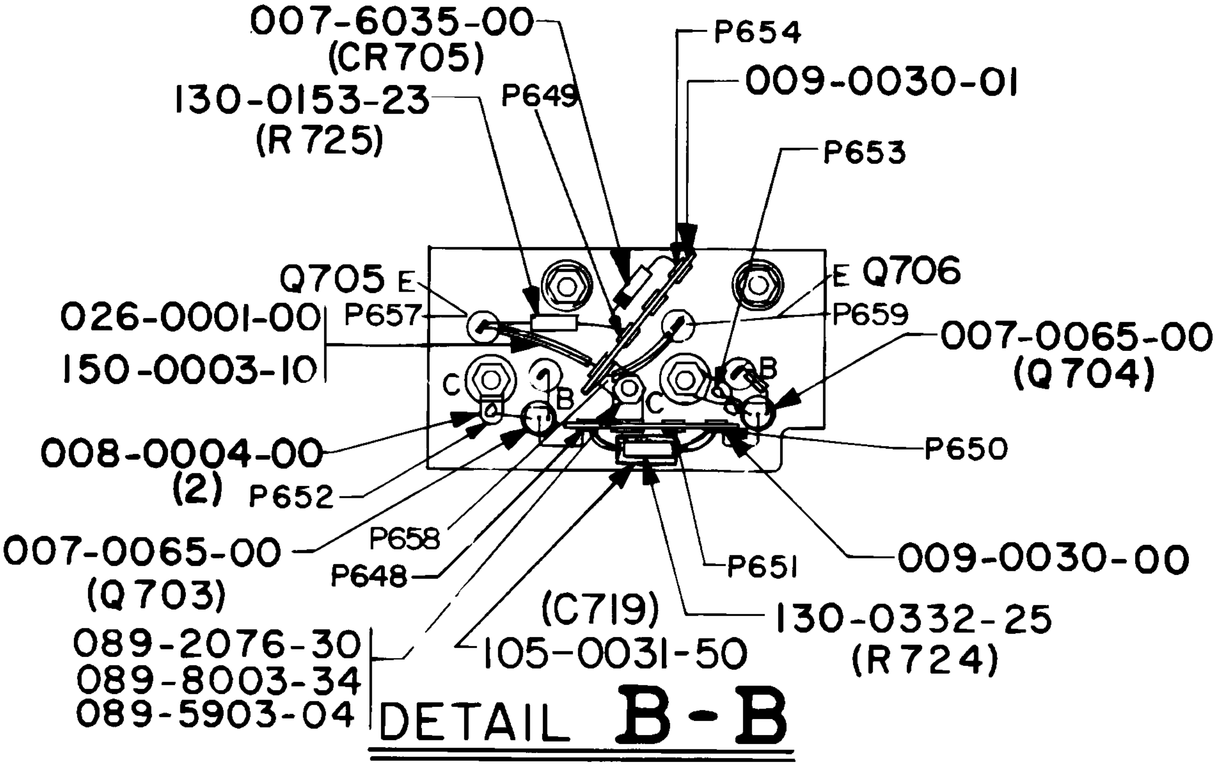


NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf).
   ALL RESISTANCES ARE IN OHMS, 1/4W, 5%
2. DIODES ARE THUS:
3. BOTTOM VIEW OF TRANSISTORS:
4. BOTTOM VIEW OF TRANSFORMERS:
5. TOP VIEW OF I.C.'s
6. VOLTAGE MEASUREMENTS TAKEN AT:
   ABOVE LINE — 117.975MHz
   BELOW LINE — 108.00MHz

   MEASUREMENTS TAKEN WITH VTVM 20,000 OHMS PER VOLT.

FIGURE 5-27 NAV SMO SCHEMATIC & ASSEMBLY
(Dwg. No. 002-0234-02)
(Dwg. No. 300-0659-00)

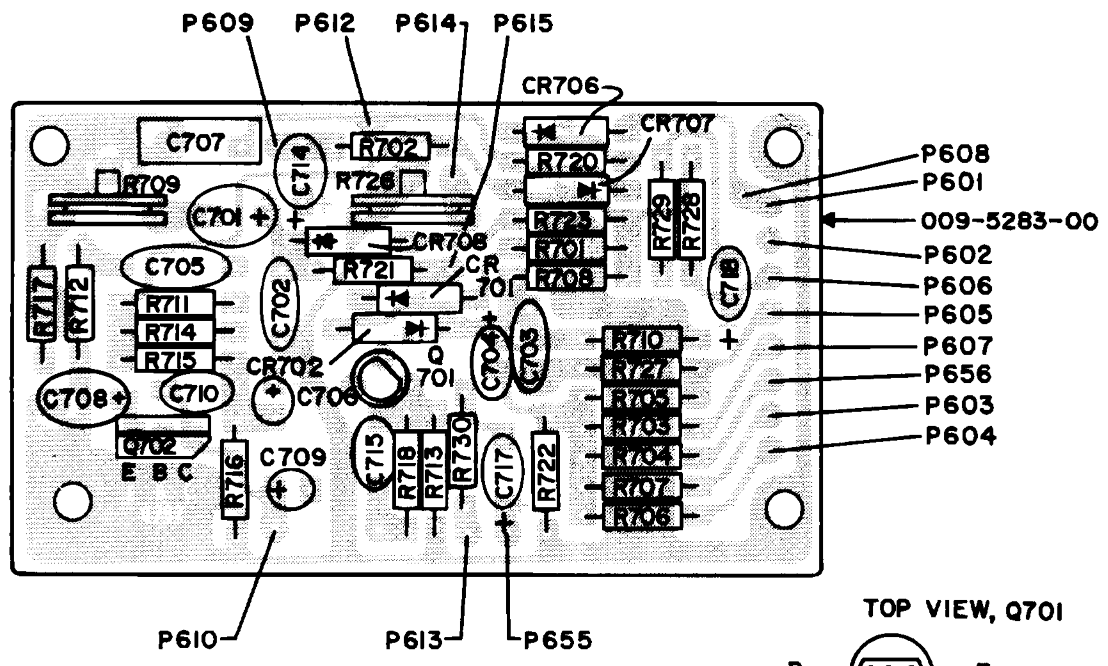


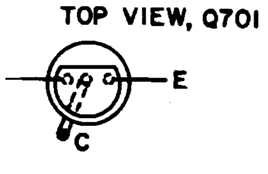
NOTES:

1. "P" NUMBERS ARE FOR REF. TO POINT TO POINT WIRING CONNECTIONS.

FIGURE 5-28 AUDIO ASSEMBLY
(Dwg. No. 300-0654-00)

KING

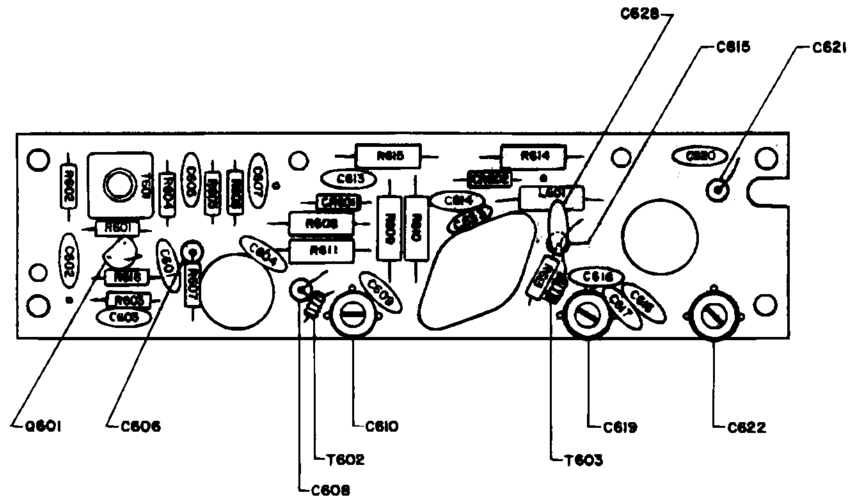




NOTES:

I. "P" NUMBERS ARE FOR REF. TO POINT-TO-POINT WIRING CONNECTION.

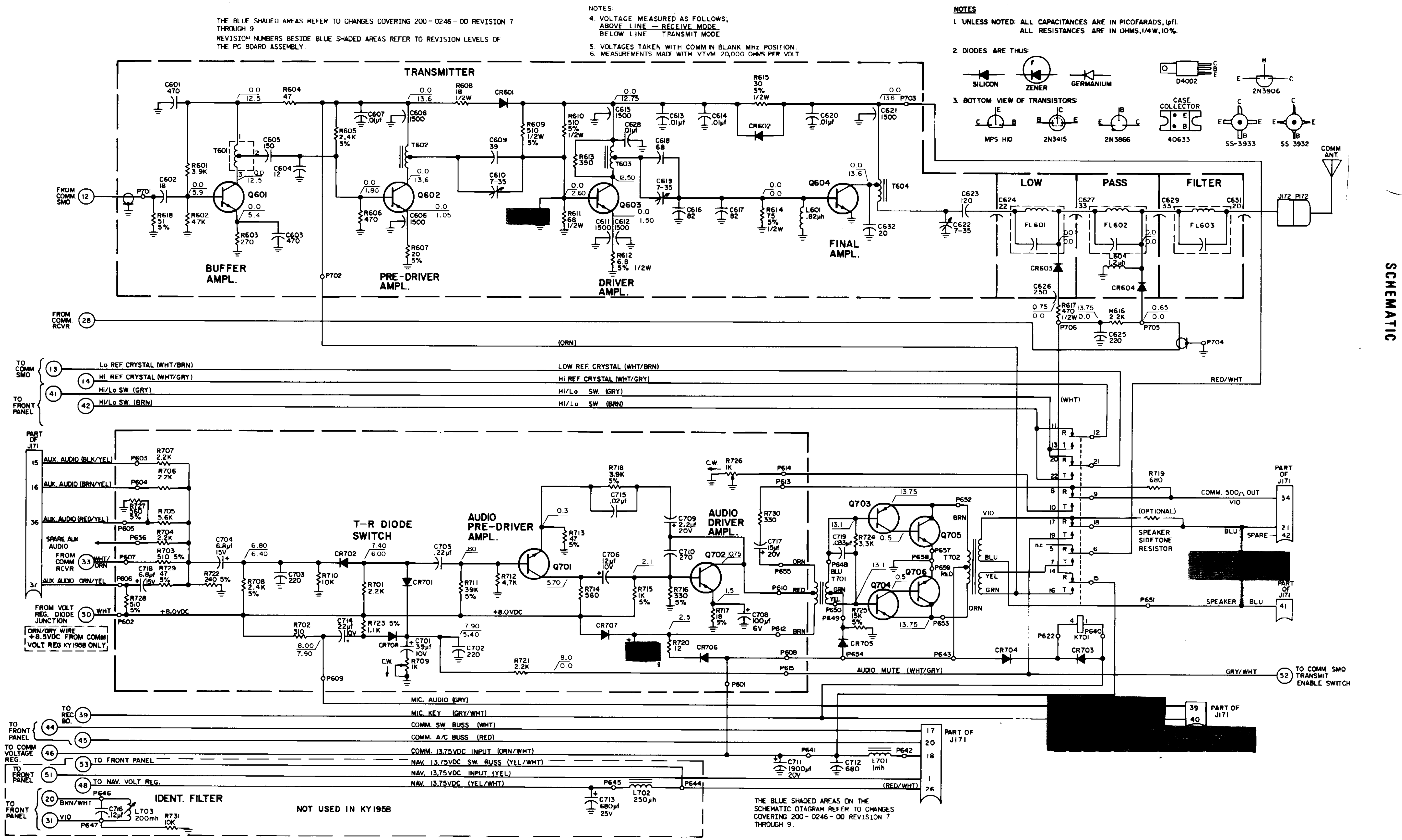
300-0655-00



NOTES:

I. ALL DISC CAPS SHALL BE INSTALLED IN P.C. BOARD WITH NO MORE THAN .07 INCH LEAD LENGTH ABOVE BOARD.

300-0106-00



THE BLUE SHADED AREAS REFER TO CHANGES COVERING 200-0246-00 REVISION 7 THROUGH 9.

REVISION NUMBERS BESIDE BLUE SHADED AREAS REFER TO REVISION LEVELS OF THE PC BOARD ASSEMBLY.

NOTES:

4. VOLTAGE MEASURED AS FOLLOWS;
ABOVE LINE — RECEIVE MODE
BELOW LINE — TRANSMIT MODE

5. VOLTAGES TAKEN WITH COMM IN BLANK MHz POSITION.
6. MEASUREMENTS MADE WITH VTVM 20,000 OHMS PER VOLT.

NOTES

I. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W, 10%.

2. DIODES ARE THUS: SILICON ZENER GERMANIUM

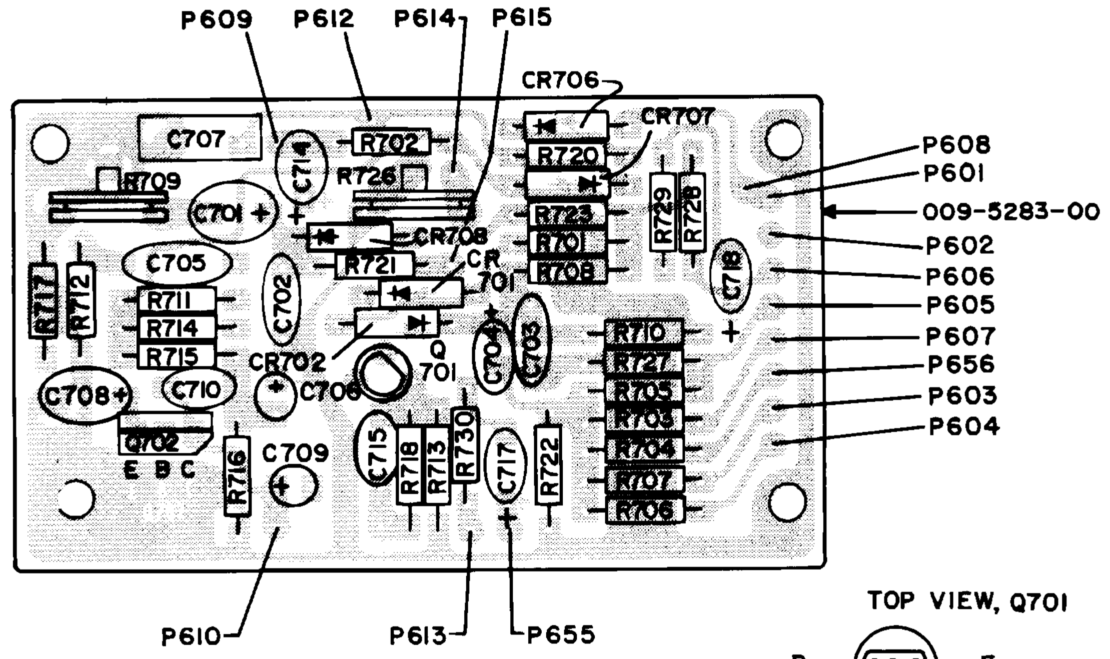
3. BOTTOM VIEW OF TRANSISTORS: MPS-H10 2N3415 2N3866 40633 SS-3933 SS-3932 D4002 2N3906

THE BLUE SHADED AREAS ON THE SCHEMATIC DIAGRAM REFER TO CHANGES COVERING 200-0246-00 REVISION 7 THROUGH 9.

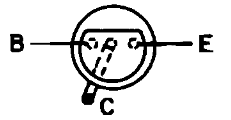
TRANSMITTER/AUDIO SCHEMATIC

FIGURE 5-28A TRANSMITTER & AUDIO SCHEMATIC & ASSEMBLY
(Dwg. No. 002-0234-03) (R-7)
(Dwg. No. 300-0106-00) (R-8)
(Dwg. No. 300-0655-00) (R-0)

KING



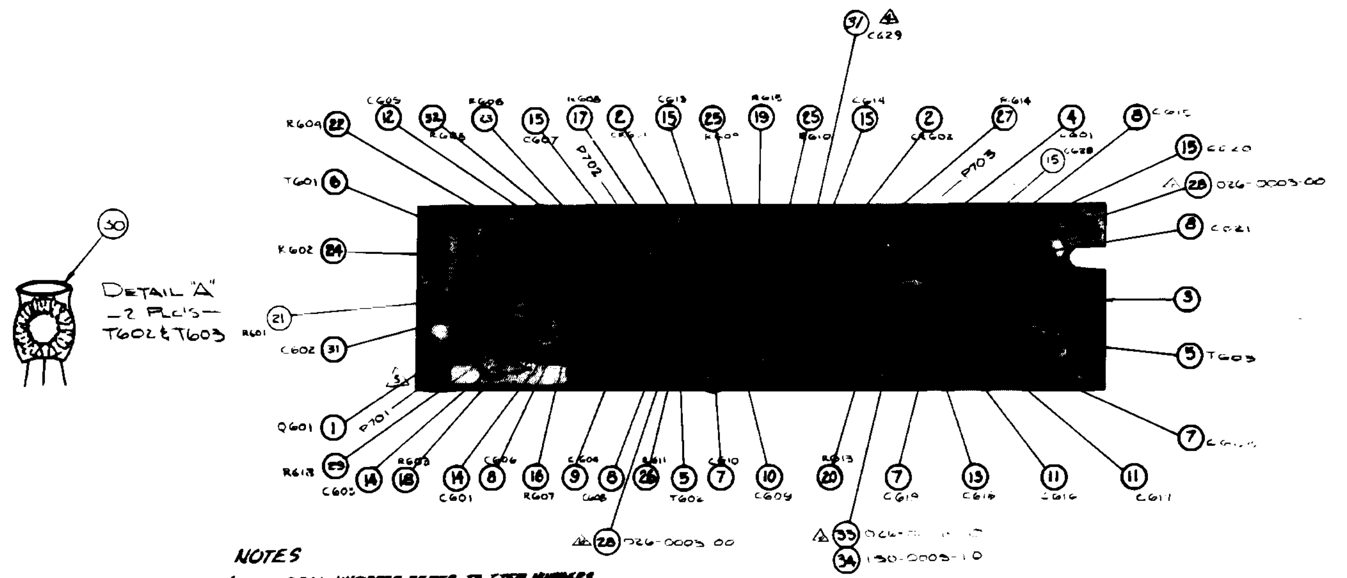
TOP VIEW, Q701



NOTES:

I. "P"NUMBERS ARE FOR REF. TO POINT-TO-POINT WIRING CONNECTION.

300-0655-00



NOTES

1. BALLOON NUMBERS REFER TO ITEM NUMBERS ON BILL OF MATERIAL 200-0085-00.

2. "P" NUMBERS ARE FOR REF. TO POINT TO POINT WIRING CONNECTION.

3. ALL DISC CAPS SHALL BE INSTALLED IN P.C. BOARD WITH NO MORE THAN .07 INCH LEAD LENGTH ABOVE BD.

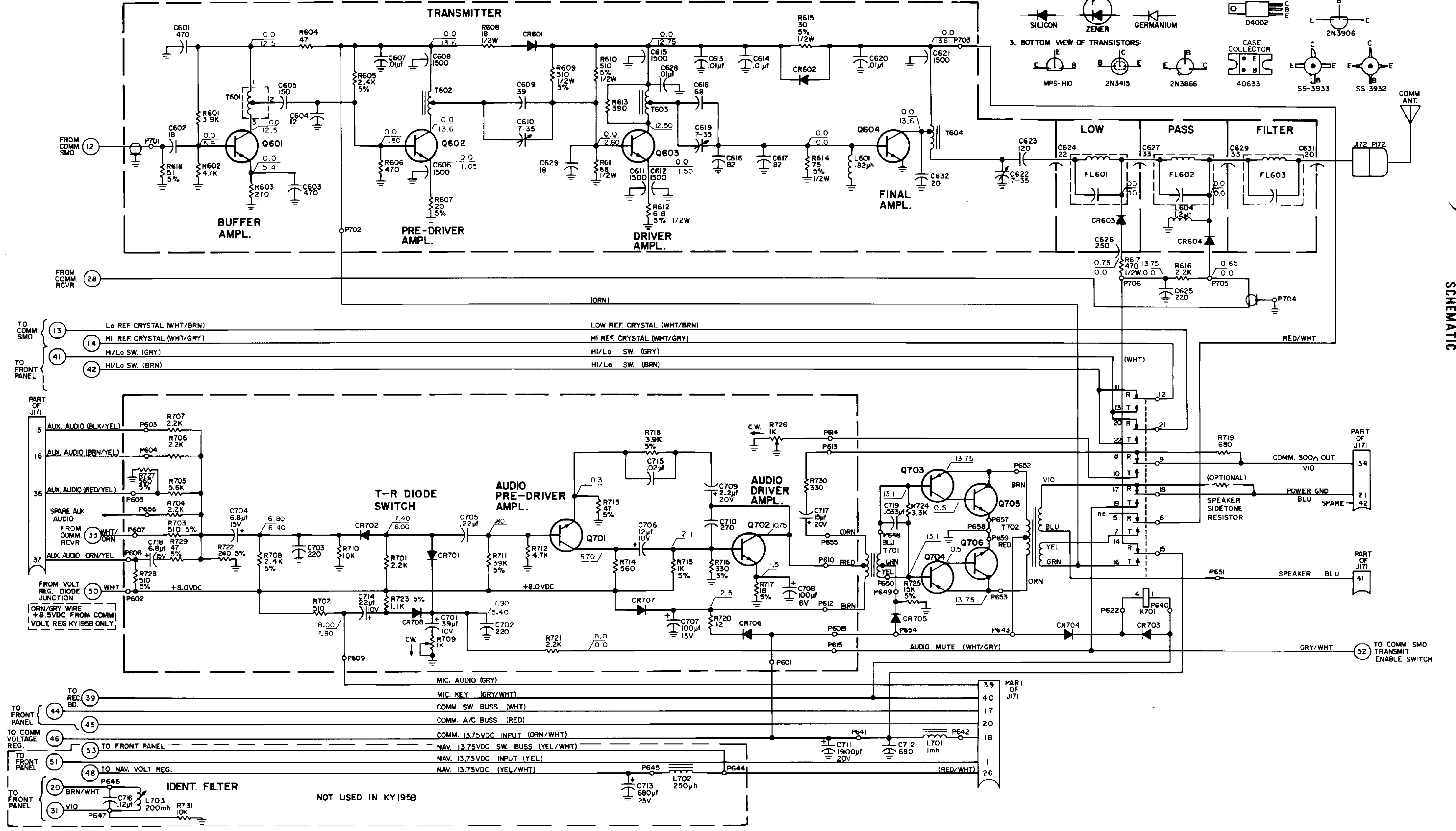
300-0106-00

FIGURE 5-28A TRANSMITTER & AUDIO SCHEMATIC & ASSEMBLY

(Dwg. No. 002-0234-03) (R-4)

(Dwg. No. 300-0106-00) (R-7)

(Dwg. No. 300-0655-00) (R-0)



NOTES:

4. VOLTAGE MEASURED AS FOLLOWS;
ABOVE LINE — RECEIVE MODE
BELOW LINE — TRANSMIT MODE

5. VOLTAGES TAKEN WITH COMM IN BLANK MHz POSITION.

6. MEASUREMENTS MADE WITH VTVM 20,000 OHMS PER VOLT

NOTES

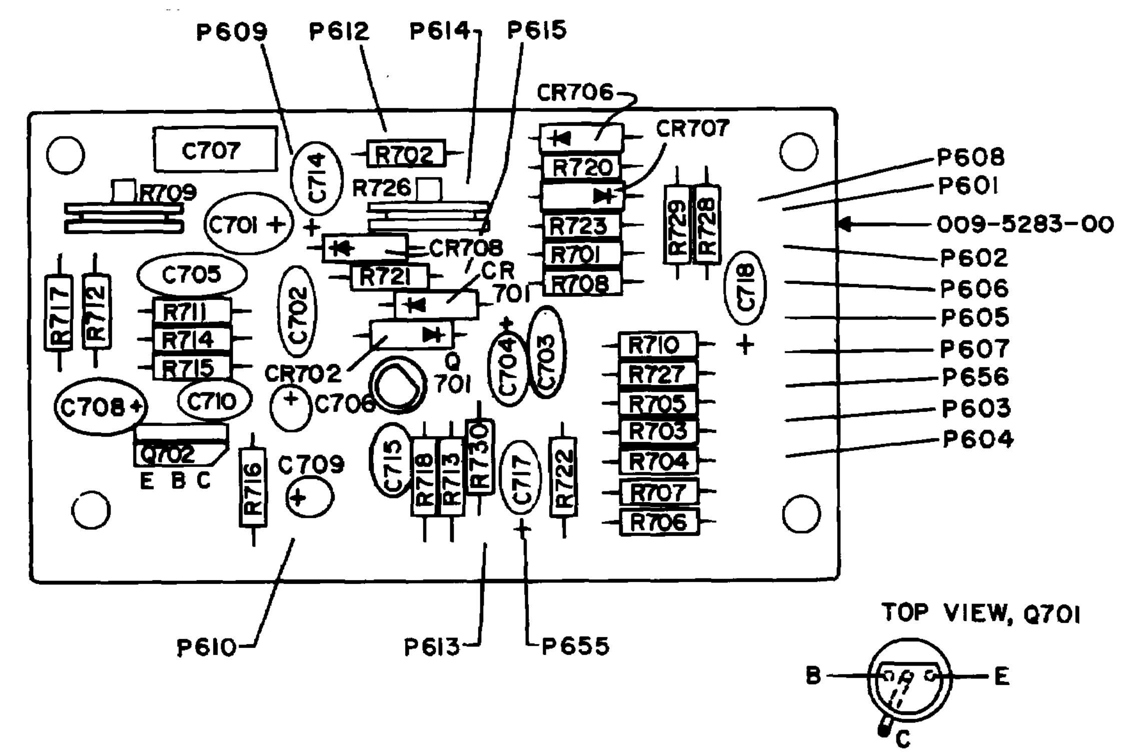
1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf).
ALL RESISTANCES ARE IN OHMS, 1/4 W, 10%.

2. DIODES ARE THUS:

3. BOTTOM VIEW OF TRANSISTORS:

TRANSMITTER/AUDIO SCHEMATIC

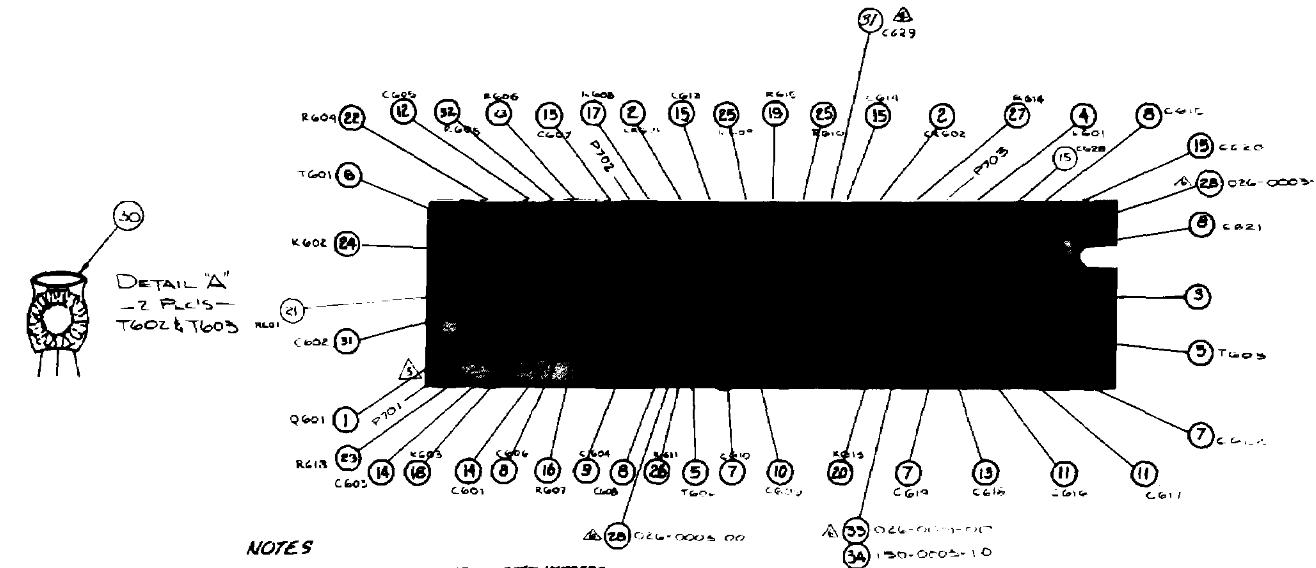
KING



NOTES:

I. "P" NUMBERS ARE FOR REF. TO POINT-TO-POINT WIRING CONNECTION.

300-0655-00



NOTES

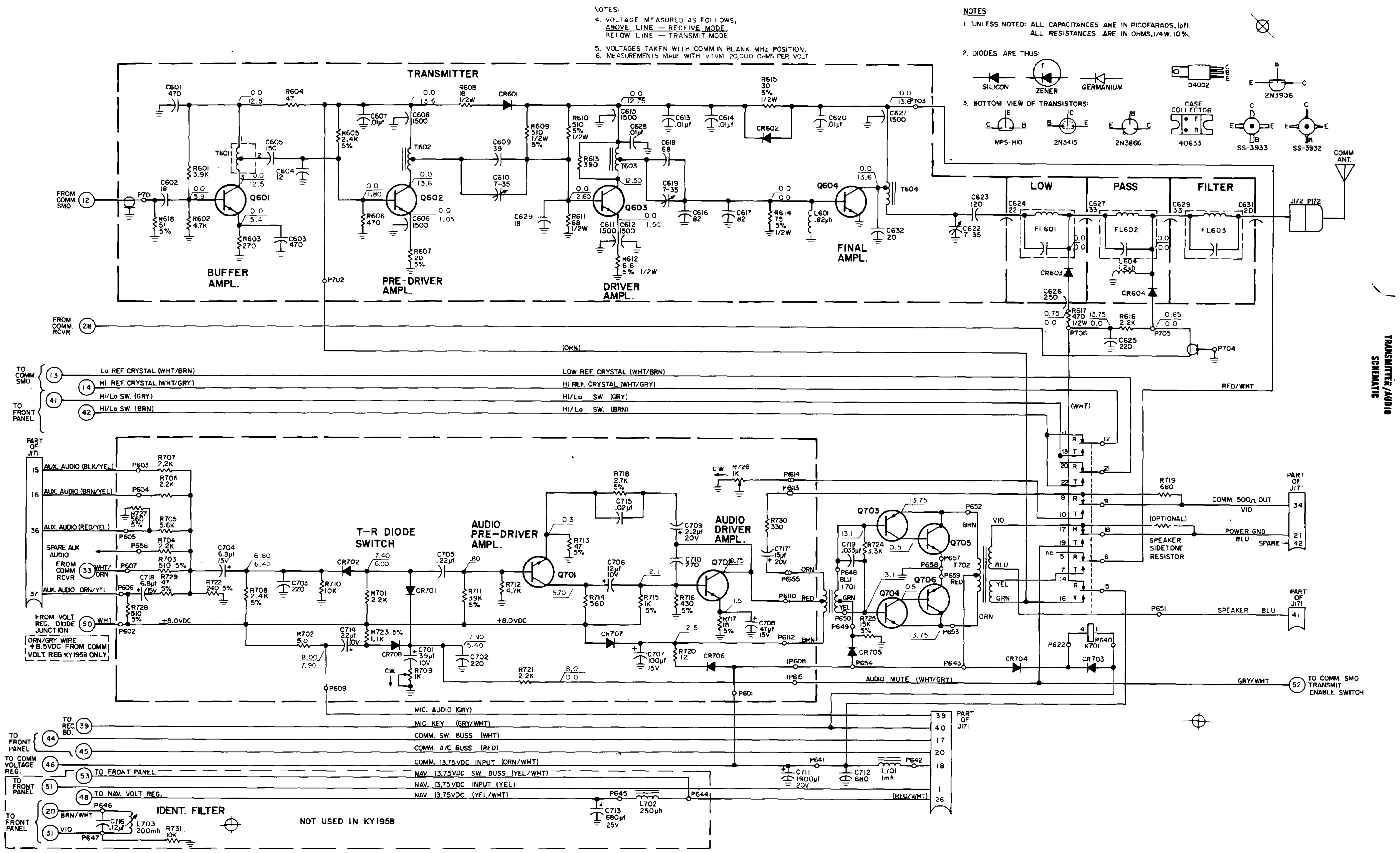
1. BALLOON NUMBERS REFER TO ITEM NUMBERS ON BILL OF MATERIAL 200-0085-00.

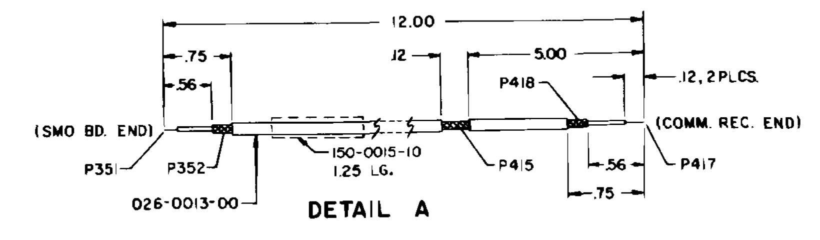
2. "P" NUMBERS ARE FOR REF. TO POINT TO POINT WIRING CONNECTION.

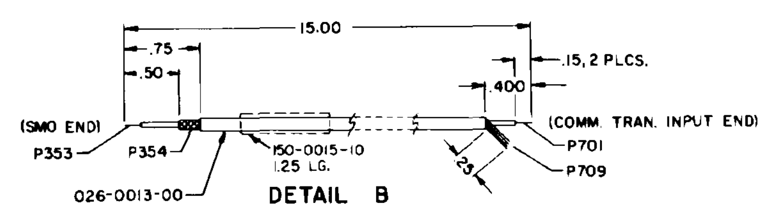
△ 3. ALL DISC CAPS SHALL BE INSTALLED IN P.C. BOARD WITH NO MORE THAN .07 INCH LEAD LENGTH ABOVE BD.

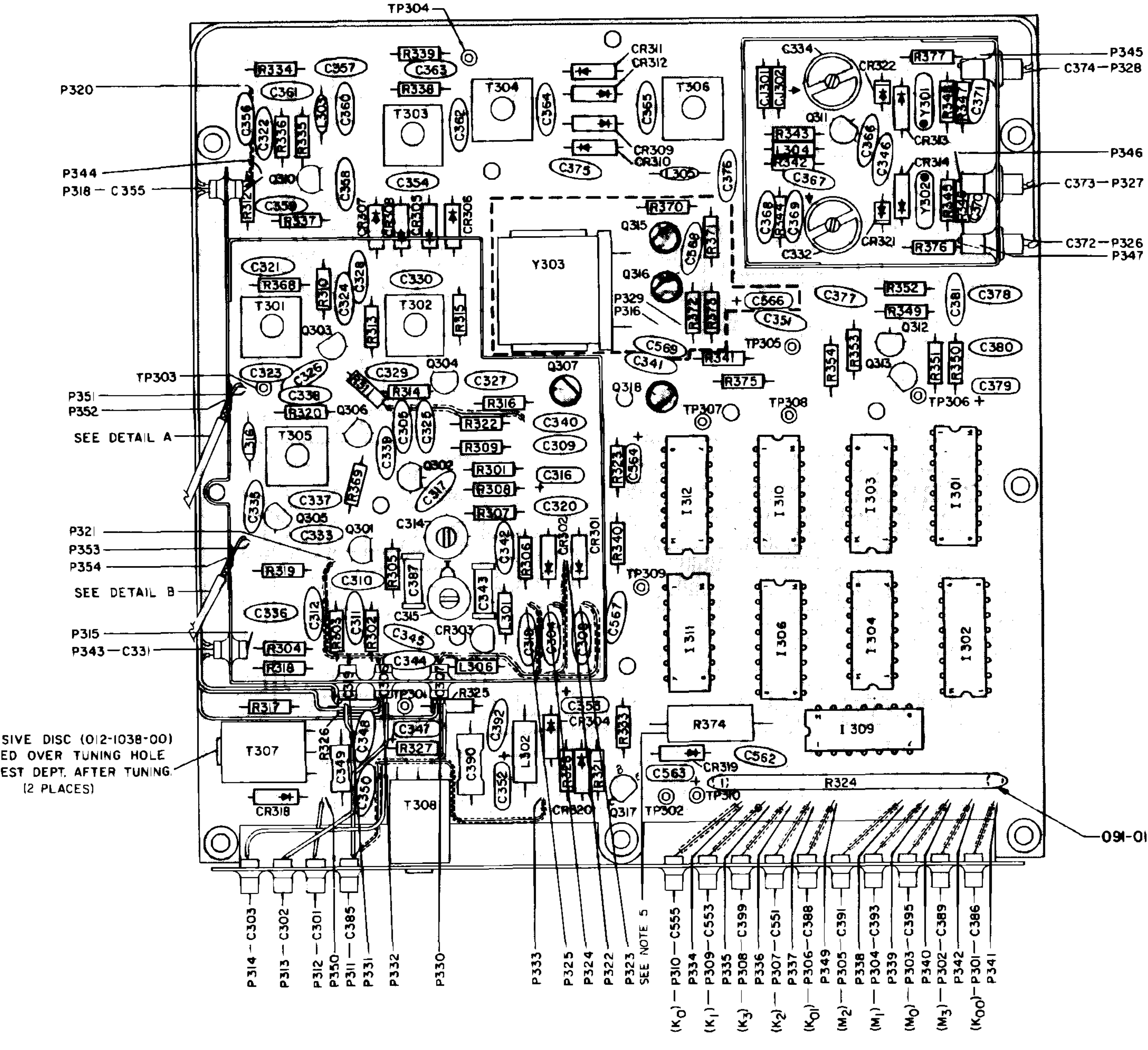
300-0106-00

FIGURE 5-28A TRANSMITTER & AUDIO SCHEMATIC & ASSEMBLY
(Dwg. No. 002-0234-03)
(Dwg. No. 300-0106-00)
(Dwg. No. 300-0655-00)









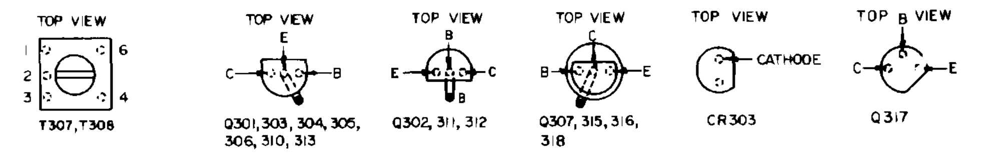


FIGURE 5-29 COMM SMO SCHEMATIC & ASSEMBLY
(Dwg. No. 002-0234-04) (R-3)
(Dwg. No. 300-0657-00) (R-3)

COMM. S.M.O. SUB-ASSY. WIRING CHART

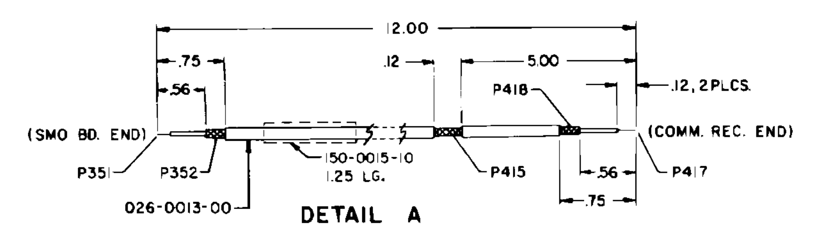
KPN	FROM	TO	LENGTH	COLOR	REMARKS
025-0018-98	P314	P330		WHT/GRY	
025-0018-98	P330	P328		WHT/GRY	
025-0018-99	P311	P331		WHT	
025-0018-99	P331	P343		WHT	
025-0018-99	P343	P318		WHT	
025-0018-99	P318	P327		WHT	
025-0018-91	P313	P332		WHT/BRN	
025-0018-91	P332	P326		WHT/BRN	
026-0001-00	P330	P323		BUSS	SLEEVE WITH 150-0003-10
	P332	P324			
	P331	P325			
	P322	P321			
	P318	P320			
	P310	P334			
	P309	P335			
	P308	P336			
	P307	P337			
	P305	P338			
	P304	P339			
	P303	P340			
	P302	P342			
	P301	P341			
	P312	P350			SLEEVE WITH 150-0003-10
	P315	P343			
	P318	P344			
	P328	P345			
	P327	P346			
	P326	P347			
026-0001-00	P306	P349			SLEEVE WITH 150-0003-10
026-0001-00	P311	P333		BUSS	SLEEVE WITH 150-0003-10

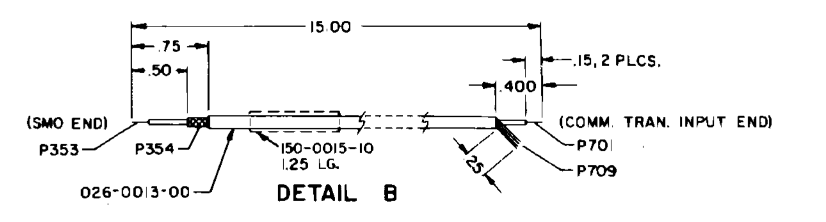
NOTES:

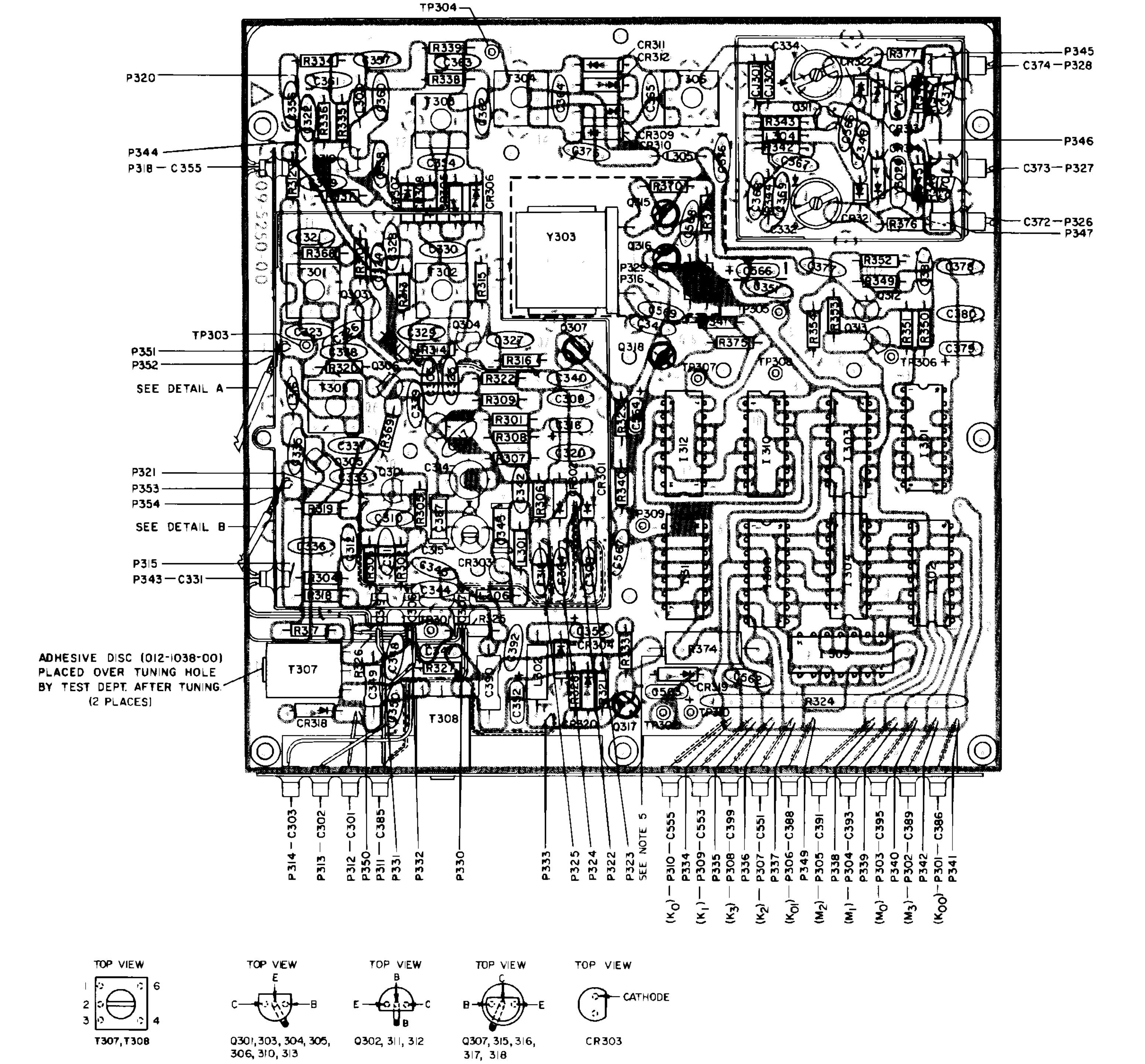
1. REFERENCE BILL OF MATERIAL 200-0456-00/01
2. "P" NUMBERS ARE FOR REF. TO POINT TO POINT WIRING CONNECTIONS.
3. COMPONENTS INSIDE DASHED LINE ARE NOT USED ON THE KX170B.
4. CR303 VARACTOR DIODE MUST REST ON P.C. BOARD.
5. BODY OF R375 TO BE .10 TO .15 ABOVE SURFACE OF BOARD.

NOTES:

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W, 5%.
2. DIODES ARE THUS:
SILICON
ZENER
GERMANIUM
VARACTOR
3. BOTTOM VIEW OF TRANSISTORS:
FPN4917
2N3415
2N3605
MPS-H10
4. TOP VIEW OF I.C.'s
14 PIN
16 PIN
5. BOTTOM VIEW OF TRANSFORMER
6. VOLTAGE MEASUREMENT CONDITIONS:
Q305, Q306 — ABOVE LINE—RECEIVE / BELOW LINE—TRANSMIT
HI-LO VOLTAGES REVERSE DURING TRANSMIT.
ALL OTHERS — RECEIVE AT FREQ — ABOVE LINE—135.975MHz / BELOW LINE—118.00MHz
MEASUREMENTS MADE WITH VTVM 20,000 OHMS PER VOLT.







COMM. S.M.O. SUB-ASSY. WIRING CHART					
KPN	FROM	TO	LENGTH	COLOR	REMARKS
025-0018-98	P314	P330		WHT/GRY	
025-0018-98	P330	P328		WHT/GRY	
025-0018-99	P311	P331		WHT	
025-0018-99	P331	P343		WHT	
025-0018-99	P343	P318		WHT	
025-0018-99	P318	P327		WHT	
025-0018-91	P313	P332		WHT/BRN	
025-0018-91	P332	P326		WHT/BRN	
026-0001-00	P330	P323		BUSS	SLEEVE WITH 150-0003-10
	P332	P324			
	P331	P325			
	P322	P321			
	P318	P320			
	P310	P334			
	P309	P335			
	P308	P336			
	P307	P337			
	P305	P338			
	P304	P339			
	P303	P340			
	P302	P342			
	P301	P341			
	P312	P350			SLEEVE WITH 150-0003-10
	P315	P343			
	P318	P344			
	P328	P345			
	P327	P346			
	P326	P347			
026-0001-00	P306	P349			SLEEVE WITH 150-0003-10
026-0001-00	P311	P333		BUSS	SLEEVE WITH 150-0003-10

NOTES:

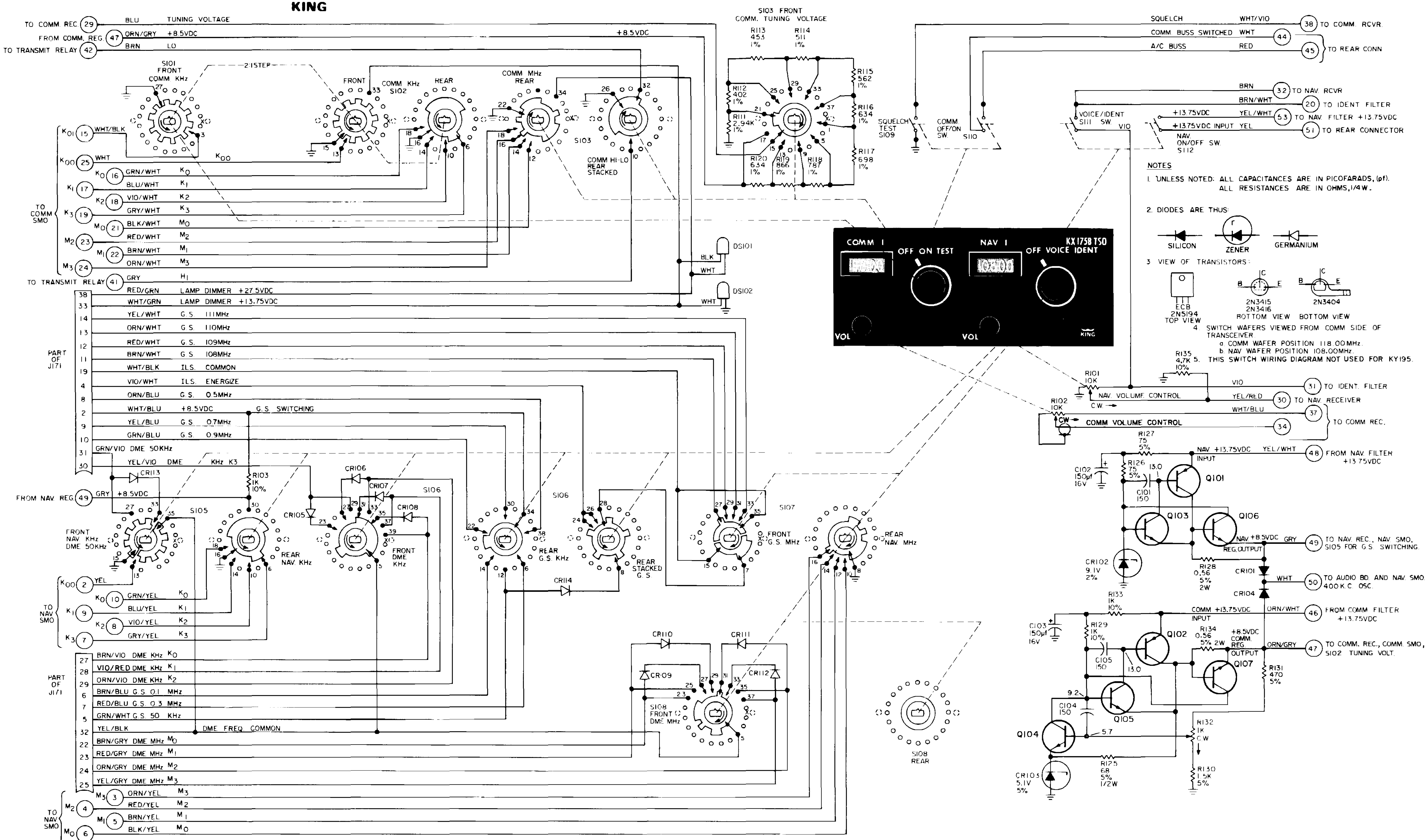
1. REFERENCE BILL OF MATERIAL 200-0456-00/01
2. "P" NUMBERS ARE FOR REF. TO POINT TO POINT WIRING CONNECTIONS.
3. COMPONENTS INSIDE DASHED LINE ARE NOT USED ON THE KX170B.
4. CR303 VARACTOR DIODE MUST REST ON P.C. BOARD.
5. BODY OF R375 TO BE .10 TO .15 ABOVE SURFACE OF BOARD.

NOTES:

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W, 5%.
2. DIODES ARE THUS:
SILICON ZENER GERMANIUM VARACTOR
3. BOTTOM VIEW OF TRANSISTORS:
FPN4917 2N3415 2N3606 MPS-H10
4. TOP VIEW OF I.C.'s
14 PIN 16 PIN
5. BOTTOM VIEW OF TRANSFORMER
6. VOLTAGE MEASUREMENT CONDITIONS:
Q305, Q306 - ABOVE LINE-RECEIVE / BELOW LINE-TRANSMIT
HI-LO VOLTAGES REVERSE DURING TRANSMIT.
ALL OTHERS - RECEIVE AT FREQ. -
ABOVE LINE -135.975MHz / BELOW LINE-118.00MHz
MEASUREMENTS MADE WITH VTVM 20,000 OHMS PER VOLT.

FIGURE 5-29 COMM SMO SCHEMATIC & ASSEMBLY
(Dwg. No. 002-0234-04)
(Dwg. No. 300-0657-00)

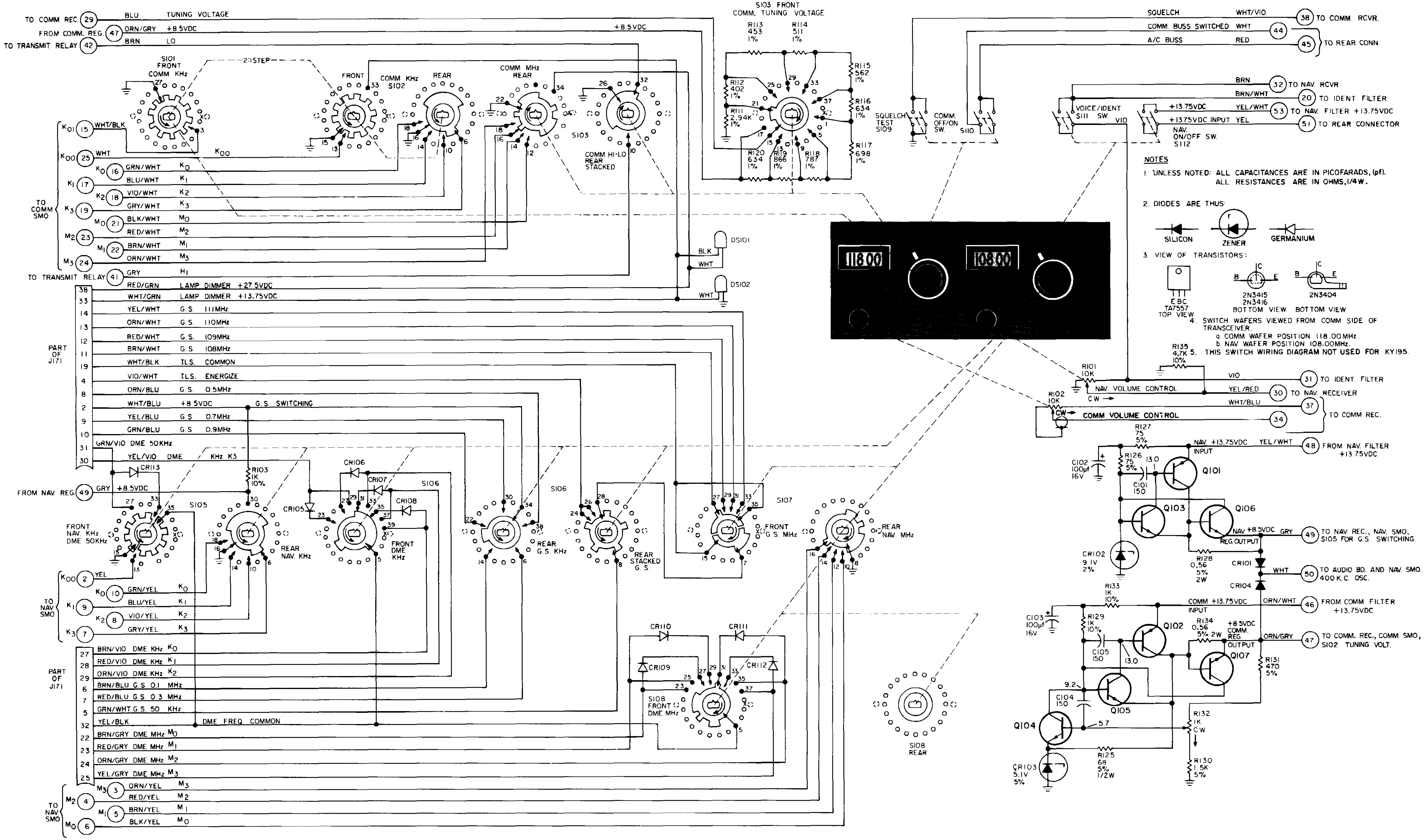
KING



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS,(pf). ALL RESISTANCES ARE IN OHMS,1/4 W.
2. DIODES ARE THUS: SILICON ZENER GERMANIUM
3. VIEW OF TRANSISTORS: ECB 2N5194 TOP VIEW; 2N3415 2N3416 BOTTOM VIEW; 2N3404 BOTTOM VIEW
4. SWITCH WAFERS VIEWED FROM COMM SIDE OF TRANSCEIVER
   a. COMM WAFER POSITION 118.00MHz
   b. NAV WAFER POSITION 108.00MHz
5. THIS SWITCH WIRING DIAGRAM NOT USED FOR KY195.

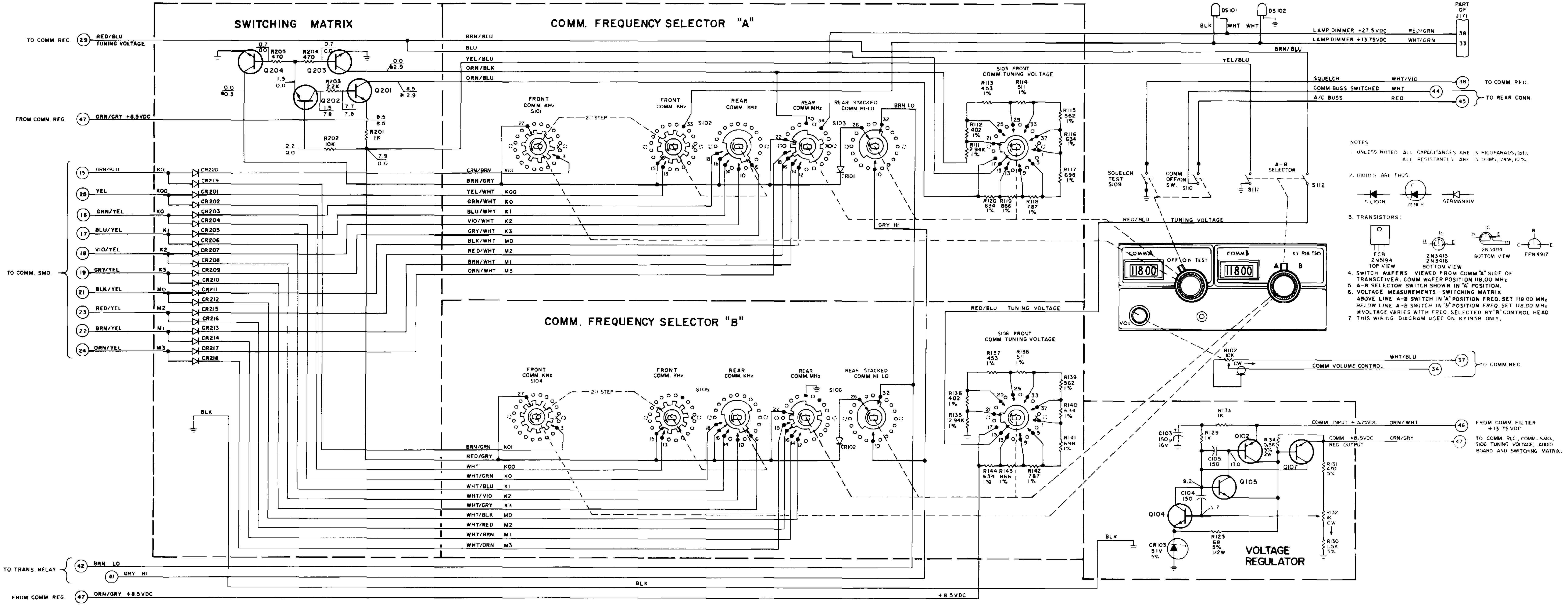
FIGURE 5-30 SWITCH WIRING DIAGRAM/VOLTAGE REGULATOR
(Dwg. No. 002-0234-05) (R-7)



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf).
   ALL RESISTANCES ARE IN OHMS, 1/4W.
2. DIODES ARE THUS:
   SILICON ZENER GERMANIUM
3. VIEW OF TRANSISTORS:
   E B C TA7557 TOP VIEW
   2N3415 2N3416 BOTTOM VIEW
   2N3404 BOTTOM VIEW
4. SWITCH WAFERS VIEWED FROM COMM SIDE OF TRANSCEIVER.
   a. COMM WAFER POSITION 118.00MHz.
   b. NAV WAFER POSITION 108.00MHz.
5. THIS SWITCH WIRING DIAGRAM NOT USED FOR KY195.

FIGURE 5-30 SWITCH WIRING DIAGRAM/VOLTAGE REGULATOR
(Dwg. No. 002-0234-05)



NOTES

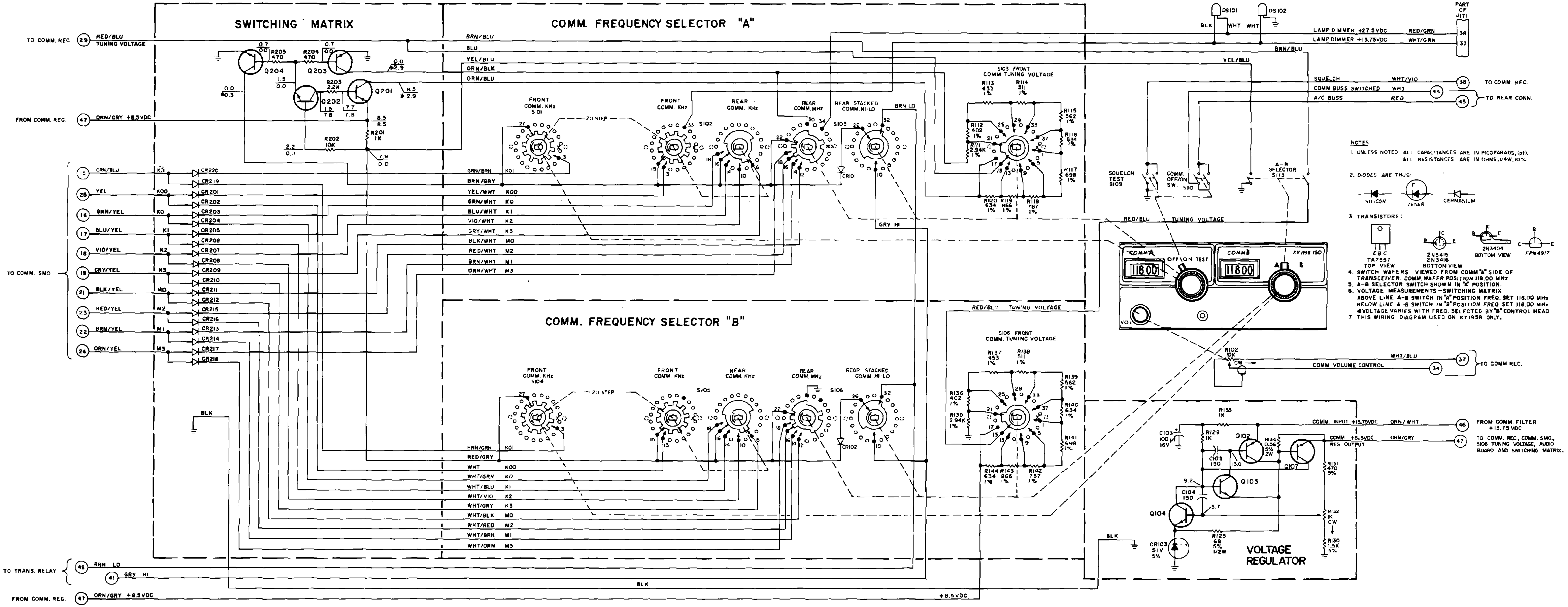
1. UNLESS NOTED ALL CAPACITANCES ARE IN PICOFARADS,(pf). ALL RESISTANCES ARE IN OHMS,1/4W,10%.
2. DIODES ARE THUS:

3. TRANSISTORS:

4. SWITCH WAFERS VIEWED FROM COMM "A" SIDE OF TRANSCEIVER. COMM. WAFER POSITION 118.00 MHz
5. A-B SELECTOR SWITCH SHOWN IN "A" POSITION.
6. VOLTAGE MEASUREMENTS - SWITCHING MATRIX
ABOVE LINE A-B SWITCH IN "A" POSITION FREQ. SET 118.00 MHz
BELOW LINE A-B SWITCH IN "B" POSITION FREQ. SET 118.00 MHz
✱VOLTAGE VARIES WITH FREQ. SELECTED BY "B" CONTROL HEAD
7. THIS WIRING DIAGRAM USED ON KY195B ONLY.

KY 195B SWITCHING ASSEMBLY SCHEMATIC

FIGURE 5-31 SWITCHING MATRIX/SWITCH WIRING/VOLT. REG.
(Dwg. No. 002-0234-06) (R-6)



NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS,(pf).
   ALL RESISTANCES ARE IN OHMS,1/4W,10%.
2. DIODES ARE THUS:
   SILICON ZENER GERMANIUM
3. TRANSISTORS:
   EBC TA7557 TOP VIEW
   2N3415 2N3416 BOTTOM VIEW
   2N3404 BOTTOM VIEW
   FPN4917
4. SWITCH WAFERS VIEWED FROM COMM "A" SIDE OF TRANSCEIVER. COMM. WAFER POSITION 118.00 MHz.
5. A-B SELECTOR SWITCH SHOWN IN "A" POSITION.
6. VOLTAGE MEASUREMENTS—SWITCHING MATRIX
   ABOVE LINE A-B SWITCH IN "A" POSITION FREQ. SET 118.00 MHz
   BELOW LINE A-B SWITCH IN "B" POSITION FREQ. SET 118.00 MHz
   *VOLTAGE VARIES WITH FREQ. SELECTED BY "B" CONTROL HEAD
7. THIS WIRING DIAGRAM USED ON KY195B ONLY.

KY 195B SWITCHING
ASSEMBLY SCHEMATIC

FIGURE 5-31 SWITCHING MATRIX/SWITCH WIRING/VOLT. REG.
(Dwg. No. 002-0234-06)

SEE PAGE 5-151 (FIG. 5-56) FOR THE SCHEMATIC AND PAGE 6-73 (FIG. 6-12) FOR THE ASSEMBLY IN THE KX 170A/KX 175 MANUAL.

FIGURE 5-32 KA 39 VOLTAGE CONVERTER SCHEMATIC & ASSEMBLY
(Dwg. No. 002-0162-00)
(Dwg. No. 300-0198-00)

NAME	FINAL ASSEMBLY
ASS'Y. NO.	069-1019-00/1020-00/1021-00
ASS'Y. DWG.	300-0660-00 300-0661-00
UNIT	KX 170B/175B KY 195B
USED ON	000-0076-0077-00/ 0078-00

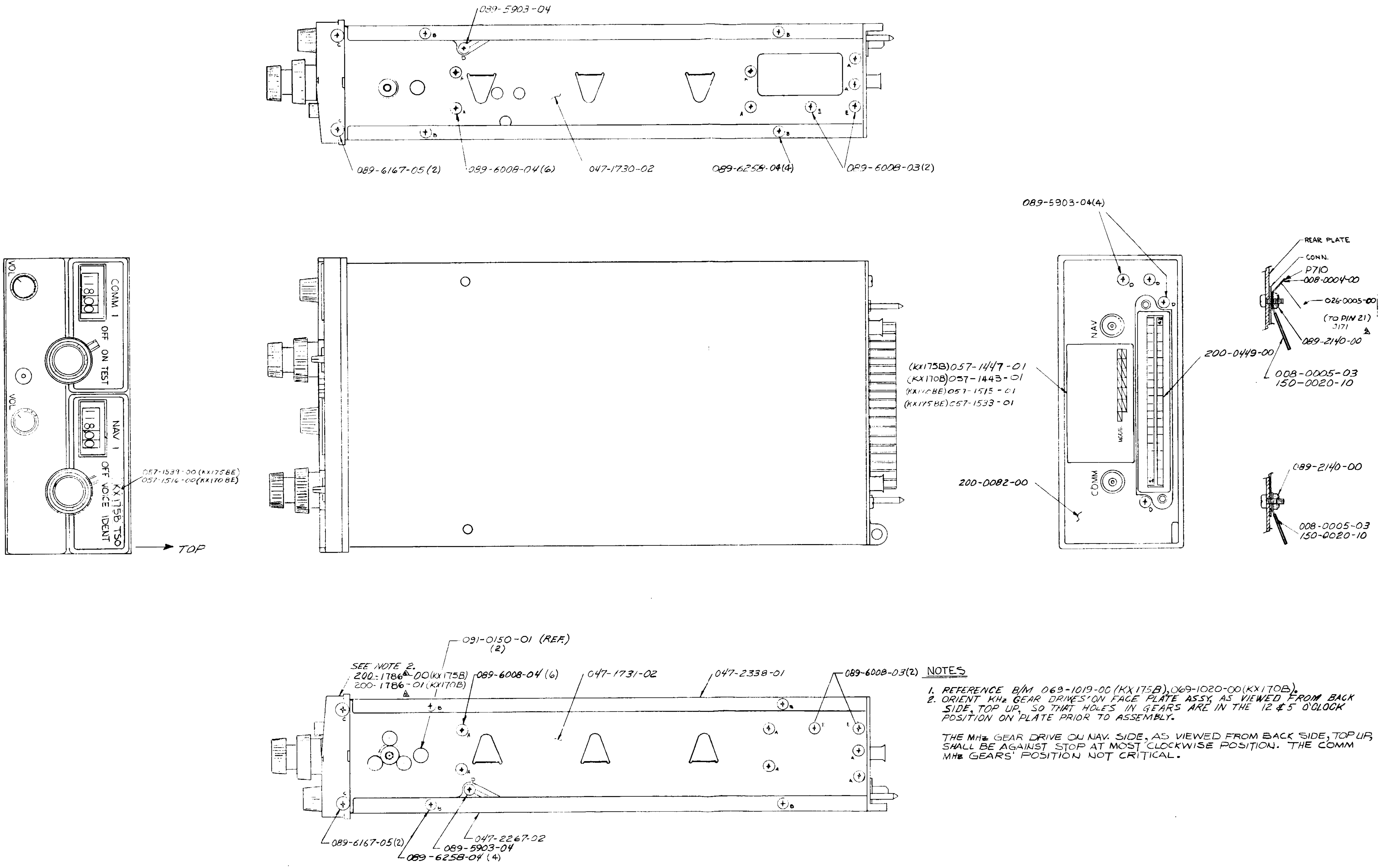
KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY		
					19	20	21
		069-1019-00	KX 175B		X		
		069-1020-00	KX 170B			X	
		069-1021-00	KY 195B				X
		008-0004-00	Solder Lug		1	1	1
		008-0005-03	Lug		2	2	2
		012-1006-00	Nyl Lacing Cord		AR	AR	AR
		016-1015-00	Adhesive		AR	AR	AR
R4		016-1038-00	Spray Adhesive #77		AR	AR	AR
		035-1013-04	Plstc Bag 9 x 18		1	1	1
		047-1695-00	Cover, Equip ←		1	1	1
		047-1728-01	Cover COMM SMO		1	1	1
		047-1729-01	Cover P. A.		1	1	1
		047-1730-02	Rail Left Side		1	1	1
		047-1731-02	Rail Right Side		1	1	1
		047-1737-01	Cover NAV SMO		1	1	-
		047-1943-00	Spring Cup		1	1	1
		047-2267-02	Cover Bottom		1	1	1
		047-2268-01	Shield Pad (Mixer)		2	2	1
R4		047-2269-01	Shield Pad (Osc)		1	1	-
		047-2293-01	Shield Pad (RF)		1	1	1
R4		047-2338-01	Cover Top		1	1	1
		047-2496-01	Shield Pad NAV IF		1	1	-
		047-2623-01	Shield Pad COMM IF		1	1	-
		057-1443-01	Serial Number Tag		-	1	-
		057-1447-01	Serial Number Tag		1	-	-
		057-1448-01	Serial Number Tag		-	-	1
		076-0339-00	Spacer		6	6	6
		089-2105-22	Nut #4 Speed		8	8	8
		089-2140-00	Nut Esna		2	2	2
		089-5899-04	Scr 2-56 x 1/4 PHP		4	4	4
		089-5903-04	Scr 4-40 x 1/4 PHP		7	7	7
		089-6008-03	Scr 4-40 x 3/16 FHP		10	10	8
		089-6008-04	Scr 4-40 x 1/4 FHP		12	12	12
		089-6167-05	Scr 6-32 x 5/16 FHP		4	4	4
		089-6258-04	Scr 4-24 x 1/4 FHP		8	8	8
		089-7018-04	Scr 4-40 x 1/4 THP		7	7	7
		091-0118-03	Insulator		2	2	1
R4		091-0118-04	Insulator		1	1	-
		091-0118-05	Insulator		1	1	1
		091-0118-06	Insulator		1	1	-
		091-0169-00	Insulator		1	1	-
		150-0020-10	Shrink Tubing		.2	.2	.2
		187-1011-00	Liner Rubber		4	4	2

NAME FINAL ASSEMBLY		**ASS'Y. NO.**	069-1019-00/1020-00/1021-00
ASS'Y. DWG. 300-0660-00 300-0661-00	**UNIT** KX 170B/175B KY 195B	**USED ON**	000-0076-00/ 0077-00/0078-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
					19	20	21			
		200-0082-00	Rear Pl Sub-Ass'y.		1	1	1			
		200-0449-00	Conn & CA Sub-Ass'y.		1	1	-			
		200-0449-01	Conn & CA Sub-Ass'y.		-	-	1			
R4		200-0450-00	Front Pl Sub-Ass'y.		1	-	-			
R4		200-0450-01	Front Pl Sub-Ass'y.		-	1	-			
R4		200-0450-02	Front Pl Sub-Ass'y.		-	-	1			
		200-0451-00	SW Head Sub-Ass'y.		1	1	-			
		200-0451-01	SW Head Sub-Ass'y.		-	-	1			
		200-0452-00	NAV/COMM Sub-Ass'y.		1	-	-			
		200-0452-01	NAV/COMM Sub-Ass'y.		-	1	-			
		200-0452-02	COMM BD. Sub-Ass'y.		-	-	1			
		200-0453-00	Rear Div Sub-Ass'y.		1	1	-			
		200-0453-01	Rear Div Sub-Ass'y.		-	-	1			
		200-0455-00	COMM SMO Sub-Ass'y.		1	-	1			
		200-0455-01	COMM SMO Sub-Ass'y.		-	1	-			
		200-0457-00	NAV SMO Sub-Ass'y.		1	1	-			
		200-0459-00	SW Matrix Ass'y.		-	-	1			

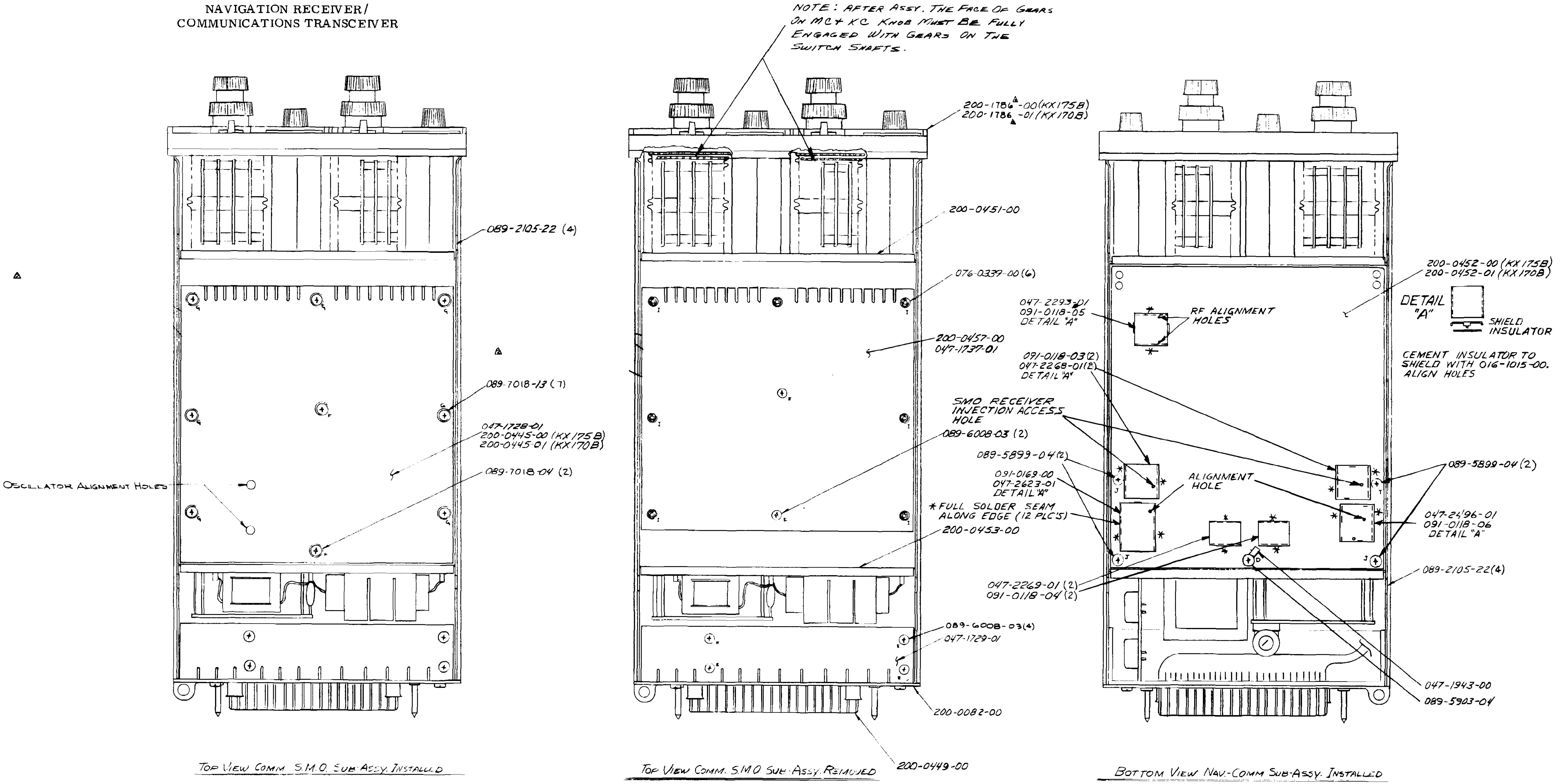


NOTES

1. REFERENCE B/M 069-1019-00(KX175B),069-1020-00(KX170B).
2. ORIENT KHz GEAR DRIVES ON FACE PLATE ASSY, AS VIEWED FROM BACK SIDE, TOP UP, SO THAT HOLES IN GEARS ARE IN THE 12 & 5 O'CLOCK POSITION ON PLATE PRIOR TO ASSEMBLY.

   THE MHz GEAR DRIVE ON NAV. SIDE, AS VIEWED FROM BACK SIDE, TOP UP, SHALL BE AGAINST STOP AT MOST CLOCKWISE POSITION. THE COMM MHz GEARS' POSITION NOT CRITICAL.

FIGURE 6-1 FINAL ASSEMBLY
(Dwg. No. 300-0660-00)(Sht. 1 of 2)(Rev 5)



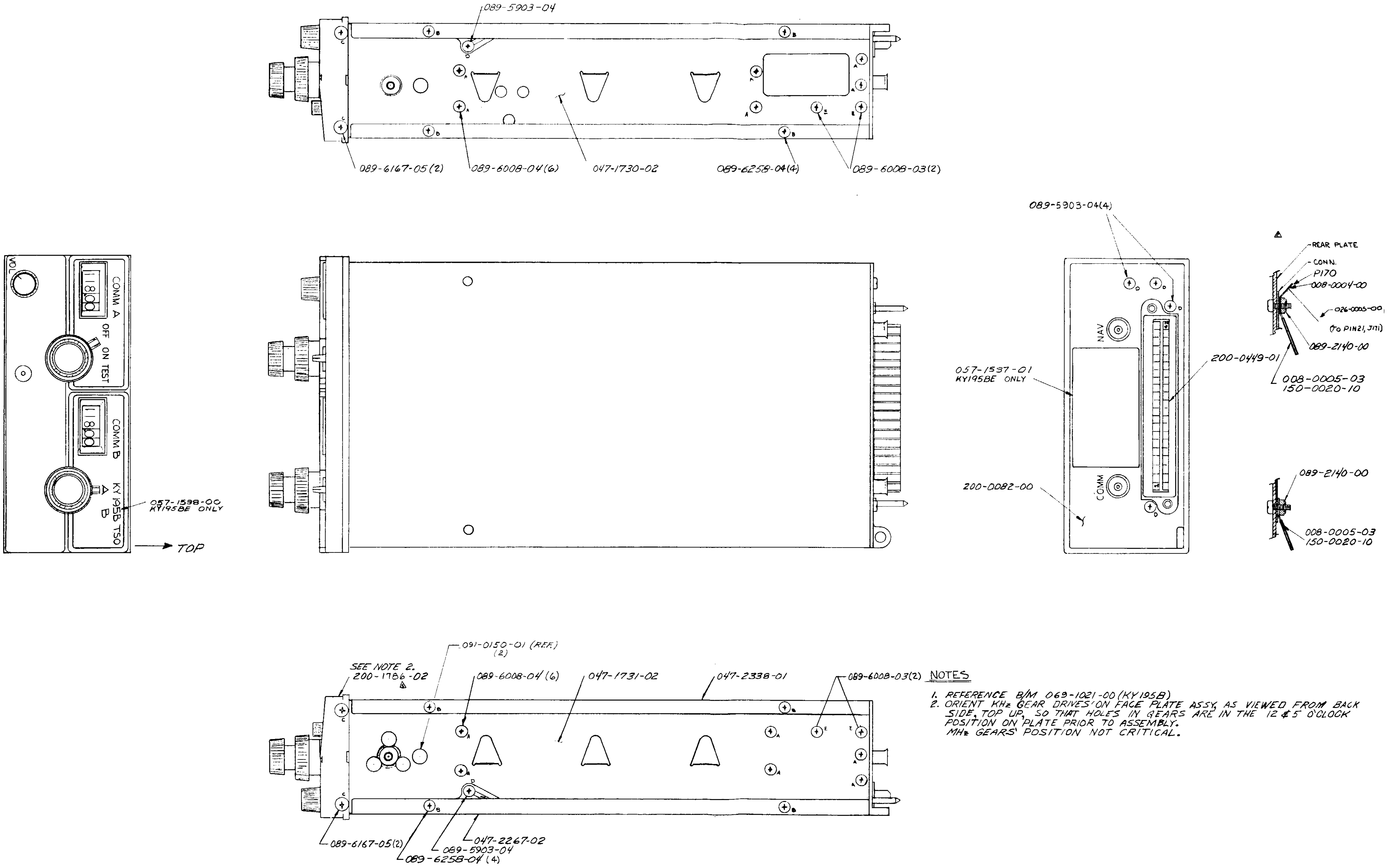
NOTE: AFTER ASSY. THE FACE OF GEARS ON MC+KC KNOB MUST BE FULLY ENGAGED WITH GEARS ON THE SWITCH SHAFTS.

TOP VIEW COMM. S.M.O. SUB-ASSY. INSTALLED

TOP VIEW COMM. S.M.O. SUB-ASSY. REMOVED

BOTTOM VIEW NAV-COMM SUB-ASSY. INSTALLED

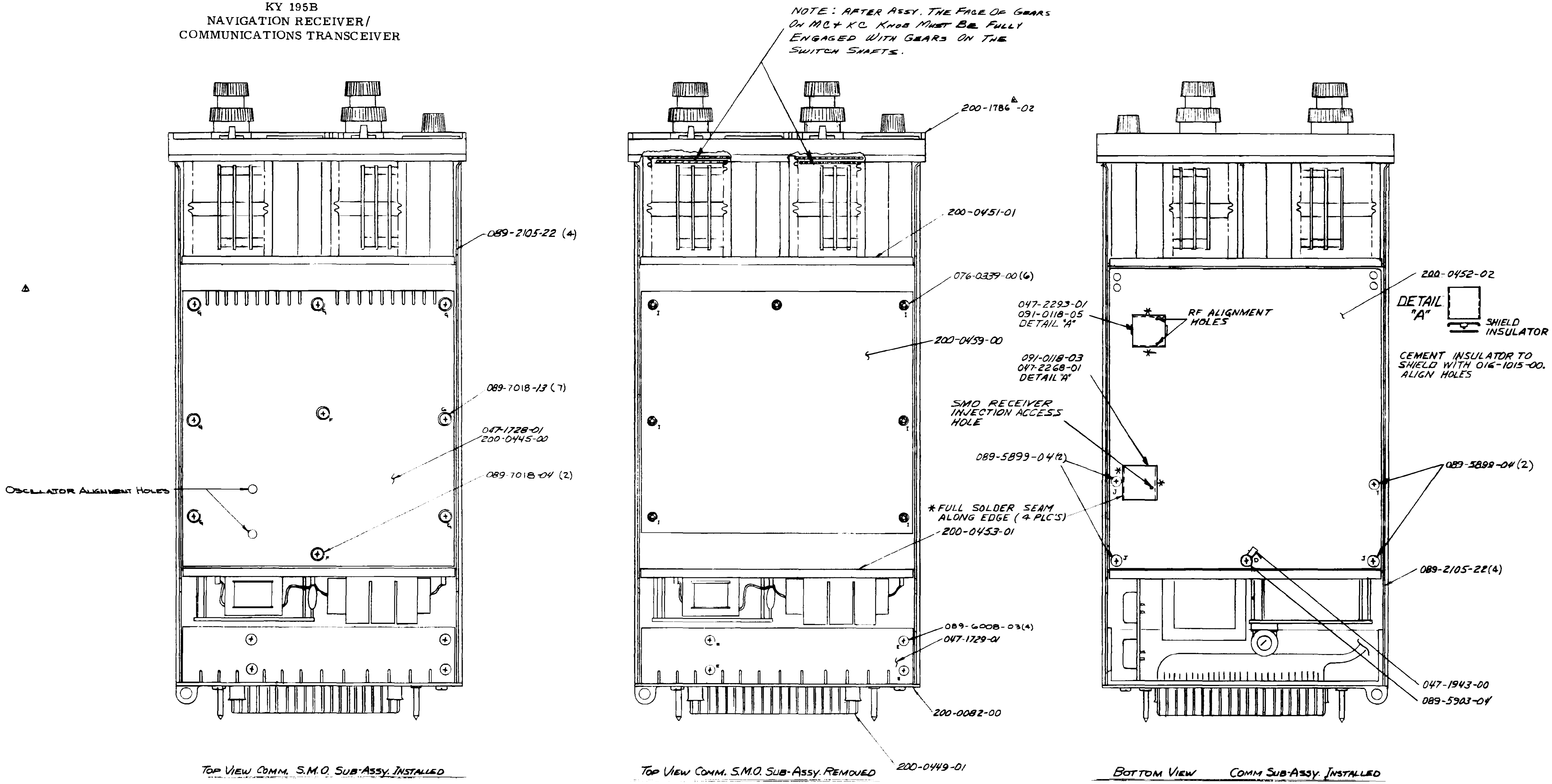
FIGURE 6-1A FINAL ASSEMBLY
(Dwg. No. 300-0660-00)(Sht. 2of 2) (R-5)



NOTES

1. REFERENCE B/M 069-1021-00 (KY195B)
2. ORIENT KHz GEAR DRIVES ON FACE PLATE ASSY, AS VIEWED FROM BACK SIDE, TOP UP, SO THAT HOLES IN GEARS ARE IN THE 12 & 5 O'CLOCK POSITION ON PLATE PRIOR TO ASSEMBLY. MHz GEARS' POSITION NOT CRITICAL.

FIGURE 6-2 FINAL ASSEMBLY
(Dwg. No. 300-0661-00)(Sht. 1 of 2)(R-5)



NOTE: AFTER ASSY. THE FACE OF GEARS ON MC + KC KNOB MUST BE FULLY ENGAGED WITH GEARS ON THE SWITCH SHAFTS.

* FULL SOLDER SEAM ALONG EDGE (4 PLC'S)

CEMENT INSULATOR TO SHIELD WITH 016-1015-00. ALIGN HOLES

TOP VIEW COMM. S.M.O. SUB-ASSY. INSTALLED

TOP VIEW COMM. S.M.O. SUB-ASSY. REMOVED

BOTTOM VIEW COMM SUB-ASSY. INSTALLED

FIGURE 6-2A FINAL ASSEMBLY
(Dwg. No. 300-0661-00)(Sht. 2 of 2)(R-5)

Parts List Revisions Record

Assembly No. 066-1019-00/1020-00/1021-00 (B/MRL Rev 15) Manual Revision No. 4

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE		047-2269-01	Shield Pad (Osc)	2 2 -
CHANGE		091-0118-04	Insulator	2 2 -
DELETED		016-1038-00		
ADDED		026-0005-00	Wire, #18 Buss	1. 1. 1
CHANGE		047-2338-02	Cover, Top	1 1 1
ADDED		091-0109-00	Plastic Ties	14 14 14
CHANGE		200-1786-00	Front Plate Sub-Ass'y	1 - -
CHANGE		200-1786-01	Front Plate Sub-Ass'y	- 1 -
CHANGE		200-1786-02	Front Plate Sub-Ass'y	- - 1

NAME	FRONT PLATE SUB-ASS'Y.	**ASS'Y. NO.**	200-0450-00/02
ASS'Y. DWG.	300-0648-00	**UNIT**	KX 170B/175B KY 195B
		USED ON	069-1019/1020/ 1021-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00	01	02			
		200-0450-00	KX 175B		X					
		200-0450-01	KX 170B			X				
		200-0450-02	KX 195B				X			
		008-0005-03	Lug		1	1	1			
		008-0040-00	Lug Solder		1	1	-			
		016-1008-04	Glyptal Blue		AR	AR	AR			
		016-1016-00	Lubricant		AR	AR	AR			
		016-1033-00	ADH Activator		AR	AR	AR			
		016-1034-00	Adhesive		AR	-	AR			
		026-0001-00	#26 Buss Wire		.4	.4	.06			
R4		026-0005-00	#18 Buss Wire		.1	.1	.06			
R4		029-0096-01	Gear Drive MHz		1	1	-			
R4		029-0096-02	Gear Drive MHz		1	1	2			
R4		029-0097-01	Gear Drive KHz		2	2	2			
		047-1672-00	Spring Detent		2	2	2			
		047-1713-00	Spring SW Detent		2	2	2			
R4		047-2214-01	Stop Arm		-	-	1			
R4		047-2613-00	Insr Fr Pnl Comm		1	1	-			
R4		047-2630-00	Insr Fr Pnl NAV		1	-	-			
R4		047-2631-00	Insr Fr Pnl Comm A		-	-	1			
		047-2632-00	Insr Fr Pnl Comm B		-	-	1			
R4		047-2634-00	Insr Fr Pnl NAV		-	1	-			
R4		047-2638-01	Clamp Hold Down		8	8	6			
		057-1369-00	Logo		1	-	1			
		057-1415-00	Logo Tag Blk		-	1	-			
R4		073-0053-00	Knob KHz		2	2	2			
		073-0085-00	Knob Mode Vol		2	2	1			
R4		073-0123-01	Knob MHz		2	2	2			
R4		073-0195-04	Pnl Fr Xcur		1	1	-			
R4		073-0195-05	Pnl Fr		-	-	1			
		078-0024-00	Spring Cprsn		1	1	1			
		088-0125-00	Hold Down Unit		1	1	1			
		088-0141-00	Lever SW		2	2	2			
		088-0326-01	Lens		2	2	2			
		089-2106-30	Hex Nut 1/4-32		2	2	1			
R4		089-5569-03	#2-56 THP		8	8	8			
		089-5874-03	Scr 2-56 x 3/16PHP		1	1	-			
		089-5899-02	Scr 2-56 x 1/8PHP		4	4	4			
		089-6218-04	Sscr #4-40		4	4	2			
		089-6222-04	Sscr #6-32		8	8	8			
		089-8023-30	Washer Flat		4	4	6			
		089-8042-30	1/4" Int T Lk Wash		2	2	1			
		089-8184-00	Wash Spacer		1	1	1			

NAME	FRONT PLATE SUB-ASS'Y.	**ASS'Y. NO.**	200-0450-00/02
ASS'Y. DWG.	300-0648-00	**UNIT**	KX 170B/175B KY 195B
USED ON	029-1019/1020/1021-00		

KING RADIO CORP. PARTS LISTING

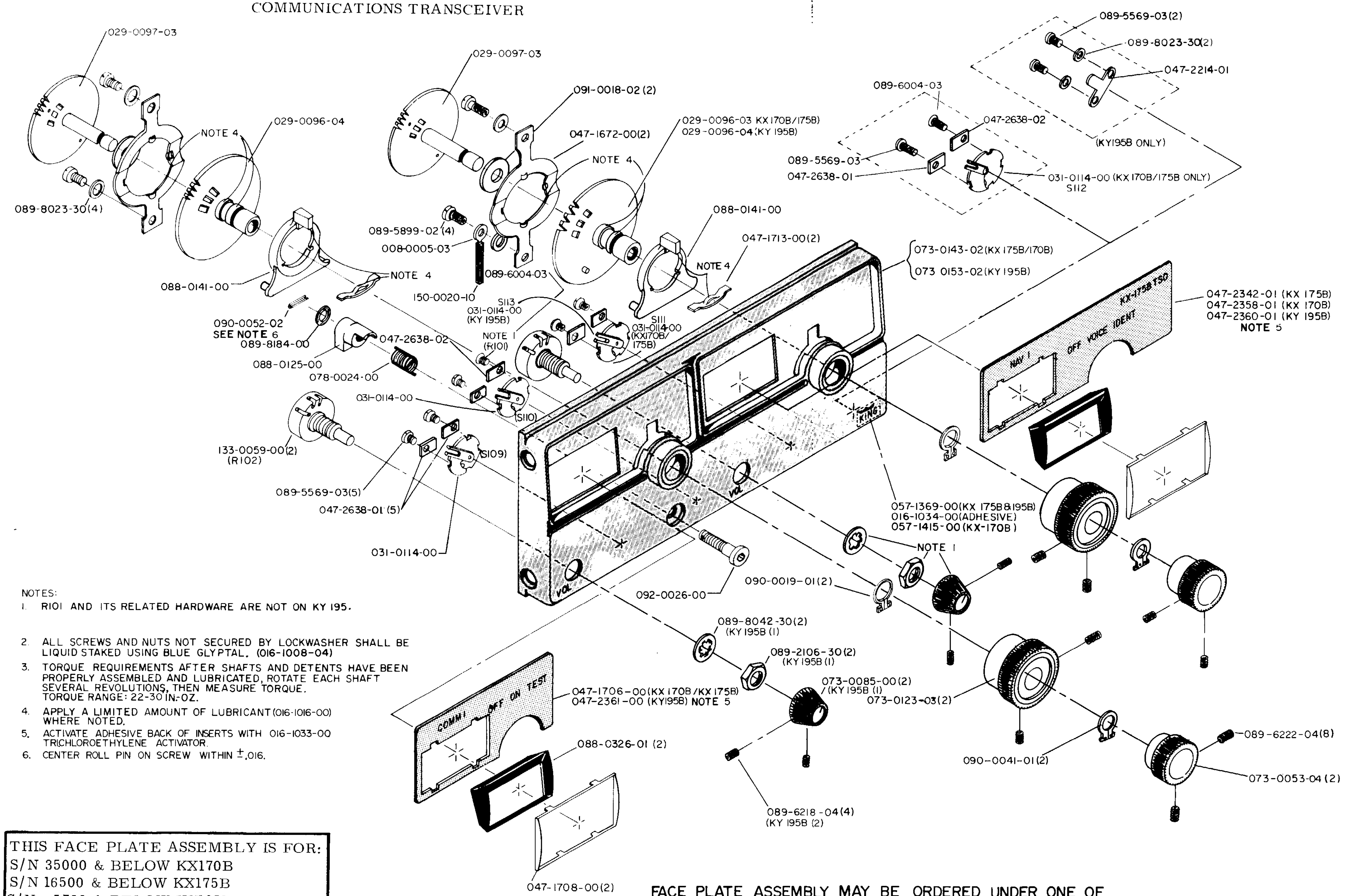
R4

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00	01	02			
	090-0019-01	R Rtng 3/8		2	2	2			
	090-0041-01	R Rtng 1/4		2	2	2			
	090-0052-00	Roll Pin		1	1	1			
	092-0026-00	Scr Hold Down		1	1	1			
	150-0003-10	#24 Tef Tubing		.4	.4	.06			
	150-0004-10	#22 Tef Tubing		.1	.1	-			
	150-0006-10	#18 Tef Tubing		.1	.1	.05			
	150-0020-10	Shrink Tubing		.1	.1	.1			
S109	031-0114-00	SW Dpst		1	1	1			
S110	031-0114-00	SW Dpst		1	1	1			
S111	031-0114-00	SW Dpst		1	1	-			
S112	031-0114-00	SW Dpst		1	1	-			
S113	031-0114-00	SW Dpst		-	-	1			
R101	133-0059-00	Res Var 10K		1	1	-			
R102	133-0059-00	Res Var 10K		1	1	1			
R135	130-0472-25	Res FC 4.7K 10% QW		1	1	-			

Parts List Revisions Record

Assembly No. 200-0450-00/02(B/MRL Rev 15) Manual Revision No. 4

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY		
CHANGE		026-0004-00	#20 Buss Wire	.1	.1	.06
CHANGE		029-0097-03	Gear, Drive KHz	2	2	2
CHANGE		047-1706-01	Insr Fr Pnl Comm	1	1	-
CHANGE		047-2361-00	Insr Fr Pnl Comm A	-	-	1
CHANGE		047-2358-01	Insr Fr Pnl NAV	-	1	-
CHANGE		047-2342-01	Insr Fr Pnl NAV	1	-	-
CHANGE		073-0143-02	Pnl Fr Xcur	1	1	-
CHANGE		073-0153-02	Pnl Fr	-	-	1
ADDED		147-0019-01	Bushing	2	2	2
ADDED		016-1045-00	Silicone Seal	AR	AR	AR
ADDED		047-1708-00	Frame Lens	2	2	2
CHANGE		089-5569-03	#2-56 THP	6	6	7
CHANGE		047-2638-01	Clamp, Hold Down	6	6	5
ADDED		047-2638-02	Clamp Hold Down	2	2	1
ADDED		080-6004-03	#2-56 x 3/16 FHP	2	2	1
CHANGE		150-0003-10	#24 Teflon Tubing	.3	.3	-
CHANGE		090-0052-02	Roll Pin	1	1	1
CHANGE		047-2214-00	Stop Arm	-	-	1
CHANGE		029-0096-03	Gear Drive MHz	1	1	-
CHANGE		073-0053-04	Knob KHz	2	2	2
CHANGE		073-0123-03	Knob MHz	2	2	2
CHANGE		029-0096-04	Gear Drive MHz	1	1	2
ADDED		091-0018-02	Washer	2	2	2



NOTES:

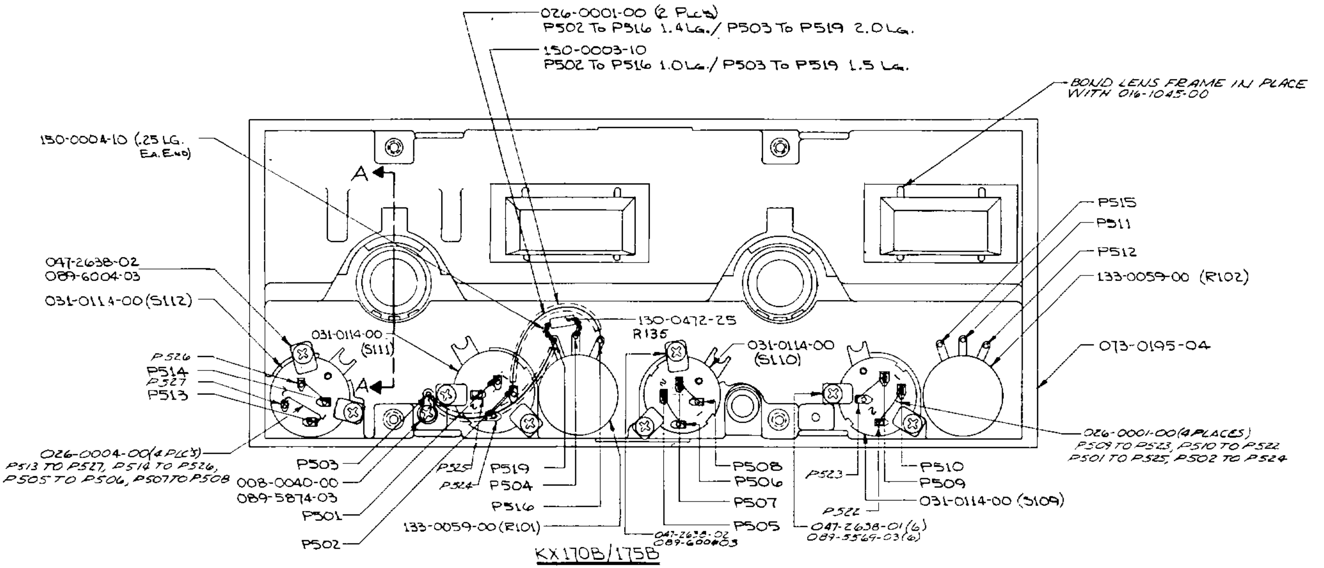
1. R101 AND ITS RELATED HARDWARE ARE NOT ON KY 195.
2. ALL SCREWS AND NUTS NOT SECURED BY LOCKWASHER SHALL BE LIQUID STAKED USING BLUE GLYPTAL. (016-1008-04)
3. TORQUE REQUIREMENTS AFTER SHAFTS AND DETENTS HAVE BEEN PROPERLY ASSEMBLED AND LUBRICATED, ROTATE EACH SHAFT SEVERAL REVOLUTIONS, THEN MEASURE TORQUE. TORQUE RANGE: 22-30 IN-OZ.
4. APPLY A LIMITED AMOUNT OF LUBRICANT (016-1016-00) WHERE NOTED.
5. ACTIVATE ADHESIVE BACK OF INSERTS WITH 016-1033-00 TRICHLOROETHYLENE ACTIVATOR.
6. CENTER ROLL PIN ON SCREW WITHIN ±.016.

THIS FACE PLATE ASSEMBLY IS FOR:
S/N 35000 & BELOW KX170B
S/N 16500 & BELOW KX175B
S/N 5700 & BELOW KY195B

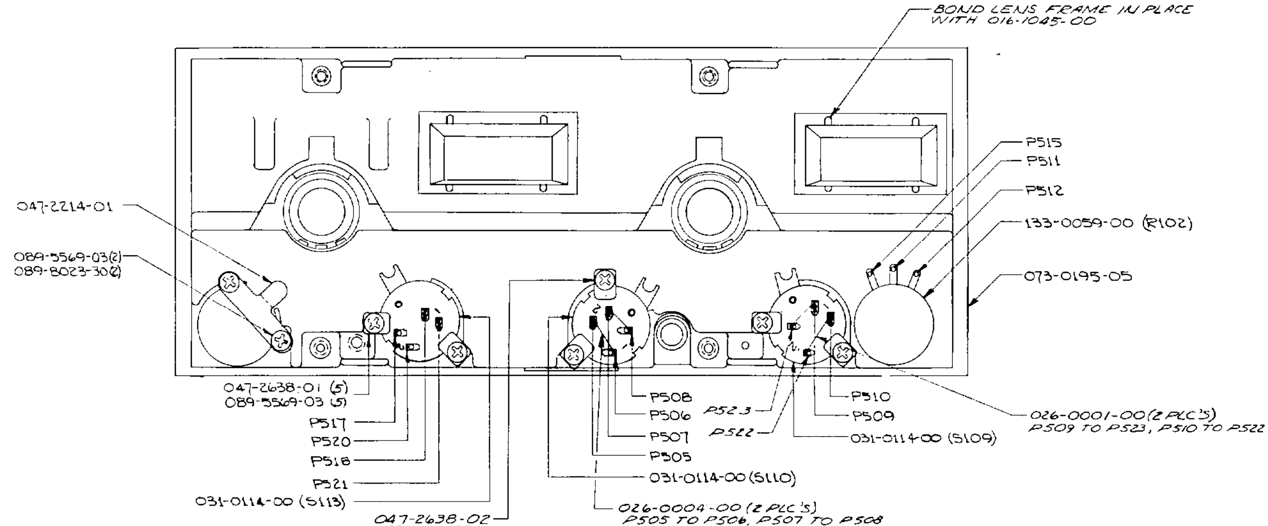
FACE PLATE ASSEMBLY MAY BE ORDERED UNDER ONE OF THE FOLLOWING NUMBERS:

KX 175B	200-0450-00
KX 170B	200-0450-01
KY 195B	200-0450-02

FIGURE 6-3 FRONT PLATE ASSEMBLY
(Dwg. No. 300-0648-00)(Sht. 1 of 2)(R-12)



KX170B/175B



KY 195B

FIGURE 6-3A FRONT PLATE ASSEMBLY
(Dwg. No. 300-0648-00)(Sht. 2 of 2)(R-12)

NAME Front Plate Sub-Assembly

ASS'Y. NO. 200-1786-00/01/02

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY				
				-00	-01	-02	-03	-04
				KX 175B	KX 170B	KY 195B		
	008-0005-03	Lug		1	1	1		
	008-0040-00	Lug Solder		1	1	—		
	016-1008-04	Glyptol Blue		AR	AR	AR		
	016-1016-00	Lubricant		AR	AR	AR		
	016-1033-00	Trichloroethlyene Activ.		AR	AR	AR		
	016-1034-00	Adhesive Quick-Setting		AR	-	AR		
	016-1045-00	Sil Seal		AR	AR	AR		
	026-0001-00	#26 Buss Wire		.4	.4	.06		
	029-0096-03	Gear Drive MHz (With Stop)	A	1	1	-		
	029-0096-04	Gear Drive MHz	A	1	1	2		
	029-0097-03	Gear Drive KHz	A	2	2	2		
	047-1672-00	Spring Detent		2	2	2		
	047-1706-01	Insert Fr Pnl (COMM)		1	1	-		
	047-1708-00	Frame Lens		2	2	2		
	047-1713-00	Spring Switch Detent		2	2	2		
	047-2342-01	Insert Fr Pnl (NAV)		1	-	-		
	047-2358-01	Insert Fr Pnl (NAV)		-	1	-		
	047-2360-01	Insert Fr Pnl (COMM B)		-	-	1		
	047-2361-00	Insert Fr Pnl (COMM A)		-	-	1		
	047-3567-00	Bracket Switch		4	4	4		
	057-1369-00	LOGO		1	-	1		
	057-1415-00	Logo Tag Blk		-	1	-		
	073-0053-04	Knob K.C.		2	2	2		
	073-0085-00	Knob Mode (Vol.)		2	2	1		
	073-0123-03	Knob M.C.		2	2	2		
	073-0322-03	Panel Front (Xcvr)		1	1	-		
	073-0322-04	Panel Front (KY 195B)		-	-	1		
	078-0024-00	Spring Compression		1	1	1		
	088-0125-00	Hold Down Unit		1	1	1		
	088-0326-01	Lens		2	2	2		
	088-0572-00	Actuator Switch		2	2	1		
	088-0572-01	Actuator Switch		-	-	1		
	089-2106-30	Hex Nut # 1/4-32		2	2	1		
	089-5874-03	#Screw 2-56x3/16PHP		5	5	4		
	089-5899-02	#2-56x1/8PHP		4	4	4		
	089-6218-04	#4-40 Bristol SS		4	4	2		
	089-6222-04	#6-32 Bristol SS		8	8	8		
	089-8023-30	Washer Flat		4	4	4		
	089-8042-30	#1/4 Int T Lockwasher		2	2	1		
	089-8184-00	Washer Spacer		1	1	1		
	090-0019-01	Ring Retainer 3/8 Shaft		2	2	2		
	090-0041-01	Ring Retainer ¼ Shaft		2	2	2		
	090-0052-02	Roll Pin		1	1	1		
	091-0018-02	Washer		2	2	2		
	092-0026-00	Screw Hold Down		1	1	1		
	147-0019-01	Bushing		2	2	2		
	150-0003-10	#22 Teflon Tubing		.3	.3	-		
	150-0004-10	#22 Teflon Tubing		.1	.1	-		
	150-0020-10	Shrinkable Tubing		.1	.1	.1		

NAME Front Plate Sub-Assembly

ASS'Y. NO. 200-1786-00/01/02

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY				
				-00	-01	-02	-03	-04
S109	031-0264-00	Switch Micro		4	4	4		
S110	031-0264-00	Switch Micro		-	-	-		
S111	031-0264-00	Switch Micro		-	-	-		
S112	031-0264-00	Switch Micro		-	-	-		
R101	133-0059-00	Res Vari 10K		2	2	1		
R102	133-0059-00	(R101 Omit on KY 195B)		-	-	-		
R135	130-0472-25	Res F/C 4.7K 10% ¼W		1	1	-		
	012-1113-00	Tape, Kapton		AR	AR	AR		

PARTS LIST REVISION HISTORY

ENGR. APPROVAL

NAME Front Plate Sub-Assembly

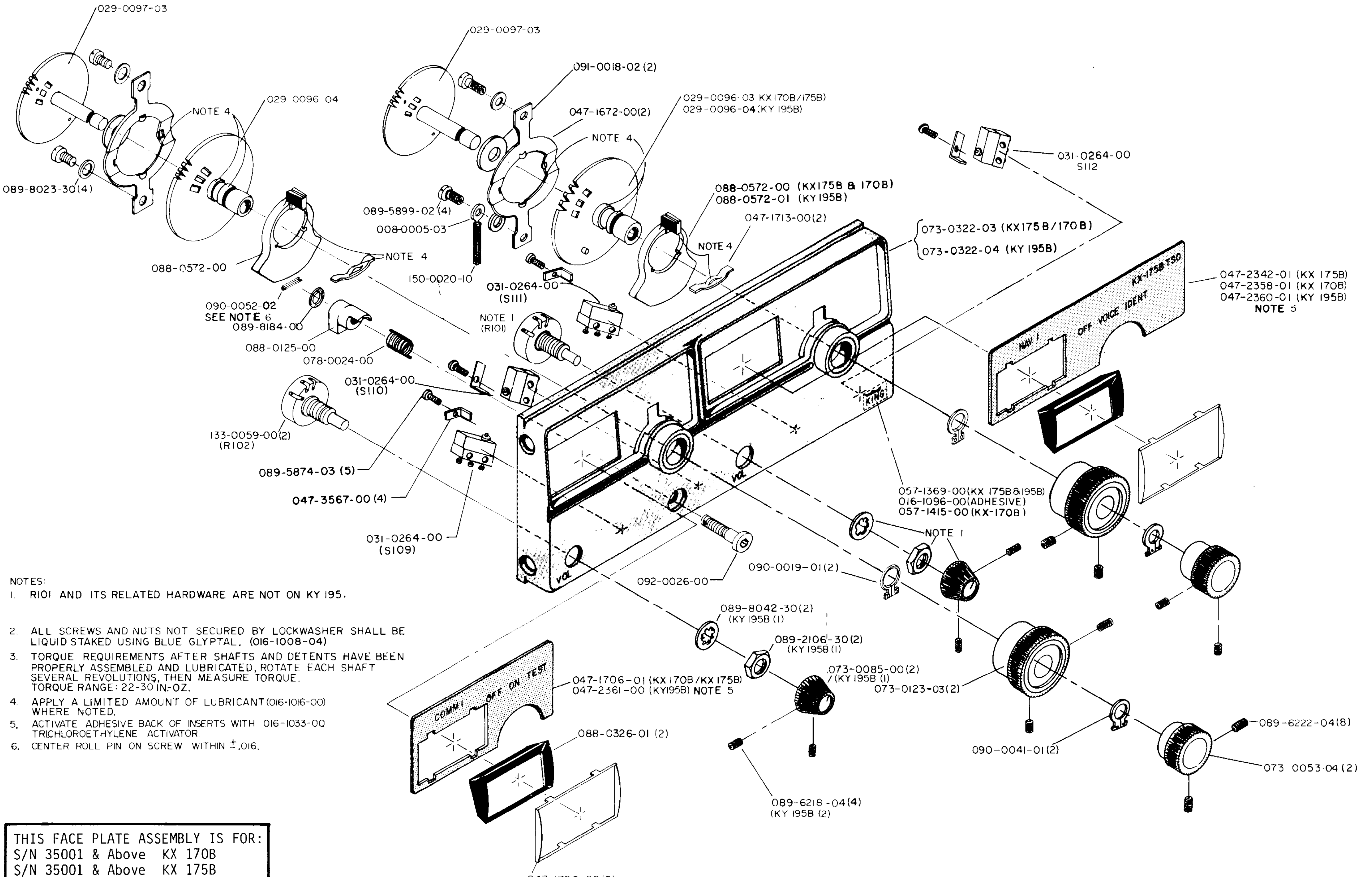
ASS'Y. NO. 200-1786-00/01/02

ASS'Y. DWG. 300-1786-00

UNIT KX 170B/175B/KY 195B

USED ON 069-1019-00 069-1021-00 069-1020-00

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION
1				
				KX 170B/KX 175B/KY 195B Rev. 4, January, 1976 Maintenance/Overhaul Manual



NOTES:

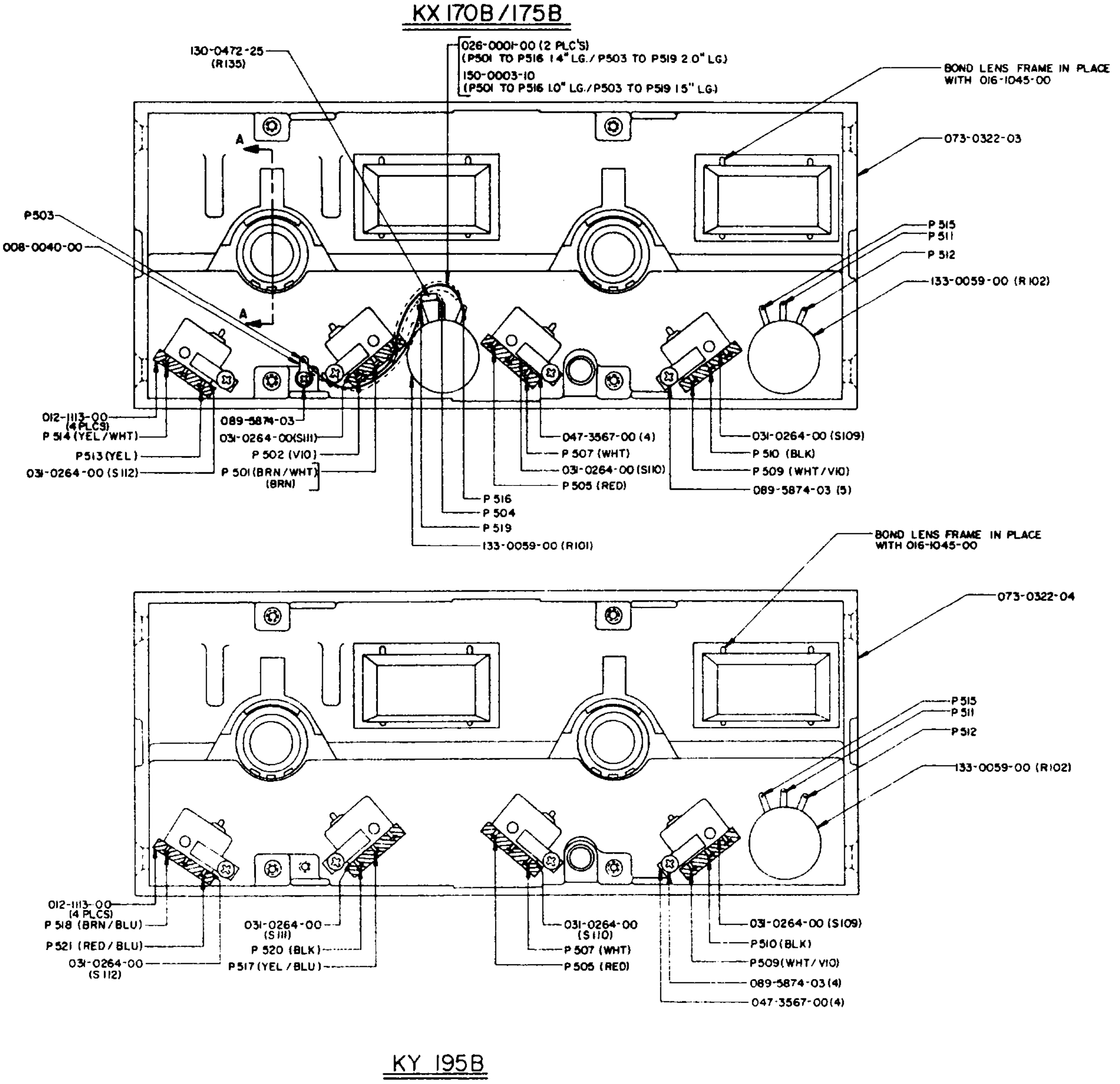
1. R101 AND ITS RELATED HARDWARE ARE NOT ON KY 195.
2. ALL SCREWS AND NUTS NOT SECURED BY LOCKWASHER SHALL BE LIQUID STAKED USING BLUE GLYPTAL. (016-1008-04)
3. TORQUE REQUIREMENTS AFTER SHAFTS AND DETENTS HAVE BEEN PROPERLY ASSEMBLED AND LUBRICATED, ROTATE EACH SHAFT SEVERAL REVOLUTIONS, THEN MEASURE TORQUE. TORQUE RANGE: 22-30 IN.-OZ.
4. APPLY A LIMITED AMOUNT OF LUBRICANT (016-1016-00) WHERE NOTED.
5. ACTIVATE ADHESIVE BACK OF INSERTS WITH 016-1033-00 TRICHLOROETHYLENE ACTIVATOR
6. CENTER ROLL PIN ON SCREW WITHIN ±.016.

THIS FACE PLATE ASSEMBLY IS FOR:
S/N 35001 & Above KX 170B
S/N 35001 & Above KX 175B
S/N 5701 & Above KY 195B

FACE PLATE ASSEMBLY MAY BE ORDERED UNDER ONE OF THE FOLLOWING NUMBERS:

KX 175B——200-1786 -00
KX 170B——200-1786-01
KY 195B——200-1786-02

FIGURE 6-3B FRONT PLATE ASSEMBLY
(Dwg. No. 300-1786-00, R-3; Sht 1)



KX 170B/175B

KY 195B

FIGURE 6-3C FRONT PLATE ASSEMBLY
(Dwg. No. 300-1786-00, R-3, Sht 2)

NAME	SWITCHING HD. SUB-ASS'Y.	**ASS'Y. NO.**	200-0451-00/01		
ASS'Y. DWG.	300-0650-00 300-0651-00	**UNIT**	KX 170B/175B KY 195B	**USED ON**	069-1019/1020/ 1021-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00	QUANTITY 01
	200-0451-00	KX 170B/KX 175B		X	
	200-0451-01	KY 195B			X
	008-0001-01	Solder Lug		2	2
	008-0005-03	Lug		5	5
	016-1004-00	Thrm Compound		AR	AR
	016-1008-04	Glyptal Blue		AR	AR
	016-1016-00	Lubricant		AR	AR
	025-0018-00	Wire #26 Blk		1. 1	. 4
	025-0018-04	Wire #26 Blk/Yel		1. 0	-
	025-0018-09	Wire #26 Blk/Wht		1. 0	1. 0
	025-0018-11	Wire #26 Brn		-	. 6
	025-0018-14	Wire #26 Brn/Yel		1. 0	-
	025-0018-15	Wire #26 Brn/Grn		-	1. 0
	025-0018-18	Wire #26 Brn/Gry		-	1. 0
	025-0018-19	Wire #26 Brn/Wht		1. 0	1. 0
	025-0018-24	Wire #26 Red/Yel		1. 0	-
	025-0018-26	Wire #26 Red/Blu		-	. 8
	025-0018-28	Wire #26 Red/Gry		-	1. 0
	025-0018-29	Wire #26 Red/Wht		1. 0	1. 0
	025-0018-30	Wire #26 Orn/Blk		-	1. 0
	025-0018-34	Wire #26 Orn/Yel		1. 0	1. 0
	025-0018-36	Wire #26 Orn/Blu		-	1. 0
	025-0018-39	Wire #26 Orn/Wht		1. 0	-
	025-0018-40	Wire #26 Yel/Blk		. 6	-
	025-0018-44	Wire #26 Yel		1. 0	-
	025-0018-49	Wire #26 Yel/Wht		-	1. 0
	025-0018-51	Wire #26 Grn/Brn		-	1. 0
	025-0018-54	Wire #26 Grn/Yel		1. 0	-
	025-0018-59	Wire #26 Grn/Wht		1. 0	1. 0
	025-0018-64	Wire #26 Blu/Yel		1. 0	-
	025-0018-66	Wire #26 Blu		-	1. 0
	025-0018-69	Wire #26 Blu/Wht		1. 0	1. 0
	025-0018-74	Wire #26 Vio/Yel		1. 0	-
	025-0018-79	Wire #26 Vio/Wht		1. 0	1. 0
	025-0018-84	Wire #26 Gry/Yel		1. 0	-
	025-0018-88	Wire #26 Gry		1. 0	. 7
	025-0018-89	Wire #26 Gry/Wht		1. 0	1. 0
	025-0018-90	Wire #26 Wht/Blk		1. 6	1. 0
	025-0018-91	Wire #26 Wht/Brn		-	1. 0
	025-0018-92	Wire #26 Wht/Red		-	1. 0
	025-0018-93	Wire #26 Wht/Orn		-	1. 0
	025-0018-95	Wire #26 Wht/Grn		-	1. 0
	025-0018-96	Wire #26 Wht/Blu		-	1. 0

NAME SWITCHING HD. SUB-ASS'Y. **ASS'Y. NO.** 200-0451-00/01

ASS'Y. DWG. 300-0650-00
300-0651-00 **UNIT** KX 170B/175B
KY 195B **USED ON** 069-1019/1020/
1021-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION		CODE	QUANTITY					
						00	01				
		025-0018-97	Wire #26	Wht/Vio		-	1.0				
		025-0018-98	Wire #26	Wht/Gry		-	1.0				
		026-0001-00	Buss Wire #26			1.8	.4				
		047-1675-01	Support Dial			1	1				
		047-2619-00	Brkt SW			-	1				
		047-2620-00	Brkt SW			1	1				
		047-2621-00	Brkt SW			1	-				
		047-2624-01	Plate Dial Mtg			1	-				
		047-2624-02	Plate Dial Mtg			-	1				
R4		047-2625-01	Plate Transfer			1	2				
		047-2635-00	Plate Xfr Adjust			1	2				
		076-0298-01	Spacer .218 Lg			6	-				
		076-0298-03	Spacer .281 Lg			4	4				
		076-0298-07	Spacer .156 Lg			2	4				
		076-0298-08	Spacer .110 Lg			2	-				
		076-0299-00	Collar			1	-				
R4		088-0136-00	Filter Blu Lamp			2	2				
R4		088-0321-01	Cntr Whl 25KHz			1	2				
		088-0232-01	Xfr Gear Cntr			1	2				
		089-2005-37	Nut Hex #2-56			4	4				
		089-2076-30	Nut #4-40			2	1				
		089-2140-00	Nut Hex S/L #4-40			6	6				
		089-5381-16	Mscr #2-56 x 1			2	4				
		089-5381-20	Mscr #2-56 x 1 1/4			2	-				
		089-5857-04	Sscr 4-40 x 1/8			2	-				
		089-6024-04	Scr 4-40 x 1/4 SCH Cap			1	2				
R4		089-5903-05	Scr 4-40 x 5/16 PHP			2	1				
R4		089-8003-34	Lk Wash SR #4			2	1				
		089-8023-30	Flat Wash			4	4				
R4		089-8025-30	Wash #4			3	3				
		089-8100-30	Flat Wash 3/8"			1	2				
R4		089-8103-30	Flat Wash 1/4"			2	4				
		090-0019-01	Rtng Ring 3/8"			1	2				
		091-0015-00	Grommet			1	1				
		091-0015-11	Grommet			2	2				
		091-0068-04	Wash Shoulder			2	1				
R4		150-0003-10	#24 Tef Tubing			.5	.5				
R4		150-0005-10	#20 Tef Tubing			.2	.3				
		150-0020-10	Shrink Tubing			.6	.6				
		200-0576-00	Comm MHz Whl Ass'y			1	2				
		200-0576-01	Comm KHz Whl Ass'y			1	2				
		200-0576-02	NAV MHz Whl Ass'y			1	-				
		200-0576-03	NAV KHz Whl Ass'y			1	-				

NAME SWITCHING HD. SUB-ASS'Y **ASS'Y. NO.** 200-0451-00/01
ASS'Y. DWG. 300-0650-00 300-0651-00 **UNIT** KX 170B/175B KY 195B **USED ON** 069-1019/1020/1021-00

KING RADIO CORP. PARTS LISTING

					QUANTITY					
	SYMBOL	PART NUMBER	DESCRIPTION	CODE	00	01				
		200-0576-04	Gear Face NAV-COMM		2	2				
R4	Q101	007-0184-01	Tstr TA7557 007 0191-00		1	-				
R4	Q102	007-0184-01	Tstr TA7557 007 0191.00		1	1				
	Q103	007-0039-01	Tstr 2N3404		1	-				
	Q104	007-0078-00	Tstr 2N3415		1	1				
	Q105	007-0039-01	Tstr 2N3404		1	1				
	Q106	007-0078-00	Tstr 2N3415		1	-				
	Q107	007-0078-00	Tstr 2N3415		1	1				
R4	CR101	007-6021-00	Dio TS-2		1	-				
	CR102	007-5026-00	Dio Zen 9.1V 1W		1	-				
	CR103	007-5016-00	Dio Zen 5.1V 1W		1	1				
R4	CR104	007-6021-00	Dio TS-2		1	-				
	S101	031-0204-00	Switch Wafer		1	1				
	S102	031-0104-00	Switch Wafer		1	1				
	S104	031-0204-00	Switch Wafer		-	1				
	S105	031-0104-00	Switch Wafer		-	1				
	S107	031-0156-00	Switch Wafer		1	-				
	DS101	090-0160-00	Socket Lamp		1	1				
	DS102	090-0140-02	Socket Lamp		1	1				
	C101	113-5151-01	Cap DC 150pf X5F		1	-				
R4	C102	097-0056-33	Cap Elec 100µf 16V		1	-				
R4	C103	097-0056-33	Cap Elec 100µf 16V		1	1				
	C104	113-5151-01	Cap DC 150pf X5F		1	1				
	C105	113-5151-01	Cap DC 150pf X5F		1	1				
	R103	130-0102-25	Res 1K 10% QW		1	-				
	R125	130-0680-33	Res 68 5% HW		1	1				
	R126	130-0750-23	Res 75 5% QW		1	-				
	R127	130-0750-23	Res 75 5% QW		1	-				
	R128	132-5017-00	Res 0.56 5% 2W		1	-				
	R129	130-0102-25	Res 1K 10% QW		1	1				
	R130	130-0152-23	Res 1.5K 5% QW		1	1				
	R131	130-0471-23	Res 470 5% QW		1	1				
	R132	133-0016-02	Pot 1K		1	1				
	R133	130-0102-25	Res 1K 10% QW		1	1				
	R134	132-5017-00	Res 0.56 5% 2W		1	1				
	S103	200-0575-00	Comm SW Ass'y		1	-				

NAME SWITCHING HD. SUB-ASS'Y.
ASS'Y. NO. 200-0451-00/01
ASS'Y. DWG. 300-0650-00
300-0651-00
UNIT KX 170B/175B
KY 195B
USED ON 069-1019/1020/
1021-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00	01				
S103	200-0575-05	COMM Sw Ass'y.		-	1				
S105	200-0575-01	NAV Sw Ass'y.		1	-				
S106	200-0575-05	COMM Sw Ass'y.		-	1				
S106	200-0575-02	NAV Sw Ass'y		1	-				
S108	200-0575-03	NAV Sw Ass'y		1	-				

Parts List Revisions Record

Assembly No. 200-0451-00/01 (B/MRL Rev 15)   Manual Revision No. 4

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY	
ADDED	R111	136-2941-22	Res. 2.04K 1% 1/8W	1	-
ADDED		150-0004-10	#22 Teflon Tubing	.1	.1
CHANGE		150-0003-10	#24 Teflon Tubing	.8	.6
CHANGE		150-0005-10	#20 Teflon Tubing	.07	.3
CHANGE		089-8103-30	Washer, Flat 1/4"	3	6
ADDED		091-0109-00	Plastic Ties	20	16
CHANGE		047-2625-04	Plate, Transfer	1	2
CHANGE		088-0321-03	Counter Wheel 25KHz	1	2
CHANGE	C102	097-0056-33	Cap. Alum 150mf 16V	1	-
CHANGE	C103	097-0056-33	Cap. Alum 150mf 16V	1	1
DELETE		088-0136-00	Filter, Blue Lamp	2	2
CHANGE	CR101	007-6024-00	Dio 1N4001	1	-
CHANGE	CR104	007-6024-00	Dio 1N4001	1	-
ADDED		089-8069-30	Washer, Flat	1	-
CHANGE	Q101	007-0191-00	Tstr, 2N5194	1	-
CHANGE	Q102	007-0191-00	Tstr 2N5194	1	1
CHANGE		089-5903-05	Scr, 4-40 x 5/16 PHP	4	2
CHANGE		089-8025-30	Washer, #4	1	2
DELETE		089-8004-34	Lk Washer #4 SR	2	1

NAME SWITCH WAFER ASSEMBLIES

ASS'Y. NO. 200-0575-00/05

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				-00	-01	-02	-03	-04	-05
	200-0575-00	Switch Ass'y COMM S103		X					
	200-0575-01	Switch Ass'y NAV S105			X				
	200-0575-02	Switch Ass'y NAV S106				X			
	200-0575-03	Switch Ass'y NAV S108					X		
	200-0575-04	Switch Ass'y COMM S102 (KX 170A/175/KY195 Only)						X	
	200-0575-05	Switch Ass'y COMM S103/106 (KY195B)							X
	150-0003-10	Tubing, Teflon #24ga		-	-	.2	-	-	.1
	150-0004-10	Tubing, Teflon #22ga		-	-	-	-	-	.1
CR101	007-6033-00	Diode 1N270		-	-	-	-	-	-
CR102	007-6033-00	Diode 1N270		-	-	-	-	-	-
CR105	007-6033-00	Diode 1N270		-	-	4	-	-	-
CR106	007-6033-00	Diode 1N270		-	-	-	-	-	-
CR107	007-6033-00	Diode 1N270		-	-	-	-	-	-
CR108	007-6033-00	Diode 1N270		-	-	-	-	-	-
CR109	007-6033-00	Diode 1N270		-	-	-	4	-	-
CR110	007-6033-00	Diode 1N270		-	-	-	-	-	-
CR111	007-6033-00	Diode 1N270		-	-	-	-	-	-
CR112	007-6033-00	Diode 1N270		-	-	-	-	-	-
CR113	007-6033-00	Diode 1N270		-	1	-	-	-	-
CR114	007-6033-00	Diode 1N270		-	-	1	-	-	-
S102	031-0107-00	Wafer, Switch		-	-	-	-	1	-
S105	031-0154-00	Wafer, Switch		-	1	-	-	-	-
S106	031-0155-00	Wafer, Switch		-	-	1	-	-	-
S108	031-0157-00	Wafer, Switch		-	-	-	1	-	-
S103	031-0205-00	Wafer, Switch		1	-	-	-	-	1
R111	136-2941-22	Res, 2.94K 1% QW		-	-	-	-	-	1
R112	136-4020-22	Res, 402 ohm 1% QW		1	-	-	-	1	1
R113	136-4530-22	Res, 453 ohm 1% QW		1	-	-	-	1	1
R114	136-5110-22	Res, 511 ohm 1% QW		1	-	-	-	1	1
R115	136-5620-22	Res, 562 ohm 1% QW		1	-	-	-	1	1
R116	136-6340-22	Res, 634 ohm 1% QW		1	-	-	-	1	1
R117	136-6980-22	Res, 698 ohm 1% QW		1	-	-	-	1	1
R118	136-7870-22	Res, 787 ohm 1% QW		1	-	-	-	1	1
R119	136-8660-22	Res, 866 ohm 1% QW		1	-	-	-	1	1
R120	136-6340-22	Res, 634 ohm 1% QW		1	-	-	-	1	1
R135	136-2941-22	Res, 2.94K 1% QW		-	-	-	-	1	1
R136	136-4020-22	Res, 402 ohm 1% QW		-	-	-	-	1	1
R137	136-4530-22	Res, 453 ohm 1% QW		-	-	-	-	1	1
R138	136-5110-22	Res, 511 ohm 1% QW		-	-	-	-	1	1
R139	136-5620-22	Res, 562 ohm 1% QW		-	-	-	-	1	1
R140	136-6340-22	Res, 634 ohm 1% QW		-	-	-	-	1	1
R141	136-6980-22	Res, 698 ohm 1% QW		-	-	-	-	1	1
R142	136-7870-22	Res, 787 ohm 1% QW		-	-	-	-	1	1
R143	136-8660-22	Res, 866 ohm 1% QW		-	-	-	-	1	1
R144	136-6340-22	Res, 634 ohm 1% QW		-	-	-	-	1	1

Rev. 4, January, 1976

SHT 2 OF 2

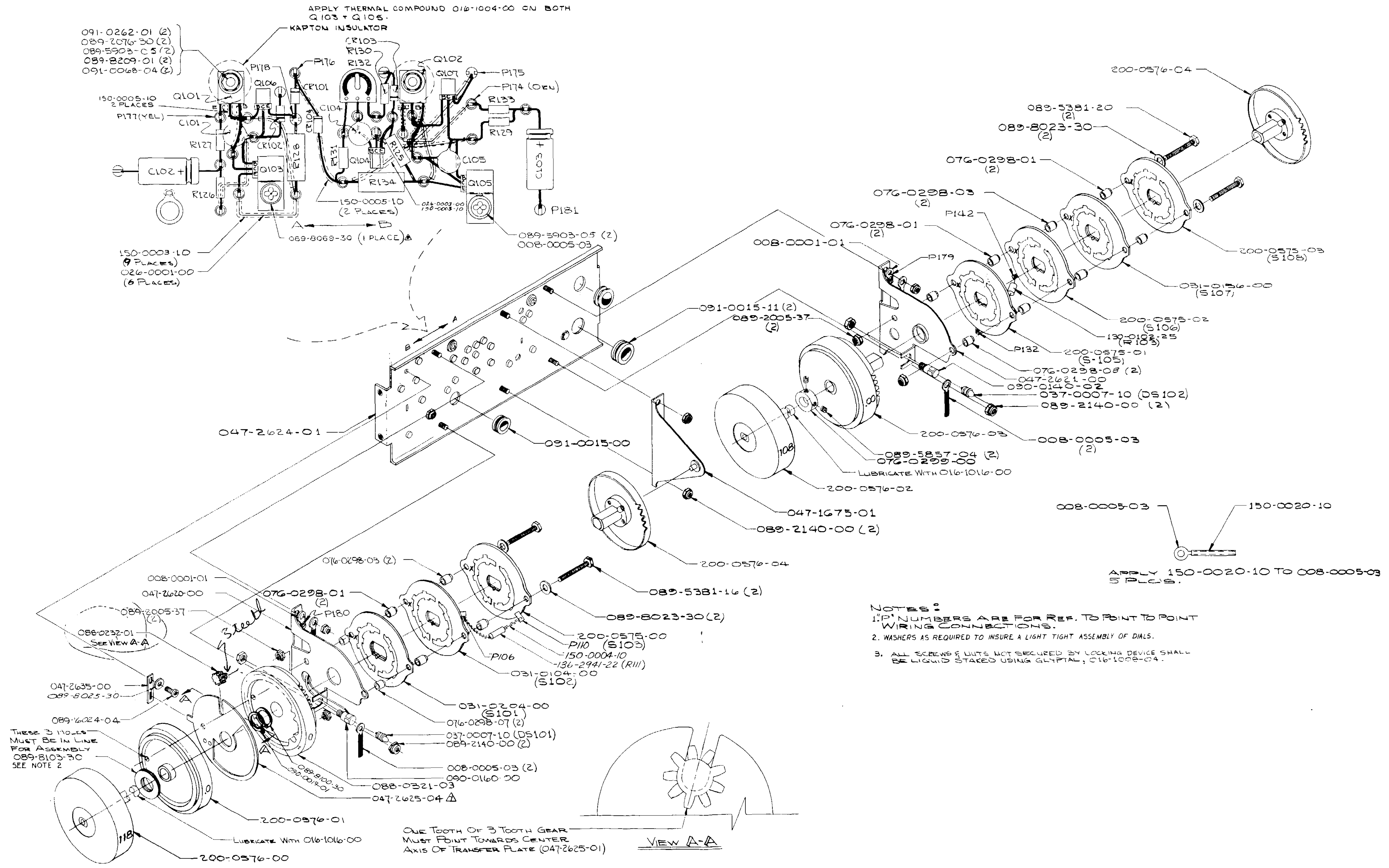
PARTS LIST REVISION HISTORY	ENGR. APPROVAL
NAME SWITCH WAFER ASSEMBLIES	ASS'Y. NO. 200-0575-00/05

ASS'Y. DWG.	UNIT KX170/175/KY195 ALL SERIES	USED ON

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION
1	12070		136-2941-22	Qty. for -00 is -0-
			150-0004-10	P/N changed from 150-0005-10 Qty. for -01,-02,-03 is -0- Qty. for -05 is .1
			150-0003-10	Added
2	14313		007-6033-00	Added CR114 Qty. change for -02 from 4 to 5
				KX 170/175/KY 195 Maintenance/ Overhaul Manual Rev. 4, Jan., 1976

SHT 1 OF 2

K-1650 3/73

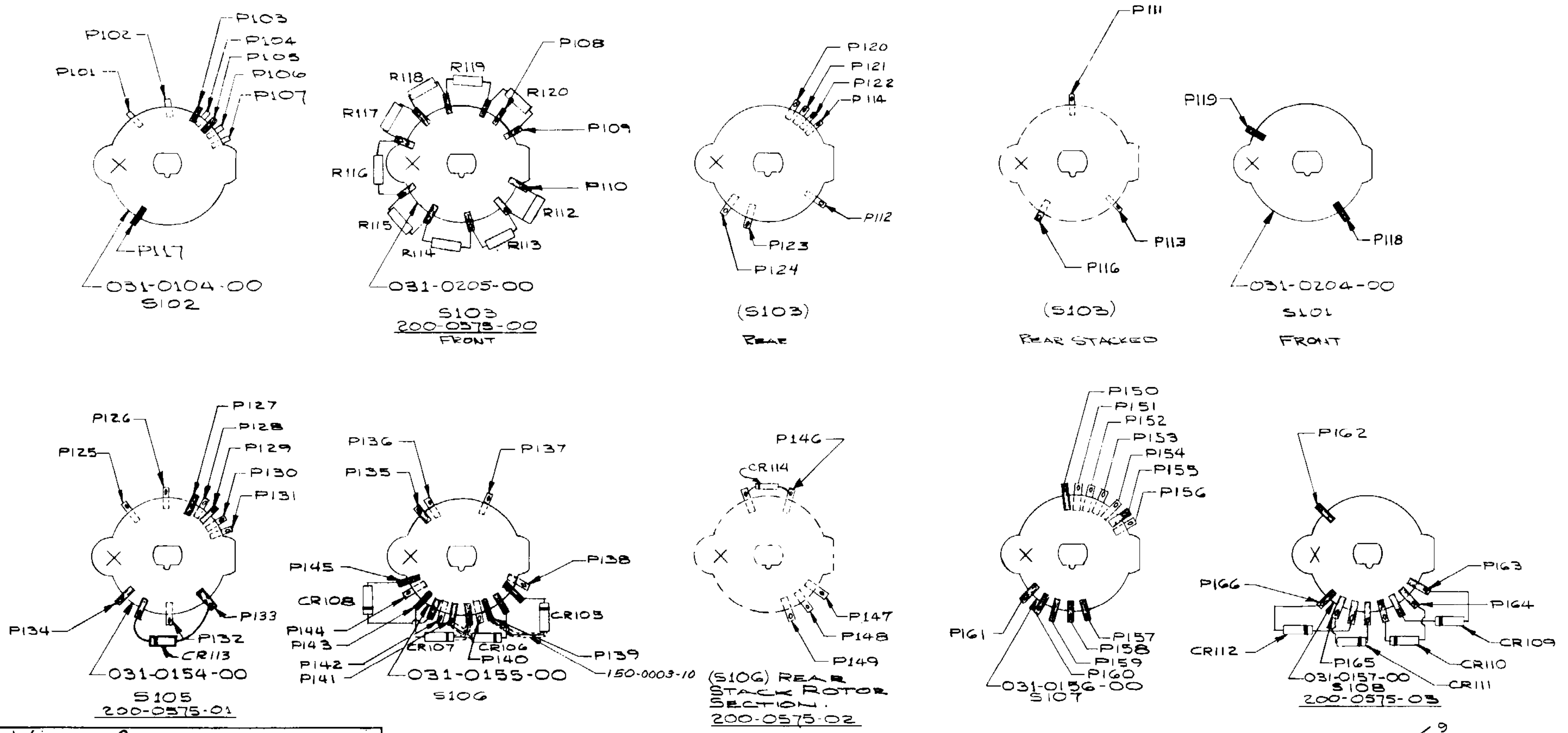


NOTES:

1. "P" NUMBERS ARE FOR REF. TO POINT TO POINT WIRING CONNECTIONS.
2. WASHERS AS REQUIRED TO INSURE A LIGHT TIGHT ASSEMBLY OF DIALS.
3. ALL SCREWS & NUTS NOT SECURED BY LOCKING DEVICE SHALL BE LIQUID STAKED USING GLYPTAL, 016-1008-04.

KX 170B/KX 175B
FIGURE 6-4 SWITCHING HEAD SUB-ASSEMBLY
(Dwg. No. 300-0650-00 R-10)(Sht. 1 of 2)

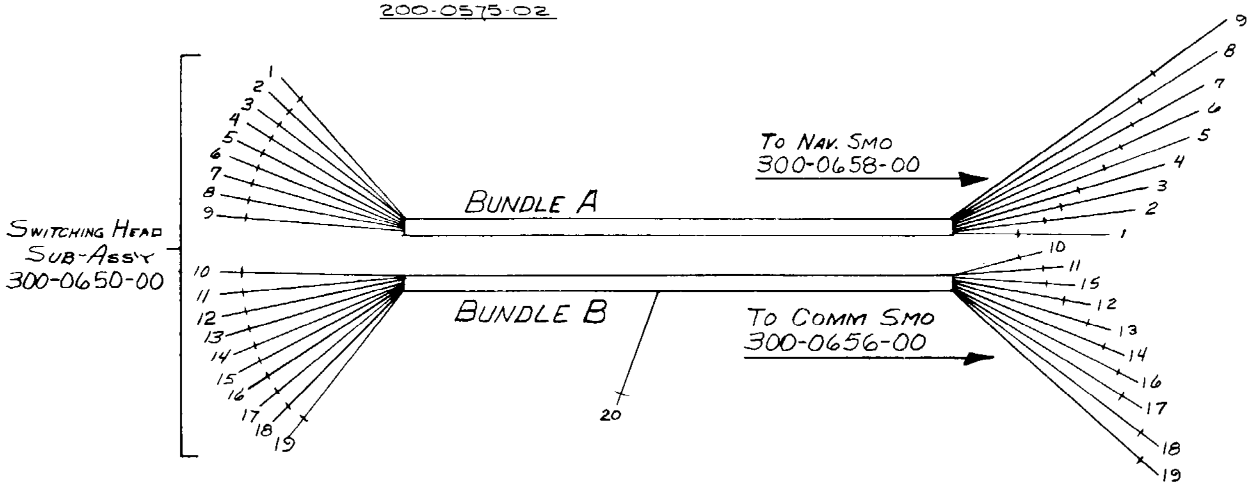
NOTES.
1. ▮ NEAR SIDE TERM.
2. ▯ FAR SIDE TERM.
3. SWITCHES READ FROM LEFT SIDE OF UNIT.



△ OBSOLETED 300-0650-01 THRU-12

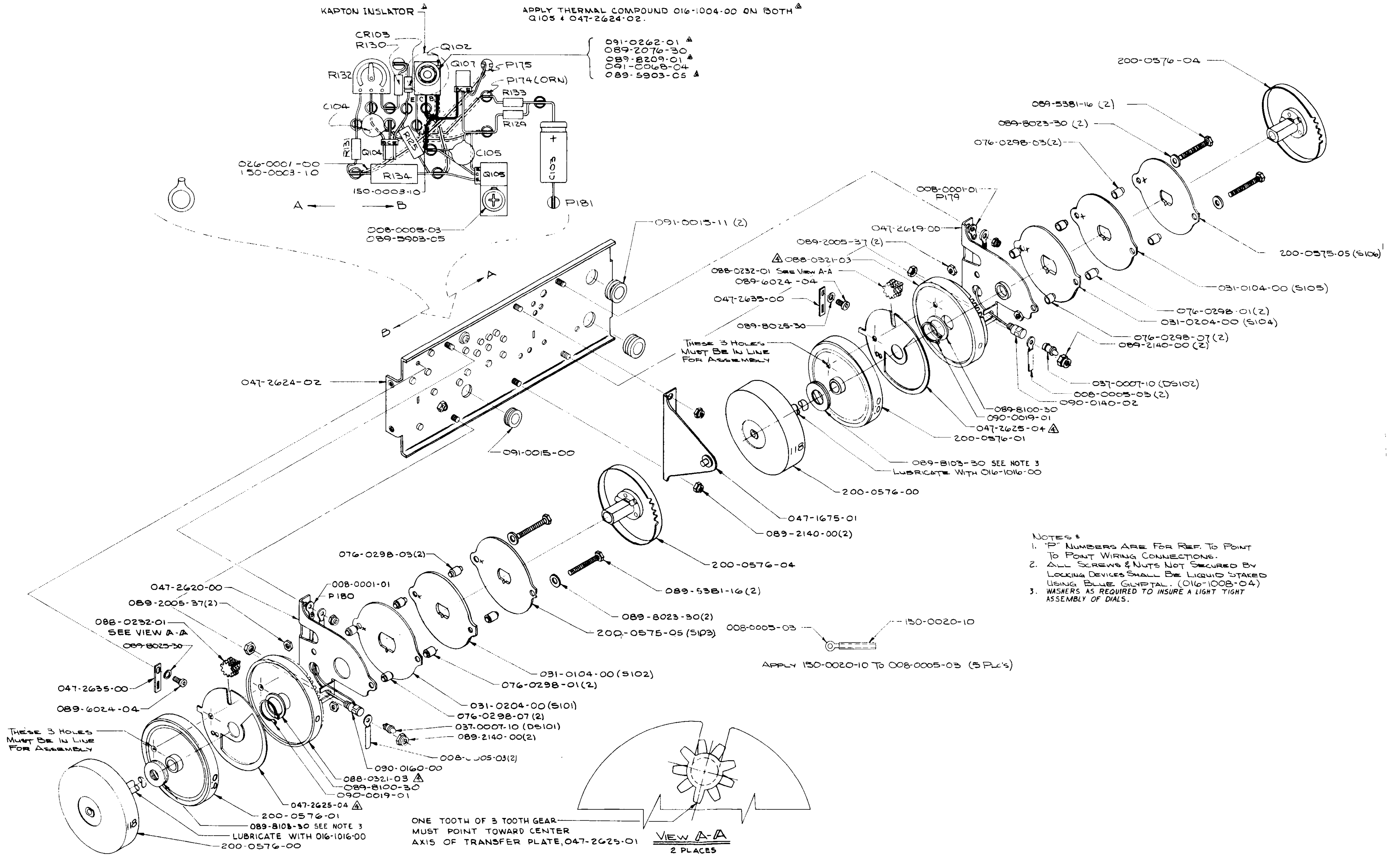
WIRING CHART

WIRE #	FROM	TO	COLOR	LENGTH
NOTE 2	P112 & P113 (S103)	P118 (S101)	BUSS	
"	P129 & P130 (S105)	P151 (S107)	│	
"	P135 (S106)	P162 (S108)	│	
	P105 (S102)	P106 (S102)	│	
	P147 (S106)	P148 (S106)	BUSS	
	P105 (S102)	P180 (GND)	BLK	3 ½
	P118 (S101)	P180 (GND)	BLK	3 ½
	P129 (S105)	P179 (GND)	BLK	3 ½
	P155 (S107)	P161 (S107	WHT/BLK	5½
	P134 (S105)	P162 (S108)	YEL/BLK	4 ¼
	P149 (S106)	P150 (S107)	ORN/BLK	5
	DS101-WHT	P124 (S103)	REF-SEE SHEET 1	
	DS101-BLK	P117 (S102)		
	DS102-WHT	P117 (S102)		
	P179 (SEE	P503 (FACE	BLK	6 ½
	P180 SHT. 1)	P510 PLATE)	BLK	3
BUNDLE A				
1	P131 (S105)	P204	GRN/YEL	6½
2	P128 │	P205	BLU/YEL	6
3	P125 │	P206	GRY/YEL	5¼
4	P126 (S105)	P207	VIO/YEL	5½
5	P154 (S107)	P209	RED/YEL	6
6	P153 │	P210	BRN/YEL	6
7	P152 │	P211	BLK/YEL	6
8	P156 (S107)	P212	ORN/YEL	5 ¾
9	P127 (S105)	P213	YEL	5 ¼
BUNDLE B				
10	P103 (S102)	P301	WHT	8 ½
11	P114 (S103)	P302	ORN/WHT	9 ¾
12	P120 │	P303	BLK/WHT	8 ¾
13	P121 │	P304	BRN/WHT	10
14	P122 (S103)	P305	RED/WHT	9 ½
15	P119 (S101)	P306	WHT/BLK	8 ½
16	P102 (S102)	P307	VIO/WHT	9
17	P101 │	P308	GRY/WHT	8 ½
18	P104 │	P309	BLU/WHT	9 ½
19	P107 (S102)	P310	GRN/WHT	11
20	P175	P311	ORN/GRY	3



NOTES:
1. UNLESS NOTED–
#26 AWG COPPERWELD – 025-0018-XX
#26 AWG BUSS – 026-0001-00
2. SLEEVE WITH 150-0003-10.
3. STRIP & TIN .20 FROM END, ALL WIRES.

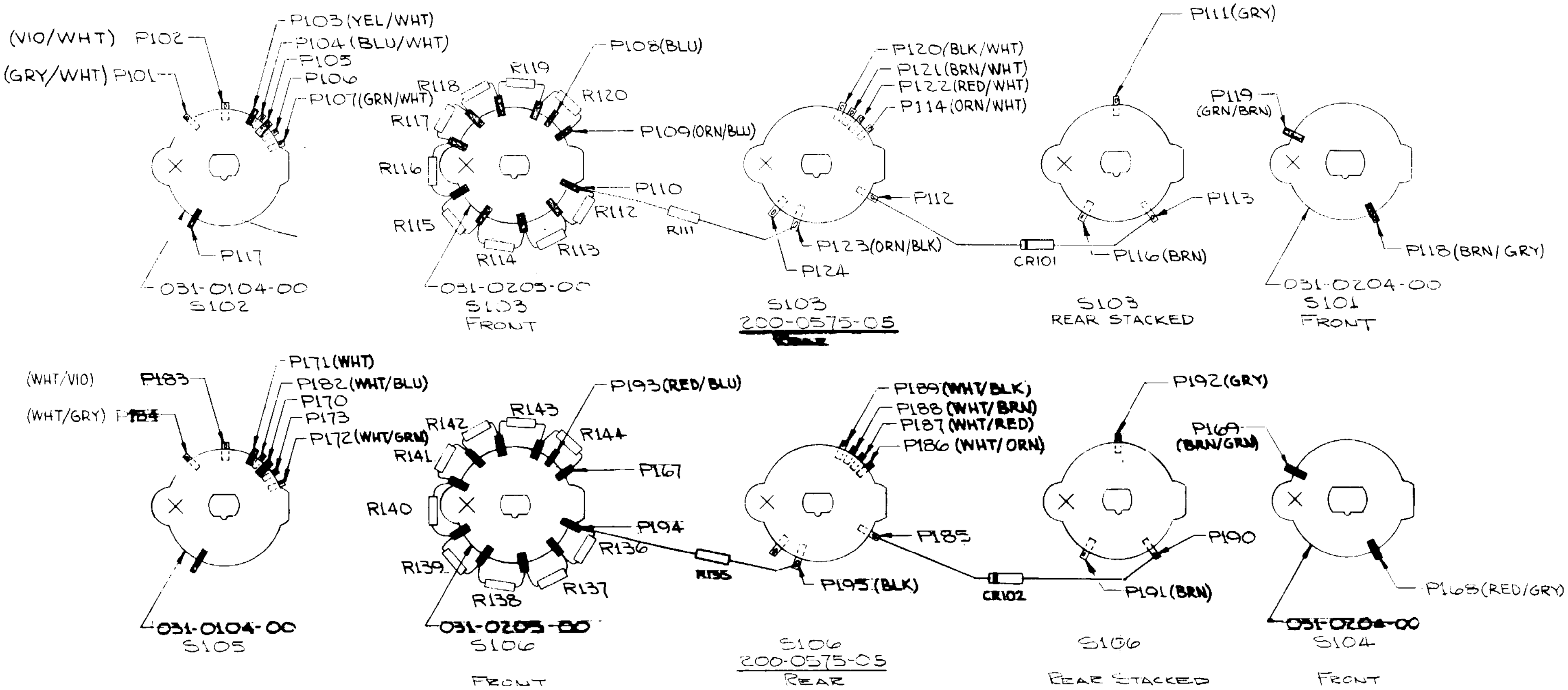
FIGURE 6-4A SWITCHING HEAD SUB-ASSEMBLY
(Dwg. No. 300-0650-00 R-10)(Sht. 2 of 2)



KY 195B
FIGURE 6-5 SWITCHING HEAD SUB-ASSEMBLY
(Dwg. No. 300-0651-00)(Sht. 1 of 2) R-6

Notes:

1. ▮ Near Side Terminal
2. ▯ Far Side Terminal
3. Switches Read From Left Side Of Unit.



SWITCH WIRING CHART			
FROM	TO	COLOR	LENGTH
P118 (S101)	P105 ∮ 106 (S102)	BUSS	
P106 (S102)	P112 (S103)	BUSS	
P111 (S103)	P192 (S106)	GREY	
P116 (S103)	P191 (S106)	BROWN	
P168 (S104)	P170 ∮ 173 (S105)	BUSS	
P170 ∮ 173 (S105)	P185 (S106)	BUSS	
P193 (S106)	P521 (NOTE 3)	RED/BLU	
P195 (S106)	P179 (NOTE 4)	BLACK	

LAMP WIRING CHART		
FROM	TO	REMARKS
DS101 (WHT)	P124 (S103)	SEE SHEET 1
DS101 (BLK)	P117 (S102)	" " "
DS102 (WHT)	P117 (S102)	" " "

BUNDLE WIRING CHART				
WIRE#	FROM	TO	COLOR	LENGTH
1	P118 (S101)	P245	BRN/GRY	
2	P119 (S101)	P257	GRN/BRN	
3	P101 (S102)	P265	GRY/WHT	
4	P102 "	P266	VIO/WHT	
5	P103 "	P269	YEL/WHT	
6	P104 "	P267	BLU/WHT	
7	P107 (S102)	P268	GRN/WHT	
8	P108 (S103)	P247	BLUE	
9	P109 "	P253	ORN/BLU	
10	P114 "	P260	ORN/WHT	
11	P120 "	P263	BLK/WHT	
12	P121 "	P262	BRN/WHT	
13	P122 "	P261	RED/WHT	
14	P123 (S103)	P255	ORN/BLK	
15	P168 (S104)	P250	RED/GRY	
16	P169 (S104)	P258	BRN/GRN	
17	P171 (S105)	P289	WHITE	
18	P172 "	P288	WHT/GRN	
19	P182 "	P287	WHT/BLU	
20	P183 "	P286	WHT/VIO	
21	P184 (S105)	P285	WHT/GRY	
22	P186 (S106)	P280	WHT/ORN	
23	P187 "	P281	WHT/RED	
24	P188 "	P282	WHT/BRN	
25	P189 (S106)	P283	WHT/BLK	

NOTES:

1. UNLESS NOTED:
   ALL WIRE #26 AWG. COPPERWELD 025-0018-XX, COLOR PER CHARTS.
   BUSS WIRE, #26 AWG. 026-0001-00 AND SLEEVED WITH 150-0003-10
2. STRIP ∮ TIN .20 FROM END, ALL WIRES.
3. TO FRONT PLATE ASSY., 300-0648-00.
4. SEE SHEET 1 FOR CONNECTIONS.

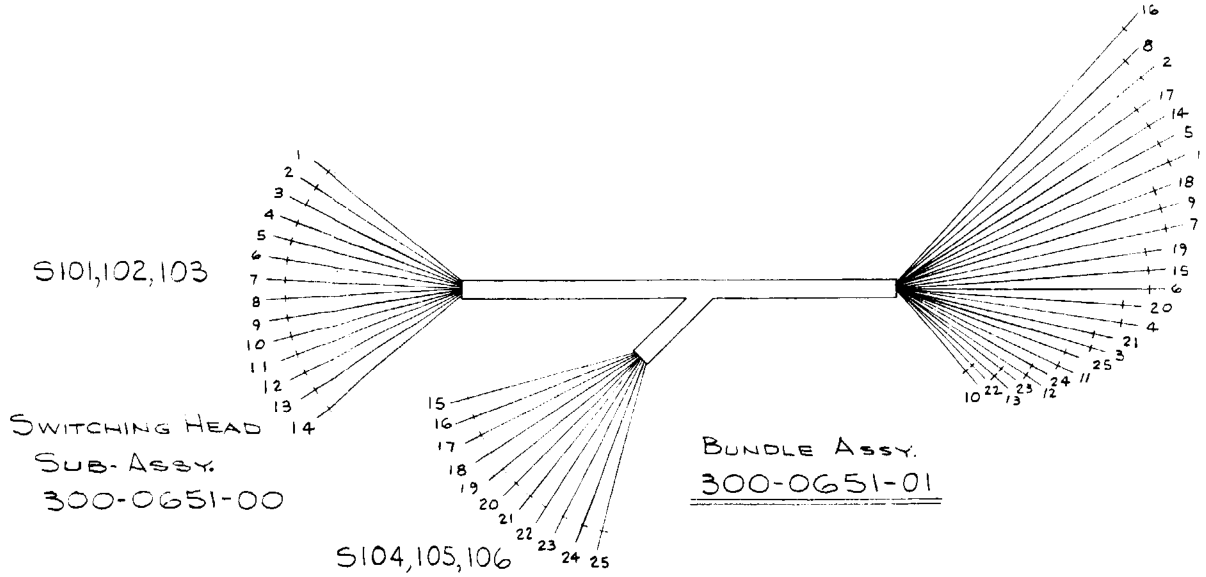


FIGURE 6-5A SWITCHING HEAD SUB-ASSEMBLY
(Dwg. No. 300-0651-00)(Sht. 2 of 2) R-6

NAME NAV SMO BD. SUB-ASS'Y **ASS'Y. NO.** 200-0458-00

ASS'Y. DWG. 300-0659-00 **UNIT** KX 170B/175B **USED ON** 200-0457-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
					00					
		009-5249-01	NAV SMO Board		1					
		012-1038-00	Adh Disc .312 Dia		1					
		025-0018-22	#26 Wire Red		.5					
		025-0018-99	#26 Wire Wht		.6					
		026-0001-00	#26 Wire		.8					
		026-0013-00	Coax Cable RG178		2.1					
		047-2154-00	Can VCO Coil		1					
		088-0066-00	Spacer Xtal		1					
		090-0104-04	Solder Ring		12					
		150-0003-10	Tubing Teflon #24		.4					
		150-0015-10	Tubing Teflon #12		.1					
	Q201	007-0238-00	Tstr FPN4917		1					
	Q202	007-0195-00	Tstr MPS-H10		1					
	Q203	007-0195-00	Tstr MPS-H10		1					
	Q206	007-0238-00	Tstr FPN4917		1					
	Q207	007-0238-00	Tstr FPN4917		1					
	Q208	007-0238-00	Tstr FPN4917		1					
	Q209	007-0195-00	Tstr MPS-H10		1					
	Q210	007-0078-00	Tstr 2N3415		1					
	Q211	007-0078-00	Tstr 2N3415		1					
R4	Q212	007-0046-00	Tstr 2N3605		1					
	CR201	007-4012-00	Dio Vctr SMV626		1					
	CR202	007-6033-00	Dio 1N270		1					
	CR203	007-6045-00	Dio FH1100		1					
	CR204	007-6045-00	Dio FH1100		1					
	CR205	007-6045-00	Dio FH1100		1					
	CR206	007-6045-00	Dio FH1100		1					
	CR207	007-6045-00	Dio FH1100		1					
	CR208	007-6045-00	Dio FH1100		1					
	CR209	007-6045-00	Dio FH1100		1					
	CR210	007-6045-00	Dio FH1100		1					
	CR214	007-5016-00	Dio 5.1V 5% 1W		1					
	CR215	007-6035-00	Dio 1N816		1					
	R261	015-0023-00	Res 4.7K 20% 2W		1					
	L201	019-2151-00	Coil VCO		1					
	L202	019-2082-70	Choke Mld 240μh 5%		1					
	L203	019-2054-16	Choke Dip 1.0μh 5%		1					
	L204	019-2054-16	Choke Dip 1.0μh 5%		1					
	L205	019-2054-13	Choke Dip .56μh 5%		1					
	L206	019-2084-40	Choke Mld 6.8μh 5%		1					

NAME	NAV SMO BD. SUB-ASS'Y			**ASS'Y. NO.**	200-0458-00
ASS'Y. DWG.	300-0659-00	**UNIT**	KX 170B/175B	**USED ON**	200-0457-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00
L207	019-2084-06	Choke Mld .27µh 5%		1
T201	019-2109-00	Ind Var 22mh		1
T202	019-3044-00	Tfmr RF Buffer		1
T203	019-3044-00	Tfmr RF Buffer		1
T204	019-5056-02	Tfmr Mixer Yel		1
T205	019-5056-02	Tfmr Mixer Yel		1
T206	019-5056-02	Tfmr Mixer Yel		1
T207	019-5056-02	Tfmr Mixer Yel		1
T208	019-2109-02	Ind Var 22mh		1
CJ201	026-0018-00	Circuit Jumper		1
Y201	044-0027-00	Xtal 53.93125MHz		1
Y202	044-0028-01	Xtal 400KHz		1
C201	114-5152-00	Cap DC 1500pf 10%		1
C202	096-1030-22	Cap Tant 22µf 10V		1
C203	114-5152-00	Cap DC 1500pf 10%		1
C204	118-0003-00	Cap DC 56pf 5%		1
C205	118-0003-00	Cap DC 56pf 5%		1
C206	113-5331-00	Cap DC 330pf 10%		1
C208	113-5681-00	Cap DC 680pf 10%		1
C210	096-1030-05	Cap Tant 10µf 15V		1
C211	114-7104-00	Cap DC .1µf 12V		1
C212	105-0031-09	Cap Myl .0022µf 80V		1
C213	113-7503-00	Cap DC .05µf 12V		1
C214	096-1030-22	Cap Tant 22µf 10V		1
C215	096-1030-22	Cap Tant 22µf 10V		1
C216	113-3150-00	Cap DC 15pf 5%		1
C217	113-5681-00	Cap DC 680pf 10%		1
C218	113-5681-00	Cap DC 680pf 10%		1
C219	113-5471-00	Cap DC 470pf 10%		1
C220	113-3100-00	Cap DC 10pf N150		1
C221	113-5681-00	Cap DC 680pf 10%		1
C222	113-5681-00	Cap DC 680pf 10%		1
C223	113-5471-00	Cap DC 470pf 10%		1
C224	113-5101-01	Cap DC 100pf 10%		1
C225	113-3330-00	Cap DC 33pf 5%		1
C226	114-5152-00	Cap DC 1500pf 10%		1
C227	114-5152-00	Cap DC 1500pf 10%		1
C228	114-5152-00	Cap DC 1500pf 10%		1
C229	114-5152-00	Cap DC 1500pf 10%		1
C230	113-3082-00	Cap DC 8.2pf N150		1

NAME NAV SMO BD. SUB-ASS'Y
ASS'Y. NO. 200-0458-00
ASS'Y. DWG. 300-0659-00
UNIT KX 170B/175B
USED ON 200-0457-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00					
C231	113-3100-00	Cap DC 10pf N150		1					
C232	113-3270-00	Cap DC 27pf N150		1					
C233	113-3100-00	Cap DC 10pf N150		1					
C234	114-5152-00	Cap DC 1500pf 10%		1					
C235	113-3470-00	Cap DC 47pf 5%		1					
C236	113-3820-00	Cap DC 82pf 5%		1					
C237	114-5152-00	Cap DC 1500pf 10%		1					
C238	114-5152-00	Cap DC 1500pf 10%		1					
C239	113-5151-01	Cap DC 150pf 10%		1					
C240	113-5151-01	Cap DC 150pf 10%		1					
C241	114-7104-00	Cap DC . 1µf 12V		1					
C242	113-5681-00	Cap DC 680pf 10%		1					
C243	114-7104-00	Cap DC . 1µf 12V		1					
C244	096-1030-22	Cap Tant 22µf 10V		1					
C245	114-7104-00	Cap DC .1µf 12V		1					
C246	096-1030-22	Cap Tant 22µf 10V		1					
C247	114-7104-00	Cap DC . 1µf 12V		1					
C248	096-1030-22	Cap Tant 22µf 10V		1					
C252	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C253	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C254	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C255	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C256	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C257	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C258	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C259	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C260	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C261	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C262	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C264	114-7104-00	Cap DC . 1µf 12V		1					
C265	096-1030-22	Cap Tant 22µf 10V		1					
C266	113-5681-00	Cap DC 680pf 10%		1					
C267	114-7104-00	Cap DC . 1µf 12V		1					
C268	113-5471-00	Cap DC 470pf 10%		1					
C270	106-0034-00	Cap FT 1. 5Kpf 20%		1					
C271	113-7503-00	Cap DC . 05µf 12V		1					
I201	120-0019-00	IC U6B902059X		1					
I202	120-0021-00	IC U6B930059X		1					
I203	120-0001-00	IC SN7400N		1					
I204	120-0004-00	IC SN7420N		1					
I206	120-0021-00	IC U6B930059X		1					
I210	120-0011-00	IC SN7493N		1					
I211	120-0001-00	IC SN7400N		1					

NAME NAV SMO BD. SUB-ASS'Y.
ASS'Y. NO. 200-0458-00
ASS'Y. DWG. 300-0659-00
UNIT KX 170B/175B
USED ON 200-0457-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00
	I212	120-0008-00	IC SN7474N		1
	R201	130-0101-25	Res FC 100 5% QW		1
	R202	130-0103-23	Res FC 10K 5% QW		1
	R203	130-0471-23	Res FC 470 5% QW		1
	R204	130-0362-23	Res FC 3. 6K 5% QW		1
	R205	130-0510-23	Res FC 51 5% QW		1
	R206	130-0473-25	Res FC 47K 10% QW		1
	R208	130-0151-23	Res FC 150 5% QW		1
	R209	130-0751-23	Res FC 750 5% QW		1
	R210	130-0112-23	Res FC 1. 1K 5% QW		1
	R214	130-0112-23	Res FC 1. 1K 5% QW		1
	R215	130-0152-25	Res FC 1. 5K 10% QW		1
	R216	130-0101-25	Res FC 100 10% QW		1
	R217	130-0392-23	Res FC 3. 9K 5% QW		1
	R218	130-0242-23	Res FC 2. 4K 5% QW		1
	R219	130-0271-23	Res FC 270 5% QW		1
	R220	130-0101-25	Res FC 100 10% QW		1
	R221	130-0392-23	Res FC 3. 9K 5% QW		1
	R222	130-0392-23	Res FC 3. 9K 5% QW		1
	R223	130-0271-23	Res FC 270 5% QW		1
	R224	130-0272-23	Res FC 2. 7K 5% QW		1
	R225	130-0221-23	Res FC 220 5% QW		1
	R226	130-0512-23	Res FC 5. 1K 5% QW		1
	R227	130-0101-23	Res FC 100 5% QW		1
R4	R228	130-0151-23	Res FC 150 5% QW		1
	R229	130-0470-25	Res FC 47 10% QW		1
R4	R230	130-0100-23	Res FC 10 5% QW		1
	R231	130-0470-23	Res FC 47 5% QW		1
	R232	130-0301-23	Res FC 300 5% QW		1
	R233	130-0101-25	Res FC 100 10% QW		1
	R234	130-0222-23	Res FC 2. 2K 5% QW		1
	R235	130-0911-23	Res FC 910 5% QW		1
	R236	130-0132-23	Res FC 1. 3K 5% QW		1
	R237	130-0302-23	Res FC 3K 5% QW		1
	R238	130-0331-23	Res FC 330 5% QW		1
	R239	130-0201-23	Res FC 200 5% QW		1
	R240	130-0241-23	Res FC 240 5% QW		1
	R241	130-0820-23	Res FC 82 5% QW		1
	R242	130-0471-23	Res FC 470 5% QW		1
	R243	130-0471-23	Res FC 470 5% QW		1
	R244	130-0472-23	Res FC 4. 7K 5% QW		1
	R245	130-0472-23	Res FC 4. 7K 5% QW		1
	R258	130-0102-25	Res FC 1K 5% QW		1

NAME NAV SMO BD. SUB-ASS'Y. **ASS'Y. NO.** 200-0458-00

ASS'Y. DWG. 300-0659-00 **UNIT** KX 170B/175B **USED ON** 200-0457-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00					
R259	132-0107-30	Res WW 12 5% 3 1/4W		1					
R260	130-0181-23	Res FC 180 5% QW		1					

Parts List Revisions Record

Assembly No. 200-0458-00 (B/MRL Rev 13) Manual Revision No. 4

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE	R230	130-0047-23	Res F/C 4.7Ω 5% QW	1
ADDED		091-0196-00	Spacer	2
CHANGE	R228	130-0101-23	Res F/C 100Ω 5% QW	1
ADDED	R262	130-0133-23	Res F/C 13K 5% QW	1
CHANGE	Q212	007-0113-00	Tstr 2N3646	1

NAME NAV SMO SUB-ASS'Y.
ASS'Y. NO. 200-0457-00
ASS'Y. DWG. 300-0658-00
UNIT KX 170B/175B
USED ON 069-1019-00
069-1020-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00
	016-1011-00	Pliobond		AR
	047-2230-02	Tray NAV SMO		1
	076-0165-09	Spacer		1
	076-0339-00	Spacer		1
	076-0343-00	Spacer		1
	089-5874-03	SCR 2-56 x 3/16 PHP		4
	089-5878-05	SCR 4-40 x 5/16 PHP.		2
	091-0088-01	Insulation NAV SMO		1
	200-0458-00	NAV SMO Sub-Ass'y.		1

Parts List Revisions Record

Assembly No. 200-0457-00 Manual Revision No. 0

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY

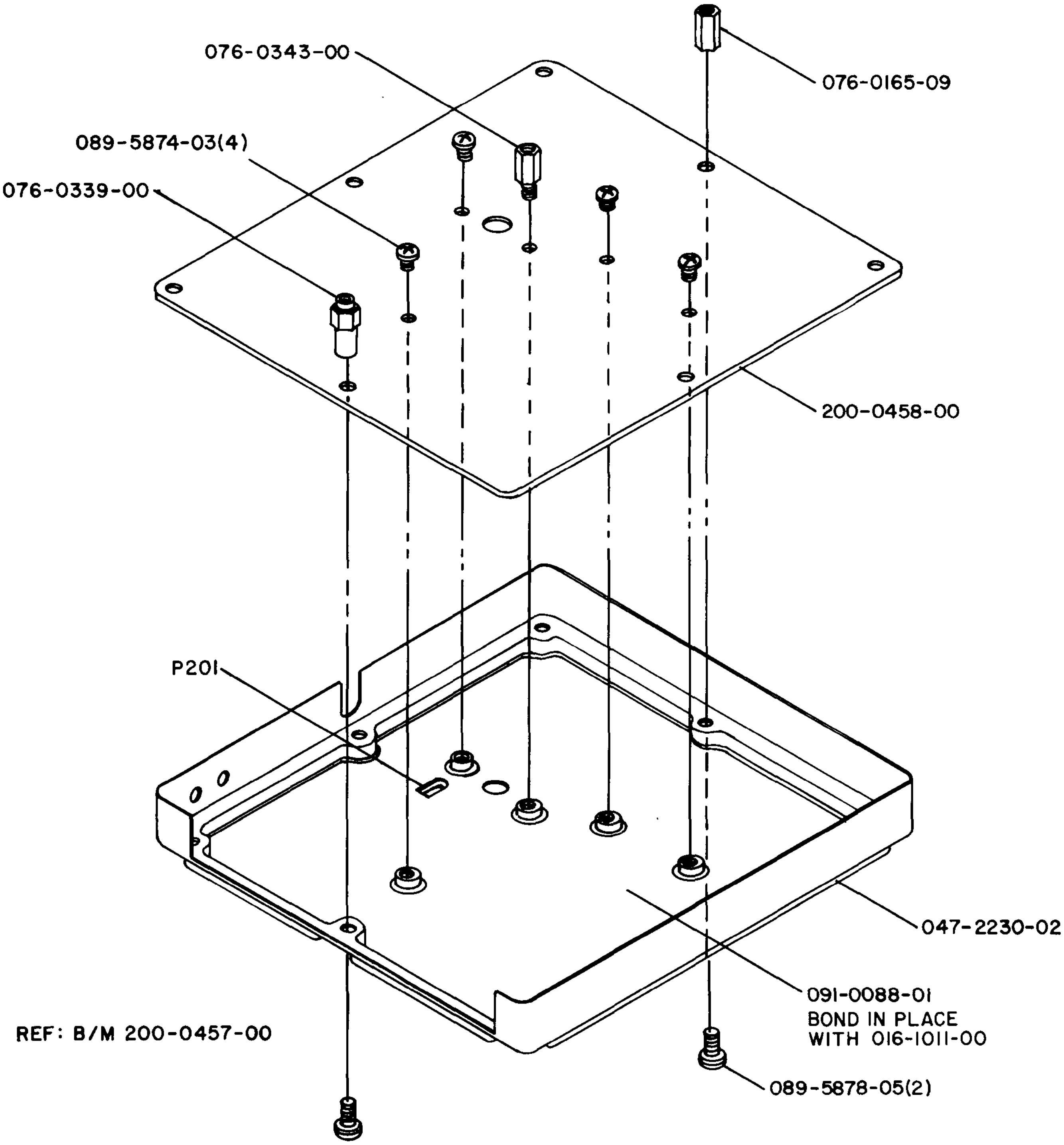


FIGURE 6-6 NAV SMO SUB-ASSEMBLY
(Dwg. No. 300-0658-00)

NAME	COMM SMO BD. SUB-ASS'Y	ASS'Y. NO.	200-0456-00/01
ASS'Y. DWG.	300-0657-00	UNIT	KX 170B/175B KY 195B
USED ON	200-0455-00/01		

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY	
				00	01
	200-0456-00	KX 175B/KY 195B		X	
	200-0456-01	KX 170B			X
	009-5250-01	Comm SMO Board		1	-
	009-5250-02	Comm SMO Board		-	1
	012-1038-00	Adh Disc .312Dia		1	1
	025-0018-91	Wire #26 Wht/Brn		1.5	1.5
	025-0018-98	Wire #26 Wht/Gry		1.5	1.5
	025-0018-99	Wire #26 Wht		2.0	2.0
	026-0001-00	Wire #26		2.0	2.0
	026-0013-00	Coax Cable RG178		2.2	2.2
	047-1853-01	Enclosure, VCO		1	1
	047-2627-01	Enclosure, Osc.		1	1
	088-0066-00	Spacer Crystal		2	2
	090-0104-04	Solder Ring		19	19
	150-0003-10	#24 Teflon Tubing		2.4	2.4
	150-0005-10	#20 Teflon Tubing		.1	.1
	150-0015-10	#12 Teflon Tubing		.21	.21
Q301	007-0195-00	Tstr MPS-H10		1	1
Q302	007-0238-00	Tstr FPN4917		1	1
Q303	007-0195-00	Tstr MPS-H10		1	1
Q304	007-0195-00	Tstr MPS-H10		1	1
Q305	007-0195-00	Tstr MPS-H10		1	1
Q306	007-0195-00	Tstr MPS-H10		1	1
Q307	007-0078-00	Tstr 2N3415		1	1
Q310	007-0195-00	Tstr MPS-H10		1	1
Q311	007-0238-00	Tstr FPN4917		1	1
Q312	007-0238-00	Tstr FPN4917		1	1
Q313	007-0195-00	Tstr MPS-H10		1	1
Q315	007-0078-00	Tstr 2N3415		1	-
Q316	007-0078-00	Tstr 2N3415		1	-
R4 Q317	007-0046-00	Tstr 2N3605		1	1
Q318	007-0078-00	Tstr 2N3415		1	1
CR301	007-6035-00	Dio 1N816		1	1
CR302	007-6035-00	Dio, 1N816		1	1
CR303	007-4012-00	Dio, Vctr SMV626		1	1
CR304	007-6033-00	Dio, 1N270		1	1
CR305	007-6045-00	Dio, FH1100		1	1
CR306	007-6045-00	Dio, FH1100		1	1
CR307	007-6045-00	Dio, FH1100		1	1
CR308	007-6045-00	Dio, FH1100		1	1
CR309	007-6045-00	Dio, FH1100		1	1
CR310	007-6045-00	Dio, FH1100		1	1
CR311	007-6045-00	Dio, FH1100		1	1

NAME	COMM SMO BD. SUB-ASS'Y	**ASS'Y. NO.**	200-0456-00/01
ASS'Y. DWG.	300-0657-00	**UNIT**	KX 170B/175B KY 195B
USED ON	200-0455-00/01		

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY	
				00	01
CR312	007-6045-00	Dio, FH1100		1	1
CR313	007-6059-00	Dio, FD400		1	1
CR314	007-6059-00	Dio, FD400		1	1
CR318	007-6033-00	Dio, 1N270		1	1
CR319	007-5016-00	Dio, 5.1V 5% 1W		1	1
CR320	007-6035-00	Dio, 1N816		1	1
CR321	007 6070-00	Dio, MPN3401		1	1
CR322	007-6070-00	Dio, MPN3401		1	1
R324	015-0023-00	Res 4.7K 20% 2W		1	1
L301	019-2099-01	Choke, Mld. .13μh 5%		1	1
L302	019-2082-70	Choke, Mld. 240μh 5%		1	1
L303	019-2054-12	Choke, Dip .47μh 5%		1	1
L304	019-2084-10	Choke, Mld. .39μh 5%		1	1
L305	019-2054-16	Choke, Dip 1.0μh 5%		1	1
L306	019-2084-49	Choke, Mld. 15μh 10%		1	1
L316	019-2054-06	Choke, Dip .15μh 5%		1	1
T301	019-3044-00	Tfmr, R. F. Buffer		1	1
T302	019-5056-02	Tfmr, Mixer (Yel)		1	1
T303	019-5056-02	Tfmr, Mixer (Yel)		1	1
T304	019-5056-01	Tfmr, Mixer (Blu)		1	1
T305	019-3044-00	Tfmr, R. F. Buffer		1	1
T306	019-5056-01	Tfmr, Mixer (Blu)		1	1
T307	019-2109-00	Ind, Var 22mh		1	1
T308	019-2109-00	Ind, Var 22mh		1	1
CJ301	026-0018-00	Circuit Jumper		1	1
CJ302	026-0018-00	Circuit Jumper		1	1
Y301	044-0050-01	Xtal, 71.0375MHz		1	1
Y302	044-0050-00	Xtal, 66.5375MHz		1	1
Y303	044-0028-01	Xtal, 400KHz		1	-
C301	106-0034-00	Cap F/T 1.5Kpf 10%		1	1
C302	106-0034-00	Cap F/T 1.5Kpf 10%		1	1
C303	106-0034-00	Cap F/T 1.5Kpf 10%		1	1
C304	113-5471-00	Cap, DC 470pf 10%		1	1
C305	113-3100-00	Cap, DC 10pf N150		1	1
C306	106-0034-00	Cap F/T 1.5Kpf 10%		1	1
C307	106-0034-00	Cap F/T 1.5Kpf 10%		1	1
C308	113-5471-00	Cap, DC 470pf 10%		1	1
C309	113-5471-00	Cap, DC 470pf 10%		1	1

NAME	COMM SMO BD. SUB-ASS'Y.	**ASS'Y. NO.**	200-0456-00/01
ASS'Y. DWG.	300-0657-00	**UNIT**	KX 170B/175B KY 195B
USED ON	200-0455-00/01		

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00	01				
	C310	113-5471-00	Cap, DC 470pf 10%		1	1				
	C311	113-5471-00	Cap, DC 470pf 10%		1	1				
	C312	113-5471-00	Cap, DC 470pf 10%		1	1				
	C314	102-0024-09	Cap, Var 7-35pf		1	1				
	C315	102-0029-00	Cap, Var 2-27pf		1	1				
	C316	096-1030-22	Cap, Tant 22µf 10V		1	1				
	C317	113-2370-00	Cap, DC 27pf N150		1	1				
	C318	113-5471-00	Cap, DC 470pf		1	1				
	C319	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C320	113-5471-00	Cap, DC 470pf		1	1				
	C321	113-5471-00	Cap, DC 470pf		1	1				
R4	C322	114-7104-00	Cap, DC 1Kpf 12V		1	1				
	C323	113-5471-00	Cap, DC 470pf		1	1				
	C324	113-5102-00	Cap, DC 1000pf		1	1				
	C325	113-3100-00	Cap, DC 10pf N150		1	1				
	C326	113-3082-00	Cap, DC 8.2pf N150		1	1				
	C327	113-5331-00	Cap, DC 330pf		1	1				
R4	C328	114-7104-00	Cap, DC 1Kpf 12V		1	1				
	C329	113-5471-00	Cap, DC 470pf		1	1				
	C330	113-3015-00	Cap, DC 1.5pf N150		1	1				
	C331	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C332	102-0009-37	Cap, Var 9-35pf N650		1	1				
	C333	113-5471-00	Cap, DC 470pf		1	1				
	C334	102-0009-37	Cap, Var 9-35pf N650		1	1				
	C335	113-3120-00	Cap, DC 12pf N150		1	1				
	C336	113-5471-00	Cap, DC 470pf		1	1				
	C337	113-5471-00	Cap, DC 470pf		1	1				
	C338	113-3270-00	Cap, DC 27pf N150		1	1				
	C339	113-5471-00	Cap, DC 470pf		1	1				
	C340	113-5471-00	Cap, DC 470pf		1	1				
	C341	113-6103-00	Cap, DC .01µf 50V		1	1				
	C342	113-5331-00	Cap, DC 330pf		1	1				
	C343	109-0008-00	Cap, Tub 3.0pf N330		1	1				
	C344	113-5471-00	Cap, DC 470pf		1	1				
	C345	113-7203-00	Cap, DC .02µf 12V		1	1				
	C346	118-0007-00	Cap, Cer 33pf N1500		1	1				
	C347	096-1030-05	Cap, Tant 10µf 20V 10%		1	1				
	C348	113-7503-00	Cap, DC .05µf 12V 20%		1	1				
	C349	105-0031-09	Cap, Myl .0022µf 80V		1	1				
R4	C350	114-7104-00	Cap, DC 1Kpf 12V		1	1				
R4	C351	114-7104-00	Cap, DC 1Kpf 12V		1	1				
	C352	096-1030-22	Cap, Tant 22µf 10V		1	1				
	C353	096-1030-22	Cap, Tant 22µf 10V		1	1				
	C354	113-3270-00	Cap, DC 27pf N150		1	1				

NAME COMM SMO BD. SUB-ASS'Y. **ASS'Y. NO.** 200-0456-00/01
ASS'Y. DWG. 300-0657-00 **UNIT** KX 170B/175B KY 195B **USED ON** 200-0455-00/01

KING RADIO CORP. PARTS LISTING

					QUANTITY					
	SYMBOL	PART NUMBER	DESCRIPTION	CODE	00	01				
	C355	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
R4	C356	114-7104-00	Cap, DC 1Kpf 12V		1	1				
	C357	114-5152-00	Cap, DC 1500pf		1	1				
	C358	114-5152-00	Cap, DC 1500pf		1	1				
	C359	114-5152-00	Cap, DC 1500pf		1	1				
	C360	113-3120-00	Cap, DC 12pf N150		1	1				
	C361	113-5331-00	Cap, DC 330pf		1	1				
	C362	113-3056-00	Cap, DC 5.6pf N150		1	1				
	C363	113-5151-01	Cap, DC 150pf		1	1				
	C364	113-3068-00	Cap, 6.8pf N150 500V		1	1				
	C365	113-3033-00	Cap, DC 3.3µf 500V		1	1				
	C366	113-5560-00	Cap, DC 56pf 10%		1	1				
	C367	114-5152-00	Cap, DC 1500pf		1	1				
	C368	114-5152-00	Cap, DC 1500pf		1	1				
R4	C369	114-7104-00	Cap, DC 1Kpf 12V		1	1				
	C370	113-7503-00	Cap, DC .05µf 20% 12V		1	1				
	C371	113-7503-00	Cap, DC .05µf 20% 12V		1	1				
	C372	106-0013-00	Cap, F/T 3Kpf		1	1				
	C373	106-0013-00	Cap, F/T 3Kpf		1	1				
	C374	106-0013-00	Cap, F/T 3Kpf		1	1				
	C375	113-5151-01	Cap, DC 150pf		1	1				
	C376	113-5151-01	Cap, DC 150pf		1	1				
R4	C377	114-7104-00	Cap, DC 1Kpf 12V		1	1				
R4	C378	114-7104-00	Cap, DC 1Kpf 12V		1	1				
	C379	096-1030-22	Cap, Tant 22µf 10V		1	1				
	C380	113-5681-00	Cap, DC 680pf		1	1				
R4	C381	114-7104-00	Cap, DC 1Kpf 12V		1	1				
	C385	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C386	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C387	109-0008-01	Cap, Tub 4.3pf N3300		1	1				
	C388	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C389	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C390	105-0031-26	Cap, Myl. .0068µf 80V		1	1				
	C391	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C392	113-7503-00	Cap, DC .05µf 12V		1	1				
	C393	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C395	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C399	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C551	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C553	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
	C555	106-0034-00	Cap, F/T 1.5Kpf 10%		1	1				
R4	C562	114-7104-00	Cap, DC 1Kpf 12V		1	1				
	C563	096-1030-22	Cap, Tant 22µf 10V		1	1				
	C564	096-1030-11	Cap, Tant 4.7µf 20V		1	1				

NAME COMM SMO BD. SUB-ASS'Y.
ASS'Y. NO. 200-0456-00/01
ASS'Y. DWG. 300-0657-00
UNIT KX 170B/175B KY 195B
USED ON 200-0455-00/01

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
					00	01				
	C566	096-1030-22	Cap, Tant 22µf 10V		1	-				
R4	C567	114-7104-00	Cap, DC 1Kpf 12V		1	1				
R4	C568	114-7104-00	Cap, DC 1Kpf 12V		1	-				
R4	C569	114-7104-00	Cap, DC 1Kpf 12V		1	-				
	I301	120-0019-00	IC U6B902059X		1	1				
	I302	120-0021-00	IC U6B930059X		1	1				
	I303	120-0001-00	IC SN7400N		1	1				
	I304	120-0004-00	IC SN7420N		1	1				
	I306	120-0021-00	IC U6B930059X		1	1				
	I309	120-0008-00	IC SN7474N		1	1				
	I310	120-0011-00	IC SN7493N		1	1				
	I311	120-0001-00	IC SN7400N		1	1				
	I312	120-0008-00	IC SN7474N		1	1				
	R301	130-0472-23	Res FC 4. 7K 5% QW		1	1				
	R302	130-0222-25	Res FC 2. 2K 10% QW		1	1				
	R303	130-0562-25	Res FC 5. 6K 10% QW		1	1				
	R304	130-0101-25	Res FC 100 10% QW		1	1				
	R305	130-0222-25	Res FC 2. 2K 10% QW		1	1				
	R306	130-0101-25	Res FC 100 10% QW		1	1				
	R307	130-0471-23	Res FC 470 5% QW		1	1				
	R308	130-0103-23	Res FC 10K 5% QW		1	1				
	R309	130-0510-23	Res FC 51 5% QW		1	1				
	R310	130-0182-23	Res FC 1. 8K 5% QW		1	1				
	R311	130-0271-23	Res FC 270 5% QW		1	1				
	R312	130-0101-25	Res FC 100 10% QW		1	1				
	R313	130-0101-25	Res FC 100 10% QW		1	1				
	R314	130-0392-23	Res FC 3. 9K 5% QW		1	1				
	R315	130-0472-23	Res FC 4. 7K 5% QW		1	1				
	R316	130-0271-23	Res FC 270 5% QW		1	1				
	R317	130-0472-25	Res FC 4. 7K 10% QW		1	1				
	R318	130-0471-25	Res FC 470 10% QW		1	1				
	R319	130-0221-25	Res FC 220 10% QW		1	1				
	R320	130-0392-23	Res FC 3. 9K 5% QW		1	1				
	R321	130-0911-23	Res FC 910 5% QW		1	1				
	R322	130-0271-23	Res FC 270 5% QW		1	1				
	R323	130-0152-25	Res FC 1. 5K 10% QW		1	1				
	R325	130-0152-23	Res FC 1. 5K 5% QW		1	1				
	R326	130-0751-23	Res FC 750 5% QW		1	1				
	R327	130-0151-23	Res FC 150 5% QW		1	1				
	R328	130-0911-23	Res FC 910 5% QW		1	1				
	R333	130-0152-25	Res FC 1. 5K 10% QW		1	1				
	R334	130-0101-25	Res FC 100 10% QW		1	1				

NAME COMM SMO BD. SUB-ASS'Y. **ASS'Y. NO.** 200-0456-00/01

ASS'Y. DWG. 300-0657-00 **UNIT** KX 170B/175B KY 195B **USED ON** 200-0455-00/01

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
					00	01				
	R335	130-0392-23	Res FC 3.9K 5% QW		1	1				
	R336	130-0332-23	Res FC 3.3K 5% QW		1	1				
	R337	130-0271-23	Res FC 270 5% QW		1	1				
	R338	130-0101-23	Res FC 100 5% QW		1	1				
	R339	130-0151-23	Res FC 150 5% QW		1	1				
	R340	130-0472-25	Res FC 4.7K 10% QW		1	1				
	R341	130-0472-25	Res FC 4.7K 10% QW		1	1				
	R342	130-0301-23	Res FC 300 5% QW		1	1				
	R343	130-0432-23	Res FC 4.3K 5% QW		1	1				
	R344	130-0101-25	Res FC 100 10% QW		1	1				
	R345	130-0182-23	Res FC 1.8K 5% QW		1	1				
	R346	130-0562-25	Res FC 5.6K 10% QW		1	1				
	R347	130-0562-25	Res FC 5.6K 10% QW		1	1				
	R348	130-0182-23	Res FC 1.8K 5% QW		1	1				
	R349	130-0132-23	Res FC 1.3K 5% QW		1	1				
R4	R350	130-0820-23	Res FC 82 5% QW		1	1				
	R352	130-0302-23	Res FC 3.0K 5% QW		1	1				
	R353	130-0201-23	Res FC 200 5% QW		1	1				
	R354	130-0331-23	Res FC 330 5% QW		1	1				
	R368	130-0392-23	Res FC 3.9K 5% QW		1	1				
	R369	130-0272-23	Res FC 2.7K 5% QW		1	1				
	R370	130-0472-23	Res FC 4.7K 5% QW		1	-				
	R371	130-0471-23	Res FC 470 5% QW		1	-				
	R372	130-0472-23	Res FC 4.7K 5% QW		1	-				
	R373	130-0471-23	Res FC 470 5% QW		1	-				
	R374	132-0107-30	Res WW 12 5% 3 1/4W		1	1				
	R375	130-0472-25	Res FC 4.7K 10% QW		1	1				
	R376	130-0222-25	Res FC 2.2K 10% QW		1	1				
	R377	130-0222-25	Res FC 2.2K 10% QW		1	1				

Parts List Revisions Record

Assembly No. 200-0456-00/01 (B/MRL Rev. 12) Manual Revision No. 4

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY	
ADDED		091-0196-00	Spacer	2	2
ADDED		091-0109-00	Plastic Ties	12	12
CHANGE	Q317	007-0113-00	Tstr 2N3646	1	1
CHANGE	R350	130-0101-23	Res F/C 100Ω 5% QW	1	1
CHANGE	C322	114-7104-00	Cap Cer .1mf ±20% X7R	1	1
CHANGE	C328	114-7104-00	Cap Cer .1mf ±20% X7R	1	1
CHANGE	C350	114-7104-00	Cap Cer .1mf ±20% X7R	1	1
CHANGE	C351	114-7104-00	Cap Cer .1mf ±20% X7R	1	1
CHANGE	C356	114-7104-00	Cap Cer .1mf ±20% X7R	1	1
CHANGE	C369	114-7104-00	Cap Cer .1mf ±20% X7R	1	1
CHANGE	C377	114-7104-00	Cap Cer .1mf ±20% X7R	1	1
CHANGE	C378	114-7104-00	Cap Cer .1mf ±20% X7R	1	1
CHANGE	C381	114-7104-00	Cap Cer .1mf±20% X7R	1	1
CHANGE	C562	114-7104-00	Cap Cer .1mf ±20% X7R	1	1
CHANGE	C567	114-7104-00	Cap Cer .1mf ±20% X7R	1	1
CHANGE	C568	114-7104-00	Cap Cer .1mf ±20% X7R	1	-
CHANGE	C569	114-7104-00	Cap Cer .1mf ±20% X7R	1	-

NAME	COMM SMO SUB-ASS'Y		**ASS'Y. NO.**	200-0455-00/01	
ASS'Y. DWG.	300-0656-00	**UNIT**	KX 170B/175B KY 195	**USED ON**	069-1019/1020/ 1021-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00	01				
	200-0455-00	KX 175B/KY 195B		X					
	200-0455-01	KX 170B			X				
	016-1011-00	Pliobond		AR	AR				
	047-1736-02	Tray Comm SMO		1	1				
	076-0165-09	Spacer		1	1				
	076-0343-00	Spacer		1	1				
	089-5874-03	Scr 2-56 x 3/16 PHP		6	6				
	089-5878-05	Scr 4-40 x 5/16 PHP		1	1				
	091-0087-00	Insulation Comm SMO		1	1				
	200-0456-00	Comm SMO Sub-Ass'y		1	-				
	200-0456-01	Comm SMO Sub-Ass'y		-	1				

Parts List Revisions Record

Assembly No. 200-0455-00/01

Manual Revision No. 0

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY

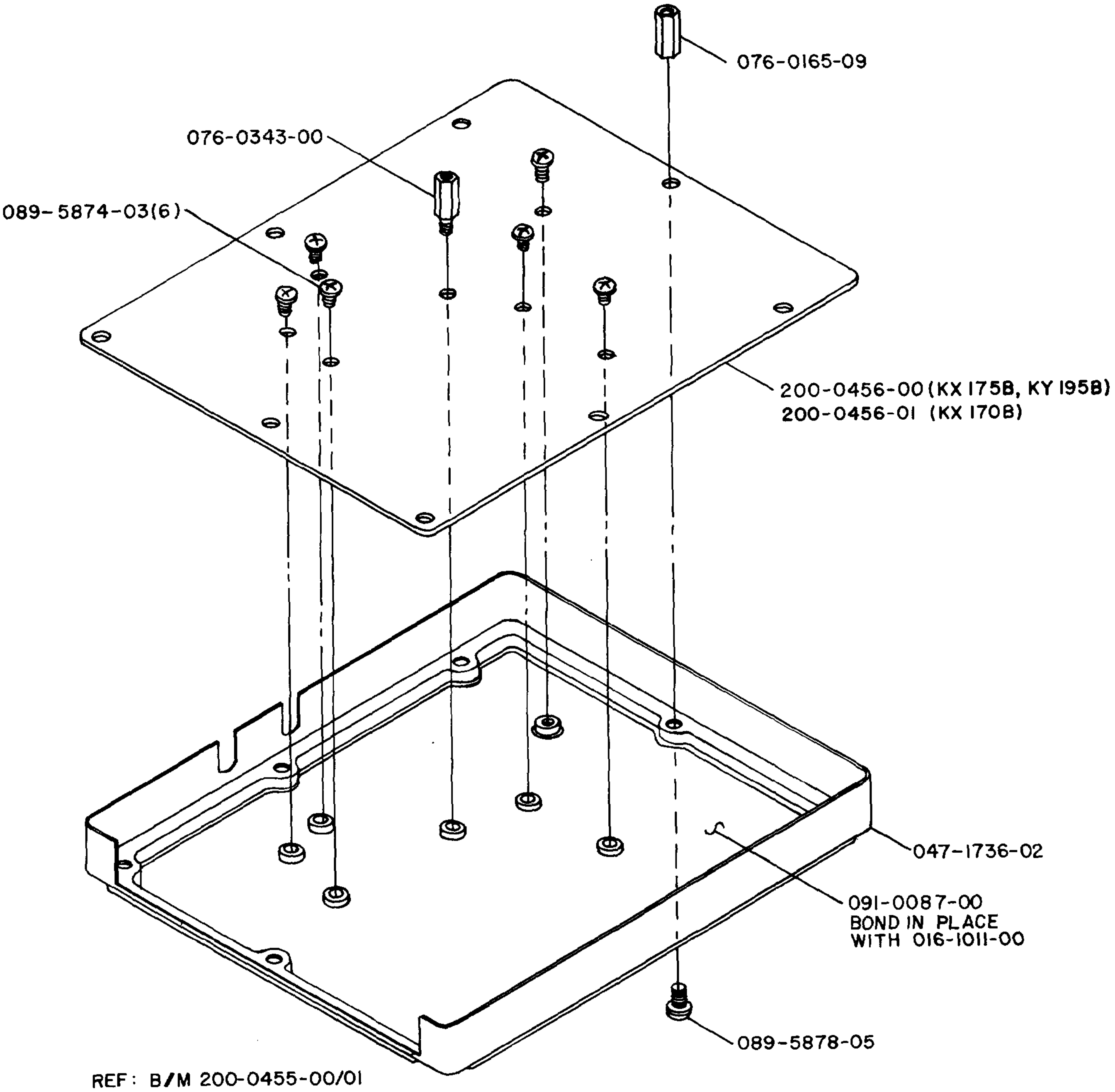


FIGURE 6-7 COMM SMO SUB-ASSEMBLY
(Dwg. No. 300-0656-00)

NAME NAV/COMM BD. SUB-ASS'Y

ASS'Y. NO. 200-0452-00/05

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04	-05
		200-0452-00	KX 175B		X					
		200-0452-01	KX 170B			X				
		200-0452-02	KY 195B				X			
		200-0452-03	KX 170BE					X		
		200-0452-04	KX 175BE						X	
		200-0452-05	KY 195BE							X
		009-5251-00	Nav/Comm Bd		1	1	1	1	1	1
		025-0018-39	Wire #26 (Orn/Wht)		.4	.4	.4	.4	.4	.4
		026-0003-00	Wire #22		.5	.5	.5	.5	.5	.5
		026-0013-00	Coax Cable RG178		3.3	3.3	3.3	3.3	3.3	3.3
		047-2640-01	Encl Comm Presel		1	1	1	1	1	1
		047-2641-01	Encl Nav Presel		1	1	-	1	1	-
		047-2642-01	Cover Nav Presel		1	1	-	1	1	-
		047-2643-01	Cover Comm Presel		1	1	1	1	1	1
R4		088-0066-01	Spacer Xtal		5	2	3	2	5	3
		089-6293-04	Scr #3-48 x 1/4		4	4	2	4	4	2
		150-0005-10	Tubing Tef #20		.2	.2	.2	.2	.2	.2
	Q401	007-0220-00	Tstr MPS 65684		1	1	-	1	1	-
	Q403	007-0196-02	Tstr SPS 6800		1	1	-	1	1	-
	Q404	007-0238-00	Tstr FPN 4917		1	1	-	1	1	-
	Q405	007-0078-00	Tstr 2N3415		1	1	-	1	1	-
	Q406	007-0078-00	Tstr 2N3415		1	1	-	1	1	-
	Q407	007-0238-00	Tstr FPN 4917		1	1	-	1	1	-
	Q408	007-0195-00	Tstr MPSH 10		1	1	-	1	1	-
R4	Q409	007-0195-00	Tstr MPSH 10		1	1	1	1	1	1
	Q410	007-0078-00	Tstr 2N3415		1	1	1	1	1	1
	Q411	007-0220-00	Tstr MPS 6568A		1	1	1	1	1	1
	Q413	007-0196-02	Tstr SPS 6800		1	1	1	1	1	1
	Q414	007-0238-00	Tstr FPN 4917		1	1	1	1	1	1
	Q415	007-0078-00	Tstr 2N3415		1	1	1	1	1	1
	Q416	007-0238-00	Tstr FPN 4917		1	1	1	1	1	1
	Q417	007-0078-00	Tstr 2N3415		1	1	1	1	1	1
	Q418	007-0078-00	Tstr 2N3415		1	1	1	1	1	1
	Q419	007-0078-00	Tstr 2N3415		1	1	1	1	1	1
	Q420	007-0078-00	Tstr 2N3415		1	1	1	1	1	1
	CR401	007-4012-00	Vctr SMV 626		1	1	-	1	1	-
	CR402	007-4012-00	Vctr SMV 626		1	1	-	1	1	-
	CR403	007-4012-00	Vctr SMV 626		1	1	-	1	1	-
	CR404	007-6067-00	Dio MBD101		1	1	-	1	1	-
	CR405	007-6067-00	Dio MBD101		1	1	-	1	1	-
	CR406	007-6067-00	Dio MBD101		1	1	-	1	1	-
	CR407	007-6067-00	Dio MBD101		1	1	-	1	1	-
	CR408	007-5011-05	Dio Zen 3.3V 1W		1	1	-	1	1	-
	CR409	007-6035-00	Dio 1N816		1	1	-	1	1	-

NAME	NAV/COMM BD. SUB-ASS'Y.	**ASS'Y. NO.**	200-0452-00/05
ASS'Y. DWG.	300-0652-00 300-0653-00	**UNIT**	KX 170B/175B KY 195B
USED ON	069-1019/1020/1021-00		

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
					00	01	02	03	04	05
R4	CR410	007-6035-00	Dio 1N816		1	1	-	1	1	-
	CR411	007-6029-00	Dio 1N457		1	1	-	1	1	-
	CR412	007-6029-00	Dio 1N457		1	1	-	1	1	-
	CR413	007-5011-13	Dio Zen 5. 6V 1W		1	1	-	1	1	-
	CR414	007-5011-14	Dio Zen 6. 8V 1W		1	1	-	1	1	-
	CR416	007-4012-00	Vctr SMV626		1	1	1	1	1	1
	CR417	007-4012-00	Vctr SMV626		1	1	1	1	1	1
	CR418	007-4012-00	Vctr SMV626		1	1	1	1	1	1
	CR419	007-4012-00	Vctr SMV626		1	1	1	1	1	1
	CR420	007-6067-00	Dio MBD101		1	1	1	1	1	1
	CR421	007-6067-00	Dio MBD101		1	1	1	1	1	1
	CR422	007-6067-00	Dio MBD101		1	1	1	1	1	1
	CR423	007-6067-00	Dio MBD101		1	1	1	1	1	1
	CR424	007-5011-12	Dio Zen 4. 3V 1W		1	1	1	1	1	1
	CR425	007-6035-00	Dio 1N816		1	1	1	1	1	1
R4	CR426	007-6035-00	Dio 1N816		1	1	1	1	1	1
	CR427	007-6029-00	Dio 1N457		1	1	1	1	1	1
	CR428	007-6059-00	Dio FD400		1	1	1	1	1	1
	CR429	007-6016-00	Dio 1N4154		1	1	1	1	1	1
	CR431	007-6029-00	Dio 1N457		1	1	1	1	1	1
	CR432	007-5011-13	Dio Zen 5. 6V 1W		1	1	1	1	1	1
	FL401	017-0035-00	Fil 15. 1875MHz MP		1	-	-	-	1	-
	FL402	017-0035-00	Fil 15. 1875MHz MP		Ref	-	-	-	-	-
	FL403	017-0042-00	Fil 9. 0MHz		-	1	-	-	-	-
	FL404	017-0037-00	Fil 15. 1875MHz MP		-	1	-	1	-	-
	FL405	017-0041-00	Fil 9. 000MHz MS		1	-	1	-	-	-
	FL406	017-0041-00	Fil 9. 000MHz MS		Ref	-	Ref	-	-	-
	FL407	017-0041-00	Fil 9. 000MHz MS		Ref	-	Ref	-	-	-
	L401	019-2167-00	Coil RF Nav Orn		1	1	-	1	1	-
	L402	019-2057-18	Choke Dip 3. 3μh 5%		1	1	-	1	1	-
	L403	019-2167-01	Coil RF Nav Vio		1	1	-	1	1	-
	L404	019-2054-20	Choke Dip 2. 2μh 5%		1	1	-	1	1	-
	L405	019-2167-02	Coil RF Nav Gry		1	1	-	1	1	-
R4	L406	019-2109-00	Ind Var 22mh		1	1	-	1	1	-
	L407	019-2150-02	Coil RF Comm Yel		1	1	1	1	1	1
	L408	019-2057-15	Choke Dip 1. 8μh 5%		1	1	1	1	1	1
	L409	019-2150-03	Coil RF Comm Grn		1	1	1	1	1	1
	L410	019-2054-19	Choke Dip 1. 8μh 5%		1	1	1	1	1	1
	L411	019-2150-04	Coil RF Comm Blu		1	1	1	1	1	1
	L412	019-2057-18	Choke Dip 3. 3μh 5%		1	1	1	1	1	1
	L413	019-2150-05	Coil RF Comm Clear		1	1	1	1	1	1
	L414	019-2109-00	Ind Var 22mh		1	1	1	1	1	1

NAME	NAV/COMM BD. SUB-ASS'Y.	**ASS'Y. NO.**	200-0452-00/05
ASS'Y. DWG.	300-0652-00 300-0653-00	**UNIT**	KX 170B/175B KY 195B
		USED ON	069-1019/1020/ 1021-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00	01	02	03	04	05
	L415	019-2082-70	Choke Mld 240μh 5%		1	1	1	1	1	1
	L416	019-2109-00	Ind Var 22mh		1	1	1	1	1	1
R4	T401	019-5056-03	Xfmr Nav Mixer		1	1	1	1	1	-
R4	T402	019-5056-05	Xfmr Mixer		1	1	-	1	1	-
	T403	019-8044-01	Xfmr IF 15. 1875MHz (Orn)		1	1	-	1	1	-
	T404	019-8044-01	Xfmr IF 15. 1875MHz (Orn)		1	1	-	1	1	-
	T405	019-8034-03	Xfmr IF 1. 1857MHz (Blu)		1	1	-	1	1	-
	T406	019-8034-04	Xfmr IF 1. 1857MHz (Red)		1	1	-	1	1	-
	T407	019-8034-01	Xfmr IF 1. 1857MHz (Wht)		1	1	-	1	1	-
	T408	019-8034-01	Xfmr IF 1. 1857MHz (Wht)		1	1	-	1	1	-
	T409	019-8034-01	Xfmr IF 1. 1857MHz (Wht)		1	1	-	1	1	-
	T410	019-8034-01	Xfmr IF 1. 1857MHz (Wht)		1	1	-	1	1	-
	T411	019-5055-00	Xfmr Nav Audio		1	1	-	1	1	-
R4	T412	019-5056-05	Xfmr Mixer		1	1	1	1	1	1
R4	T413	019-5056-04	Xfmr Mixer		1	1	1	1	1	1
	T414	019-8043-01	Xfmr IF 90MHz (Yel)		1	1	1	1	1	1
	T415	019-8043-00	Xfmr IF 90MHz (Blu)		1	1	1	1	1	1
	T416	019-8046-00	Xfmr IF 861. 25KHz (Yel)		1	1	1	1	1	1
	T417	019-8046-01	Xfmr IF 861. 25KHz (Vio)		1	1	1	1	1	1
	T418	019-8046-02	Xfmr IF 861. 25KHz (Orn)		1	1	1	1	1	1
	T419	019-8046-02	Xfmr IF 861. 25KHz (Orn)		1	1	1	1	1	1
	T420	019-8046-03	Xfmr IF 861. 25KHz (Brn)		1	1	1	1	1	1
	T421	019-8046-03	Xfmr IF 861. 25KHz (Brn)		1	1	1	1	1	1
	CJ401	026-0018-00	Circuit Jumper		1	1	-	1	1	-
	Y401	044-0029-01	Xtal 14. 0018MHz		1	1	-	1	1	-
	Y402	044-0029-00	Xtal 8. 13875MHz		1	1	1	1	1	1
	C401	113-3100-00	Cap DC 10pf N150		1	1	-	1	1	-
	C402	114-3560-00	Cap DC 56pf N150		1	1	-	1	1	-
	C404	113-5151-01	Cap DC 150pf X5F		1	1	-	1	1	-
	C405	114-7104-00	Cap DC . 1μf 12V		1	1	-	1	1	-
	C406	114-3560-00	Cap DC 56pf N150		1	1	-	1	1	-
	C407	113-3082-00	Cap DC 8. 2μf N150		1	1	-	1	1	-
	C408	113-3200-00	Cap DC 20pf N150		1	1	-	1	1	-
	C410	113-5391-00	Cap DC 390pf X5F		1	1	-	1	1	-
	C411	113-5101-01	Cap DC 100pf X5F		1	1	-	1	1	-
	C412	113-5471-00	Cap DC 470pf X5F		1	1	-	1	1	-
	C413	114-3560-00	Cap DC 56pf N150		1	1	-	1	1	-
	C414	113-3082-00	Cap DC 8. 2pf N150		1	1	-	1	1	-
	C415	113-3220-00	Cap DC 22pf N150		1	1	-	1	1	-
	C417	113-5101-01	Cap DC 100pf X5F		1	1	-	1	1	-

NAME	NAV/ COMM BD. SUB-ASS'Y.	**ASS'Y. NO.**	200-0452-00/ 05		
ASS'Y. DWG.	300-0652-00 300-0653-00	**UNIT**	KX 170B/175B KY 195B	**USED ON**	069-1019/1020/ 1021-00

	KING RADIO CORP. PARTS LISTING			CODE	QUANTITY					
	SYMBOL	PART NUMBER	DESCRIPTION		00	01	02	03	04	05
	C418	106-0001-18	Cap Mld . 82pf 5%		1	1	-	1	1	-
	C419	106-0001-34	Cap Mld 6. 8pf 5%		1	1	-	1	1	-
	C420	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
	C421	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
	C422	113-7203-00	Cap DC . 02µf 12V		1	1	-	1	1	-
	C424	106-0001-34	Cap Mld 6. 8pf 5%		1	1	-	1	1	-
	C425	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
	C426	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
	C428	106-0001-34	Cap Mld 6. 8pf 5%		1	1	-	1	1	-
	C429	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
	C435	096-1030-24	Cap Tant 68µf 10V		1	1	-	1	1	-
	C436	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
	C437	105-0031-08	Cap Myl. . 0022µf 80V		1	1	-	1	1	-
	C438	113-7503-00	Cap DC . 05µf 12V		1	1	-	1	1	-
	C439	097-0062-02	Cap Elec . 22µf 25V		1	1	-	1	1	-
	C440	097-0062-06	Cap Elec 1µf 25V		1	1	-	1	1	-
	C441	096-1030-25	Cap Tant 150µf 10V		1	1	-	1	1	-
	C442	096-1030-25	Cap Tant 150µf 10V		1	1	-	1	1	-
	C443	096-1030-08	Cap Tant 100µf 15V		1	1	-	1	1	-
	C444	113-7503-00	Cap DC . 05µf 12V		1	1	-	1	1	-
	C446	113-7503-00	Cap DC . 05µf 12V		1	1	-	1	1	-
	C447	113-5181-00	Cap DC 180pf X5F		1	1	-	1	1	-
	C448	113-3330-00	Cap DC 33pf N150		1	1	-	1	1	-
	C449	113-7503-00	Cap DC . 05µf 12V		1	1	-	1	1	-
	C450	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
	C451	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
	C452	096-1030-24	Cap Tant 68µf 10V		1	1	-	1	1	-
	C453	096-1030-17	Cap Tant 6. 8µf 15V		1	1	-	1	1	-
R4	C454	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
R4	C455	105-0031-47	Cap Myl . 027µf 80V		1	1	-	1	1	-
	C456	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
	C457	096-1030-03	Cap Tant 2. 2µf 15V		1	1	-	1	1	-
	C458	113-7503-00	Cap DC . 05µf 12V		1	1	-	1	1	-
	C459	114-7104-00	Cap DC . 1µf 12V		1	1	-	1	1	-
	C460	113-5331-00	Cap DC 330pf X5F		1	1	1	1	1	1
	C461	114-7104-00	Cap DC . 1µf 12V		1	1	1	1	1	1
	C462	114-7104-00	Cap DC . 1µf 12V		1	1	1	1	1	1
	C463	113-3270 -00	Cap DC 27pf N150		1	1	1	1	1	1
	C464	096-1030-17	Cap Tant 6. 8µf 15V		1	1	1	1	1	1
	C465	097-0062-06	Cap Elec 1µf 25V		1	1	1	1	1	1
	C466	097-0062-06	Cap Elec 1µf 25V		1	1	1	1	1	1
	C467	113-3039-00	Cap DC 3. 9pf N150		1	1	1	1	1	1
	C468	113-3820-00	Cap DC 82pf X5F		1	1	1	1	1	1
	C469	113-3047-00	Cap DC 4.7pf N150		1	1	1	1	1	1

NAME	NAV/COMM BD. SUB-ASS'Y.	**ASS'Y. NO.**	200-0452-00/05
ASS'Y. DWG.	300-0652-00 300-0653-00	**UNIT**	KX 170B/175B KY 195B
USED ON	069-1019/1020/1021-00		

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00	01	02	03	04	05
C470	113-5151-01	Cap DC 150pf X5F		1	1	1	1	1	1
C472	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C473	113-5151-01	Cap DC 150pf X5F		1	1	1	1	1	1
C474	113-5022-00	Cap DC 2.2pf N150		1	1	1	1	1	1
C475	113-3390-00	Cap DC 39pf N150		1	1	1	1	1	1
C476	113-5471-00	Cap DC 470pf X5F		1	1	1	1	1	1
C477	113-5471-00	Cap DC 470pf X5F		1	1	1	1	1	1
C478	113-5151-01	Cap DC 150pf X5F		1	1	1	1	1	1
C479	113-5151-01	Cap DC 150pf X5F		1	1	1	1	1	1
C480	113-5151-01	Cap DC 150pf X5F		1	1	1	1	1	1
C481	113-3015-00	Cap DC 1.5pf N150		1	1	1	1	1	1
C482	113-3270-00	Cap DC 27pf N150		1	1	1	-	1	1
C483	113-3820-00	Cap DC 82pf X5F		1	1	1	-	1	1
C484	106-0001-36	Cap Mld 5.6pf 5%		1	1	1	1	1	1
C485	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C486	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C487	106-0001-37	Cap Mld 6.2pf 5%		1	1	1	1	1	1
C488	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C489	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C490	113-7203-00	Cap DC .02μf 12V		1	1	1	1	1	1
C491	106-0001-36	Cap Mld 5.6pf 5%		1	1	1	1	1	1
C492	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C493	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C494	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C495	096-1030-27	Cap Tant 15μf 15V		1	1	1	1	1	1
C496	105-0031-32	Cap Myl .01μf 80V		1	1	1	1	1	1
C497	096-1030-27	Cap Tant 15μf 15V		1	1	1	1	1	1
C498	097-0062-06	Cap Elec 1μf 25V		1	1	1	1	1	1
C499	097-0062-06	Cap Elec 1μf 25V		1	1	1	1	1	1
C501	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C502	105-0031-35	Cap Myl .012μf 80V		1	1	1	1	1	1
C503	105-0031-32	Cap Myl .01μf 80V		1	1	1	1	1	1
C504	113-3820-00	Cap DC 82pf X5F		1	1	1	1	1	1
C505	096-1030-21	Cap Tant 12μf 10V		1	1	1	1	1	1
C506	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C507	113-7203-00	Cap DC .02μf 12V		1	1	1	1	1	1
C508	096-1030-27	Cap Tant 15μf 15V		1	1	1	1	1	1
C509	097-0062-06	Cap Elec 1μf 25V		1	1	1	1	1	1
C510	113-7203-00	Cap DC .02μf 12V		1	1	1	1	1	1
C511	097-0062-06	Cap Elec 1μf 25V		1	1	1	1	1	1
C512	096-1030-21	Cap Tant 12μf 10V		1	1	1	1	1	1
C513	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1
C514	105-0031-63	Cap Myl .068μf 80V		1	1	1	1	1	1
C515	114-7104-00	Cap DC .1μf 12V		1	1	1	1	1	1

NAME	NAV/COMM BD. SUB-ASS'Y.	**ASS'Y. NO.**	200-0452-00/05
ASS'Y. DWG.	300-0652-00 300-0653-00	**UNIT**	KX 170B/175B KY 195B
USED ON	069-1019/1020/ 1021-00		

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00	01	02	03	04	05
	C516	106-0001-15	Cap Mld . 56pf 10%		1	-	1	-	-	-
	C517	106-0001-15	Cap Mld . 56pf 10%		1	-	1	-	-	-
	I401	120-3007-00	IC U8B7703394		1	1	-	1	1	-
	I402	120-3007-00	IC U8B7703394		1	1	-	1	1	-
	I403	120-3006-00	IC CA3020		1	1	-	1	1	-
	I404	120-3007-00	IC U8B7703394		1	1	1	1	1	1
	I405	120-3007-00	IC U8B7703394		1	1	1	1	1	1
	R401	130-0103-25	Res FC 10K 10% QW		1	1	-	1	1	-
	R402	130-0103-25	Res FC 10K 10% QW		1	1	-	1	1	-
	R403	130-0102-23	Res FC 1K 5% QW		1	1	-	1	1	-
	R404	130-0622-23	Res FC 6. 2K 5% QW		1	1	-	1	1	-
	R405	130-0621-23	Res FC 620 5% QW		1	1	-	1	1	-
	R406	130-0101-25	Res FC 100 10% QW		1	1	-	1	1	-
	R407	130-0103-25	Res FC 10K 10% QW		1	1	-	1	1	-
	R408	130-0473-23	Res FC 47K 5% QW		1	1	-	1	1	-
	R409	130-0683-23	Res FC 68K 5% QW		1	1	-	1	1	-
	R410	130-0222-23	Res FC 2. 2K 5% QW		1	1	-	1	1	-
	R413	130-0131-23	Res FC 130 5% QW		1	1	-	1	1	-
	R414	130-0132-23	Res FC 1. 3K 5% QW		1	1	-	1	1	-
	R415	130-0332-23	Res FC 3. 3K 5% QW		1	1	-	1	1	-
	R417	130-0473-23	Res FC 47K 5% QW		1	1	-	1	1	-
	R421	130-0103-25	Res FC 10K 10% QW		1	1	-	1	1	-
	R422	130-0473-23	Res FC 47K 5% QW		1	1	-	1	1	-
	R424	130-0201-23	Res FC 200 5% QW		1	1	-	1	1	-
	R425	133-0084-01	Res Var 5K		1	1	-	1	1	-
	R426	130-0471-25	Res FC 470 10% QW		1	1	-	1	1	-
	R427	130-0112-23	Res FC 1. 1K 5% QW		1	1	-	1	1	-
	R428	130-0242-23	Res FC 2. 4K 5% QW		1	1	-	1	1	-
	R429	130-0103-23	Res FC 10K 5% QW		1	1	-	1	1	-
	R430	130-0222-23	Res FC 2. 2K 5% QW		1	1	-	1	1	-
	R431	130-0223-23	Res FC 22K 5% QW		1	1	-	1	1	-
	R432	130-0223-23	Res FC 22K 5% QW		1	1	-	1	1	-
R4	R433	136-1741-77	Res 1. 74K 1%		1	1	-	1	1	-
R4	R434	136-1211-77	Res 1. 21K 1%		1	1	-	1	1	-
	R435	130-0181-23	Res FC 180 5% QW		1	1	-	1	1	-
	R436	130-0222-25	Res FC 2. 2K 10% QW		1	1	-	1	1	-
	R437	130-0331-23	Res FC 330 5% QW		1	1	-	1	1	-
	R438	130-0101-25	Res FC 100 10% QW		1	1	-	1	1	-
	R439	130-0101-25	Res FC 100 10% QW		1	1	-	1	1	-
	R440	130-0512-23	Res FC 5. 1K 5% QW		1	1	-	1	1	-
	R441	130-0133-23	Res FC 13K 5% QW		1	1	-	1	1	-
	R442	130-0472-23	Res FC 4. 7K 5% QW		1	1	-	1	1	-

NAME NAV/COMM BD. SUB-ASS'Y. **ASS'Y. NO.** 200-0452-00/05

ASS'Y. DWG. 300-0652-00
300-0653-00 **UNIT** KX 170B/175B
KY 195B **USED ON** 069-1019/1020/
1021-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00	01	02	03	04	05
R4	R443	130-0132-23	Res FC 13K 5% QW		1	1	-	1	1	-
	R444	130-0300-33	Res FC 30 5% HW		1	1	-	1	1	-
	R445	130-0224-25	Res FC 220K 10% QW		1	1	-	1	1	-
	R446	130-0224-25	Res FC 220K 10% QW		1	1	-	1	1	-
	R447	130-0152-25	Res FC 1. 5K 10% QW		1	1	-	1	1	-
	R448	130-0751-23	Res FC 750 5% QW		1	1	-	1	1	-
	R449	130-0182-23	Res FC 1. 8K 5% QW		1	1	-	1	1	-
R4	R450	130-0224-23	Res FC 220K 5% QW		1	1	-	1	1	-
	R451	130-0472-23	Res FC 4. 7K 5% QW		1	1	1	1	1	1
R4	R452	130-0202-23	Res FC 2. 0K 5% QW		1	1	1	1	1	1
	R453	130-0133-23	Res FC 13K 5% QW		1	1	1	1	1	1
	R454	130-0512-23	Res FC 5. 1K 5% QW		1	1	1	1	1	1
	R455	130-0101-25	Res FC 100 10% QW		1	1	1	1	1	1
	R456	130-0470-25	Res FC 47 10% QW		1	1	1	1	1	1
	R457	130-0102-23	Res FC 1K 5% QW		1	1	1	1	1	1
	R458	130-0753-23	Res FC 75K 5% QW		1	1	1	1	1	1
	R460	130-0103-25	Res FC 10K 10% QW		1	1	1	1	1	1
	R461	130-0103-25	Res FC 10K 10% QW		1	1	1	1	1	1
	R462	130-0102-23	Res FC 1K 5% QW		1	1	1	1	1	1
	R463	130-0751-23	Res FC 750 5% QW		1	1	1	1	1	1
	R464	130-0682-23	Res FC 6. 8K 5% QW		1	1	1	1	1	1
	R465	130-0101-25	Res FC 100 10% QW		1	1	1	1	1	1
R4	R466	130-0103-25	Res FC 100 10% QW		1	1	1	1	1	1
R4	R467	130-0103-25	Res FC 100 10% QW		1	1	1	1	1	1
	R468	130-0274-25	Res FC 270K 10% QW		1	1	1	1	1	1
	R469	130-0154-23	Res FC 150K 5% QW		1	1	1	1	1	1
	R470	130-0222-23	Res FC 2. 2K 5% QW		1	1	1	1	1	1
	R471	130-0184-23	Res FC 180K 5% QW		1	1	1	1	1	1
	R472	130-0184-23	Res FC 180K 5% QW		1	1	1	1	1	1
	R473	130-0131-23	Res FC 130 5% QW		1	1	1	1	1	1
	R474	130-0911-23	Res FC 910 5% QW		1	1	1	1	1	1
	R475	130-0272-23	Res FC 2. 7K 5% QW		1	1	1	1	1	1
	R477	130-0134-23	Res FC 130K 5% QW		1	1	1	1	1	1
	R478	130-0164-23	Res FC 160K 5% QW		1	1	1	1	1	1
	R481	130-0103-25	Res FC 10K 10% QW		1	1	1	1	1	1
	R482	130-0330-23	Res FC 33 5% QW		1	1	1	1	1	1
	R483	133-0084-02	Res Var 10K		1	1	1	1	1	1
	R484	130-0181-23	Res FC 180 5% QW		1	1	1	1	1	1
	R485	130-0681-23	Res FC 680 5% QW		1	1	1	1	1	1
	R486	130-0391-23	Res FC 390 5% QW		1	1	1	1	1	1
	R487	130-0473-25	Res FC 47K 10% QW		1	1	1	1	1	1
R4	R488	130-0103-23	Res FC 10K 5% QW		1	1	1	1	1	1
	R489	130-0472-23	Res FC 4. 7K 5% QW		1	1	1	1	1	1
	R490	130-0152-23	Res FC 1. 5K 5% QW		1	1	1	1	1	1

NAME	NAV/COMM BD. SUB-ASS'Y.	**ASS'Y. NO.**	200-0452-00/05		
ASS'Y. DWG.	300-0652-00 300-0653-00	**UNIT**	KX 170B/175B KY 195B	**USED ON**	069-1019/1020/ 1021-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00	01	02	03	04	05
R491	130-0222-25	Res FC 2.2K 10% QW		1	1	1	1	1	1
R492	130-0472-23	Res FC 4.7K 5% QW		1	1	1	1	1	1
R493	130-0331-23	Res FC 330 5% QW		1	1	1	1	1	1
R494	130-0621-23	Res FC 620 5% QW		1	1	1	1	1	1
R495	133-0084-00	Res Var 1K		1	1	1	1	1	1
R496	130-0182-23	Res FC 1.8K 5% QW		1	1	1	1	1	1
R497	130-0181-25	Res FC 180 10% QW		1	1	1	1	1	1
R498	130-0473-25	Res FC 47K 10% QW		1	1	1	1	1	1
R499	130-0101-25	Res FC 100 10% QW		1	1	1	1	1	1
R500	130-0102-25	Res FC 1K 10% QW		1	1	1	1	1	1
R501	130-0184-25	Res FC 180K 10% QW		1	1	1	1	1	1
R502	130-0471-25	Res FC 470 10% QW		1	1	1	1	1	1
R503	130-0101-25	Res FC 100 10% QW		1	1	1	1	1	1
R504	130-0182-23	Res FC 1.8K 5% QW		1	1	1	1	1	1
R505	130-0102-25	Res FC 1K 10% QW		1	1	1	1	1	1
R506	130-0103-23	Res FC 10K 5% QW		1	1	1	1	1	1
R507	130-0103-23	Res FC 10K 5% QW		1	1	1	1	1	1
R508	130-0332-23	Res FC 3.3K 5% QW		1	1	1	1	1	1
R509	130-0103-23	Res FC 10K 5% QW		1	1	1	1	1	1
R510	130-0271-25	Res FC 270 10% QW		1	1	1	1	1	1
RT501	134-1004-00	Tmtr 1K		1	1	1	1	1	1
RT502	134-1019-00	Tmtr 50		1	1	-	1	1	-

Parts List Revisions Record

Assembly No. 200-0452-00/05 (B/MRL Rev 18) Manual Revision No. 4

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY					
				00	01	02	03	04	05
CHANGE		088-0066-00	Spacer, Xtal	5	2	3	2	5	3
ADDED		047-1943-00	Spring, Clip	1	1	-	-	1	1
CHANGE	CR426	007-6059-00	Diode FD400	1	1	1	1	1	1
CHANGE	R488	130-0512-23	Res F/C 5.1K 5% QW	1	1	1	1	1	1
DELETE	L406	019-2019-00							
CHANGE	R450	130-0474-23	Res F/C 470K 5% QW	1	1	-	1	1	-
ADDED	R511	130-0331-23	Res F/C 330 ohm 5% QW	1	1	-	1	1	-
DELETE	C455	105-0031-47							
CHANGE	C454	111-0001-03	Cap MC .22uf	1	1	-	1	1	-
CHANGE	Q409	007-0196-02	Tstr SPS6800	1	1	1	1	1	1
CHANGE	R452	130-0362-23	Res F/C 3.6K 5% QW	1	1	1	1	1	1
CHANGE	CR2410	007-6035-03	Dio 1N816	1	1	-	1	1	1
ADDED	FL403	017-0034-00	Fil 9.00MHz	-	-	-	1	1	1
CHANGE	T401	019-8066-00	Xfmr Nav Mixer	1	1	-	1	1	-
CHANGE	T402	019-8066-00	Xfmr Mixer	1	1	-	1	1	-
CHANGE	T412	019-8066-00	Xfmr Mixer	1	1	1	1	1	1
CHANGE	T413	019-8066-00	Xfmr Mixer	1	1	1	1	1	1
ADDED	C482	113-3390-00	Cap D/C 39pf N150	-	-	-	1	-	-
ADDED	C483	113-5101-01	Cap D/C 100pf X5F	-	-	-	1	-	-
CHANGE	R433	136-1741-72	Res 1.74K 1%	1	1	-	1	1	-
CHANGE	R434	136-1211-72	Res 1.21K 1%	1	1	-	1	1	-
CHANGE	R443	130-0332-23	Res F/C 3.3K 5% QW	1	1	-	1	1	-
CHANGE	R466	130-0103-25	Res F/C 10K 10% QW	1	1	1	1	1	1
CHANGE	R467	130-0103-25	Res F/C 10K 10% QW	1	1	1	1	1	1
ADDED	C471	113-3027-00	Cap D/C 2.7pf N150	-	-	-	1	1	1

NAME Transmitter Bd. Sub-Assembly **ASS'Y. NO.** 200-0083-00

ASS'Y. DWG. 300-0106-00 **UNIT** KX170B/175B
KY195B **USED ON** 200-0082-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00					
	009-5075-00	P. A. Board		1					
	026-0001-00	#26 Buss Wire		.1					
	026-0003-00	#22 Buss Wire		.1					
	150-0003-10	Tubing Teflon #24		.1					
	150-0042-10	Shrink Tubing		.2					
Q601	007-0195-00	Tstr MPS-H10		1					
CR601	007-6022-00	Dio Ts-6		1					
CR602	007-6022-00	Dio Ts-6		1					
L601	019-2057-11	Choke .82μh 5%		1					
T601	019-3044-00	Tfmr R. F. Buffer		1					
T602	019-3026-00	Tfmr R. F.		1					
T603	019-3026-00	Tfmr R. F.		1					
C601	113-5471-00	Cap DC 470pf 10%		1					
C602	113-3180-00	Cap DC 18pf 500V		1					
C603	113-5471-00	Cap DC 470pf 10%		1					
C604	113-3120-00	Cap DC 12pf 5%		1					
C605	113-5151-01	Cap DC 150pf 10%		1					
C606	106-0034-00	Cap FT 1.5Kpf		1					
C607	113-6103-00	Cap DC .01pf		1					
C608	106-0034-00	Cap FT 1.5Kpf		1					
C609	113-3390-00	Cap DC 39pf 5%		1					
C610	102-0024-09	Cap VAR 7-35pf		1					
C613	113-6103-00	Cap DC .01μf		1					
C614	113-6103-00	Cap DC .01μf		1					
C615	106-0034-00	Cap FT 1.5Kpf		1					
C616	113-3820-00	Cap DC 82pf 5%		1					
C617	113-3820-00	Cap DC 82pf 5%		1					
C618	113-3680-00	Cap DC 68pf 500V		1					
C619	102-0024-09	Cap VAR 7-35pf		1					
C620	113-6103-00	Cap DC .01μf		1					
C621	106-0034-00	Cap FT 1.5Kpf		1					
C622	102-0024-09	Cap VAR 7-35pf		1					
C628	113-6103-00	Cap DC .01μf		1					

NAME Transmitter Bd. Sub-Assembly **ASS'Y. NO.** 200-0083-00

ASS'Y. DWG. 300-0106-00 **UNIT** KX 170B/175B KY 195B **USED ON** 200-0082-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00					
C629	113-3180-00	Cap DC 18pf 500V		1					
R601	130-0392-25	Res. FC 3.9K, 10% QW		1					
R602	130-0472-25	Res. FC 4.7K, 10%, QW		1					
R603	130-0271-25	Res. FC 270 10%, QW		1					
R604	130-0470-25	Res. FC 47, 10%, QW		1					
R605	130-0242-23	Res. FC 2.4K, 5% QW		1					
R606	130-0471-25	Res. FC 470, 10%, QW		1					
R607	130-0200-23	Res. FC 20, 5%, QW		1					
R608	130-0180-35	Res. FC 18, 10%, HW		1					
R609	130-0511-33	Res. FC 510, 5%, HW		1					
R610	130-0511-33	Res. FC 510, 5%, HW		1					
R611	130-0680-35	Res. FC 68, 10%, HW		1					
R613	130-0391-25	Res. FC 390, 10%, QW		1					
R614	130-0750-33	Res. FC 75, 5%, HW		1					
R615	130-0300-33	Res. FC 30, 5%, HW		1					
R618	130-0510-23	Res. FC 51, 5%, QW		1					

Parts List Revision Record

Assembly No. 200-0083-00 Manual Revision No. 0

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY

NAME Rear Plate Sub-Assembly **ASS'Y. NO.** 200-0082-00
ASS'Y. DWG. 300-0105-00 **UNIT** KX170B/175B KY195B **USED ON** 060-1014-00/1016/1017/1018-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00					
	008-0042-00	Lug, Solder		1					
	008-0044-01	Term. Gnd Stud		1					
	010-0019-90	Term. Standoff		2					
	010-0029-90	Term. Feedthru		1					
	016-1004-00	Thermal Comp		AR					
	026-0003-00	#22 Wire		1					
	047-1833-01	Cover Conn		1					
	073-0093-02	Rear Plate		1					
	076-0139-09	Spacer		1					
	076-0164-06	Spacer		3					
	089-2005-37	Nut Hex #2-56		1					
	089-2272-30	Nut #8-32		2					
	089-5874-03	Scr. 2-56X3/16 PHP		3					
	089-5878-04	Scr. 4-40X1/4 PHP		2					
	089-8012-37	Washer #2		1					
	090-0133-00	Heat Sink		1					
	091-0028-00	Scr. Nyl 4-40X3/16		1					
	091-0155-00	Washer, Mica		1					
	200-0083-00	Trans. Bd. Sub-Ass'y.		1					
Q602	007-0066-00	Tstr 2N3866		1					
Q603	007-0149-00	Tstr SS3932		1					
Q604	007-0150-00	Tstr SS3933		1					
CR603	007-6059-00	Dio FD400		1					
CR604	007-6059-00	Dio FD400		1					
FL601	017-0025-00	Filter		1					
FL602	017-0027-00	Filter		1					
FL603	017-0027-00	Filter		1					
L604	019-2054-17	Choke 1.2μh 5%		1					
T604	019-3045-00	R. F. Tfmr		1					
J172	030-0059-00	Ant. Conn.		1					
J173	030-0059-00	Ant. Conn.		1					

NAME	Rear Plate Sub-Assembly	**ASS'Y. NO.**	200-0082-00
ASS'Y. DWG.	300-0105-00	**UNIT**	KX170B/175B KY195B
USED ON	069-1014-00/1016/ 1017/1018-00		

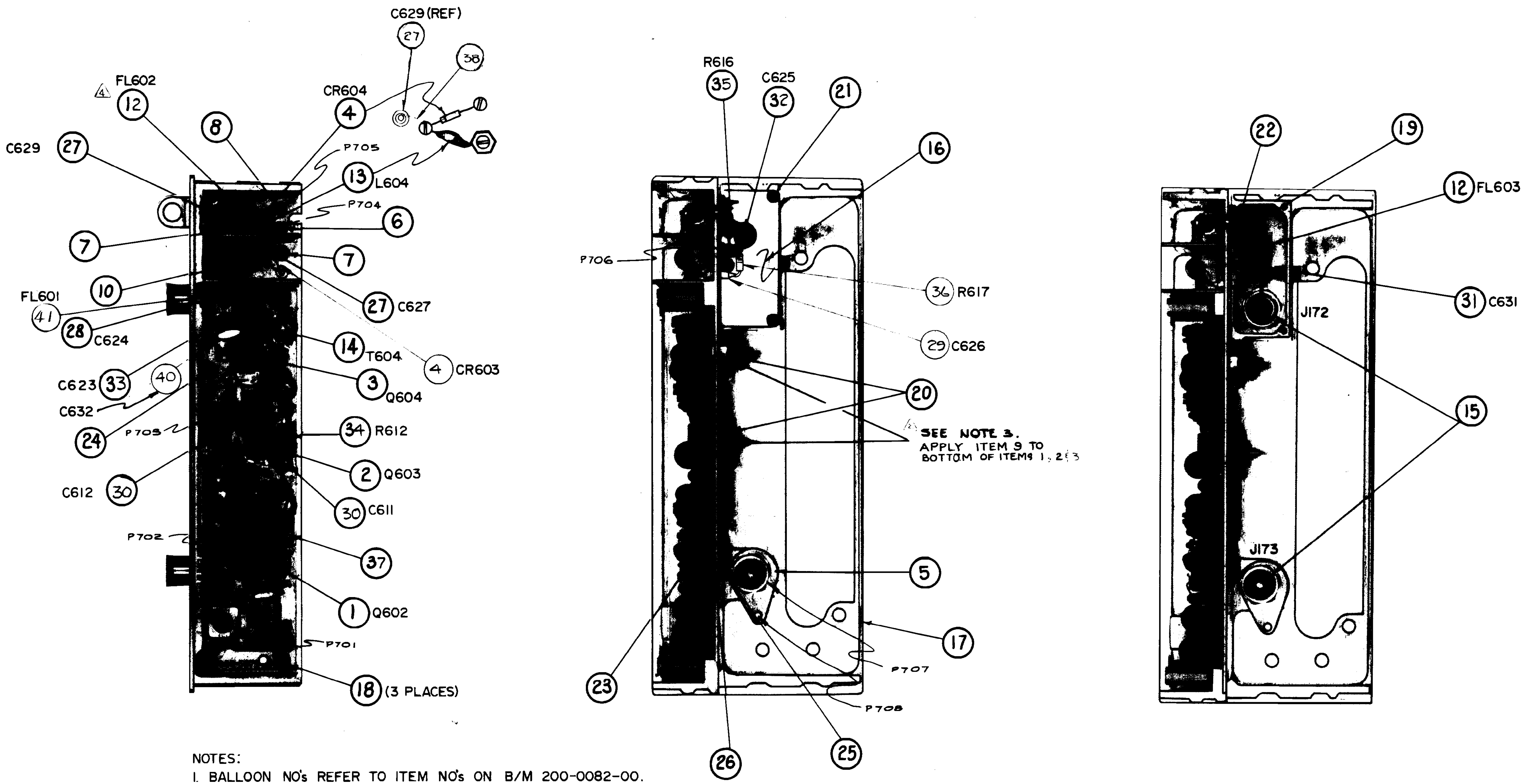
KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY
				00
C611	106-0018-01	Cap FT 1.5Kpf		1
C612	106-0018-01	Cap FT 1.5Kpf		1
C623	113-3121-00	Cap DC 120pf 5%		1
C624	106-0006-02	Cap FT 22pf		1
C625	113-5221-01	Cap DC 220pf 10%		1
C626	106-0006-03	Cap FT 250pf		1
C627	106-0006-00	Cap FT 33pf		1
C629	106-0006-00	Cap FT 33pf		1
C631	106-0024-00	Cap Standoff 20pf		1
C632	113-3200-00	Cap DC 20pf 5%		1
R612	130-0068-33	Res FC 6.85% HW		1
R616	130-0222-25	Res FC 2.2K 10% QW		1
R617	130-0471-35	Res FC 470 10% HW		1

Parts List Revision Record

Assembly No. 200-0082-00 Manual Revision No. 0

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY



NOTES:

1. BALLOON NO's REFER TO ITEM NO's ON B/M 200-0082-00.
2. "P" NO's ARE FOR REF. TO POINT TO POINT WIRING CONN.
3. TORQUE REQUIREMENTS— 90-100 IN. OZ. (ITEM 2 & 3).

FIGURE 8 REAR PLATE SUB-ASSEMBLY
(Dwg. No. 300-0105-00)

NAME AUDIO DRIVE BD. SUB-ASS'Y **ASS'Y. NO.** 200-0454-00

ASS'Y. DWG. 300-0655-00 **UNIT** KX 170E/175B KY 195B **USED ON** 069-1019/1020/1021-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00
		009-5283-00	Audio Drive Bd.		1
	Q701	007-0078-00	Tstr 2N3415		1
	Q702	007-0227-01	Tstr D40D2		
	CR701	007-6035-00	Diode 1N816		1
	CR702	007-6035-00	Diode 1N816		1
R4	CR706	007-6021-00	Diode TS-2		1
R4	CR707	007-6021-00	Diode TS-2		1
	CR708	007-6029-00	Diode 1N457A		1
	C701	096-1030-23	Cap Tant 39μf 10V		1
	C702	113-5221-01	Cap DC 220pf		1
	C703	113-5221-01	Cap DC 220pf		1
	C704	096-1030-17	Cap Tant 6. 8μf 15V		1
	C705	114-7224-00	Cap DC . 22μf 12V		1
	C706	096-1030-21	Cap Tant 12μf 10V		1
	C707	096-1030-08	Cap Tant 100μf 15V		1
R4	C708	096-1030-06	Cap Tant 47μf 15V		
	C709	096-1030-16	Cap Tant 2. 2μf 20V		1
	C710	113-5271-00	Cap DC 270pf 500V		1
	C714	096-1030-22	Cap Tant 22μf 10V		1
	C715	113-7203-00	Cap DC . 02μf 12V		1
	C717	096-1030-09	Cap Tant 15μf 20V		1
	C718	096-1030-17	Cap Tant 6. 8μf 15V		1
	R701	130-0222-25	Res 2. 2K 10% QW		1
	R702	130-0511-23	Res 510 5% QW		1
	R703	130-0511-23	Res 510 5% QW		1
	R704	130-0222-25	Res 2. 2K 10% QW		1
	R705	130-0562-25	Res 5. 6K 10% QW		1
	R706	130-0222-25	Res 2. 2K 10% QW		1
	R707	130-0222-25	Res 2. 2K 10% QW		1
	R708	130-0242-23	Res 2. 4K 5% QW		1
	R709	133-0084-00	Res Var 1K		1
	R710	130-0103-25	Res 10K 10% QW		1
	R711	130-0393-23	Res 39K 5% QW		1
	R712	130-0472-25	Res 4. 7K 10% QW		1
	R713	130-0470-23	Res 47 5% QW		1
	R714	130-0561-25	Res 560 10% QW		1
	R715	130-0102-23	Res 1. 0K 5% QW		1
R4	R716	130-0431-23	Res 430 5% QW		1
	R717	130-0180-23	Res 18 5% QW		1
R4	R718	130-0272-23	Res 2. 7K 5% QW		1

NAME AUDIO DRIVE BD. SUB-ASS'Y **ASS'Y. NO.** 200-0454-00

ASS'Y. DWG. 300-0655-00 **UNIT** KX 170B/175B
KY 195B **USED ON** 069-1019/1020/1021-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00					
R720	130-0120-25	Res 12 10% QW		1					
R721	130-0222-25	Res 2. 2K 10% QW		1					
R722	130-0241-23	Res 240 5% QW		1					
R723	130-0112-23	Res 1. 1K 5% QW		1					
R726	133-0084-00	Res Var 1K		1					
R727	130-0561-23	Res 560 5% QW		1					
R728	130-0511-23	Res 510 5% QW		1					
R729	130-0470-23	Res 47 5% QW		1					
R730	130-0331-25	Res 330 10% QW		1					

Parts List Revisions Record

Assembly No. 200-0454-00 (B/MRL Rev. 4) Manual Revision No. 4

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
CHANGE	C708	096-1030-43	Cap Tant 100mf, 10%, 6V	1
CHANGE	R718	130-0392-23	Res 3. 9K, 5% QW	1
CHANGE	R716	130-0331-23	Res 330 ohm 5%, QW	1
CHANGE	CR706	007-6024-00	Diode 1N4001	1
CHANGE	CR707	007-6024-00	Diode 1N4001	1

NAME	REAR DIVIDER SUB-ASS'Y.	**ASS'Y. NO.**	200-0453-00/01
ASS'Y. DWG.	300-0654-00	**UNIT**	KX 170B/175B KY 195B
		USED ON	069-1019/1020/1021-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00	01				
	200-0453-00	KX 170B/KX 175B		X					
	200-0453-01	KY 195B			X				
	008-0004-00	Lug		2	2				
R4	008-0005-01	Lug		3	2				
	008-0040-00	Lug		1	-				
	009-0003-08	Tml Strip		2	-				
	009-0030-00	Tml Strip		1	1				
	009-0030-01	Tml Strip		1	1				
	016-1004-00	Thrm Compound		AR	AR				
	016-1034-00	Adhesive		AR	AR				
	025-0003-02	Wire #22 Red		1. 3	1. 3				
	025-0003-03	Wire #22 Orn		1. 0	1. 0				
	025-0018-29	Wire #26 Red/Wht		. 6	. 6				
	025-0018-33	Wire #26 Orn		. 6	. 6				
	025-0018-69	Wire #26 Blu/Wht		. 5	. 5				
	025-0018-79	Wire #26 Vio/Wht		. 5	. 5				
	025-0018-98	Wire #26 Wht/Gry		. 3	. 3				
	025-0018-99	Wire #26 Wht		. 7	. 7				
	026-0001-00	Wire #26 Buss		. 2	. 2				
	047-1733-02	Divider Rear		1	1				
	047-2110-01	Bracket Tstr		1	1				
	076-0165-04	Spacer		4	4				
	089-2007-37	Nut 3-48		1	1				
	089-2076-30	Nut Hex 4-40 S. S.		7	5				
	089-2140-00	#4 Esna Nut		4	4				
	089-2144-30	Nut Hex 2-56 S. S.		2	-				
	089-2147-22	#6 Esna Nut		2	2				
	089-5878-04	Scr 4-40 x 1/4		4	4				
	089-5903-04	Scr 4-40 x 1/4		3	3				
	089-5903-05	Scr 4-40 S. S. PHP		4	4				
	089-5907-05	Scr 6-32 x 5/16		2	2				
	089-8001-34	Washer S/L #2		2	-				
	089-8003-34	Washer S/L #4		7	5				
	089-8013-37	Washer Int T #3		1	1				
	089-8025-30	Washer Flat #4		4	4				
	091-0068-04	Shld Phenolic		4	4				
	150-0003-10	#24 Tef Tubing		. 2	. 2				
R4	150-0005-10	#20 Tef Tubing		. 2	. 2				
R4	150-0020-10	Shrink Tubing		. 3	. 3				
	187-1029-00	Channel Rubber		13	. 13				
	200-0454-00	Audio Dr. Bd. Sub Ass'y		1	1				

NAME REAR DIVIDER SUB-ASS'Y.
ASS'Y. NO. 200-0453-00/01
ASS'Y. DWG. 300-0654-00
UNIT KX 170B/175B KY 195B
USED ON 069-1019/1020/1021-00

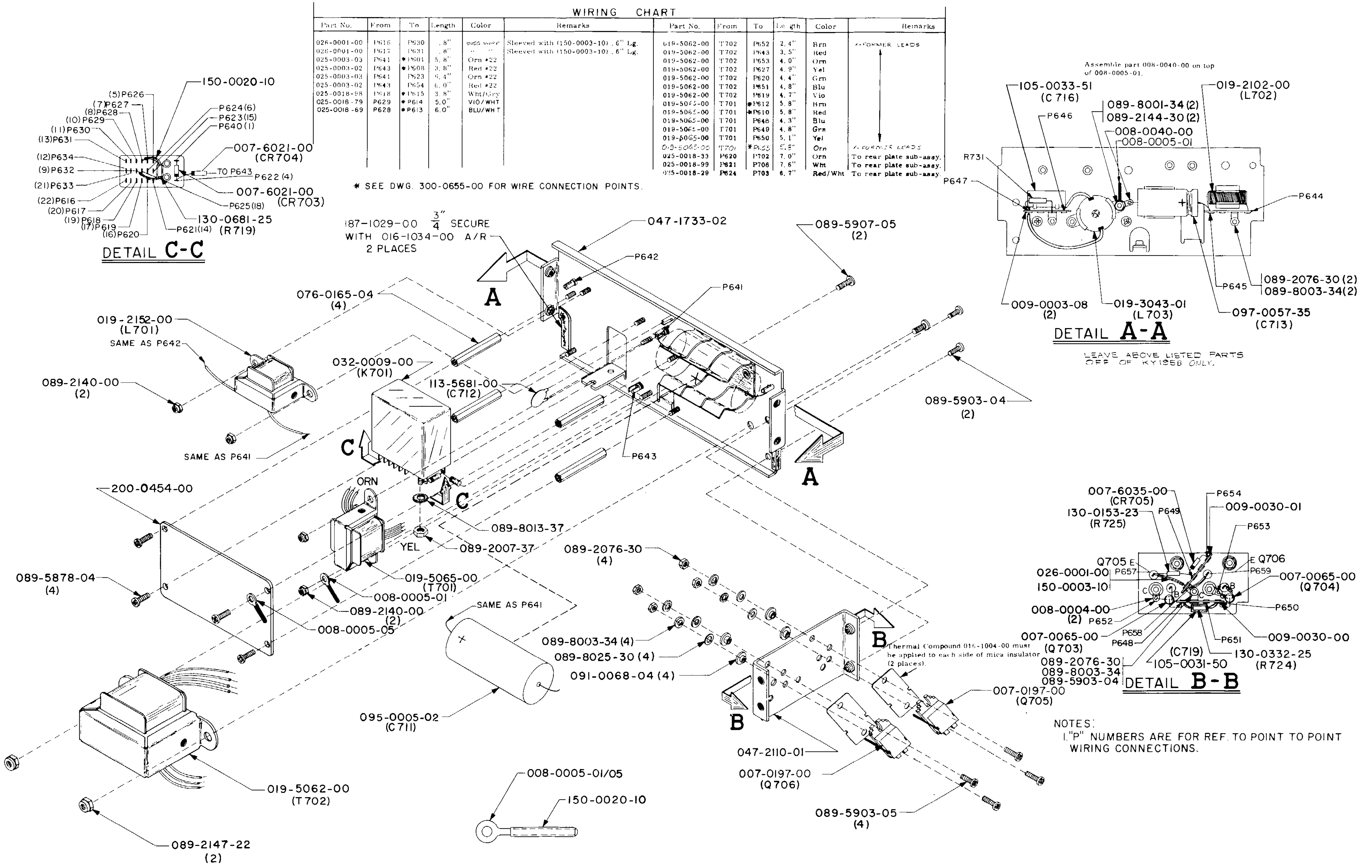
KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY	
					00	01
	Q703	007-0065-00	Tstr 2N3906		1	1
	Q704	007-0065-00	Tstr 2N3906		1	1
	Q705	007-0197-00	Tstr 40633		1	1
	Q706	007-0197-00	Tstr 40633		1	1
R4	CR703	007-6021-00	Diode TS-2		1	1
R4	CR704	007-6021-00	Diode TS-2		1	1
	CR705	007-6035-00	Diode 1N816		1	1
	L701	019-2152-00	Choke 1mh		1	1
	L702	019-2102-00	Choke 250μh		1	-
	L703	019-3043-01	Idctr 200mh Var		1	-
	T701	019-5065-00	Tfmr Driver		1	1
	T702	019-5062-00	Tfmr Mod		1	1
	K701	032-0009-00	Relay 6PDT		1	1
	C711	095-0005-02	Cap Elec 1900μf 20V		1	1
	C712	113-5681-00	Cap DC 680pf		1	1
	C713	097-0057-35	Cap Elec 680μf 25V		1	-
	C716	105-0033-51	Cap .12μf 50V		1	-
	C719	105-0031-50	Cap Myl .033μf 80V		1	1
	R719	130-0681-25	Res FC 680 10% QW		1	1
	R724	130-0332-25	Res FC 3.3K 10% QW		1	1
	R725	130-0153-23	Res FC 15K 5% QW		1	1
	R731	130-0103-25	Res FC 10K 10% QW		1	-

Parts List Revisions Record

Assembly No. 200-0453-00/01 (B/MRL Rev. 6)   Manual Revision No. 4

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY	
CHANGE		008-0005-01	Lug	2	1
ADDED		008-0005-05	Lug	1	1
ADDED		091-0109-00	Cable Tie	7	7
DELETE		150-0005-10			
CHANGE		150-0020-10	Shrink Tubing	.4	.4
CHANGE	CR703	007-6024-00	Diode 1N4001	1	1
CHANGE	CR704	007-6024-00	Diode 1N4001	1	1



WIRING CHART

Part No.	From	To	Length	Color	Remarks
026-0001-00	P616	P630	.8"	BUSS WIRE	Sleeved with (150-0003-10) .6" Lg.
026-0001-00	P617	P631	.8"	" "	Sleeved with (150-0003-10) .6" Lg.
025-0003-03	P641	*P601	5.8"	Orn #22	
025-0003-02	P643	*P608	3.8"	Red #22	
025-0003-03	P641	P623	6.4"	Orn #22	
025-0003-02	P643	P654	6.0"	Red #22	
025-0018-98	P618	*P615	3.8"	Wht/Gry	
025-0018-79	P629	*P614	5.0"	VIO/WHT	
025-0018-69	P628	*P613	6.0"	BLU/WHT	
019-5062-00	T702	P652	2.4"	Brn	X-FORMER LEADS
019-5062-00	T702	P643	3.5"	Red	
019-5062-00	T702	P653	4.0"	Orn	
019-5062-00	T702	P627	4.9"	Yel	
019-5062-00	T702	P620	4.4"	Grn	
019-5062-00	T702	P651	4.8"	Blu	
019-5062-00	T702	P619	4.7"	Vio	
019-5065-00	T701	*P612	5.8"	Brn	
019-5065-00	T701	*P610	5.8"	Red	
019-5065-00	T701	P648	4.3"	Blu	
019-5065-00	T701	P649	4.8"	Grn	
019-5065-00	T701	P650	5.1"	Yel	
019-5065-00	T701	*P655	5.5"	Orn	X-FORMER LEADS
025-0018-33	P620	P702	7.0"	Orn	To rear plate sub-assy.
025-0018-99	P621	P706	7.6"	Wht	To rear plate sub-assy.
025-0018-29	P624	P703	6.7"	Red/Wht	To rear plate sub-assy.

* SEE DWG. 300-0655-00 FOR WIRE CONNECTION POINTS.

Assemble part 008-0040-00 on top of 008-0005-01.

LEAVE ABOVE LISTED PARTS OFF OF KY195B ONLY.

Thermal Compound 016-1004-00 must be applied to each side of mica insulator (2 places).

NOTES:
1. "P" NUMBERS ARE FOR REF. TO POINT TO POINT WIRING CONNECTIONS.

FIGURE 6-9 REAR DIVIDER SUB-ASSEMBLY
(Dwg. No. 300-0654-00, R2)

NAME	CONN & WIRING SUB-ASS'Y.	**ASS'Y. NO.**	200-0449-00/01		
ASS'Y. DWG.	300-0646-00 300-0647-00	**UNIT**	KX 170B/175B KY 195B	**USED ON**	069-1019/1020/1021-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION		CODE	QUANTITY					
						00	01				
		200-0449-00	KX 170B/KX 175B			X					
		200-0449-01	KY 195B				X				
		012-1006-00	Nyl. Lacing Tape			AR	AR				
R4		025-0003-04	Wire, #22	Yel		1.6	-				
R4		025-0003-12	Wire, #22	Red/Wht		.6	-				
R4		025-0003-13	Wire, #22	Orn/Wht		2.7	2.7				
R4		025-0003-14	Wire, #22	Yel/Wht		2.8	-				
R4		025-0005-02	Wire #18	Red		1.6	1.6				
R4		025-0005-09	Wire #26	Wht		1.6	1.6				
R4		025-0018-00	Wire #26	Blk		1.0	1.1				
R4		025-0018-04	Wire #26	Blk/Yel		1.4	.6				
		025-0018-11	Wire #26	Brn		2.3	1.5				
R4		025-0018-14	Wire #26	Brn/Yel		1.3	.6				
R4		025-0018-16	Wire #26	Brn/Blu		1.3	1.3				
		025-0018-17	Wire #26	Brn/Vio		1.3	-				
		025-0018-18	Wire #26	Brn/Gry		1.2	-				
R4		025-0018-19	Wire #26	Brn/Wht		4.4	-				
R4		025-0018-22	Wire #26	Red		.8	-				
R4		025-0018-24	Wire #26	Red/Yel		.6	.6				
R4		025-0018-25	Wire #26	Red/Grn		1.7	1.7				
R4		025-0018-26	Wire #26	Red/Blu		1.2	.8				
R4		025-0018-27	Wire #26	Red/Vio		1.3	-				
		025-0018-28	Wire #26	Red/Gry		1.2	-				
R4		025-0018-29	Wire #26	Red/Wht		2.1	-				
R4		025-0018-34	Wire #26	Orn/Yel		1.4	.6				
R4		025-0018-36	Wire #26	Orn/Blu		1.2	-				
R4		025-0018-37	Wire #26	Orn/Vio		1.2	-				
R4		025-0018-38	Wire #26	Orn/Gry		1.2	3.0				
R4		025-0018-39	Wire #26	Orn/Wht		2.0	-				
R4		025-0018-40	Wire #26	Yel/Blk		1.3	-				
R4		025-0018-42	Wire #26	Yel/Red		1.1	-				
R4		025-0018-43	Wire #26	Yel/Orn		2.1	-				
R4		025-0018-44	Wire #26	Yel		.8	-				
R4		025-0018-45	Wire #26	Yel/Grn		1.5	-				
R4		025-0018-46	Wire #26	Yel/Blu		1.2	1.2				
R4		025-0018-47	Wire #26	Yel/Vio		1.2	-				
R4		025-0018-48	Wire #26	Yel/Gry		1.3	-				
		025-0018-49	Wire #26	Yel/Wht		1.3	-				
R4		025-0018-56	Wire #26	Grn/Blu		1.3	-				
R4		025-0018-57	Wire #26	Grn/Vio		1.3	-				
R4		025-0018-59	Wire #26	Grn/Wht		2.1	-				
R4		025-0018-66	Wire #26	Blu		2.7	1.8				
R4		025-0018-69	Wire #26	Blu/Wht		.8	-				

NAME	CONN & WIRING SUB-ASS'Y	**ASS'Y. NO.**	200-0449-00/01
ASS'Y. DWG.	300-0646-00 300-0647-00	**UNIT**	KX 170B/175B KY 195B
USED ON	069-1019/1020/ 1021-00		

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION		CODE	QUANTITY					
						00	01				
R4		025-0018-77	Wire #26	Vio		2.1	.7				
R4		025-0018-79	Wire #26	Vio/Wht		1.9	-				
R4		025-0018-88	Wire #26	Gry		4.0	2.4				
R4		025-0018-89	Wire#26	Gry/Wht		4.7	4.0				
		025-0018-90	Wire #26	Wht/Blk		1.4	-				
		025-0018-91	Wire #26	Wht/Brn		1.7	1.7				
R4		025-0018-93	Wire #26	Wht/Orn		2.1	1.6				
R4		025-0018-95	Wire #26	Wht/Grn		1.5	1.5				
		025-0018-96	Wire #26	Wht/Blu		2.0	.9				
R4		025-0018-97	Wire #26	Wht/Vio		.8	.8				
		025-0018-98	Wire #26	Wht/Gry		1.7	1.7				
R4		025-0018-99	Wire #26	Wht		2.6					
R4		026-0005-00	Wire #18 Buss			.1	.1				
R4		026-0013-00	Coax Cable RG178			.9	.9				
		030-2109-00	Conn 42 Pin			1	1				
		150-0020-10	Shrink Tubing			2.0	2.0				

Parts List Revision Record

Assembly No. 200-0449-00/01

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY	
CHANGE		025-0003-04	Wire #22 Yel	1.3	-
CHANGE		025-0003-12	Wire #22 Red/Wht	.7	-
CHANGE		025-0003-13	Wire #22 Orn/Wht	2.6	2.6
CHANGE		025-0003-14	Wire #22 Yel/Wht	1.9	-
CHANGE		025-0005-02	Wire #18 Red	1.7	1.7
CHANGE		025-0005-09	Wire #18 Wht	1.7	1.7
CHANGE		025-0018-04	Wire #26 Blk/Yel	.9	.6
CHANGE		025-0018-14	Wire #26 Brn/Yel	.8	.6
CHANGE		025-0018-16	Wire #26 Brn/Blu	1.4	1.4
CHANGE		025-0018-19	Wire #26 Brn/Wht	2.8	-
CHANGE		025-0018-22	Wire #26 Red	.9	-
CHANGE		025-0018-24	Wire #26 Red/Yel	.8	.8
CHANGE		025-0018-25	Wire #26 Red/Grn	1.6	1.6
CHANGE		025-0018-26	Wire #26 Red/Blu	1.4	.8
CHANGE		025-0018-29	Wire #26 Red/Wht	1.3	-
CHANGE		025-0018-34	Wire #26 Orn/Yel	.7	.6
CHANGE		025-0018-36	Wire #26 Orn/Blu	1.3	-
CHANGE		025-0018-37	Wire #26 Orn/Vio	1.3	-
CHANGE		025-0018-38	Wire #26 Orn/Gry	3.0	3.0
CHANGE		025-0018-39	Wire #26 Orn/Wht	1.4	-
CHANGE		025-0018-40	Wire #26 Yel/Blk	1.4	-
CHANGE		025-0018-42	Wire #26 Yel/Red	1.0	-
CHANGE		025-0018-43	Wire #26 Yel/Orn	2.5	-
CHANGE		025-0018-45	Wire #26 Yel/Grn	1.9	-
CHANGE		025-0018-46	Wire #26 Yel/Blu	1.3	1.3
CHANGE		025-0018-47	Wire #26 Yel/Vio	1.3	-
CHANGE		025-0018-48	Wire #26 Yel/Gry	1.2	-
CHANGE		025-0018-56	Wire #26 Grn/Blu	1.4	-
CHANGE		025-0018-57	Wire #26 Grn/Vio	1.4	-
CHANGE		025-0018-59	Wire #26 Grn/Wht	1.3	-
CHANGE		025-0018-66	Wire #26 Blu	3.0	1.8
CHANGE		025-0018-77	Wire #26 Vio	2.3	.7
CHANGE		025-0018-79	Wire #26 Vio/Wht	1.3	-
CHANGE		025-0018-88	Wire #26 Gry	4.4	2.4
CHANGE		025-0018-89	Wire #26 Gry/Wht	4.3	4.0
CHANGE		025-0018-93	Wire #26 Wht/Orn	2.0	1.6
CHANGE		025-0018-95	Wire #26 Wht/Grn	1.6	1.6
CHANGE		025-0018-97	Wire #26 Wht/Vio	.9	.9
CHANGE		025-0018-99	Wire #26 Wht	2.0	-
CHANGE		026-0013-00	Coax Cable RG178	1.0	1.0
DELETED		025-0018-00			
DELETED		025-0018-44			
DELETED		025-0018-69			
DELETED		026-0005-00			
ADDED		091-0194-00	Cable Tie	28	19
CHANGE		025-0018-72	Wire #26 Vio/Red	1.3	-

KING®

KY 195B
COMMUNICATIONS TRANSCEIVER

INSTALLATION MANUAL
006-0088-01

REV. 1 JANUARY, 1976

THIS EQUIPMENT MANUFACTURED UNDER
THE FOLLOWING U.S. PATENT 3,696,422

KING
KY 195B
COMMUNICATIONS TRANSCEIVER

Table of Contents

HISTORY OF REVISIONS

Rev. 1, January, 1976

Page	Reasons for Change
Front Page	Rev. No. change and Warranty deleted
2-1	Paragraph 2.3(b) revised
2-4A	Antenna Cable Assembly added
2-6	Interconnect revised
2-7	Added
2-9	Added

SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the King Radio Corporation Silver Crown KY 195B.

1.2 PURPOSE OF EQUIPMENT

The King KY 195B COMM combines in a single panel mounted unit a 720 channel VHF COMM Transceiver with dual, independent, frequency selectors.

1.3 DESIGN FEATURES

A. Controls

1. On-Off switch is independent of volume control settings allowing the volume to remain at desired levels.
2. Dual control head with thumb switch selection of frequency selector A or frequency selector B.
3. Automatic squelch eliminates pilot responsibility for continuously monitoring squelch adjustments. Squelch threshold automatically adjusts to open on readable signals. Test position opens squelch to test COMM receiver sensitivity and to listen to extremely weak signals.
4. Frequency selector mechanism features human engineered concentric knobs, airline type drum readout, and blue-white back lighting.

B. Electronics

1. Varactor diode tuned filters eliminates use of mechanical tuning shafts and mechanisms.
2. Balanced mixers for superior intermodulation, cross modulation, and L. O. radiation performance.
3. Transistorized transmitter provides 5 watts minimum output power and long term reliability superior to tube designs.
4. The digital frequency synthesizer utilizes state of the art integrated circuits to replace all but 4 crystals.
5. Crystal filter selectivity.
6. Carrier to noise squelch with carrier squelch back up functionally described above.
7. Tight AGC (typically 0.5db from $10\mu v$ to $20,000\mu v$) minimizes audio level variations.

C. Construction

1. Modular construction for ease of maintenance.
2. Rack mounted, removable from the front panel.
3. Anti-theft locking mechanism available.

1.4 POWER REQUIREMENTS

The KY 195B requires 13.75 volts for proper operation. Aircraft having electrical power plants producing 27.5 volts require the installation of a voltage converter. The KA 39 Voltage Converter, designed to convert 27.5 volts to 13.75 volts, may be conveniently remote mounted in the aircraft.

1.5 TECHNICAL CHARACTERISTICS

SPECIFICATION	CHARACTERISTIC
KY 195B TRANSCEIVER	
TSO COMPLIANCE:	
COMM Transmit	C37b (DO-110, Class II)
COMM Receive	C38b (DO-109)
Environmental	DAPBAAXXXXXX
MOUNTING:	Panel mounted, no shock mounting required
SIZE:	6.312 × 2.600 × 14.15 inches w/connectors. (16.03 × 6.60 × 35.94 centimeters)
WEIGHT:	6.0 lbs. excluding external connectors and harness. (2.7Kg)
POWER REQUIREMENTS:	13.75V (or 27.5V with KA 39)
COMM Receive	0.70 amps
COMM Transmit (Tone)	4.5 amps (2.8 amps unmodulated)
Lamps	0.16 amps (13.75Vdc), 0.08 amps (27.5Vdc)
COMM TRANSCEIVER	
CRYSTAL CONTROLLED:	720 channels
FREQUENCY RANGE:	118.000 to 135.975MHz with 25kHz spacing
FREQUENCY STABILITY:	±0.003%
TRANSMITTER	
VHF POWER OUTPUT:	5 watts minimum, 50 ohm load

SPECIFICATION	CHARACTERISTIC
MODULATION:	85% modulation capability with 90% limiting, less than 15% distortion at 80% mod.
MICROPHONE:	Carbon or dynamic mike containing transistorized pre-amp (must provide at least 120mvrms into 500Ω load).
SIDETONE:	Adjustable up to 4mw into 500 ohm headphones
DUTY CYCLE:	1 minute on, 4 minutes off (20%)
RECEIVER	
SENSITIVITY:	1.5µv (soft) will provide a 6db minimum signal plus noise to noise ratio
SELECTIVITY:	Typical 6db at ±8kHz, 70db at ±25kHz
SPURIOUS RESPONSES:	Down at least 60db
SQUELCH:	Automatic squelch (carrier to noise) with manual disable and carrier squelch override.
AGC CHARACTERISTICS:	From 10µv to 20,000µv audio output will not vary more than 3db.
AUDIO	
AUXILIARY AUDIO INPUTS:	Two (2) 500 ohms with 30db isolation between any two.
INTERCOM INPUTS:	One (1) Intercom Microphone Input. (Microphone must provide at least 120mvrms into 500Ω load).
FREQUENCY RESPONSES:	Within 6db from 350Hz to 2500Hz.
HEADPHONE OUTPUT:	50mw into 500 ohm
SPEAKER OUTPUT:	4.5Vrms into auxiliary input produes 5 watts audio output
KA 39 VOLTAGE CONVERTER	
SIZE:	3.500 × 2.000 × 5.500 inches (8.89 × 5.08 × 13.97 centimeters)
WEIGHT:	1.1 lbs. (.5Kg) excluding harness

SPECIFICATION		CHARACTERISTIC	
		A	B
POWER:	Input Volts	27.5vdc	27.5vdc
	Output Volts	13.75vdc (nominal)	13.75vdc (nominal)
	Output Current continuous	1.5A	0.75A
	Output Current 40% duty	5.0A	------------

1.6 UNITS AND ACCESSORIES SUPPLIED

A. King KY 195B COMM (069-1021-00)

B. King KY 195B Installation Kit (050-1142-02) includes the following parts:

030-0061-00	Connector, Antenna (TED 9-10-2)	1
030-1019-00	Clamp, Cable Hall	2
030-2101-04	Connector, 42 pin (Amphenol 26-190-42)	1
047-1851-00	Cover, Connector Mounting Plate	1
088-0136-01	Filter, Red Lamp	2
089-2188-22	E4 ESNA Nut	2
089-5523-05	Screw, #4-40 × 5/16 Fil HP	4
089-5903-05	Screw, #4-40 × 5/16 PHP	2
089-5907-05	Screw, #6-32 × 5/16 PHP	2
089-6008-04	Screw, #4-40 × 1/4 FHP	4
089-8025-30	Flat Washer	2
089-8094-30	Flat Washer	2
090-0019-07	Ring, Retainer	2
047-1743-01	Plate, Connector Mounting	1

1.7 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

A. Communication antenna and cables

B. Headphones and speaker:

1. Headphones: Low impedance types, 300 to 1,000 ohms.

2. Speaker: Voice coil impedance 3 to 6 ohms nominal.

C. KA 39 Voltage Converter, 27.5V to 13.75V (required in 27.5V installation only).

D. Microphone: Low impedance carbon, or dynamic with transistor preamp, such as King KA 14.

1.8 LICENSE REQUIREMENTS

The Federal Communications Commission requires that the operator of the transmitter of this equipment hold a Restricted Radio Telephone Operator Permit, or higher class license. A permit may be obtained by an U. S. citizen from the nearest field office of the FCC; no examination is required.

This equipment has been type accepted by the FCC and entered on their list of type accepted equipments as King KY 195B and must be identified as King KY 195B.

–CAUTION–

The VHF transmitter in this equipment is guaranteed to meet Federal Communications Commission approval only when King crystals are used.

Use of other than King crystals is considered an unauthorized modification.

SECTION II

INSTALLATION

2.1 GENERAL

This section contains suggestions and factors to consider before installing the KY 195B COMM unit and KA 39 Voltage Converter (27.5V installations only). Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking each unit. Make a visual inspection of each unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place in the shipping container all packing materials for use in unit storage or reshipment. The KY 195B installation will conform to standards designated by the customer, installing agency and existing conditions as to unit location and type of installation.

2.3 KY 195 B INSTALLATION

Listed below are factors and suggestions to consider before installing your KY 195B system. Close adherence to these suggestions will assure more satisfactory performance from your equipment.

(a) The KY 195B is mounted rigid in the aircraft panel. Mark and cut the mounting hole as shown in Figure 2-4. The purpose of the "behind aircraft panel mount cutout is to allow a margin of error in cutout size and prevent the mounting tray front edge from being visible. The mounting tray bottom lip should extend through the mounting hole flush with the instrument panel to insure proper plug pin engagement.

(b) Avoid mounting close to any high external heat source. If this is done, no blower or ram air cooling will be required. For Blower or Ram Air cooling. see Figures 2-6 and 2-7.

(c) Remember to allow adequate space for installation of cables and connectors.

(d) Secure the mounting rack to instrument panel per Figure 2-4. The rear mounting bosses should be attached to the airframe by means of support brackets.

(e) Slide the KY 195B into the rack and secure by turning locking screw on the front panel.

—CAUTION—

Do not force locking tab screw.

(f) An antitheft mechanism is available for the KY 195B (KPN 050-1326-00 short locking bar, 050-1326-01, long locking bar). This kit may be installed at the customers option to provide a means of locking the radio to the instrument panel with a padlock located on the lower rear corner of the mounting tray.

Installation consists of riveting the bracket to the mounting tray as shown in Figure 2-4. After the radio installation is complete, the locking bar may be inserted and a small padlock affixed to deter theft.

2.4 KA 39 INSTALLATION (For use in 27. 5 volt installations only)

(a) Select the KA 39 location considering good thermal conductivity to the airframe, convenient cable routing, proximity to the KY 195B and separation from other heat sources.

(b) Refer to Figure 2-3 for the KA 39 mounting dimensions.

(c) Secure the KA 39 firmly in place.

(d) The installing agency will supply and fabricate external cables.

2.5 ANTENNA INSTALLATION

(a) A conventional 50 ohm vertically polarized COMM antenna is required with the KY 195B. Vertical bent whip antennas are not recommended Wideband COMM antennas provide efficient operation over the COMM band. Antennas should be installed per manufacturers recommendations. Additional recommendations are as follows

1. Mount antenna on flat metal surface or install a ground plane at least 18 inches square.

2. The antenna should be well removed from any projections including the engine(s) and propeller.

3. The COMM Antenna should be well separated from any NAV Antenna to minimize COMM interference to NAV while transmitting. (30db min.).

(b) Refer to Figure 2-2 for the COMM antenna cable connector assembly. Solder tack the snap on shield to the connector base at two points to insure that a good electrical ground is made.

2.6 CABLING

(a) The length and routing of the external cables must be carefully studied and planned prior to installation. Avoid sharp bends and placing cables too near the aircraft control cables.

(b) Fabricate the external cables in accordance with the installation drawing that fulfills the system requirement.

-NOTE-

Use good quality stranded wire that will not support a flame and with at least 600 volts insulation. It is recommended that the mike audio line be in a shielded-twisted pair.

(c) Since other radio equipment will possibly utilize the same speaker circuits for muting, speaker selection and microphone switching must be devised by the installing agency.

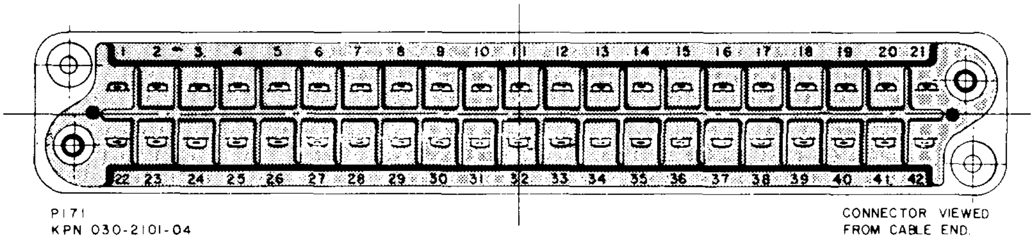
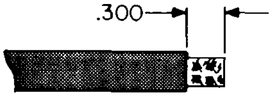
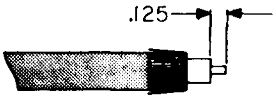


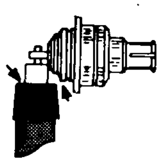
FIGURE 2-1 KY 195B CONNECTOR PIN LOCATIONS
(DWG. NO. 696-6002-00 R-0)



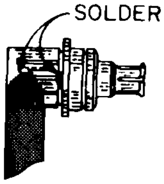
Trim coax cable outer insulation as shown.



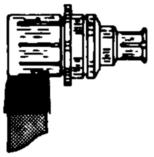
Fold braid back over outer cover of coax. Do not cross strands.



Solder center conductor to center pin of conductor. Make sure front end of braid (Point of fold) is even with bottom of connector. (Shown by arrows)

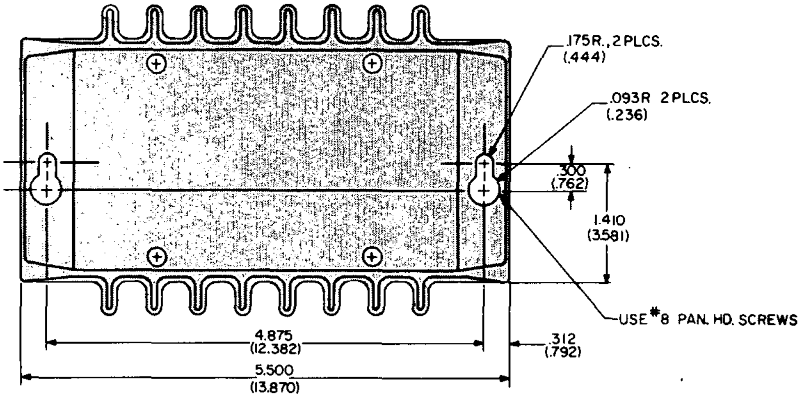


Slide connector cap, with clearance hole in position to clear dielectric, on to connector until it snaps in place.



Push braid forward and flatten against connector cap and solder.
Solder tac connector cap to connector in at least two places to insure good electrical contact.

FIGURE 2-2 ANTENNA CABLE ASSEMBLY
(DWG. NO. 696-6005-00 R-0)

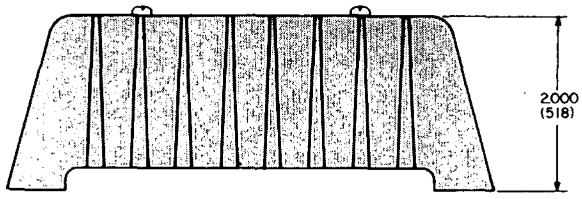


NOTES:

1. ALL DIMENSIONS IN PARENTHESIS ARE IN CENTIMETERS.
2. WEIGHT: 1.1 lbs
3. TERMINALS WILL TAKE 16 TO 22 AWG WIRE.
4. TERMINALS ARE #5-40 X 1/4 BD. HD. SCREWS.

WARNING

DO NOT MOUNT IN CLOSE PROXIMITY
TO HEATER DUCT OR OTHER SOURCES OF HEAT



155-5076-00 (R-)

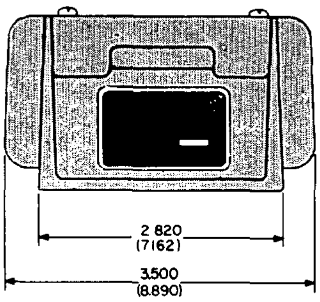
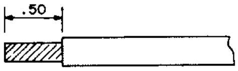


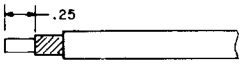
FIGURE 2-3 KA 39 VOLTAGE CONVERTER OUTLINE AND MOUNTING DRAWING
(DWG. NO. 155-5076-00 R-0)

CONNECTOR ASSEMBLY INSTRUCTIONS

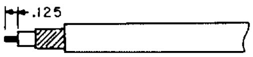
DOCUMENT 006-1058-00, OCT, 1972



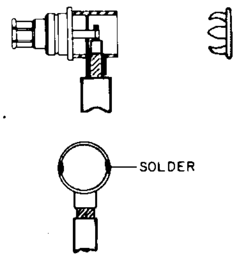
Trim coax outer insulation as shown.



Trim braid but not center conductor or insulation back 0.25".

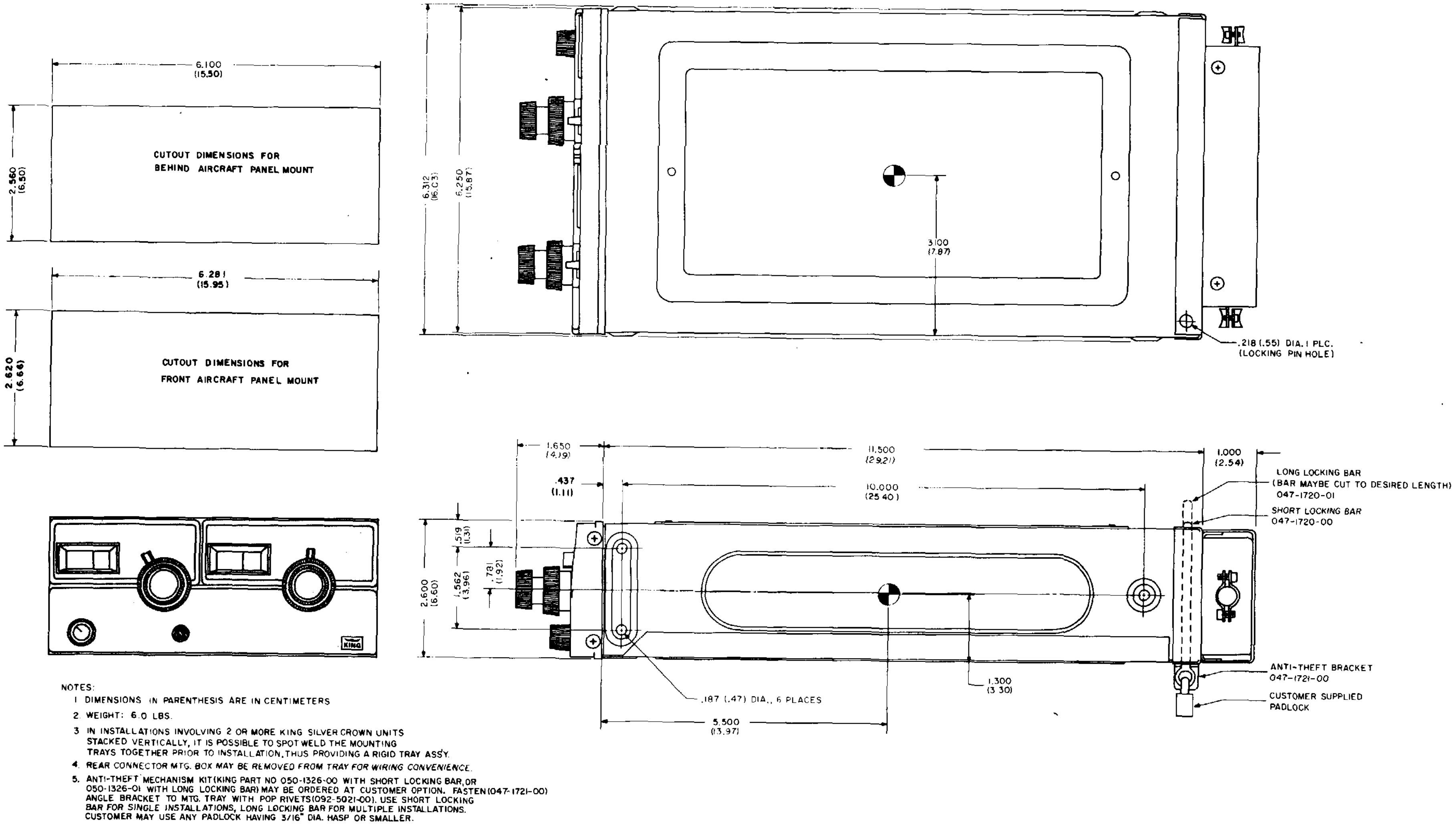


Strip insulation back 0.125".



Insert cable through side wall of connector and solder center conductor to center pin of connector. Heat the outside of the connector sleeve and at the same time apply solder between braid and sleeve. Continue to apply heat until the solder flows. Insert connector cap into end of fitting and tack solder in 2 places.

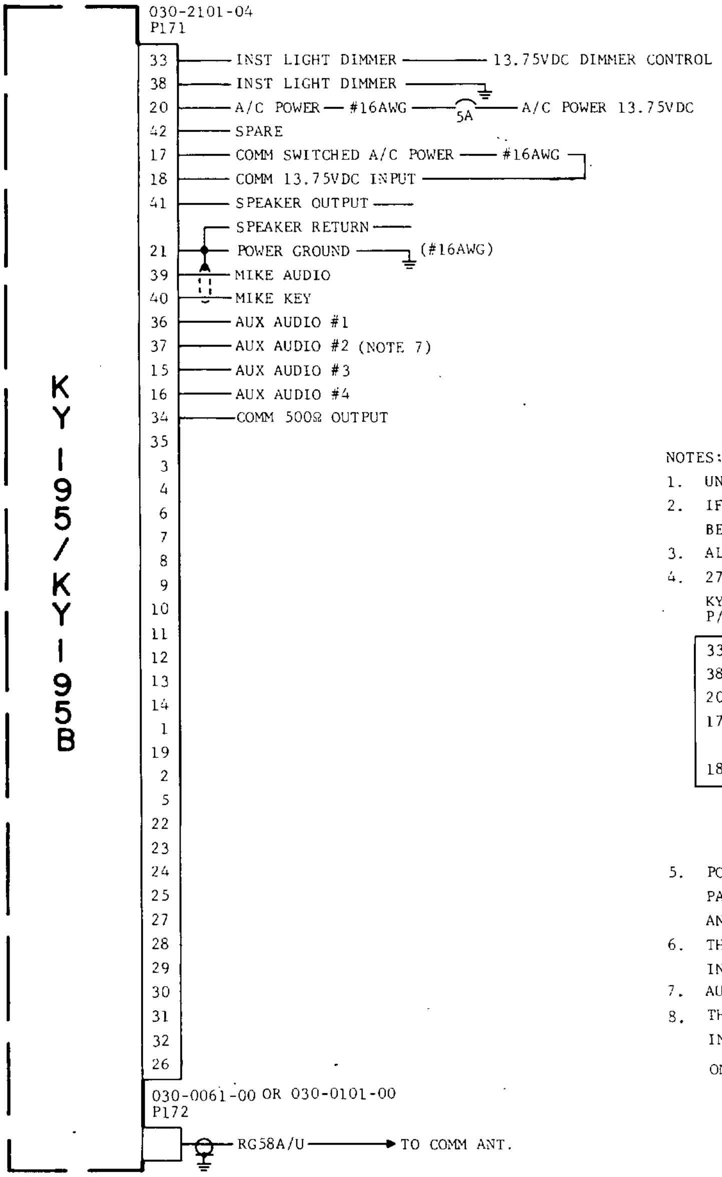
FIGURE 2-3A ANTENNA CABLE ASSEMBLY



NOTES:

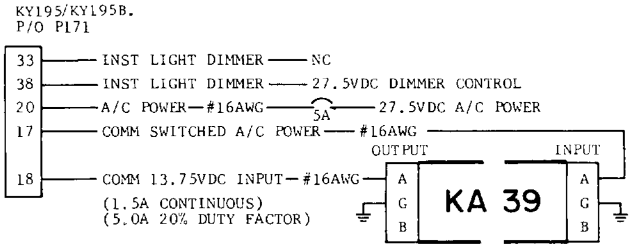
1. DIMENSIONS IN PARENTHESIS ARE IN CENTIMETERS
2. WEIGHT: 6.0 LBS.
3. IN INSTALLATIONS INVOLVING 2 OR MORE KING SILVER CROWN UNITS STACKED VERTICALLY, IT IS POSSIBLE TO SPOT WELD THE MOUNTING TRAYS TOGETHER PRIOR TO INSTALLATION, THUS PROVIDING A RIGID TRAY ASS'Y.
4. REAR CONNECTOR MTG. BOX MAY BE REMOVED FROM TRAY FOR WIRING CONVENIENCE.
5. ANTI-THEFT MECHANISM KIT (KING PART NO 050-1326-00 WITH SHORT LOCKING BAR, OR 050-1326-01 WITH LONG LOCKING BAR) MAY BE ORDERED AT CUSTOMER OPTION. FASTEN (047-1721-00) ANGLE BRACKET TO MTG. TRAY WITH POP RIVETS (092-5021-00). USE SHORT LOCKING BAR FOR SINGLE INSTALLATIONS, LONG LOCKING BAR FOR MULTIPLE INSTALLATIONS. CUSTOMER MAY USE ANY PADLOCK HAVING 3/16" DIA. HASP OR SMALLER.

FIGURE 2-4 KY 195B OUTLINE AND MOUNTING DRAWING
(DWG. NO. 155-5108-00 R-0)



NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. IF SPEAKER IS NOT USED, INSTALL A 4Ω, 10W RESISTOR TO SIMULATE LOAD BETWEEN PINS 41 AND 21.
3. ALL GROUNDS ARE AIRFRAME GROUNDS UNLESS OTHERWISE NOTED.
4. 27.5VDC OPERATION:



5. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
6. THE KY195 WILL FUNCTION PROPERLY WHEN PLUGGED INTO KX175 OR KX170A INSTALLATIONS. REFER TO KX170A/KX175 INSTALLATION MANUAL (006-0057-00).
7. AUXILIARY AUDIO #2 IS INTERCOM MIC. INPUT ON KY195B, KX170B/KX175B ONLY.
8. THE KY195B WILL FUNCTION PROPERLY WHEN PLUGGED INTO KX170B OR KX175B INSTALLATIONS. REFER TO KX170B/KX175B INSTALLATION MANUAL (006-00[illegible]-00).

ONE POSSIBLE INTERCONNECT IS SHOWN BELOW.

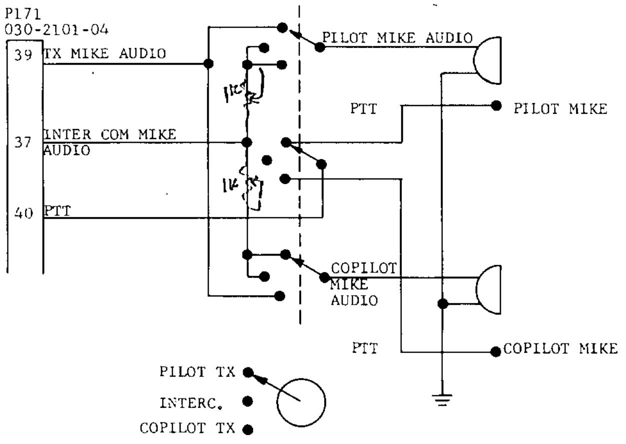
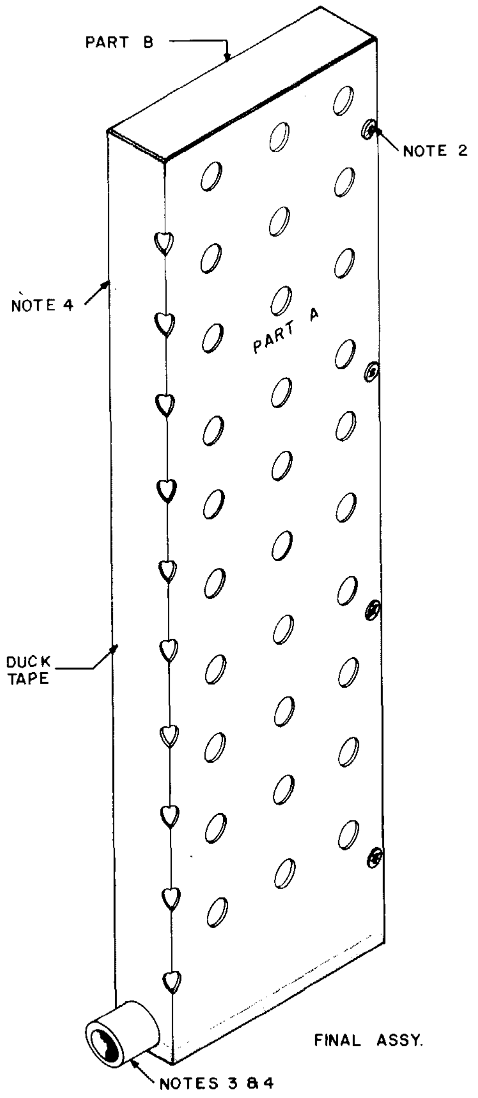
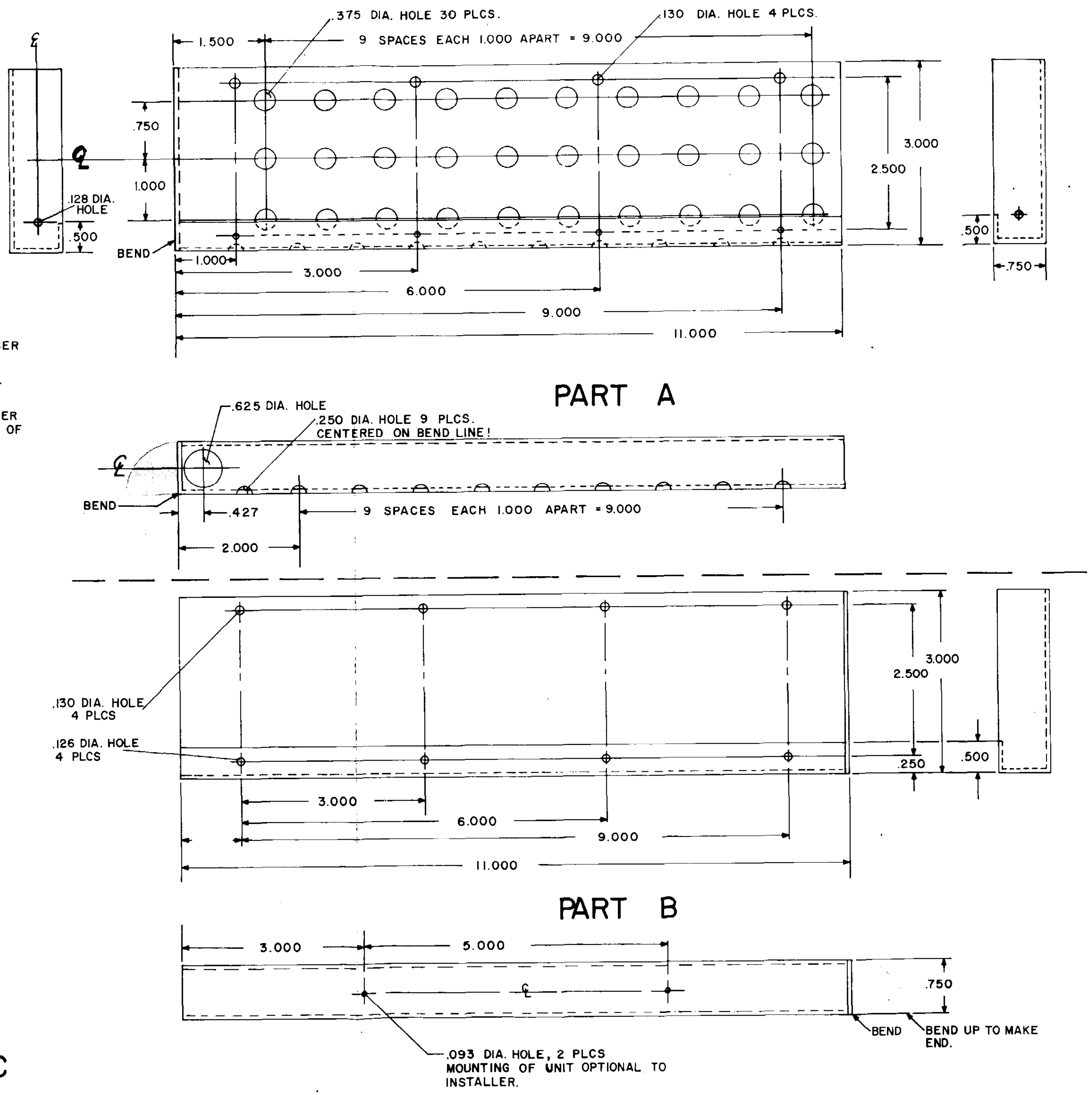


FIGURE 2-5 KY 195 INTERCONNECT
(DWG. NO. 155-1099-00 R-3)



NOTES:

1. MAKE ONE OF EACH PART SHOWN.
2. POP RIVET TOGETHER 8 PLCS.
3. POP RIVET RAM AIR TUBE TO DIFFUSER HOUSING.
4. DUCK TAPE ALL SEAMS OF DIFFUSER. AND SEAL IN TUBE.
5. THE LENGTH OF DIFFUSER, AND NUMBER OF HOLES. DEPENDS ON THE HEIGHT OF RADIO STACK OR AIRCRAFT PANEL.
6. SEE SHEET 2 FOR SUGGESTED INSTALLATION.



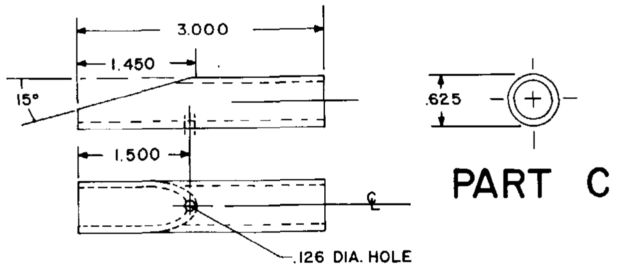


FIGURE 2-6 COOLING DIFFUSER FOR RADIO STACKS

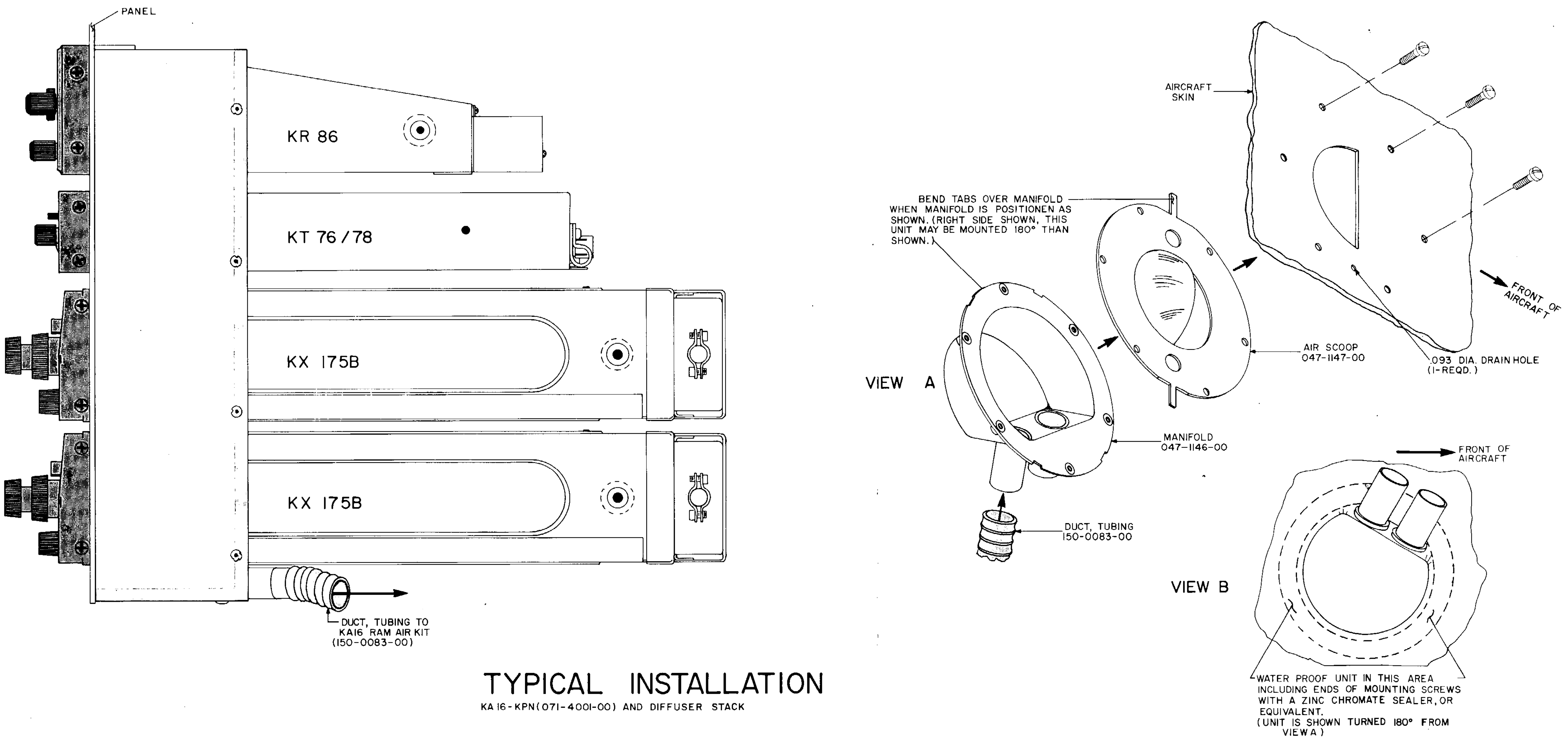


FIGURE 2-7 KR 16 RAM AIR KIT AND DIFFUSER INSTALLATION

SECTION III

OPERATION

3.1 GENERAL

All controls required to operate the KY 195B are located on the unit front panel.

3.2 KY 195B COMM CONTROLS

3.2.1 COMM ON-OFF TEST CONTROL

The ON-OFF-TEST control is located directly above the COMM A channel selector. Power is supplied to the COMM when this control is either in the ON or TEST position. The TEST position is used to defeat the COMM automatic squelch for both test purposes and listening to extremely weak signals.

3.2.2 COMM VOLUME CONTROL

The Volume (VOL) control, located on the lower left side of the KY 195B is used to adjust the transceiver audio volume. The KY 195B system power ON/OFF switch is independent of this control, allowing the COMM volume to remain at a desired preset level.

3.2.3 COMM A FREQUENCY SELECTOR

The two concentric knobs under the COMM A frequency window are used to dial COMM A frequencies. The larger knob selects MHz and the smaller knob selects KHz. The transceiver is inoperable in the two unused MHz positions between 118MHz and 135MHz. Clockwise rotation selects higher frequencies. The dial mechanism has no stops, permitting continuous rotation.

3.2.4. COMM B FREQUENCY SELECTOR

The two concentric knobs under the COMM B frequency window are used to dial COMM B frequencies. The larger knob selects MHz and the smaller knob selects KHz. The transceiver is inoperable in the two unused MHz positions between 118MHz and 135MHz. Clockwise rotation selects higher frequencies. The dial mechanism has no stops, permitting continuous rotation.

3.2.5 A-B SELECTOR CONTROL

The A-B leverswitch is used to select control head A or control head B.

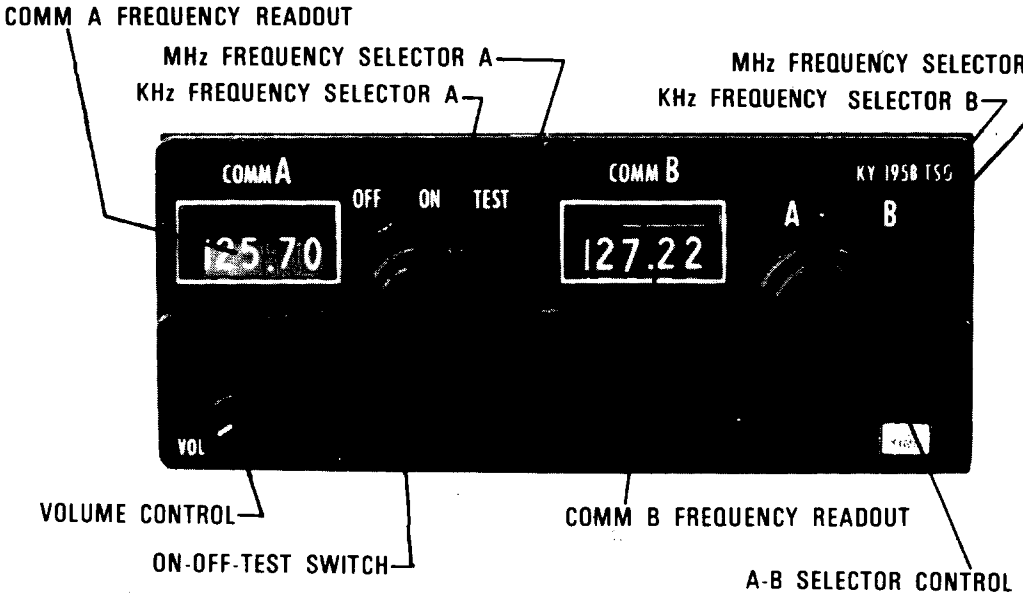


FIGURE 3-1 KY 195B CONTROL FUNCTIONS

3.3 POST-INSTALLATION CHECKOUT

An operational performance flight test is recommended after the installation is completed to insure satisfactory performance of the equipment in its normal environment.

To check the communications transceiver, maintain an appropriate altitude and contact a ground station facility at a range of at least fifty nautical miles. Contact a ground station close in. Place the squelch knob in the test position and listen for any unusual electrical noise which would reduce the COMM receiver sensitivity by increasing the squelch threshold. If possible, verify the communications capability on both the HIGH and LOW ends of the VHF COMM band.

MAINTENANCE/OVERHAUL MANUAL

KY 195B COMMUNICATIONS TRANSCEIVER

KING RADIO CORPORATION®

400 NORTH ROGERS ROAD
OLATHE, KANSAS, U.S.A.

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SECTION IV THEORY OF OPERATION AND MAINTENANCE

SECTION V ILLUSTRATED PARTS LIST

LIST OF ILLUSTRATIONS

SECTION IV

THEORY OF OPERATION/MAINTENANCE

4.1 GENERAL

KY 195 unit incorporates a 720 channel communications transceiver, a 5 watt audio system, and dual control heads. The transceiver and audio systems are identical to the respective portions of the KX 175B. For theory and maintenance procedures on the COMM transceiver or audio system, refer to the KX 175B text. Theory and maintenance of the dual control head mechanism appear in this section.

4.2 DUAL CONTROL HEAD

Wafer switches in the KY 195B are identical to the COMM wafer switches used in the KX 175B. Lever switch "A-B" applies either "A" or "B" channeling information to the SMO and "A" or "B" tuning voltage to the varactor tuned filters in the COMM receiver preselector.

4.3 DUAL CONTROL HEAD-DETAILED DESCRIPTION

Refer to Figure 5-31 in the KX 170B/KX 175B Maintenance Manual for the KY 195B Switching Assembly Diagram.

4. 3. 1 Control Head Selector in "A" Position

The DPST switch (S111) contacts are open and the "B" tuning voltage (red-blue wire) from switch wafer S106 is disconnected from the COMM tuning voltage buss. Additionally, the common wire to the "B" switch wafers (red-gray wire) assumes a voltage of approximately 8 volts, back biasing the isolation diodes associated with the "B" wafer switches which effectively disconnects the "B" switching circuitry from the COMM SMO. Transistors Q201-Q204 are saturated. Q204 shorts the common wire of the "A" switch wafers (brown-gray wire) to ground, activating the "A" wafer switch functions. Q203 connects the negative side of the "A" tuning voltage divider on switch wafer, S102, to ground while Q201 connects the positive side to +8. 5VDC providing a current path through the tuning voltage divider. The "A" tuning voltage from switch wafer S102 is connected directly to the COMM tuning voltage buss (red-blue wire) providing "A" tuning voltage to the COMM receiver preselector.

4. 3. 2 Control Head Selector in "B" Position

The DPST switch (S111) contacts are closed, connecting (a) the COMM tuning voltage from switch wafer S106 to the tuning voltage buss (red-blue wire) and (b) the common wire of the "B" switch wafers (red-gray wire) to ground. With the common wire on ground, the "B" channeling wafers are activated and transistors Q201-Q204 are off. With Q203 and Q201 off, no current flows through the "A" tuning voltage divider on switch wafer S102, isolating it from the COMM tuning voltage buss (red-blue wire). With Q204 off, the "A" wafers and associated isolation diodes represent an open circuit to the COMM SMO frequency selection circuitry.

4.4 TROUBLESHOOTING THE DUAL CONTROL HEAD

Refer to Figure 5-31 in the KX 170B/KX 175B Maintenance Manual for the KY 195B switching matrix voltage measurements. See the KX 175B Manual for channeling malfunctions, refer to Table 4-3 "COMM Programmable Counter Coding" and for COMM receiver preselector tuning voltage versus channel frequency see Table 5-3 "COMM Channel-Receive SMO Frequency-Tuning Voltage. "

KY 195B
COMMUNICATIONS TRANSCEIVER

1. KY 195B-See page 6-1 and 6-2 in KX 170B/KX 175B Maintenance Manual.
2. FRONT PLATE SUB-ASSEMBLY-See pages 6-4 thru 6-9 in KX 170B/KX 175B Maintenance Manual.
3. SWITCHING HEAD SUB-ASSEMBLY-See pages 6-10 thru 6-14 in KX 170B/KX 175B Maintenance Manual.
4. COMM SMO BOARD SUB-ASSEMBLY-See pages 6-32 thru 6-38. For schematic and assembly drawing see page 5-69 of the KX 170B/ KX 175B Maintenance Manual.
5. COMM SMO SUB-ASSEMBLY-See pages 6-39 thru 6-41 in KX 170B/KX 175B Maintenance Manual.
6. NAV/COMM BOARD SUB-ASSEMBLY-See pages 6-42 thru 6-50 in KX 170B/KX 175B Maintenance Manual. For schematic and assembly drawings see pages 5-63 and 5-63A in KX 170B/ KX 175B Maintenance Manual.
7. TRANSMITTER BOARD SUB-ASSEMBLY-See pages 6-51 thru 6-53 in KX 170B/KX 175B Maintenance Manual. For schematic and assembly drawing see page 5-67 in KX 170B/ KX 175B Maintenance Manual.
8. REAR PLATE SUB-ASSEMBLY-See pages 6-54 thru 6-56 in KX 170B/KX 175B Maintenance Manual. For assembly drawing see page 6-60 in KX 170A/ KX 175 Maintenance Manual.
9. AUDIO DRIVE BOARD SUB-ASSEMBLY-See pages 6-57 thru 6-59 in KX 170B/KX 175B Maintenance Manual. For schematic and assembly drawing see page 5-67 in KX 170B/KX 175B Maintenance Manual.
10. REAR DIVIDER SUB-ASSEMBLY-See pages 6-60 thru 6-63 in KX 170B/KX 175B Maintenance Manual.
11. CONNECTOR & CABLE SUB-ASSEMBLY-See pages 6-65 thru 6-67 in KX 170B/KX 175B Maintenance Manual.
12. KA 39 VOLTAGE CONVERTER-See pages 6-71 thru 6-74 in KX 170A/KX 175 Maintenance Manual.

NAME	SW MATRIX SUB-ASS'Y.		**ASS'Y. NO.**	200-0459-00	
ASS'Y. DWG.	300-0662-00	**UNIT**	KY 195B	**USED ON**	069-1021-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY					
				00					
	009-0030-02	Terminal Strip		5					
	012-1006-00	Nyl Lacing Tape		AR					
	025-0018-04	#26 Wire Blk/Yel		.3					
	025-0018-14	#26 Wire Brn/Yel		.3					
	025-0018-24	#26 Wire Red/Yel		.3					
	025-0018-34	#26 Wire Orn/Yel		.3					
	025-0018-44	#26 Wire Yel		.5					
	025-0018-54	#26 Wire Grn/Yel		.5					
	025-0018-56	#26 Wire Grn/Blu		1.0					
	025-0018-64	#26 Wire Blu/Yel		.4					
	025-0018-74	#26 Wire Vio/Yel		.4					
	025-0018-84	#26 Wire Gry/Yel		.4					
	026-0001-00	#26 Buss Wire		.2					
	047-2362-02	Chassis SW Matrix		1					
	076-0339-00	Spacer		1					
	089-2076-30	Nut 4-40		5					
	089-5878-05	Scr 4-40 x 5/16 PHP		1					
	089-8003-34	Washer S/L		5					
	150-0003-10	Tubing Tef #24 AWG		.2					
Q201	007-0238-00	Tstr FPN4917		1					
Q202	007-0078-00	Tstr 2N3415		1					
Q203	007-0078-00	Tstr 2N3415		1					
Q204	007-0078-00	Tstr 2N3415		1					
CR201	007-6033-00	Diode 1N270		1					
CR202	007-6033-00	Diode 1N270		1					
CR203	007-6033-00	Diode 1N270		1					
CR204	007-6033-00	Diode 1N270		1					
CR205	007-6033-00	Diode 1N270		1					
CR206	007-6033-00	Diode 1N270		1					
CR207	007-6033-00	Diode 1N270		1					
CR208	007-6033-00	Diode 1N270		1					
CR209	007-6033-00	Diode 1N270		1					
CR210	007-6033-00	Diode 1N270		1					
CR211	007-6033-00	Diode 1N270		1					
CR212	007-6033-00	Diode 1N270		1					
CR213	007-6033-00	Diode 1N270		1					
CR214	007-6033-00	Diode 1N270		1					
CR215	007-6033-00	Diode 1N270		1					
CR216	007-6033-00	Diode 1N270		1					
CR217	007-6033-00	Diode 1N270		1					
CR218	007-6033-00	Diode 1N270		1					
CR219	007-6033-00	Diode 1N270		1					
CR220	007-6033-00	Diode 1N270		1					

NAME	SW MATRIX SUB-ASS'Y.			**ASS'Y. NO.**	200-0459-00
ASS'Y. DWG.	300-0662-00	**UNIT**	KY 195B	**USED ON**	069-1021-00

KING RADIO CORP. PARTS LISTING

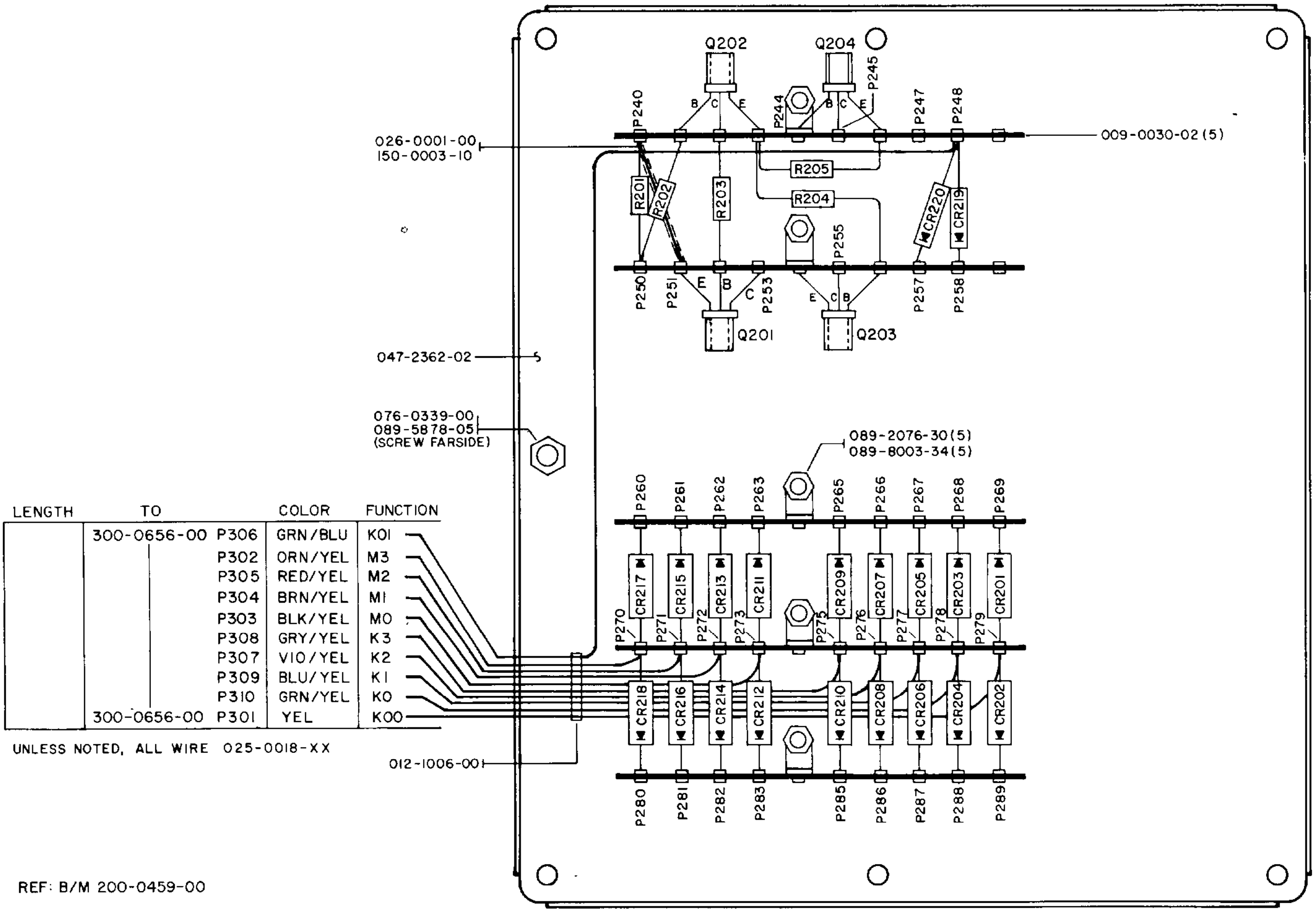
SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY 00					
R201	130-0102-25	Res 1K 10% QW		1					
R202	130-0103-25	Res 10K 10% QW		1					
R203	130-0222-25	Res 2.2K 10% QW		1					
R204	130-0471-25	Res 470Ω 10% QW		1					
R205	130-0471-25	Res 470Ω 10% QW		1					

Parts List Revision Record

Assembly No: 200-0459-00

Manual Revision 0

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY



LENGTH	TO	COLOR	FUNCTION
	300-0656-00 P306	GRN/BLU	K01
	P302	ORN/YEL	M3
	P305	RED/YEL	M2
	P304	BRN/YEL	M1
	P303	BLK/YEL	M0
	P308	GRY/YEL	K3
	P307	VIO/YEL	K2
	P309	BLU/YEL	K1
	P310	GRN/YEL	K0
	300-0656-00 P301	YEL	K00

UNLESS NOTED, ALL WIRE 025-0018-XX

REF: B/M 200-0459-00

FIGURE 5-1 SWITCHING MATRIX SUB-ASS'Y
(Dwg. No. 300-0662-00) R-1

KING

KX 170BE
NAVIGATION RECEIVER
COMMUNICATION TRANSCEIVER

KX 170BE

1.1 This section contains information relative to the King Radio Corporation KX 170BE Communications Transceiver/Navigation Receiver. The KX 170BE is identical to the KX 170B with the exception of the Communication Transceiver Selectivity.

Refer to the KX 170B text and the changes listed below to completely specify the KX 170BE.

1.2 Page 1-3, Section 1.5 Technical Characteristics should read:

SPECIFICATION	CHARACTERISTIC
RECEIVER SELECTIVITY	Typical 6db at ±15KHz 65db at ±50KHz

1.3 Page 1-9, Section 1.6 Units and Accessories Supplied should read:

A. King KX 170BE NAV/COMM (069-1020-01).

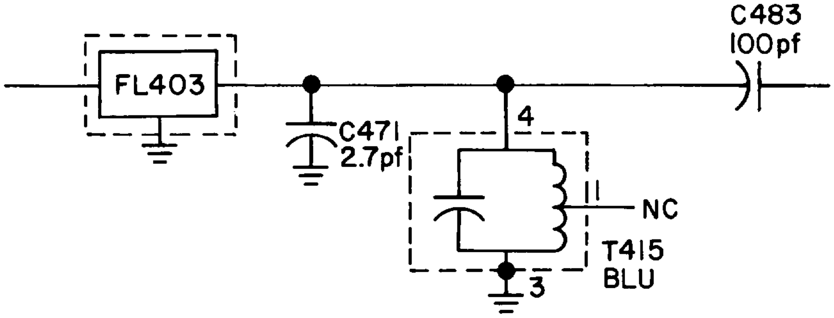
1.4 Page 6-43 NAV/COMM Board Sub-Assembly should read:

SYMBOL	PART NUMBER	DESCRIPTION	QTY
FL403	017-0034-00	Fil 9.00MHz	1

1.5 Page 6-44 NAV/COMM Board Sub-Assembly should read:

SYMBOL	PART NUMBER	DESCRIPTION	QTY
C471	113-3027-00	Cap D/C 2.7pf±.25pf N150	1
C482	113-3390-00	Cap D/C 39pf 5% N150	1
C483	113-5101-01	Cap D/C 100pf 10% X5F	1

1.6 Page 5-63A, Figure 5-26A NAV/COMM Receiver Schematic & Assy.



KING

KX 175BE
NAVIGATION RECEIVER/
COMMUNICATION TRANSCEIVER

KX 175BE

1.1 This section contains information relative to the King Radio Corporation KX 175BE Communications Transceiver/Navigation Receiver. The KX 170BE is identical to the KX 175B with the exception of the Communication Transceiver Selectivity.

Refer to the KX 175B text and the changes listed below to completely specify the KX 175BE.

1.2 Page 1-6, Section 1.5 Technical Characteristics should read:

SPECIFICATION	CHARACTERISTIC
RECEIVER SELECTIVITY	Typical 6db at ±15KHz 65db at ±50KHz

1.3 Page 1-9, Section 1.6 Units and Accessories Supplied should read:

King KX 175BE NAV/COMM (069-1019-01).

1.4 Page 6-43 NAV/COMM Board Sub-Assembly should read:

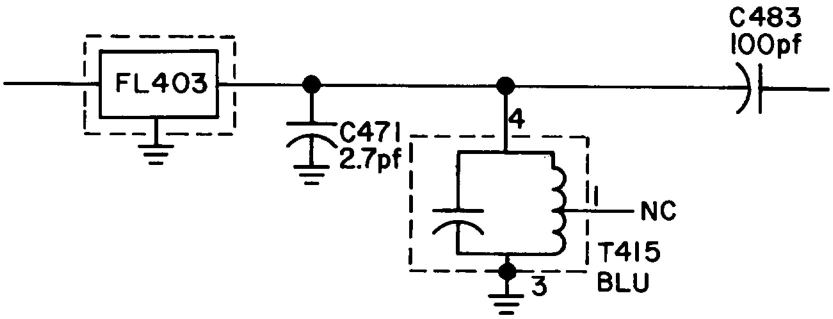
SYMBOL	PART NUMBER	DESCRIPTION	QTY
FL403	017-0034-00	Fil 9.00MHz	1

1.5 Page 6-44 NAV/COMM Board Sub-Assembly should read:

SYMBOL	PART NUMBER	DESCRIPTION	QTY
C471	113-3027-00	Cap D/C 2.7pf ± .25pf N150	1
C482	113-3390-00	Cap D/C 39pf 5% N150	1
C483	113-5101-01	Cap D/C 100pf 10% X5F	1

1.6 Page 5-63A Fig. 5-26A NAV/COMM Receiver Schematic & Ass'y.

(KX 170B Assy. Drawing - COMM Side is Applicable to KX175BE)



KY 195BE

1.1 This section contains information relative to the King Radio Corporation KY 195BE Communications Transceiver. The KY 195BE is identical to the KY 195B with the exception of Transceiver Selectivity.

Refer to the KY 195B test and the changes listed below to completely specify the KY 195BE.

1.2 Page 1-3, Section 1.5 Technical Characteristics should read:

SPECIFICATION	CHARACTERISTIC
RECEIVER SELECTIVITY	Typical 6db at ± 15KHz 65db at ± 50KHz

1.3 Page 1-4, Section 1.6 Units and Accessories Supplied should read:

A. King KY195BE NAV/COMM (069-1021-01).

1.4 Page 6-43 NAV/COMM Board Sub-Assembly should read:

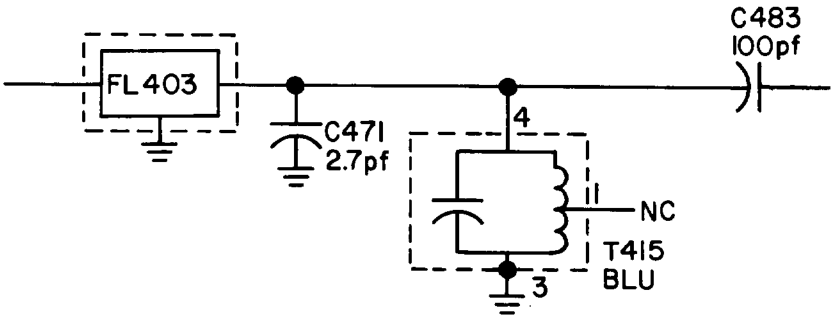
SYMBOL	PART NUMBER	DESCRIPTION	QTY
FL403	017-0034-00	Fil 9.00MHz	1

1.5 Page 6-44 NAV/COMM Board Sub-Assembly should read:

SYMBOL	PART NUMBER	DESCRIPTION	QTY
C471	113-3027-00	Cap D/C 2.7pf ±.25pf N150	1
C482	113-3390-00	Cap D/C 39pf5% N150	1
C483	113-5101-01	Cap D/C 100pf 10% X5F	1

1.6 Page 5-63 and 5-63A (Located KX 170B/KX 175B Section)

(KX 170B Ass'y Drawing - COMM SIDE is Applicable to KY195BE)



KING

KX 175B
NAVIGATION RECEIVER/
COMMUNICATION TRANSCEIVER

KX 175B
(069-1019-05)

1.1 This section contains information relative to the King Radio Corporation KX 175B (069-1019-05) Communication Transceiver/Navigation Receiver. The KX 175B (069-1019-05) is identical to the KX 175B (069-1019-00) with the exception of the Communication Transceiver selectivity which meets both RTCA DO-156, class C and D, and RTCA DO-109 receiver selectivity requirements.

Refer to the KX 175B text and the changes listed below to completely specify the KX 175B (069-1019-05).

1.2 Page 1-6, Section 1.5, Technical Characteristics should read:

SPECIFICATION	CHARACTERISTIC
Receiver Selectivity	Typical: 6db at ±9KHz, 40db at ±13.5KHz 60db at ±16KHz

1.3 Page 1-9, Section 1.6, Units and Accessories Supplied should read:

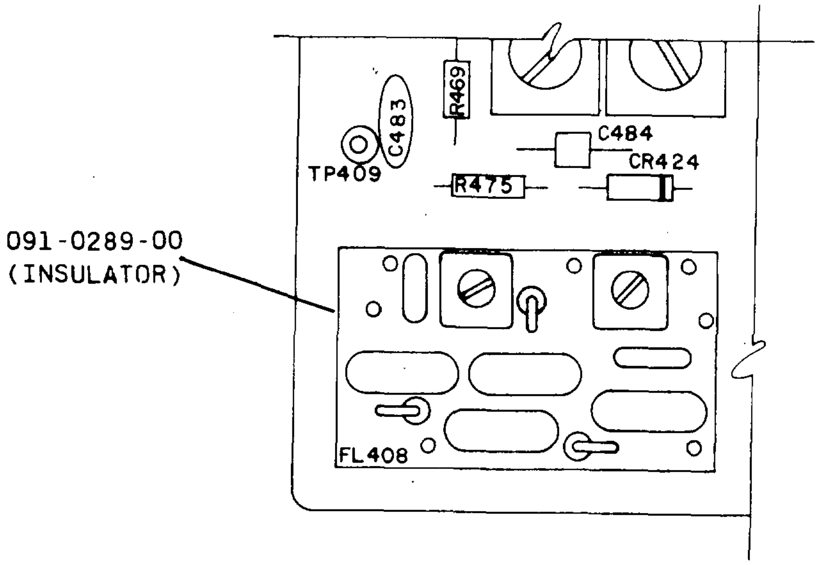
B. King KX 175B NAV/COMM (069-1019-05)

1.4 Page 5-13, Paragraph 5.2.5.4 I.F. Alignment should read:

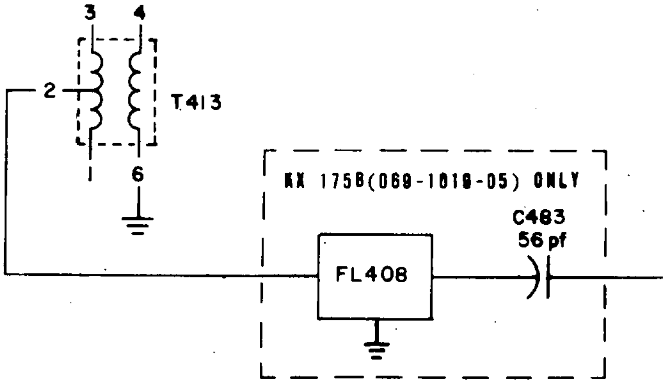
Repetitively peak the two inductors on FL408 until no further improvements are noted. (no load used)

1.5 Page 5-63A, Figure 5-26A NAV/COMM Reeeiver Schematic and Assembly

The following drawing should be added:



The scehmatic should be revised as follows:



1.6 Pages 6-33 through 6-35, Comm. Smo. Bd. Sub-Ass'y should read:

SYMBOL	PART NUMBER	DESCRIPTION	QTY
Y301	044-0066-01	Xtal, 71.0375MHz	1
Y302	044-0066-00	Xtal, 66.5375MHz	1
Y303	044-0065-00	Xtal, 400KHz	1
C346	109-0008-09	Cap, Cer, 33pf N5600	1
C366	118-0031-00	Cap, Cer, 56pf N5600	1

1.7 Pages 6-42 through 6-47 NAV/COMM Bd. Sub-Ass'y.
Delete, add, or change the lines as shown below:

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QTY
Delete	FL405	017-0041-00	Fil 9.000MHz MS	1
Delete	FL406	017-0041-00	Fil 9.000MHz MS	Ref
Delete	FL407	017-0041-00	Fil 9.000MHz MS	Ref
Delete	T414	019-8043-01	Xfmr 9.0MHz	1
Delete	T415	019-8043-00	Xfmr 9.0MHz	1
Delete	C482	113-3270-00	Cap DC 27pf N150	1
Delete	C516	106-0001-15	Cap MLD .56pf 10%	1
Delete	C517	106-0001-15	Cap MLD .56pf 10%	1
Add	FL408	017-0059-00	Fil 9.000MHz	1
Add		091-0289-00	Filter Spacer	1
Change to	C483	104-0001-44	Cap DM 56pf 5%	1

KY 195B
(069-1021-04)

1.1 This section contains information relative to the King Radio Coroporation KY 195B (069-1021-04) Communications Transceiver. The KY 195B (069-1021-04) is identical to the KY 195B (069-1021-00) with the exception of the Communication Transceiver selectivity which meets both RTCA DO-156 Class C and D, and RTCA DO-109 receiver selectivity requirements.

Refer to the KY 195B text and the changes listed below to completely specify the KY 195B (069-1021-04).

1.2 Page 1-3, Section 1.5 Technical Characteristics should read as follows:

SPECIFICATION	CHARACTERISTIC
Receiver Selectivity	Typical: 6db at ±9KHz 40db at ±13.5KHz 60db at ±16KHz

1.3 Page 1-4, Section 1.6 Units and Accessories Supplied should read:

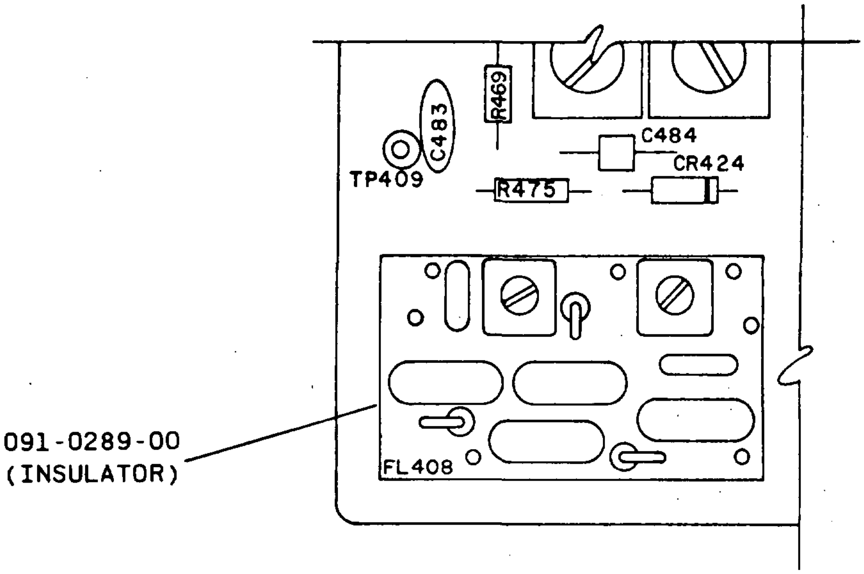
A. King KY 195B COMM (069-1021-04)

1.4 Page 5-13, Paragraph 5.2.5.4 I.F. Alignment should read:

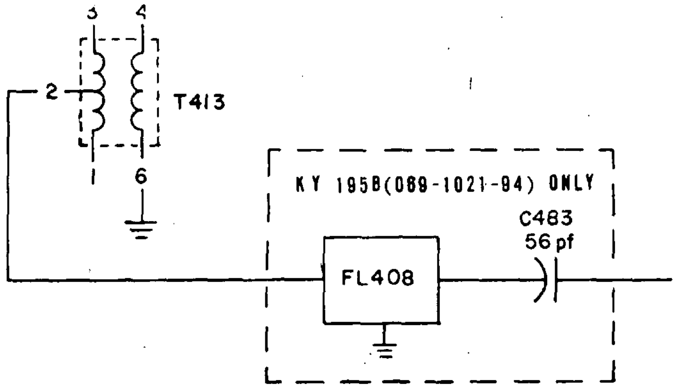
Repetitively peak the two inductors on FL408 until no further improvements are noted. (no load used)

1.5 Page 5-63A, Figure 5-26A NAV/COMM Receiver Schematic and Assembly

The following drawing should be added:



The schematic should be revised as follows:



1.6 Pages 6-33 through 6-35, Comm. Smo. Bd. Sub-Ass'y should read:

SYMBOL	PART NUMBER	DESCRIPTION	QTY
Y301	044-0066-01	Xtal, 71.0375MHz	1
Y302	044-0066-00	Xtal, 66.5375MHz	1
Y303	044-0065-00	Xtal, 400KHz	1
C346	109-0008-09	Cap, Cer, 33pf N5600	1
C366	118-0031-00	Cap, Cer, 56pf N5600	1

1.7 Pages 6-42 through 6-47 NAV/COMM Bd. Sub-Ass'y.
Delete, add or change the lines as shown below:

ACTION	SYMBOL	PART NUMBER	DESCRIPTION	QTY
Delete	FL405	017-0041-00	Fil 9.000MHz MS	1
Delete	FL406	017-0041-00	Fil 9.000MHz MS	Ref
Delete	FL407	017-0041-00	Fil 9.000MHz MS	Ref
Delete	T414	019-8043-01	Xfmr 9.0MHz	1
Delete	T415	019-8043-00	Xfmr 9.0MHz	1
Delete	C482	113-3270-00	Cap, DC 27pf N150	1
Delete	C516	106-0001-15	Cap, MLD .56pf 10%	1
Delete	C517	106-0001-15	Cap, MLD .56pf 10%	1
Add	FL408	017-0059-00	Fil 9.000MHz	1
Add		091-0289-00	Filter Spacer	1
Change to	C483	104-0001-44	Cap, DM 56pf 5%	1