

SERVICE MANUAL

LPH SERIES SYNTHESIZED PORTABLE RADIO



BENDIX/KING

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SECTION I GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical, and electrical characteristics of the King Radio Corp LPH Series handheld VHF FM Communications Transceivers.

1.2 DESCRIPTION

The LPH series radios are a self contained VHF FM Transceiver covering the frequency range of 148MHz to 173.995MHz. Models are available in 2 watt 2 channel, 2 watt 14 channel, 5 watt 2 channel and 5 watt 14 channel versions. The 5 watt models have an external switch for Hi-Lo power output. CODE GUARD™, Scan, Transmitter time out timer, scan delay, and priority scan are built into the LPH 214/514. A variety of twist-off battery packs are also available.

1.3 TECHNICAL CHARACTERISTICS

LPH 202/214/502/514	
FREQUENCY:	148-173.995MHz
POWER SUPPLY:	One rechargeable nickel-cadmium battery pack with temperature sensor or one Alkaline battery pack
CODE GUARD™ CTCSS & DCTSS:	Programmable
SQUELCH TAIL ELIMINATION:	Standard
PRIORITY CH, SCAN, TOT, SCAN DELAY	Programmable (LPH 214/514 Only)
CHANNELS:	
LPH 202	2
LPH 214	14
LPH 502	2
LPH 514	14
FREQUENCY SPREAD:	26 MHz with no degradation
OPERATING TEMPERATURE:	-30° to +60°c
PHYSICAL DIMENSIONS:	
Weight:	20 oz. (24 oz. with large battery pack)
Width:	2.55 in
Depth:	1.50 in
Height:	6.60 in (7.80 in with large battery)
ANTENNA TYPE:	Threaded Helical wound rubber flex (standard) BNC Helical wound rubber flex (optional)
CHANNEL SPACING:	30 Khz
FCC Identification number:	
5 Watt:	ASY90Q LT20001
2 Watt:	ASY90Q LT20002
MAX CURRENT DRAIN:	Transmit 2 watt: 575 mA Transmit 5 watt: 1.4 amps Receive: 165 mA Standby with battery save off: 45 mA Standby with battery save on: 15 mA

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TRANSMITTER

RF OUTPUT POWER:

LPH 202	2 Watts
LPH 214	2 Watts
LPH 502	5 Watts (HI Power Mode) 2 Watt (LO Power Mode)*
LPH 514	5 Watts (HI Power Mode) 2 Watt (LO Power Mode)*

*Low power output is adjustable

MODULATION CHARACTERISTIC: 16F3, 15F2, and 16F9

SPURIOUS AND HARMONICS: 60 dB

MAXIMUM DEVIATION: ± 5 Khz

FM HUM AND NOISE: 43 dB

FREQUENCY STABILITY: ± 5 ppm

AUDIO DISTORTION: 5% maximum with 3KHz deviation

AUDIO RESPONSE: +1 to -3dB from 6dB/Octave de-emphasis characteristic at 0.3 to 3 Khz

DUTY CYCLE: Continuous

RECEIVER

SENSITIVITY:

12dB SINAD:	0.25uV
NOISE SQUELCH:	0.18uV

SELECTIVITY: 70 dB

IMAGE AND SPURIOUS RESPONSES: 70dB

INTERMODULATION: 70dB

AUDIO OUTPUT: 500mW with 5% distortion maximum into an 8 Ω load

AUDIO RESPONSE: +1 to -3dB from 6dB/Octave de-emphasis characteristic at 0.3 to 3Khz

1.4 ACCESSORIES

The following units are available as optional accessories for the LPH hand held transceivers:

- A. LAA 0100 Standard Nicad Battery Pack, KPN 200-3224-00.
- B. LAA 0105 Large Nicad Battery Pack, KPN 200-3224-01.
- C. LAA 0106 Large Alkaline Battery, KPN 200-3237-00.
- D. LAA 0200 Speaker/Microphone, KPN 071-3012-04.
- E. LAA 0300 14 Hr. desktop trickle charger, KPN 062-0102-00.
- F. LAA 0310 1 Hr. desktop charger 121VAC, KPN 062-0103-00.
- G. LAA 0311 242VAC conversion kit for LAA 0310, KPN 050-2316-00.
- H. LAA 0340 14VDC Veh. trickle charger, KPN 062-0107-00.
- I. LAB 0356 14VDC 1 Hr veh. charger, with speaker and microphone.
- J. LAA 0810 Std port antenna 148-174MHz, KPN 071-1299-01.
- K. LAA 0811 BNC port antenna, KPN 071-1299-20.

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- L. LAA 0812 BNC Conversion Kit, KPN 050-2185-00
- M. LAA 0700 Cloning cable and Programming Manual, KPN 200-3467-00
- N. LAA 0701 Programming Plug and Programming manual, KPN 200-3466-00
- O. LAA 0705 RS232 Interface and Manual, KPN 200-3236-00
- P. LAA 0600 Portable tool kit, includes the following: Spanner and ant wrench, Accy Cable, RF cable, Audio cable and Battery Eliminator, KPN 200-3465-00

1.5 LICENSE REQUIREMENTS

This equipment must be licensed by the Federal Communications Commission before it may be used. Your King Radio dealer can assist you in filing the appropriate application for the FCC and will program each radio with your authorized frequencies, signaling codes, etc.

1.6 SERVICE INFORMATION

If you have questions regarding service you may contact the factory at the address below:

King Radio Corporation
Mobile Communications Division
P.O. Box 3347
Lawrence, Kansas 66046-0347
(913) 842-0402

1.7 WARRANTY INFORMATION

KING RADIO CORPORATION's Mobile Communications Division ("Warrantor") warrants to the purchaser of new radio equipment of the warrantor's manufacture that such equipment shall be free from defects in material and workmanship for a period of one (1) year from the earlier of (a) installation of the equipment or (b) two months from the date of purchase of the equipment. Equipment and accessory items not manufactured by the Warrantor carry the standard warranty of the manufacturer thereof.

This warranty does not cover equipment which has been (a) damaged or not maintained as reasonable and necessary, (b) modified in any way, (c) improperly installed, (d) repaired by someone other than the warrantor or an authorized warranty repair station, or (e) used in a manner or purpose for which the equipment was not intended. This warranty shall not extend to incidental or consequential damages arising from operation of the equipment or from any claimed breach of this warranty.

To obtain warranty repair, the customer must return the equipment properly packaged, freight prepaid, to warrantor or any authorized warranty repair station. The equipment will be returned freight prepaid.

This warranty is the only warranty with respect to the equipment and is expressly in lieu of all other warranties, express or implied. Warrantor hereby DISCLAIMS ANY IMPLIED WARRANTY OR MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE. No person, whether in the employ of the warrantor or not is authorized to make oral or other modifications, extensions, or additions to this warranty, unless approved in writing by an authorized officer of the warrantor at its home office.

The liability of the warrantor is expressly limited to the repair or replacement of the equipment as described herein. The warrantor shall not be liable to the purchaser and the purchaser, shall upon his tender of the purchase price for the equipment, agree that the warrantor shall not be liable, in any respect, for the equipment or damages caused thereby, except as prescribed herein, whether such liability is predicated upon negligence, tort, contract, or other products liability theory.

SECTION II

INSTALLATION AND PROGRAMMING

2.1 GENERAL INFORMATION

This section contains suggestions and factors to consider before installing the LPH 202/214/502/514. Close adherence to these suggestions will assure optimum performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking the equipment. Make a visual inspection of the 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. The claim should be promptly filed with the transportation company. It would be advisable to retain the container and packaging material after all equipment has been removed in the event that equipment storage or reshipment should become necessary.

2.3 PROGRAMMING

2.3.1 INTRODUCTION

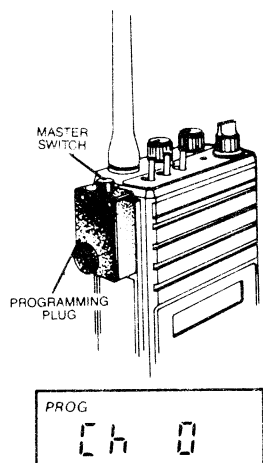
There are two basic types of radios offered by King Mobile Communications. The first are units with an internal keyboard and a display. These will be referred to as the MASTER units. Any MASTER unit can be programmed using its internal keyboard and display. MASTER units are also capable of transferring their program to any other King Radio of that type. The second type of radio has no keyboard or display. These will be referred to as SLAVES. A SLAVE must be programmed by an external source.

There are three possible techniques for programming:

- A. A MASTER unit can be programmed using its internal keyboard and display.
- B. Any King Radio (MASTER or SLAVE) can be cloned from a master unit by attaching a cloning cable from the MASTER to the CLONE and pressing a download button.
- C. Any King Radio can be cloned from a computer via a special RS 232 interface.

2.3.2 REVIEWING THE PROGRAM IN A MASTER RADIO

A. To Enter the Programming Mode:



1. Make sure the battery pack is charged.
2. Insert the programming plug into the side connector of the radio. (Note: the cloning cable will serve as a substitute for the programming plug. However, the cloning cable has two plugs and the plug with the master switch must be plugged into the radio side connector.
3. Press and hold the master switch.
4. While holding the master switch, press the (FCN) key. After approximately three seconds the display will show PROG Ch 0. The radio is now in the programming mode.
5. Release the master switch and (FCN) key. The program is now ready to be reviewed.

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B. To Review General Radio Performance Variables (CH 0):

Channel 0 is the portion of the program that controls radio performance variables such as transmitter Time Out Timer, Scan Delay, Identification Number, Priority Scan Operation, etc.

PROG
CH 0

PROG ID
135 7296

PROG TX
45 566

PROG SCAN
2.0566

PROG
1- 12345

PROG SCAN
2- 12345

PROG
CH 0

ENTRY POINT

1. After entering the program mode, the display will show PROG Ch 0.
2. Press the (FCN) key. The display will show an ID number (up to seven digits in length).
3. Press the (FCN) key. The display will show the Transmitter Time Out Timer length in seconds.
4. Press the (FCN) key. The display will show the Scan Delay Length in seconds.
5. Press the (FCN) key. The display will show five individual functions that can be enabled or disabled.
6. Press the (FCN) key. The display will show a second group of five functions.
7. Press the (FCN) key. The display will loop back to the Channel 0 entry point and show PROG Ch 0.

C. To Review Frequencies and CODE GUARDS™ for an Individual Channel:

PROG
CH 0

PROG
CH 5

PROG RX
153.590

PROG RX CG
0.0

CARRIER SQUELCH

PROG RX CG
114.8

CODE GUARD™

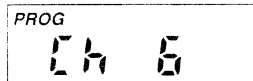
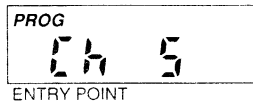
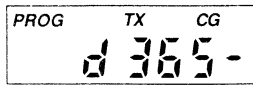
PROG RX CG
d 365

DIGITAL CODE GUARD™

INDICATES
INVERTED
CODE

PROG TX
153.590

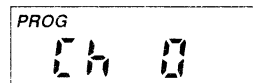
1. After entering the program mode, the display will show PROG Ch 0.
2. Press (CLR) then press the digit keys of the channel that needs to be reviewed. The display will show the channel to be reviewed.
3. Press the (FCN) key. The display will show the receive frequency in MHz.
4. Press the (FCN) key. The display will show the receive CODE GUARD™ or Digital CODE GUARD™ (the value 0.0 denotes carrier squelch). Digital CODE GUARD™ will be a three digit number preceded by a "d" in the display.
5. Press the (FCN) key. The display will show the transmit frequency in MHz.
6. Press the (FCN) key. The display will show the transmit CODE GUARD™ or digital CODE GUARD™. (Digital CODE GUARD™ illustrated.)



7. Press the (FCN) key. The display will loop back to the entry point and display the reviewed channel.
8. Press (CLR) then press the digit key of the next channel to be reviewed, or press (PRI) to increment the channel number one digit. The function key can then be used to review the frequencies and CODE GUARDS™ of this channel.
9. To leave the programming mode, power the unit down by rotating the volume knob counter clockwise to the off position. Remove the programming plug. Normal operation will occur on the next power up.

2.3.3 PROGRAMMING A MASTER RADIO THROUGH THE INTERNAL KEYBOARD AND DISPLAY

A. To Enter the Programming Mode:

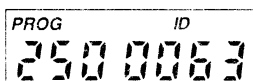
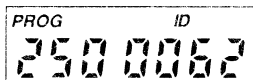
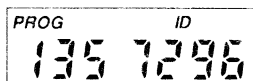


1. Make sure that the battery pack is charged.
2. Insert the programming plug into the side connector of the radio. (Note: The cloning cable will serve as a substitute for the programming plug. The cloning cable has two plugs, the plug with the master switch must be plugged in to the radio side connector.)
3. Press and hold master switch.
4. While holding the master switch, press the (FCN) key for approximately three seconds. The display will show "PROG Ch 0". The radio is now in the programming mode.
5. Release the master switch and (FCN) key. The radio is now ready to be programmed.

B. To Program General Radio Performance Variables (CH 0):

"Channel 0" is the portion of the program that controls radio performance variables such as Transmitter Time Out Timer, Scan Delay, Identification Number, Priority Scan Operation, etc.

C. To Set the ID Number



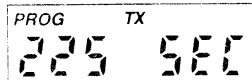
1. After entering the program mode, the display will show "PROG CH 0".
2. Press the (FCN) key.
3. The display will show up to a seven digit ID number. This seven digit number is intended as an electronic serial number for radio system management. An option must be added to the radio to allow this number to be transmitted.
 - 4a. If no change is needed for the ID number, press (FCN) to advance to the next section.
 - 4b. A new number can be entered by pressing (CLR) followed by any number up to seven digits. The digits will appear at the right of the screen and move to the left as more digits are entered. Press (ENT) to store the new ID number and the program will automatically advance to the next section.
 - 4c. If desired, the existing ID number can be incremented one digit by pressing (PRI). Then press (ENT) to store the new ID number and automatically advance to the next section.

D. To Set the Transmitter Time Out Timer

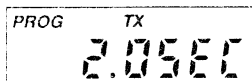


After the ID number is set, the upper display will show "PROG TX." This is the duration of the transmitter Time Out Timer. "0 SEC" means that the Time Out Timer is inhibited.

1. If no change is needed, press (FCN) to advance to the next section.
2. The Time Out Timer length can be changed by pressing the (PRI) or (CLR) key. Each press of the (PRI) key will increase the length by 15 seconds. Up to 225 seconds (3 minutes, 45 seconds). Another press after 225 seconds resets the value to 0. Pressing the (CLR) key will automatically reset the value to 0. Press (ENT) to store the chosen value and automatically advance the program to the next section.



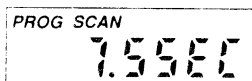
E. To Set the Scan Delay Time



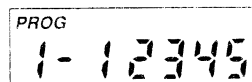
After the Time Out Timer is set the upper display will show "PROG SCAN." This is the duration of the scan delay time in seconds.

1. If no change is needed, press (FCN) to advance to the next section.
2. The scan delay length can be changed by pressing the (PRI) or (CLR) key. Each press of the (PRI) key will increase the scan delay time by .5 seconds up to 7.5 seconds. Another press after 7.5 seconds resets to 0. Pressing the (CLR) key will automatically reset the value to 0. Press (ENT) to store the chosen value and automatically advance the program to the next section.

Note: It is not recommended to leave the scan delay time at "0" seconds.



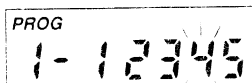
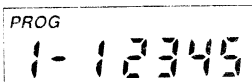
F. Miscellaneous Channel O Programming - GROUP 1



After the scan delay time is set the display will show "PROG 1-12345." This is a group of five individual functions that can be enabled or disabled.

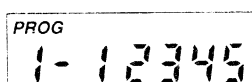
When a function is enabled, the corresponding number in the display will flash. When the function is disabled the number is steady. If you wish to change the function from enable to disable or vice versa, press the number key corresponding to that function.

Example: If function #4 (priority key lockout) is disabled, the "4" in the display will not be flashing. If the (4) key is pressed, the "4" in the display will flash signifying that priority key lockout is enabled. A subsequent press of the (4) key will return priority key lockout to a disabled status.

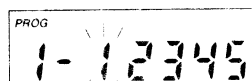


G. GROUP ONE Functions

1. Battery Saver Inhibit - When enabled (flashing), this turns off the battery saver. The battery saver should be turned off only to get proper voltage readings during service or in systems requiring extremely fast squelch attack time. Note: King Radio current drain and battery life specifications are based on performance with the battery saver on.



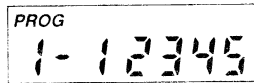
BATTERY SAVER ON



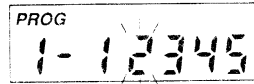
BATTERY SAVER OFF

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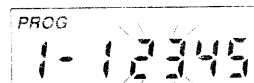
2. & 3. Functions 2 and 3 are used to define priority scan operation. There are three types of priority scan available. Their operational characteristics are thoroughly discussed in Section 3.2.5 E of this manual. In summary:



PRIORITY MODE A



PRIORITY MODE B



PRIORITY MODE C

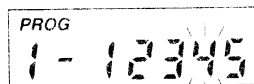
Priority Mode A - The priority channel follows the position of the channel select knob.

Priority Mode B - The priority channel is fixed. You will transmit on the channel selected by the channel select knob channel.

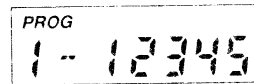
Priority Mode C - The priority channel is fixed. When the PRI toggle switch is on, you will transmit on the priority channel regardless of the channel select knob setting.

To set function 2 and 3 for priority mode A, B, or C, use the following chart:

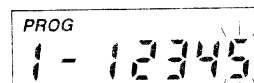
	FUNCTION 2	FUNCTION 3
PRIORITY MODE A	DISABLE (STEADY)	DISABLE (STEADY)
PRIORITY MODE B	ENABLE (FLASHING)	DISABLE (STEADY)
PRIORITY MODE C	ENABLE (FLASHING)	ENABLE (FLASHING)



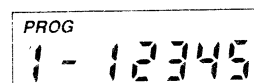
PRIORITY CHANNEL NOT CHANGEABLE



PRIORITY CHANNEL CHANGEABLE



SCAN LIST NOT CHANGEABLE



SCAN LIST CHANGEABLE

4. (PRI) Key Lockout- When enabled (flashing) the (PRI) key will be locked out in the operating mode. The user will not be able to change the designation of the Priority Channel. When disabled (steady) the user will be able to change the channel that is designated as Priority Channel.

See Section 3.2.5 F for instructions on changing the Priority channel. See Section 3.2.5 G for instructions on locking out the Priority channel.

5. Scan List Lockout - When enabled (flashing), the user will not be able to change the channels in the scan list. When disabled (steady), the user can enter or delete channels from the scan list.

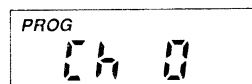
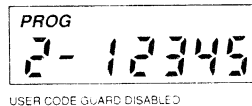
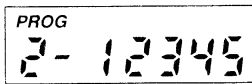
See Section 3.2.5 C for instructions on changing the scan list.

See Section 3.2.5 D for instructions on locking out the scan list.

Once each function 1-5 is set as desired, press (ENT) to store them into memory and automatically advance the program to the next section.

If no changes have been entered, press (FCN) to advance to the next section.

H. Miscellaneous Channel 0 Programming - GROUP 2



After group 1 functions are set the display will show PROG 2-12345 for Group 2 functions. As with Group 1 functions, the enabled function number will flash, the disabled functions remain steady.

1. User Code Guard Selection

When enabled (flashing) the user will be able to press the keyboard to independently select the code guard values that are programmed into channels 1 thru 9 while operating on any channel 1 thru 14. When disabled the user will be unable to use the keyboard for code guard selection. See Section 3.2.5. H for operation procedures of this function.

NOTE: This feature available on select models only. Features 2 thru 5 are reserved for future options and should remain disabled at this time.

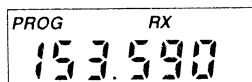
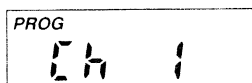
Once Group 2 functions are set, press (ENT) to store the functions into memory. The display will revert back to the CH0 entry point.

I. To Review Channel 0 Values

Repeated pressing of the (FCN) key will display each value in Channel 0, then loop back to the "Ch 0" entry point.

J. To Enter Frequencies and CODE GUARD™ Values for Channel 1:

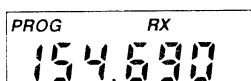
Once Channel 0 programming is complete, the display will show "PROG Ch 0". Any channel number can now be pressed to allow access to the frequency and CODE GUARD™ values for that channel.



1. Press (1) and the display will show "PROG CH 1". This is the entry point for channel 1 values.

2. Press (FCN) and the upper part of the display will show "PROG RX". This is the receive frequency for channel 1 (in MHz).

3. If the displayed frequency is correct, press (FCN) to advance to the next value.

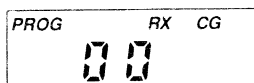


If a new frequency is desired, press (CLR) followed by the digits of the desired frequency from left to right. Then press (ENT) to store this frequency and automatically advance to the next value.

Only frequencies from 148 to 173.995 Mhz will be operable.

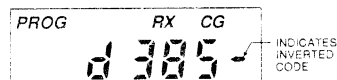
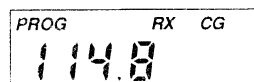
See Section 4.3.5 for frequency increments.

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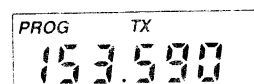


4. After the receive frequency is set the upper part of the display will show "PROG RX CG". This is the CODE GUARD™ value for Channel 1 receive. Note: 0.0 indicates carrier squelch operation.

If the displayed value is correct, press (FCN) to advance to the next value.



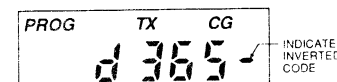
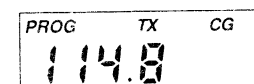
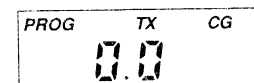
If a new value is desired, press the (CLR) key to reset the display to 0.0 (CODE GUARD™ inhibited). Tone CODE GUARD™ is entered directly, using the digit keys (0 thru 9). See Section 2.3.8. Digital CODE GUARD™ is entered by first pressing (CLR), then the (#) key, causing the letter "d" to appear, followed by the proper three digit code (0 thru 7 keys only. 8 & 9 respond as a 7.) See Section 2.3.9. Pressing the (PRI) key after the three digit code has been entered allows the digital code to be inverted. When the displayed value is correct, press (ENT) to store the CODE GUARD™ and automatically advance to the next value.



5. After the receive CODE GUARD™ is set the upper part of the display will show "PROG TX." This is the transmitter frequency for Channel 1. If it is correct, press (FCN) to advance to the next value.

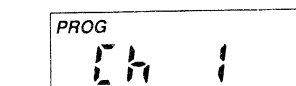
If you wish to change it, press (CLR) followed by the frequency in (MHz) then (ENT) to store the new frequency and automatically advance to the next value.

Only frequencies from 148 to 173.995Mhz will be operable. See Section 4.3.5 for frequency increments.



6. After the transmit frequency is set the upper part of the display will show "PROG TX CG>" This is the CODE GUARD™ value for Channel 1 transmit (0.0 indicates carrier squelch). If this value is correct press (FCN) to advance to the next value.

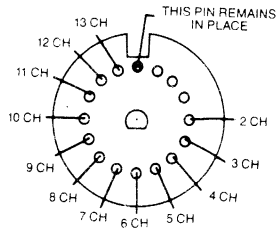
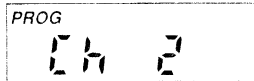
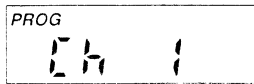
If a new value is desired, follow the procedure for receive CODE GUARD™ as described in step 4.



7. After the transmit CODE GUARD™ is set, the display will loop back to the Channel 1 entry point. If you wish to review the frequencies and CODE GUARD™ values in Channel 1, subsequent pressing of the (FCN) key will show each value and then loop back to the Channel 1 entry point.

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J. To Enter Frequencies and CODE GUARD™ Values for any Channel



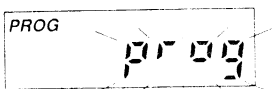
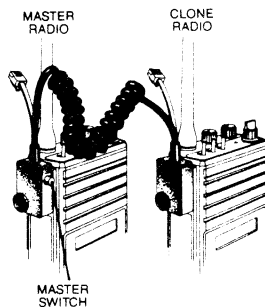
1. After Channel 1 information is set, the display will loop back to show "PROG CH 1". Press (CLR) followed by the digits of any other channel number to gain access to the frequencies and CODE GUARDS™ values for that channel. Each channel is then programmed using the same technique as previously outlined for Channel 1.
2. After the frequencies and CODE GUARD™ values are entered for each channel, the channel select knob can be modified to limit its travel. Remove the channel select knob from the radio. There are two .025" square pins. The pin centered at the channel number opening on the skirt should remain in place at all times. The second pin can be set to limit the travel from two to 14 channels as needed. Press the pin in to the appropriate hole as shown. If all 14 channels are programmed, the second pin should be removed.

K. To Leave the Programming Mode:

1. Rotate the on/off/volume knob on top of the radio counter clockwise to the off position.
2. Remove the programming plug.
3. Normal radio operation will occur on the next power up.

2.3.4 CLONING A RADIO FROM A MASTER

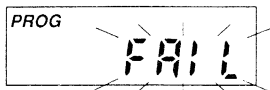
Any MASTER radio (unit with internal keyboard and display) is capable of transferring its program to another MASTER or SLAVE (unit without keyboard). Note: Both units must be of the same frequency band. The radio receiving the program will be referred to as the CLONE.



1. Make sure that both battery packs are charged.
2. Attach the MASTER switch end of the cloning cable to the side connector of the MASTER radio. (Note: one plug of the cloning cable has a push button MASTER switch. This plug must be attached to the MASTER radio.)
3. Power up the MASTER radio by rotating the off/volume knob clockwise past the detent.
4. To put the MASTER radio in the programming mode, press and hold the MASTER switch. Then press the (FCN) key until the display shows "PROG CH 0".
5. Review the values in the program. Any changes required must be made at this time.
6. Connect the other plug of the cable to the side connector of the radio to be cloned.
7. Power up the clone.
8. Press the (*) key on the MASTER radio keyboard. The display will flash "PROG" signifying that the radio is ready to download.

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9. Press (FCN) key. The program in the MASTER will be downloaded to the clone. The clone will send back the program to the MASTER to verify successful cloning.
10. If the download was successful, the MASTER will resume flashing "PROG". Power down the clone. Disconnect the cable. Normal radio operation will occur on the next power up.
11. If the download was not successful the MASTER will display "FAIL" and multiple beeps will follow. Failure of downloading can be due to:



- A. Incorrect radio types (VHF tries to program UHF or vice versa).
- B. Improper connection.
- C. Failure to power up clone.
- D. Clone set in programming mode.

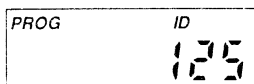
Note: To stop fail mode, press (CLR), power down the radios, and try again starting at step 1.

2.3.5 SPECIAL CLONING INSTRUCTIONS

It is possible to change "Channel 0" values on the MASTER radio, hold them in a temporary memory, and download them to the clone without actually entering them into the permanent memory of the MASTER. This is convenient for sequential identification numbers used to identify a series of portables in a radio system. Assuming that the frequencies, CODE GUARDS™ values, and other "Ch 0" values are common for all radios in the system, but that the radio identification number should be unique to each radio, the following method would be used to clone additional radios for the system:



1. Program the MASTER with all frequencies, CODE GUARD™ values and Channel "0" values that will be common to all radios.
2. Advance the display to show the MASTER's ID number (for example #100).
3. Press (CLR); press (1) (2) (5). #125 is now in temporary memory.
4. Press (*), connect the cable to clone and download by pressing (FCN). ID #125 is now stored in permanent memory of the clone.
5. After download press (CLR). Disconnect the clone. The MASTER radio display will show that #125 is still being held in the temporary memory of the MASTER.
6. Press (PRI). This will increment the ID number one digit to #126. (Note: any new number can be entered at this point by pressing (CLR) and using the digit keys to enter the new number.)
7. Press (*). Connect cable to the second clone and download by pressing (FCN).
8. Any number of radios can be coded with different or sequential ID numbers using this technique. The ID number in the permanent memory of the MASTER will remain unchanged as #100.



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2.3.6 SCAN LIST AND PRIORITY CHANNEL CLONING

When a MASTER downloads to a clone, the scan list and priority channel designations are also transferred to the clone. This includes priority mode and any lockout functions.

If electing to program a clone with a set priority mode, priority channel and scan list along with the respective lockout functions (if desired), the MASTER radio must first be programmed with these parameters. Hence whatever is programmed in the master will be downloaded to the clone radio. See the appropriate operating procedures in section 3.2 for selecting the scan list, priority channel and lockout functions. See Section 2.3.3 G for priority mode selection.

2.3.7 CLONING VIA RS 232 INTERFACE

Programming from a computer via the RS 232 interface is covered in a separate programming manual. Contact your King sales representative and order model LAA 0705.

2.3.8 SELECTING A TONE CODE GUARD™

The tone CODE GUARD™ system may be set for any frequency in the range of 67 to 250.3 Hz. However, since most systems adhere to the Electronic Industry Association (EIA) standards, tones should be selected from the following EIA list. In order to insure optimum performance tone selection for use on the same radio frequency (RF) channel or adjacent channels in the same coverage area should be made from one of the Groups A, B, or C to the maximum degree possible. King Radio guarantees optimum receiver performance only if tone frequencies below 220 Hz are chosen.

<u>GROUP A</u>		<u>Group B</u>		<u>Group C</u>
67.0	*151.4	71.9	146.2	74.4
77.0	162.2	82.5	156.7	79.7
88.5	173.8	94.8	167.9	85.4
*100.0	186.2	103.5	*179.9	91.5
107.2	203.5	100.9	192.8	
114.8	218.1	*118.8	210.7	
123.0	233.6	127.3	225.7	
131.8	250.3	136.5	241.8	
141.3				

* 50/60 Hz power distribution systems could cause flashing.

The assignments in a given area shall be made from one of the Groups A, B, or C to the maximum degree possible.

2.3.9 SELECTING A DIGITAL CODE GUARD™

Codes for the Digital CODE GUARD™ system may be chosen from the following list. Since there are no EIA standards for the performance or compatibility of Digital CODE GUARD™ systems it is recommended that an operational test be made on the intended system before wholesale assignments are made. In some cases either or both the transmit and receive codes will require an inverted code to operate with existing systems. This can be done during the code programming of the system. Usually systems using direct unit to unit transmission (systems without mobile relays, repeaters, remote control, etc) may use codes from the table. Systems with relays etc. may use code variations for system control and operational efficiency. The system operator or engineer should be consulted regarding the operational requirement on such systems.

023	065	131	172	251	331	412	466	612	703
025	071	132	174	261	343	413	503	624	712
026	072	134	205	263	346	423	506	627	723
031	073	143	223	265	351	431	516	631	731
032	074	152	226	271	364	432	532	632	732
043	114	155	243	306	365	445	546	654	734
047	115	156	244	311	371	464	565	662	743
051	116	162	245	315	411	465	606	664	754
054	125	165							

2.3.10 BATTERY REPLACEMENT

- A. To remove the battery, turn the radio off. Press up the metal tab on the side of the case while twisting the battery pack approximately 30° and remove it from the radio.
- B. To reinstall the battery, locate the center hub on the radio base and place it in the recesses of the battery pack. Position the pack at the 30° offset, seating two metal studs in their recess. Apply upward pressure to the pack while twisting the pack to its original position. The metal tab will click, locking the pack in position.
- C. King battery packs are available in a variety of sizes and types for special applications. Rechargeable packs can be charged separately or while attached to a radio.
- D. Periodically check the contacts on battery pack for dirt that may prevent a good electrical contact with the charging base.
- E. Do not dispose of a battery pack in fire. An explosion may occur.

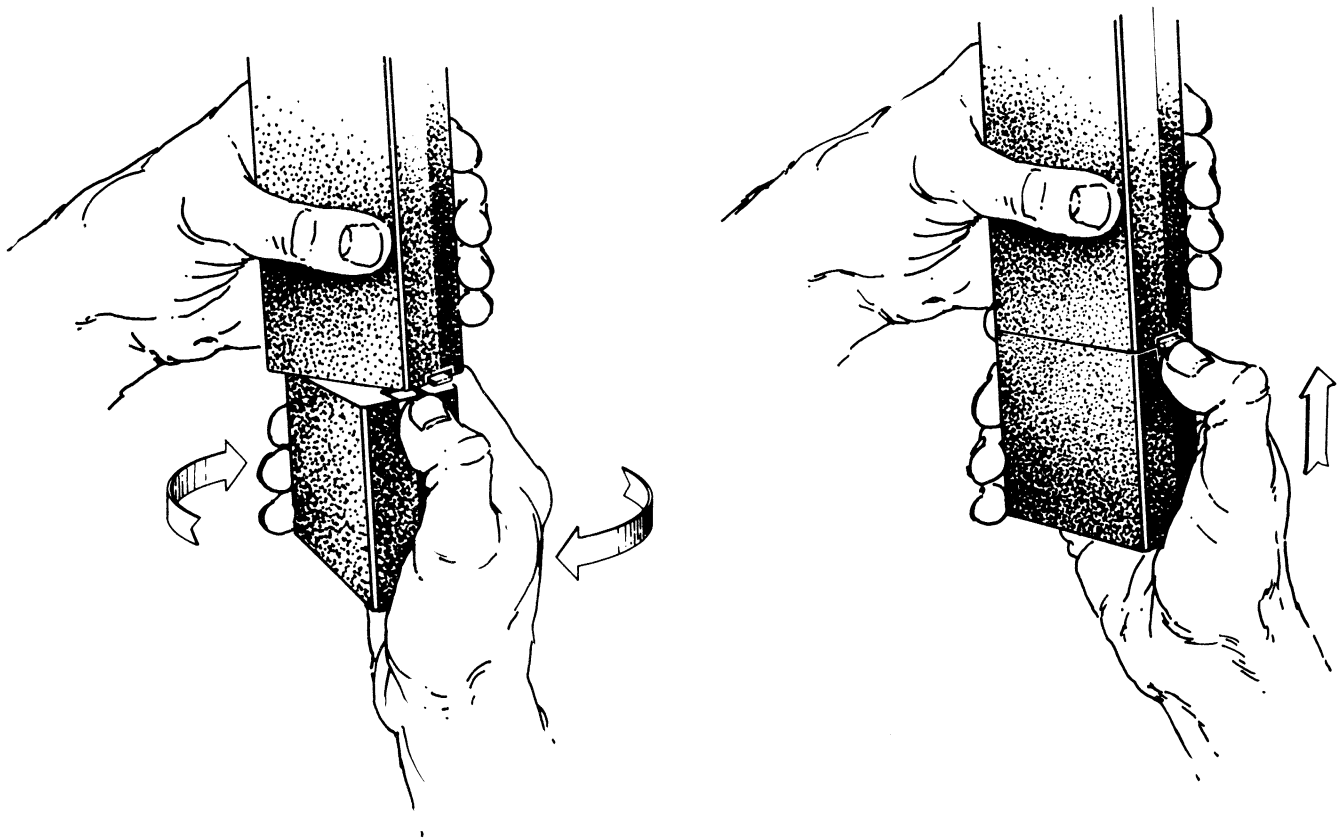


FIGURE 2-1 BATTERY REPLACEMENT

SECTION III OPERATION

3.1 INTRODUCTION

This section contains a basic operation procedure for the LPH hand held VHF FM Transceivers. Information on programming and installation is contained in section 2 of this manual.

WARNING

DO NOT OPERATE THIS UNIT IN CLOSE PROXIMITY
TO BLASTING CAPS. DO NOT OPERATE THIS RADIO
IN AN EXPLOSIVE ATMOSPHERE (PETROLEUM FUELS,
SOLVENTS, DUST, ETC).

3.2 OPERATION

3.2.1 BASIC OPERATION

A. Receive (Listen)

Turn the power on by rotating the VOL (volume) knob clockwise past the OFF detent. Select the appropriate channel using the Channel Select knob (14 channel) or toggle switch (2 channel). Rotate the SQ (squench) knob clockwise until a rushing noise is heard. Set the volume to a comfortable level, then rotate the SQ knob counter-clockwise until the noise stops. This is called the squench threshold setting. Further rotation counter-clockwise tightens the squench setting, making it necessary for stronger signals to open the squench and allow a message to be heard.

B. Transmit (Talk)

Press and hold the side PTT (push to talk) switch. The transmit LED will glow red when the transmitter is on. Talk in a normal voice with the speaker one to two inches from your lips. Make each transmission as brief as possible. Release the PTT switch to end the transmission.

If the transmit LED does not glow when you press the PTT switch, the battery pack may need to be charged. If the transmit LED does not glow and a tone is heard, you are on a receive only channel. Switch the channel selector to an authorized transmit channel. If the length of your message exceeds the preset time out timer setting, the transmitter will automatically shut off and a tone will be heard. If you wish to continue the transmission, release the PTT, then press, hold, and continue talking.

3.2.2 CODE GUARD™ OPERATION

CODE GUARD™ allows one radio or group of radios to be selectively called within a system. If the radio has been programmed with CODE GUARD™, use the following receive and transmit instructions.

A. Receive (Listen)

Turn the power on by rotating the VOL (volume) knob clockwise past the OFF detent. Rotate the SQ (squench) knob clockwise until a rushing noise is heard. Set the volume to a comfortable level then rotate the SQ knob completely counter-clockwise, past the detent for CODE GUARD™ operation. A message will be heard only when the programmed CODE GUARD™ is being transmitted.

B. Transmit (Talk)

Before transmitting on CODE GUARD™ channels, monitor the channel by turning the SQ knob clockwise, off the detent. If the channel is not busy, press and hold the side PTT (push to talk) switch. The Transmit LED will glow RED when the transmitter is on. Talk in a normal voice with the speaker one to two inches away from your lips. Make each transmission as brief as possible. Release the PTT switch to end transmission. Reset the SQ knob to the CODE GUARD™ position.

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If the Transmit LED does not glow when you press the PTT switch, the battery pack may need to be charged. If the Transmit LED does not glow and a tone is heard, you are on a receive only channel. Switch the channel selector to an authorized transmit channel. If the length of your message exceeds the preset time out timer setting, the transmitter will automatically shut off and a tone will be heard. If you wish to continue this transmission, release the PTT, then press and hold.

3.2.3 TRANSMIT POWER (LPH 502/514 models only)

Placing the HI/LO toggle switch in the HI position enables full transmitter power. The LO position reduces power to about one watt thereby reducing current drain and increasing battery life.

3.2.4 BUILT IN FEATURES

Select King radios are based on a microprocessor core that allows certain features and operational characteristics to be built in to the radio. You should define the best operational settings for your customer's system and program them in to the radio.

Additional transmit and receive frequencies, up to 14, can be added. If you wish to monitor other local radio systems that fall anywhere in the band, a frequency with or without CODE GUARD™ can be added to the program.

The radio comes equipped with a time out timer. This is used to limit the duration of calls and to guard against accidental PTT locking on the transmitter and tying up the radio system. The duration of the time out timer can be changed from 0 - 3.75 minutes as required.

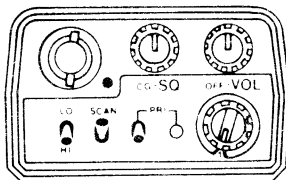
A SCAN delay is included to allow a response to a transmission to be received before the scanner moves on to search for new activity. If you find that the scanner is restarting before message replies are heard, increase the scan delay time. (0 - 7.5 seconds)

There are three different priority modes available. These are discussed in the priority section of this manual. System needs and suggestions should be discussed with the customer.

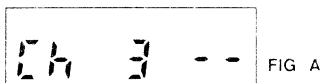
3.2.5 OPERATIONAL FEATURES AVAILABLE ON SELECT MODELS

A. Scan Operation

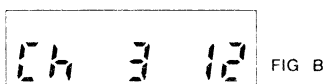
When in the scan mode, the radio receiver samples channels in a predetermined list (scan list) looking for activity. If an active channel is found, the scanning action stops and the message on that channel is heard. Once the message stops, the receiver will wait for a response before scanning resumes. This waiting period is called the "scan delay time". It can be preset (from 0 seconds to 7.5 seconds). The scan list has also been preset. On some radios you will be able to add or delete channels from the scan list. The channel, that the Channel Selector Knob is set to, is always included in the scan list.



To begin scanning, place the SCAN toggle switch in the SCAN position. Scan operation occurs only while the radio is receiving. After SCAN is enabled, two flashing bars on the right side of the display (Figure A) indicate that the radio is scanning the channels in the Scan List.



When a signal is detected, scanning stops and the signal being received is heard, with active channel shown on the right side of the LCD display. (Figure B) The radio receiver stays tuned to that channel until activity ceases and resumes scanning after the "scan delay" time.



If you wish to transmit on the last active scan channel (right side of display), turn the Channel Select Knob on top of the radio to match that channel. (Figure C) Turn OFF the SCAN toggle switch for normal talk-listen operation.

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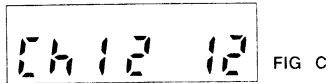


FIG C

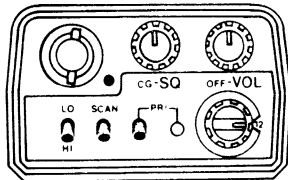
When the PTT is pressed while in the scan mode, the radio transmits on the "transmit" (left side of display) channel. Upon release of PTT, the radio receiver will hold on that channel. If no activity occurs during the "scan delay" time, the radio resumes scanning.

B. Scanning CODE GUARD™ Channels

To scan for channels with programmed CODE GUARD™, rotate the SQ knob completely counter-clockwise, past the detent. When a signal is detected, scanning stops and the CODE GUARD™ for that channel is checked. If the proper CODE GUARD™ is present, the radio receives on that channel until CODE GUARD™ ceases. If the proper CODE GUARD™ is not present the radio receiver will resume scanning immediately.

C. Changing the Scan List

The radio can be programmed with a permanent or changeable scan list. If the scan list can be changed, use the following steps to enter or clear channels.



To avoid confusion, turn OFF the PRI and SCAN toggle switches on the top of the radio.

Turn the Channel Select Knob to the channel to be entered or cleared.

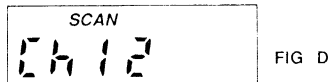
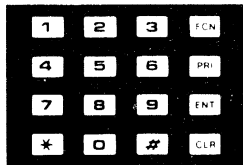


FIG D

To ENTER a channel into the scan list, press the [ENT] key on the keyboard. A short beep will be heard. "SCAN" will be shown in the LCD display.(Figure D)



To CLEAR a channel from the scan list, press the [CLR] key. A short beep will be heard, and the "SCAN" in the display will disappear.

D. Permanent Scan List

To make the scan list permanent enter the program mode CH0. Press the FCN key until Group 1 functions appear (1-12345). Press the digit 5 so it begins to flash, then press (ENT). The scan list is now permanent in the normal operation mode and cannot be changed until the scan lockout function has been reversed.

E. Priority Operation

Priority operation consists of receiving on any channel while still monitoring for a message on the priority channel. Priority can also be used in combination with Scan operation.

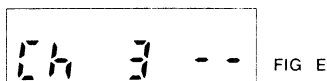


FIG E

When the PRI (priority) toggle switch is turned ON, the channel designated "priority" is sampled 4 times a second, regardless of activity on any other channel. Two flashing bars on the right hand side of the display indicate that the radio is sampling the priority channel. (Figure E) If a signal is received on the priority channel, the radio receiver will lock on to this channel for the duration of the transmission.

When the SCAN toggle switch is ON and the PRI toggle switch is OFF, normal scanning will occur but priority channel will not be sampled. If both scan and priority toggles are off, the radio will function as in basic operation.

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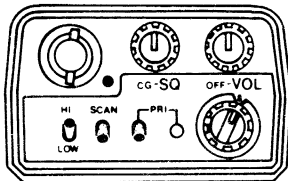
There are three priority modes:

Priority Mode A - The priority channel is tied to the Channel Select Knob. When the selector is set on channel 5, this is the priority channel. If the selector is switched to channel 8, this becomes the priority channel. You will transmit on the frequency chosen by the Channel Select Knob.

Priority Mode B - The priority channel is fixed. You will transmit on the frequency chosen by the Channel Select Knob.

Priority Mode C - The priority channel is fixed. When the PRI toggle switch is ON, you will transmit on the priority channel regardless of the Channel Select Knob setting.

If you do not know which priority mode is preset for the radio, the following steps will identify it.



1. Set the PRI and SCAN toggle switches to OFF.
2. Rotate the Channel Select Knob, stopping at each detent to view the LCD Display.
3. If a "PR" symbol (in the upper left of the LCD Display) does not appear for any channel, you have priority Mode A. (Figure F)
4. If "PR" is displayed, rotate the Channel Select Knob to a different channel, then turn the PRI toggle ON.

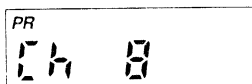


FIG F

If the LCD display doesn't show "PR", you have priority Mode B.

If the LCD Display changes and "PR" appears, you have priority Mode C.

Priority Mode A Details:

In this mode, the priority channel is tied to the Channel Select Knob. When the SCAN and PRI (priority) Toggle Switches are ON. Scanning will occur until an active scan channel is found. The radio will receive the active channel (Figure G) while continuing to sample the priority channel 4 times per second. If during this sampling the priority channel becomes active, the priority LED will light. The radio receiver will go to the priority channel and hold for the duration of the transmission. (Figure H) The active channel (scan or priority) will be shown on the right hand side of the display. If you wish to reply to a message on the priority channel, press the PTT and you will transmit on the priority channel. Once activity ceases on the priority channel, the radio returns to scan operation.



FIG G

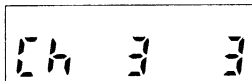


FIG H

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Priority Mode B Details:

This mode fixes one channel in the radio as the priority channel. With the SCAN toggle switch OFF and PRI (priority) toggle switch ON, the radio can receive on the Knob Selected Channel while still sampling the priority channel. If the priority channel becomes active, the Priority LED goes on and the radio holds on the priority channel for the duration of the transmission. If you wish to reply to a message on the priority channel, you must rotate the Channel Select Knob to the priority channel, then transmit.

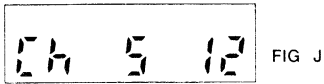


FIG J

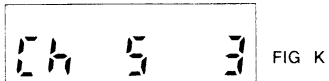


FIG K

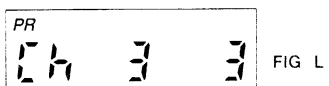


FIG L

With both SCAN and PRI toggle switches ON, normal scanning operation will occur until the scanner locks on to an active channel. (Figure J) The priority channel will continue to be sampled 4 times per second while the radio is listening to this active channel. If activity occurs on the priority channel, the radio will override the active scan channel, go to the priority channel, and hold for the duration of the transmission. (Figure K) If you wish to reply to a message on the priority channel, you must rotate the channel selector to the priority channel, then transmit. (Figure L) Once activity has ceased on the priority channel, the radio returns to scan operation.

Priority Mode C Details:

With the PRI toggle switch ON and SCAN switch OFF, radio operation is exactly the same as in Mode B. The fixed priority channel is sampled 4 times a second. If activity occurs on the priority channel, the radio will go to the priority channel and hold for the duration of the transmission. If you wish to reply to a message heard on the priority channel, press the push to talk and the radio will automatically transmit on the priority channel regardless of the setting of the Channel Select Knob. In Priority Mode "C" the radio will always transmit on the priority channel if the PRI toggle switch is ON. The priority LED will come on as a reminder that you are transmitting on the priority channel. Once activity has ceased on the priority channel, the radio will return to the Channel Select Knob receive channel.

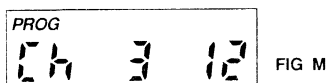


FIG M

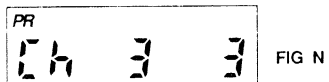


FIG N

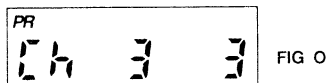


FIG O

With both SCAN and PRI toggle switches ON, the radio will scan until it locks on to an active channel. (Figure M) The priority channel will continue to be sampled 4 times a second while the radio is listening to this active channel. If activity occurs on the priority channel, the radio will override the active scan channel, go to the priority channel and hold for the duration of the transmission. (Figure N) If you wish to reply to a message on the priority channel, press the PTT and the radio will automatically transmit on the priority channel regardless of the setting of the Channel Select Knob. In priority Mode "C" the radio will always transmit on the priority channel if the PRI toggle switch is on. (Figure O) The priority LED will come on to remind you that you are transmitting on the priority channel. Once activity ceases on the priority channel, the radio returns to scan operation.

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F. To Change the Priority Channel

The priority channel used in Priority Mode B and C may be permanently set or may be changeable. If the radio has changeable priority, use the following steps to make this change. Note: Only one channel can be designated as the priority channel.

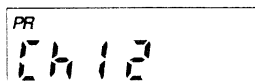
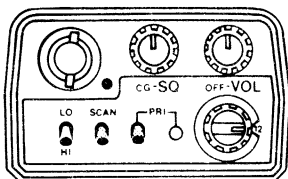
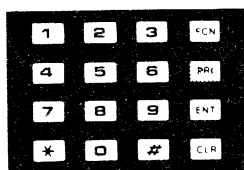


FIG P



1. To avoid possible confusion, turn OFF the PRI and SCAN toggle switches on the top of the radio.
2. Turn the Channel Select Knob to the channel that you wish to enter as the new priority channel.

A press of the [PRI] key causes a short beep, with letters "PR" displayed, indicating that the displayed channel is now the priority channel. (Figure P)

A channel can be both a priority and a scanned channel. Due to multiple sampling of the same channel, maximum performance occurs when the priority channel is not also a scan channel.

G. Setting Priority channel lockout

1. To lockout a priority channel setting the radio must first be programmed for priority mode B or C.
2. With the radio in normal operation mode set the channel select knob to the desired priority channel.
3. Press the (PRI) key on the keyboard. PR should appear on the display.
4. Enter the programming mode. While in CH 0 press the (FCN) key until Group 1 functions appear (1-12345).
5. Press the digit 4 on the keyboard. The 4 in the display should now be flashing.
6. Press ENT. Return the radio to normal operation mode by turning the radio off then back on again. The channel selected as priority channel should show PR on the upper portion of the display.
7. To verify priority channel lockout set the channel select knob to a different channel and press the (PRI) key. The PR symbol should not appear in the display.

H. User Code Guard TM (optional on selected models only)

The user Code Guard TM feature allows the user to select any of the Code Guard TM values that are programmed in channels 1 thru 9 while operating on any channel 1 thru 14. This feature only operates when a system uses one frequency with more than one Code Guard TM value and is operative in both receive and transmit modes.

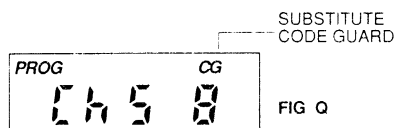


FIG Q

To select a Code Guard TM other than what is used by the channel setting of the channel select knob just press the digit on the keyboard of the channel (1 thru 9) you wish to use. The Code Guard TM selected will appear in the display as shown in Figure Q.

Pressing the digit 0 clears the selected Code Guard TM and normal channel operation will resume.

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NOTE: During scan or priority scan mode the display will not show the selected CG but will instead revert to the normal scan-priority display.

NOTE: Once a Code Guard TM value is selected by the keyboard it will not change even if the power is interrupted or if the channel selector is changed.

I. Programming Errors (Radios with keyboard microprocessors, KPN 122-0058-01)

If the channel selector switch is set to a channel containing an invalid receive frequency there will be no display indications after power up. If this should occur, rotate the channel select switch to a channel with a valid receive frequency. The display should then come on and normal radio operation will resume.

Another indication of an invalid frequency programmed into a channel is when the channel select switch is rotated and the channel shown in the display does not change.

*NOTE: Invalid frequencies include all frequencies less than 148.00MHz (including 0.0MHZ) and all frequencies above 173.995MHz.

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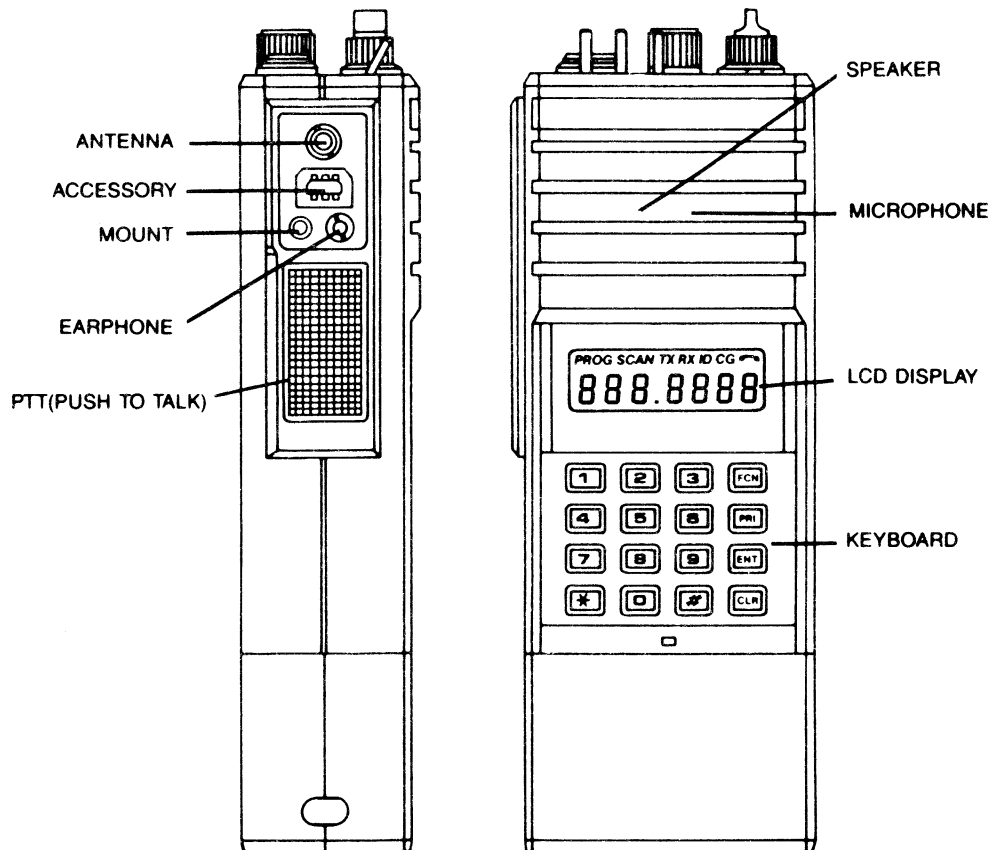
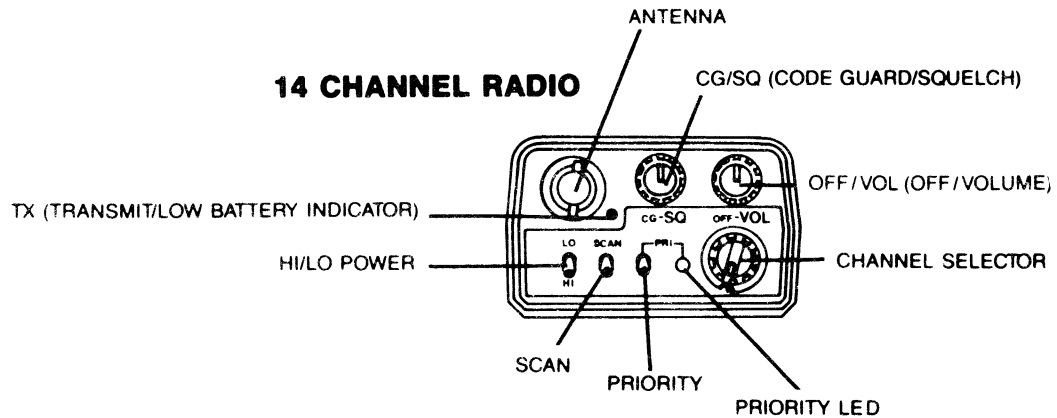
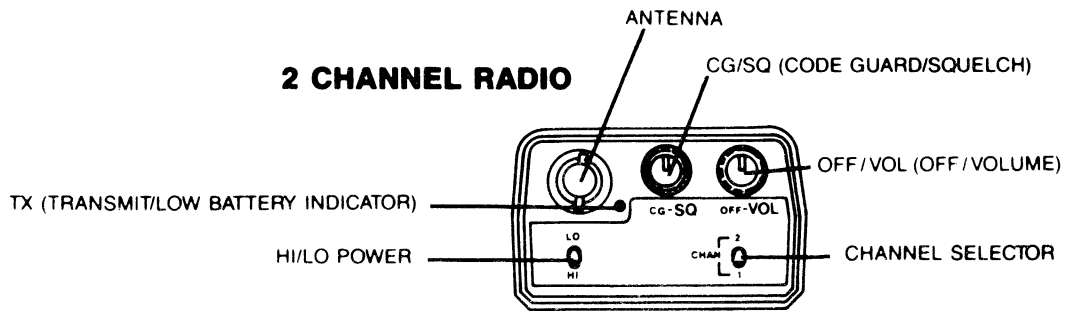


FIGURE 3-1 LPH 214/514 CONTROLS

SECTION IV THEORY OF OPERATION

4.1 INTRODUCTION

This section contains the theory of operation for the LPH series transceivers. Block diagrams are included in this section as Figure 4-1 and Figure 4-2 to aid in understanding the operation of the equipment. Schematic diagrams are found in Section V of this manual.

4.2 EQUIPMENT DESCRIPTION

The LPH 202, LPH 214, LPH 502, and LPH 514 are handheld VHF FM Transceivers operating in the 148-174 MHz band and are designed for use in domestic and foreign Land Mobile services. The LPH 202 and LPH 502 are two channel transceivers. The LPH 514 and LPH 214 are a 14 channel transceivers. All models are digitally synthesized and use a single crystal for frequency control. Usable channels are dealer programmable from 148 to 173.995MHz.

Controls include an On/Off/Volume control, Squelch Sensitivity, Channel Selector, and a HI/LO Power switch. In addition, the LPH 514 and the LPH 214 contain Scan and Priority select switches, a keyboard, and a liquid crystal display which displays channel and status information. Connectors are provided on the side of each unit for an external antenna, speaker, microphone, and programming and other related accessories.

4.3 THEORY OF OPERATION

Circuitry for the LPH series transceivers is comprised of four major circuits as follows:

The RECEIVER, which consists of the RF Amplifier, RF Filters, Mixer, IF Filters, Demodulation circuitry, squelch circuitry, and receiver audio circuitry.

The TRANSMITTER, which consists of the Power Amplifier, Harmonic Filter, Antenna Switch, and Power Control circuitry.

The SYNTHESIZER, which consists of the Voltage Controlled Oscillator (VCO), VCO Buffer, Prescaler, Prescaler Buffer, Reference Oscillator, Loop Filter, and the Synthesizer LSI.

The SYSTEMS AREA, which consists of the Microprocessor, Memory circuits, Code Guard TM circuitry, Transmitter Audio circuitry, Deviation Compensation circuitry, Front End Tuning circuitry, and the 5VDC and 8.3VDC Regulators.

4.3.1 RECEIVER

A. RF Preselectors

The first and second RF Preselectors are varactor tuned two pole filters which are essentially identical in structure. Coupling has been adjusted to allow the first filter to operate with low loss and the second filter to provide greater selectivity at a higher loss. Overall the preselectors exhibit a 3 dB bandwidth of 4.5 MHz and greater than 75 dB of rejection at the image frequency. The first preselector consists of L7, C35, CR4A, L8, C39 and CR4B. The second preselector consists of L9, C47, CR4C, L10, C51 and CR4D. CR4A through CR4D are a matched set of four varactor diodes. Tuning voltage for the preselectors is fed to the varactors through R33, R34, R44, and R45. The tuning voltage is generated digitally by the microprocessor and range shifted by I2A before application to the varactor diodes.

B. RF Amplifier

The RF Amplifier is a cascode amplifier providing 22 dB of RF gain. It is comprised of Q9 and Q10 and associated biasing circuitry.

C. Balanced Mixer

The Double Balanced Mixer is comprised of input transformer T3, diodes CR11 through CR14, and output transformer T1. Local oscillator injection is provided at the center tap of the primary of T1. The secondary of T1 is tuned to the IF frequency of 16.9 MHz.

D. IF Filter and IF Amplifier

The output of the mixer is fed to the first IF Filter, consisting of crystal filters FL4A and FL4B. This filter is 15 kHz wide centered at 16.9 MHz. The output of the first IF Filter is coupled to IF Amplifier Q2 and associated biasing circuitry through T2.

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E. AGC

High input power levels are detected by CR10 which in conjunction with Q5 causes the emitter voltage of Q10 to increase thereby reducing the receiver front end gain.

F. FM IF Subsystem

The FM IF Subsystem is built around I1, a multi-function integrated circuit. The following discussion describes the functions performed by I1.

The Second Local Oscillator consists of Y1, C19, and C20 connected to pins 1 and 2 of I1. The Second Mixer is contained in I1 and its output is filtered external to I1 by FL1, a 455 kHz ceramic filter. A five stage limiting amplifier within I1 provides most of the radio gain at 455 kHz. The FM signal is demodulated by ceramic discriminator FL2 and the audio output appears at pin 9 of I1. R24, R25, and C32 provide low pass filtering. The audio signal is split and then fed to the Audio Processing circuitry and the noise Squelch circuitry, which are described below.

G. Noise Squelch

A high pass filter for the detection of audio high frequency noise is provided by C28, C29, C30, C31, R23, R26, and R27 in conjunction with an amplifier contained within I1 at pins 10 and 11. The audio noise level is controlled by squelch depth adjustment R22 and fed to Noise Detector CR3 through C27. The resultant DC level on C26 represents the level of the noise in the audio, with R22 providing a noise gain adjustment. The DC noise indication is level shifted and buffered by Q19 and is detected by a Schmitt Trigger comprised of Q7, Q8, and associated circuitry, which provides some switching hysteresis. The output of the Schmitt Trigger is fed to inverting transistor Q18 and is subsequently routed to the System Board for further processing.

H. Audio Processing

The audio signal is fed to output pin 3 for signal processing options. The audio also passes through an audio filtering network comprised of I2C, I2D, and associated circuitry. This filtering network strips low frequency signalling tones from the audio. This filtered audio is also made available for options through output pin 4.

The filtered audio is routed through fast mute switch Q11 to I2C, which in conjunction with its associated circuitry, provides audio gain and the required FM de-emphasis characteristic. The output of the de-emphasis filter is made available for options (pin 8) and fed to gain control adjustment R58. The output of R58 is applied to I3 which provides sufficient audio power to drive the speaker. An additional input is provided at I3 for internally generated tones (pin 12).

I. Regulators

DC power to the receiver is controlled by the RX +5V supply generated on the Systems Board and Q12, Q13, and associated circuitry which use the presence of the RX +5V supply to switch the 10V A+ voltage to the rest of the receiver. In addition, a separate power switch consisting of Q4 and Q14 provides the ability to remove power from audio power amplifier I3 in response to a mute condition.

4.3.2 Transmitter

A. Power Amplifier (5 Watt Versions)

The 5 Watt Power Amplifier is comprised of four RF Amplifier stages: (1) the Low Level Amplifier, (2) the Predriver, (3) the Driver, and (4) the Final Amplifier.

The Low Level Amplifier Q7 is a Class A amplifier stage. At rated output power, it takes an RF signal at a nominal input level of +2 dBm and amplifies it to a nominal level of +10 dBm. In addition, this stage provides for output power reduction for low power operation by operating with a variable supply voltage.

Predriver Q8 is another Class A amplifier. At rated output power, it takes an RF signal at a nominal level of +10 dBm and amplifies it to a nominal level of +17.5 dBm. This stage also provides for output power reduction by operating with a variable supply voltage.

Driver Q9 is a Class C amplifier. Operating with a nominal gain of 10 dB, it takes the RF input signal provided by the Predriver and amplifies it to a nominal level of +27.5 dBm.

Final Amplifier Q11 is a Class C amplifier. Operating with a nominal gain of 10 dB, it takes the output of the Driver and amplifies it to a nominal level of +37.5 dBm (5.6 Watts).

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B. Power Amplifier (2 Watt Version)

The 2 watt power amplifier is comprised of three Rf amplifier stages:

- (1) The low Level Amplifier
- (2) The Driver
- (3) The Final Amplifier

The low level amplifier, Q4, is a class A amplifier stage. At rated output power, it takes an RF signal at a nominal input of +2 dBm and amplifies it to a nominal level of +14.0 dBm. In addition, this stage provides for output power reduction for low power operation by operating with a variable supply voltage.

The driver, Q5, is a class C amplifier. Q5 operates with a nominal gain of +12.0 dBm and takes the RF signal from Q4 and amplifies it to +26.0 dBm. This stage also provides for output power reduction for low power operation by operating with a variable supply voltage.

The final amplifier, Q6, is a class C amplifier. Q6 operates with a nominal gain of +7.8 dBm and amplifies the driver output to +33.8 dBm (2.4 watts).

C. Harmonic Filter and Antenna Switch

The Harmonic Filter is a 9 pole Chebyshev lowpass filter. Located on the Receiver Board, it attenuates harmonics created by the Power Amplifier to a level lower the 60 dB below the carrier power. Integral to the Harmonic Filter is the Antenna Switch which is comprised of two PIN diodes, CR1 and CR2 in a series-shunt configuration. In the Receive Mode (diodes off) the series diode, CR1 isolates the transmitter from the antenna while the shunt diode, CR2 now allows RF signals to pass freely to the receiver. In the Transmit Mode (diodes on) the series diode CR1, allows RF signals to pass freely from the transmitter to the antenna while the shunt diode CR2, is at the end of an effective quarter-wave match and blocks RF signals to the receiver. Losses in the Harmonic Filter reduce the power output to 5 Watts.

D. Power Control Circuitry

The power control circuitry consists of a current detector, an error amplifier, and two DC amplifier/inverters. The current detector consisting of R25, R15, R53, R55, CR8, and Q12 provides a DC voltage which is proportional to current drawn by the power amplifier. This voltage is presented to an error amplifier I5 where it is compared to a reference voltage determined by the power setting of the radio. The amplified error voltage is then fed to DC amplifier/inverters Q4 and Q5 which provide a control voltage to the low level amplifier Q7 and the predriver Q8. The control voltage adjusts the amplifier output power to reduce the error present at the input to the error amplifier to a small value, thus maintaining a constant current into the power amplifier. Since amplifier output power is proportional to current, the output power is maintained at a relatively constant value.

4.3.3 SYNTHESIZER

A. Voltage Controlled Oscillator (VCO)

VCO Q1 generates the RF signal used for both the receiver and transmitter. Two frequency controlling varactors are used, one to set the carrier frequency (CR1) and one to modulate the carrier frequency during transmit (CR7). The oscillator frequency range is from 148-174 MHz in the Transmit Mode and 131.1-157.1 MHz in the Receive Mode (low side injection). The frequency range is covered using band switching with PIN diodes CR2 and CR3. CR3 is used to generate the 16.9 MHz offset from transmit to receive. CR2 is used to generate an approximate 12.6 MHz offset which increases the range of the oscillator. The following table describes the oscillator band switching:

Radio State	Carrier Frequency Range (MHz)	Oscillator Frequency Range (MHz)	Band Shift	RX/TX
RX	148.0 to 160.595	131.1 to 143.695	High	High
RX	160.6 to 174.0	143.7 to 157.1	Low	High
TX	148.0 to 160.595	148.0 to 160.595	High	Low
TX	160.6 to 174.0	160.6 to 174.0	Low	Low

B. VCO Buffer

VCO Buffer Q3 functions as both an amplifier and a buffer. It amplifies the RF signal provided by the VCO from a nominal level of -5 dBm to a nominal level of +5 dBm on receive and +2 dBm on transmit. The output of this stage supplies signal to the receiver, transmitter, and Prescaler Buffer.

C. Prescaler Buffer

Prescaler Buffer Q10 serves as a buffer between the Prescaler and the RF signal injection to the receiver and transmitter. It is the first device in the feedback path of the Synthesizer.

D. Prescaler

Prescaler I3 is the first divider in the feedback path of the synthesizer. Using emitter coupled logic, it divides the RF signal provided by the Prescaler Buffer to a frequency which can be processed by the following CMOS dividers. The Prescaler is of the dual modulus type which allows the divide value to be set by the Synthesizer LSI to either divide-by-40 (modulus control line high) or divide-by-41 (modulus control line low). This capability allows the channel spacing to be determined by the divided down reference frequency and not a multiple thereof.

E. Synthesizer LSI

Synthesizer I2 contains three programmable CMOS dividers, a sample-and-hold phase detector, and the amplifier for the reference oscillator. The first divider (divide-by-R) divides the reference oscillator down to a frequency which is used as a reference by the sample-and-hold phase detector. The second divider (divide-by-N) divides the output of the Prescaler down to a frequency which is equal to the divided down reference frequency when the loop is locked. The third divider (divide-by-A) controls the modulus control line of the Prescaler. The sample-and-hold phase detector provides a DC voltage through the Loop Filter to the VCO that is proportional to the phase error and adjusts the VCO frequency in a direction to maintain phase and therefore frequency lock between the divided down frequencies. R43, C46, C47 and R31 set the operating parameters of the sample and hold phase detector. R43 sets the bias on a constant current source to create a ramp voltage on C46 with a slope of approximately .60V/msec. C47 is the hold capacitor and R31 sets the bias on the DC output buffer pin 17.

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F. Reference Oscillator

The Reference Oscillator provides the frequency reference from which the receiver and transmitter injection signal are synthesized. The oscillator frequency is controlled by crystal Y1 which operates in the parallel resonant mode across an amplifier built into the Synthesizer LSI. This crystal is compensated to ± 5 ppm by a temperature compensating circuit consisting of Q13, RT1, R27, R32, R56, and R57. In addition, a method of modulation is provided to improve the synthesizer frequency response to low frequency modulation.

G. Loop Filter

The Loop Filter removes noise and unwanted frequency components from the output of the Sample-and-Hold Phase Detector which would otherwise modulate the VCO. In addition, it employs a multiple filter bandwidth design which allows fast response during frequency changes (such as in Channel Scan) without degrading the noise and spurious performance of the synthesizer during steady state receive or transmit conditions. The filter bandwidth is switched to a wide condition when the Latch Enable line pulses high for approximately 4 msec during a frequency change. This allows the new frequency to be reached quickly. When the Latch Enable line returns to the low state the filter bandwidth changes to a narrow condition and provides for good noise and spurious performance. Finally, different filter bandwidths are used from transmit to receive to provide better hum and noise performance on transmit and better response time on receive. This is accomplished by changing the filter bandwidth to a narrower value when the RX/TX- lines goes low during transmit.

4.3.4 SYSTEMS AREA

A. Microprocessor

Microprocessor I4 takes inputs from user keys (SCAN, PTT, etc) and controls radio functions such as loading the synthesizer, adjusting the deviation, receiver tuning, and time-out functions. A 4 MHz crystal at pins 42 and 43 forms the master oscillator.

B. EEPROM

EEPROM I3 stores user specific parameters such as frequencies, time out timer length, scan list, etc. To reduce standby power, the EEPROM is turned on whenever pin 13 of I1 is brought low. The serial data bus (DATA IN, DATA OUT, and CLOCK) is used to read/write to the EEPROM.

C. 5V Regulator and Low Voltage Reset

5V Regulator I4 is set by the voltage difference between the output and the adjust. R22, R100 and R23 form a voltage divider to keep this difference at 1.25 VDC regardless of the load on the output line. When battery voltage falls below 8.5 VDC, zener diode CR7 turns off, which turns Q13 off. This turns Q2 on, pulling the RESET line low and resetting the microprocessor.

D. 8.3V Supply

Q4 and I5B form a feedback loop that translates regulated 5 VDC to 8.3 VDC. R65 and R66 divide down 8.3 VDC to 5 VDC which is compared and corrected by the op amp. Whenever the radio is not in Battery Saver Mode, synthesizer 8V is turned on by Q11. CR8 and Q14 form a logic OR gate whenever pin 15 (TX) or pin 14 (RX) are in their active state.

E. Transmit Audio

Electret microphone audio is amplified about 3 times and buffered by I5D. I6A hard limits the audio to about 3Vp-p. I5C forms a summing buffer, bringing together any CTCSS via R72 and the microphone audio via R53. A three pole low pass filter with a cutoff near 3 kHz follows the summing buffer. The output is fed to the TX/SYNTH board as deviation compensated audio (see below) and direct reference modulation.

F. Deviation Compensation and Front End Tuning

On transmit, network R42, R43, R44, and R45 form a variable resistor that becomes a voltage divider with R41, controlling the peak voltage (deviation) to the transmitter board. As the transmit frequency increases, less voltage is needed at the VCO, so a lower resistance (more conductance in parallel) is set by the microprocessor.

On receive, network R8, R13, R14, R15, R16 and R90 form a Digital-to-Analog Convertor that sets a voltage for controlling the receiver front end tuning. As the receiver frequency increases, the voltage increases.

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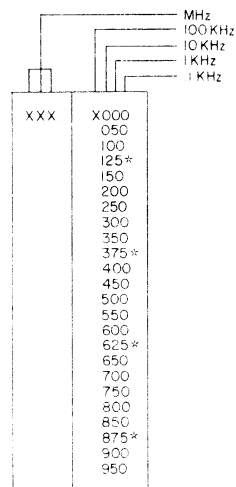
G. CTCSS Filters

During transmit, the Digital-to-Analog Convertor network is used to generate the proper CTCSS waveform. This is coupled into a 3 pole low pass filter via R85 with a cutoff near 250 Hz. R72 sets the deviation to about 750 Hz.

On receive, discriminator audio is fed into a 5 pole low pass filter followed by limiter I2B. CR 3 is used to speed up charging C4 whenever a major DC change occurs. The hard limited waveform is further processed by the microprocessor to determine if the proper CTCSS was sent.

4.3.5 PROGRAMMABLE FREQUENCY INCREMENTS

Frequencies can be programmed from 148.00 to 173.995MHz in increments of 5KHz for 2141 and 5141 models and in 12.5KHz increments for 2142 and 5142 models.



* AVAILABLE ON 2142 AND 5142 MODELS ONLY

TABLE 4-1 FREQUENCY INCREMENTS
(Dwg No 696-0775-10 Rev 0)

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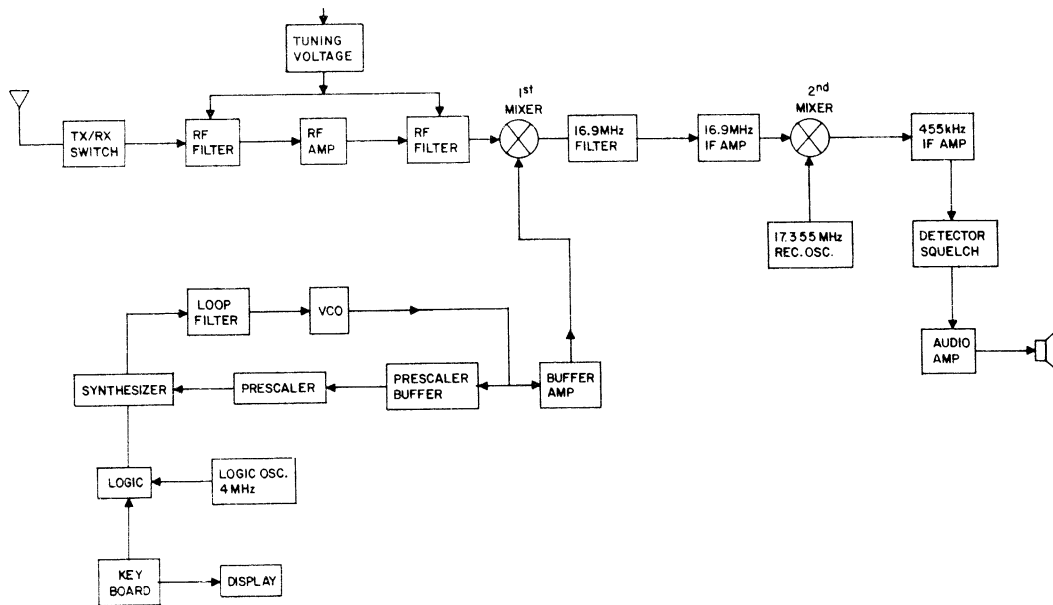


FIGURE 4-1 LPH RECEIVE BLOCK DIAGRAM
(Dwg No 696-0775-06 Rev 0)

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Page 4-8

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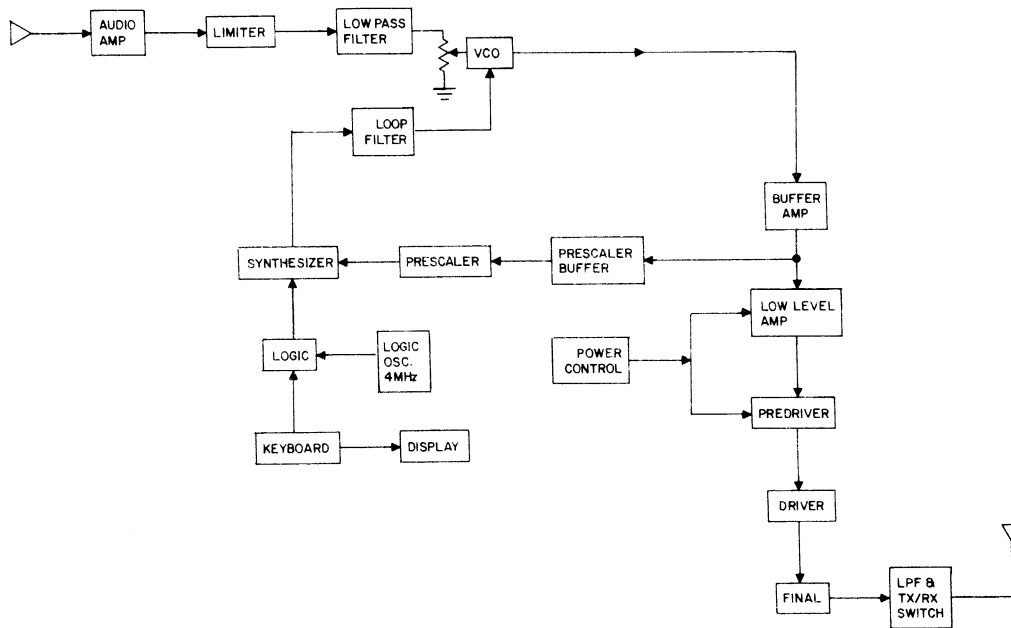


FIGURE 4-2 LPH TRANSMIT BLOCK DIAGRAM
(Dwg No 696-0775-07 Rev 0)

SECTION V MAINTENANCE

5.1 INTRODUCTION

The maintenance section contains test and alignment procedures for an operational LPH 202/214/502/514. This section also contains troubleshooting and assembly/disassembly procedures. Before maintenance is attempted it is advisable to have thorough understanding of the theory of operation of the unit.

5.2 TEST AND ALIGNMENT

5.2.1 TEST EQUIPMENT REQUIRED

- A. RF Signal Generator HP8640B or equivalent.
- B. Distortion Analyzer HP334A or equivalent.
- C. RF Voltmeter (optional) Booton 92C or equivalent.
- D. RF Power meter Bird Termaline 6104 or equivalent.
- E. Service Monitor Cushman 4000 Radio Communications Test Set or equivalent.
- F. Digital Multimeter Fluke 8012A or equivalent.
- G. Programmer (for non-keyboard/display units only) Companion radio with keyboard display.
- H. Portable Tool Kit LAA 0600, KPN 050-2567-00. This tool kit consists of the following parts:
 - 1. RF Cable Assembly, KPN 155-2268-00.
 - 2. Audio Cable Assembly, KPN 155-2269-00.
 - 3. Accessory Test Cable, KPN 155-2260-00.
 - 4. Battery Eliminator, KPN 017-5087-00.
 - 5. Antenna Adapter Key, KPN 047-6745-00.
 - 6. Spanner, KPN 076-1451-00.

5.2.2 STANDARD TEST SIGNAL

NONE

5.2.3 DISASSEMBLY/ASSEMBLY

5.2.3.1 Battery Removal

- A. To remove the battery, turn the radio off. Press up the metal tab on the side of the case while twisting the battery pack approximately 30° and remove it from the radio.

5.2.3.2 Unit Disassembly

- A. Remove the four (4) screws from the rear cover (the side opposite from the speaker grill).
- B. Remove the two screws from the bottom end of the Receiver frame assembly to free the Transmitter frame assembly.
- C. The unit should now be able to be folded out to expose both halves of it.
- D. Remove the four (4) screws on the System board to access the keyboard assembly.
- E. To gain access to the top of the unit remove the squelch, volume and channel select knobs. Remove the two (2) retaining nuts that secure the volume and squelch potentiometers. Remove the antenna connector in the follow manner:
 - 1. Perform steps A and B.
 - 2. Unsolder the coil and capacitor that connects to the antenna connector.
 - 3. Remove the antenna connector using the special antenna adapter key, KPN 047-6745-00, included in the portable tool kit, KPN 050-2567-00.
- F. Lift off the top housing assembly to complete disassembly.

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5.2.3.3 Assembly

To assemble the unit perform the disassembly procedures in reverse order.

5.2.4 TEST AND ALIGNMENT PROCEDURES

5.2.4.1 8.3 Volt Power Supply

Adjust R100 on the system board for 8.3VDC as read with a DVM between E5 and ground.

5.2.4.2 Receiver

A. Front End Tuning (Rev 0 PC Assembly)

1. Channel the radio to a frequency, near 148MHz. Set the squelch to open and the volume at approximately 1/2 level.
2. Set the signal generator to the frequency selected in step 1 with modulation set at 1000Hz at 3KHz deviation.
3. Using the RF cable assembly connect the signal generator to the antenna input. Connect the distortion analyzer to the audio output with the Audio cable assembly.
4. Increase the RF level until an improvement is observed in the SINAD reading (6-12dB SINAD).
5. Adjust L7, L8, L9, and L10 alternately for best SINAD while reducing the RF input level to maintain approximately 10dB SINAD.
6. Adjust T1 and T2 for best audio signal with a RF input level of 1 millivolt RMS.
NOTE: T3 is primarily for coupling and will have little or no effect on the tuning.

B. Front End Tuning (Rev 1 and up PC Assemblies)

1. Channel the radio to a frequency, near 174MHz. Set the squelch to open and the volume at approximately 1/2 level.
2. Set the signal generator to the frequency selected in step 1 with modulation set at 1000Hz at 3KHz deviation.
3. Using the RF cable assembly connect the signal generator to the antenna input. Connect the distortion analyzer to the audio output with the Audio cable assembly.
4. Increase the RF level until an improvement is observed in the SINAD reading (6-12dB SINAD).
5. Adjust L7, L8, L9, and L10 alternately for best SINAD while reducing the RF input level to maintain approximately 10dB SINAD.
6. Select a channel and receive frequency near 148MHz and adjust R101 for best SINAD.
7. Adjust T1 and T2 for best audio signal with a RF input level of 1 millivolt RMS.
NOTE: T3 is primarily for coupling and will have little or no effect on the tuning.

C. Squelch Adjustment (Rev 2 and up PC Assemblies)

1. Turn the RF generator all the way down and set the squelch control to the tight position (counterclockwise all the way but not in the CG position)
2. Rotate R19 fully clockwise.
3. Set the RF input level to 6db above 12db measured SINAD (approx. .4 to .5μvolts).
4. Slowly adjust R19 counterclockwise until the squelch opens.

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5.2.4.3 Transmitter

A. High Power Set (5 Watt Version)

1. Connect the antenna output to the power meter with the RF cable assembly.
2. Set the radio to the lowest available frequency.
3. Key the transmitter and adjust R22 for a 5 watt reading on the power meter.
4. Recheck the output power on the remaining frequencies, and on any channel that has a power output less than 5 watts adjust R22 to increase the power output to 5 watts.

B. Low Power Set (5 Watt Version)

1. This adjustment should only be performed after the high power level has been set.
2. Connect the Antenna Output to the power meter as above.
3. Set the radio to the lowest available frequency.
4. Key the transmitter and adjust R21 for a 2 watt reading on the power meter.
5. Recheck the output power on the remaining channels. If any frequency has an output power of more than 2.4 watts, adjust R21 to decrease the output power to 2.4 watts.

C. Power Set (2 Watt Version)

1. Connect the antenna output to the power meter as above.
2. Set the radio to the lowest available frequency.
3. Key the transmitter and adjust R47 for a 2 watt reading on the power meter.
4. Recheck the output power on the remaining channels. If any frequency has an output power of less than 2 watts, adjust R47 to increase the output power to 2 watts.

5.2.4.4 SYNTHESIZER

A. VCO Adjustment

1. The following test frequencies should be programmed into the EEPROM as needed (Refer to paragraph 2.3.3 in Section 2 of this manual for programming information):

148MHz
160.595MHz
160.6MHz
174MHz

2. Set the radio to receive on 148 MHz.
3. Connect a digital multimeter between TP1 and ground.
4. Adjust L1 for a reading of 3VDC with the synthesizer locked.
5. Set the radio to receive on 160.6MHz.
6. If the voltage at TP1 is less than 3VDC, adjust L1 to increase the reading to 3VDC.
7. Set the radio to receive at 160.595MHz.
8. If the voltage at TP1 is greater than 6.5VDC, or the synthesizer does not lock up, adjust L1 to obtain a reading of 6.5VDC.
9. Set the radio to receive at 174MHz.
10. If the voltage at TP1 is greater than 6.5VDC, or if the synthesizer does not lock up, adjust L1 to obtain a reading of 6.5VDC.

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B. Reference Oscillator Adjustment

1. Connect the antenna output to the RF input jack of the Service Monitor.
2. Set the radio for any valid transmit frequency, and set the Service Monitor to receive on the same frequency.
3. Key the transmitter and adjust C28 for zero frequency error.

C. Deviation Adjustment

1. Connect the antenna output to the RF input jack of the Service Monitor using the RF cable assembly.
2. Connect the modulation output of the Service Monitor to the mic high input of the radio using the accessory test cable.
3. Adjust the audio modulation output level from the Service Monitor for 0.25 VRMS at 1000Hz.
4. Select a transmit test frequency as follows: If the radio will be transmitting with CODE GUARD™, select a frequency where CODE GUARD™ will be operational. If both tone and digital CODE GUARD™ are used, select a frequency using digital CODE GUARD™.
5. Set the Service Monitor to receive this transmitter frequency.
6. Adjust R49 to the center of it's range.
7. Key the transmitter and adjust R46 to obtain a deviation reading of 4.75KHz on the Service Monitor.
8. For radios using digital CODE GUARD™, perform the following additional adjustments.

Reference modulation Adjustment:

- a. Adjust the modulation output level from the Service Monitor to 0 volts.
 - b. Key the transmitter and observe the resulting waveform on the CRT display of the Service Monitor.
 - c. Adjust R49 to obtain the flattest waveform as shown in Figure 5-1 below.
 - d. Return the modulation output level from the Service Monitor to .25 VRMS.
9. Check the deviation reading on all the other transmit frequencies. On any frequency where the deviation is greater than 5 KHz adjust R46 to reduce the deviation to 5KHz.

NOTE

If readjustment of R46 is required in this step, return to step 8 for radios containing digital CODE GUARD™.

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5.2.5 TROUBLESHOOTING

Refer to the Troubleshooting flowcharts at the end of this section and the schematics in the Illustrated Parts List for troubleshooting information.

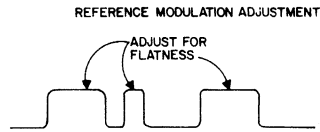
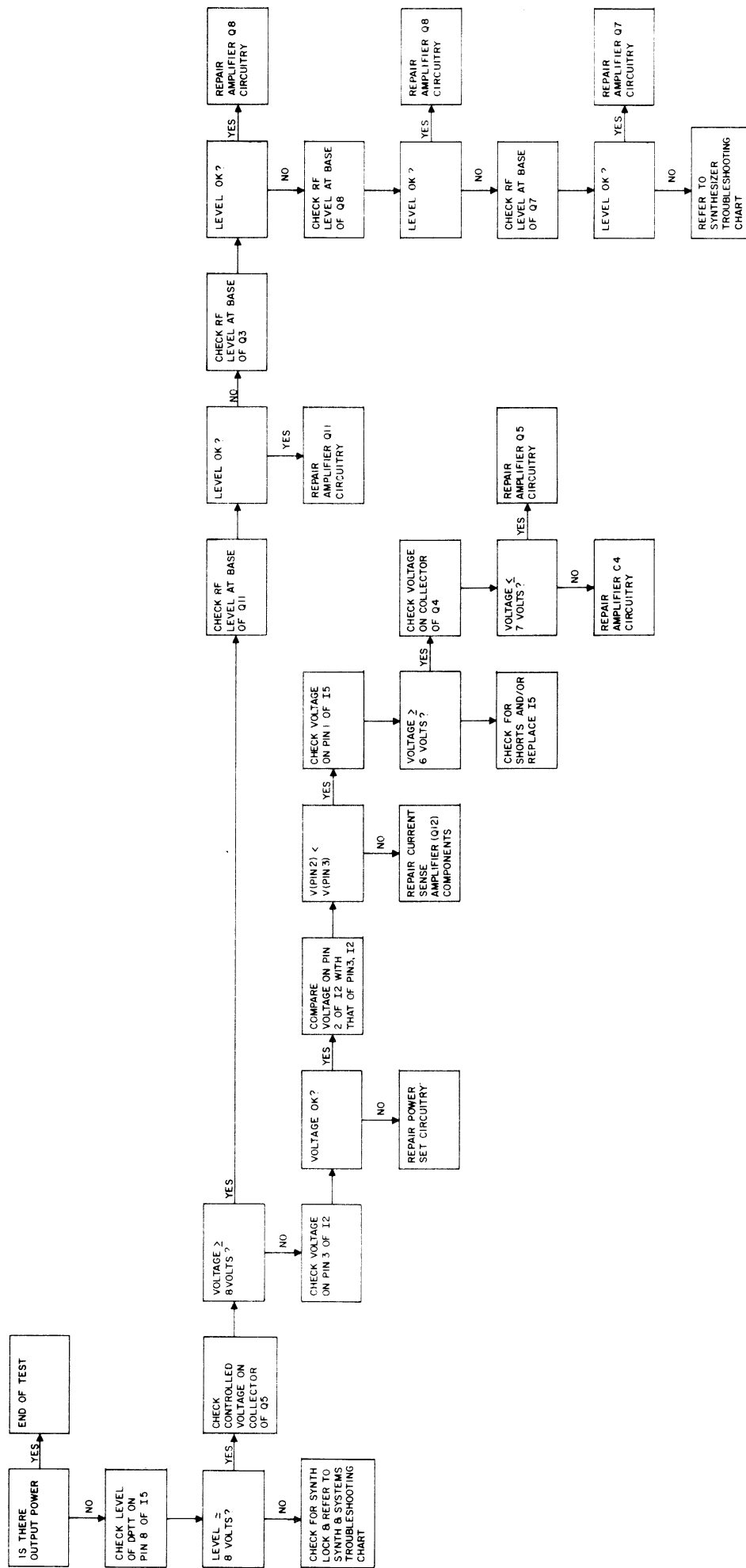


FIGURE 5-1 REFERENCE MODULATION ADJUSTMENT



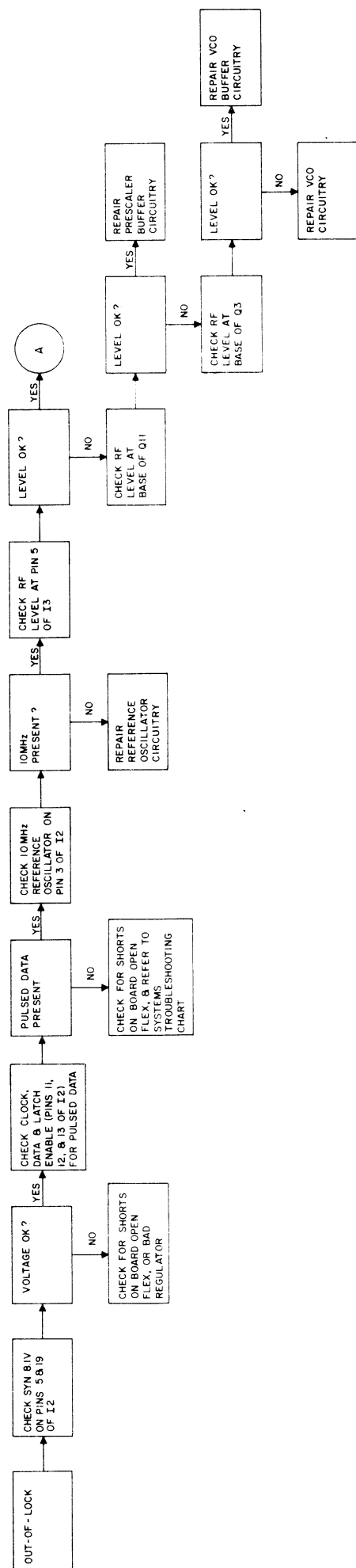
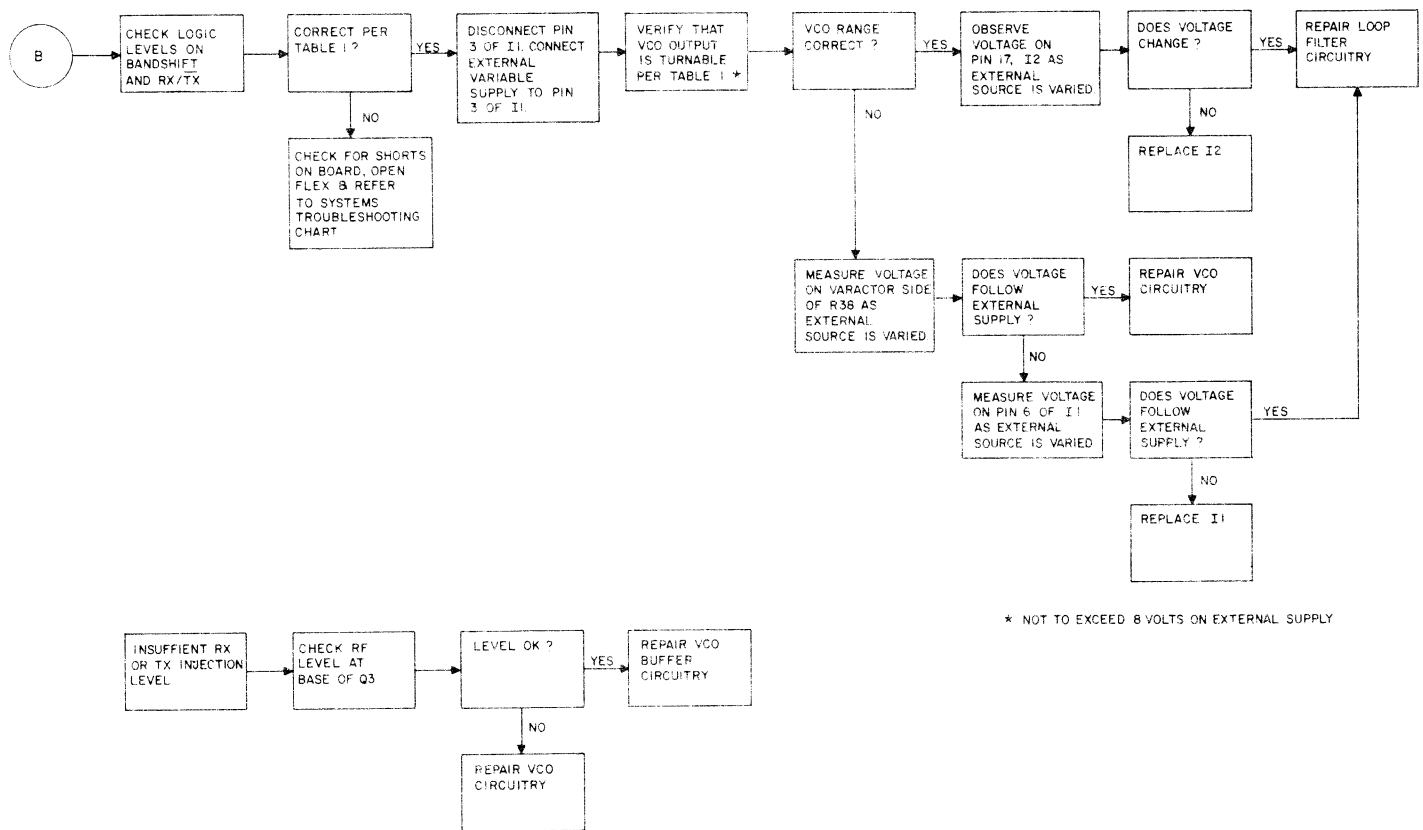


FIGURE 5-3 SYNTHESIZER TROUBLESHOOTING FLOWCHART
(Dwg No 696-0775-02 Rev 0)
(Sheet 1 of 2)

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* NOT TO EXCEED 8 VOLTS ON EXTERNAL SUPPLY

TABLE 1

PROGRAMMED GREATER THAN	FREQUENCY LESS THAN	MODE	BANDSHIFT	RX/TX	STEERING VOLTAGE (APPROXIMATE)	MINIMUM TURNABLE FREQUENCY RANGE
148.000 MHz	160.5975 MHz	RX	+8V	+8V	2.5V-6.5V	131 MHz - 144 MHz
160.600 MHz	174.000 MHz	RX	+0V	+8V	2.5V-6.5V	143 MHz - 158 MHz
148.000 MHz	160.5975 MHz	TX	+8V	+0V	2.5V-6.5V	148 MHz - 161 MHz
160.600 MHz	174.000 MHz	TX	+0V	+0V	2.5V-6.5V	160 MHz - 174 MHz

FIGURE 5-3 SYNTHESIZER TROUBLESHOOTING FLOWCHART
(Dwg No 696-0775-02 Rev 0)
(Sheet 2 of 2)

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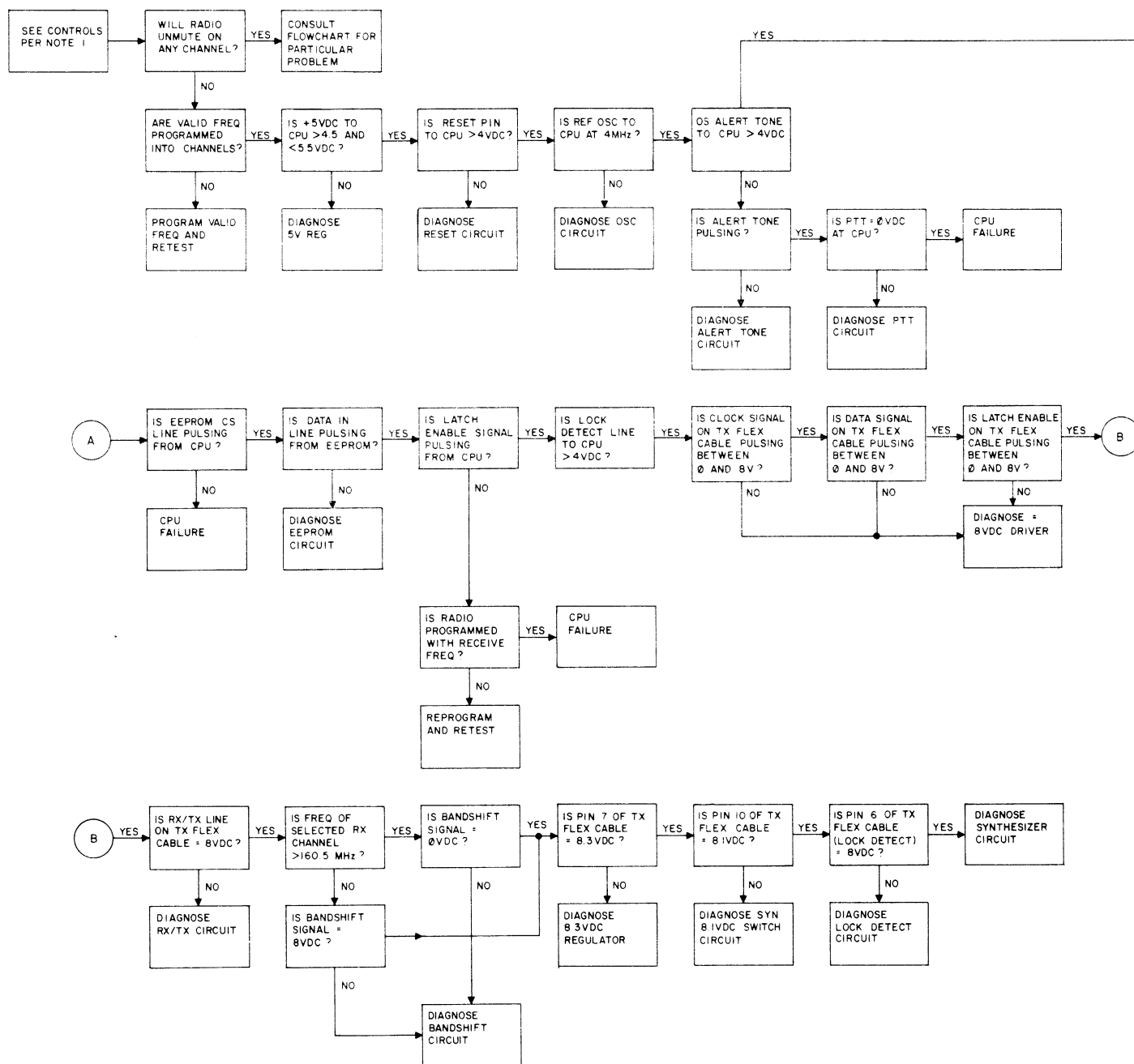
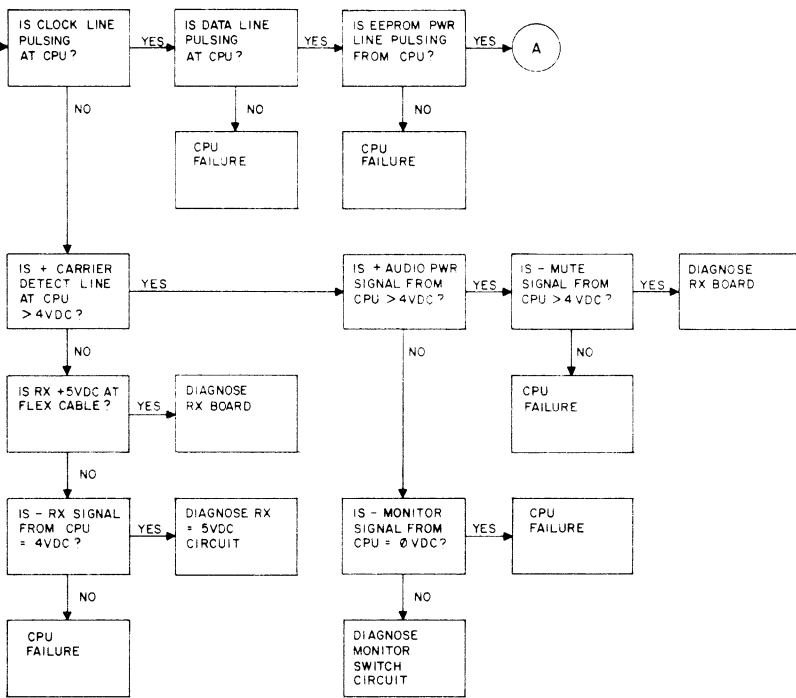


FIGURE 5-5 LPH SYSTEM TROUBLESHOOTING FLOWCHART
 (Dwg No 696-0775-09 Rev 0)
 (Sheet 1 of 2)



NOTES:

1. SET RADIO CONTROLS AS FOLLOWS.

VOLUME	HALF
SQUELCH	CW
PWR	LOW
SCAN	OFF
PRIORITY	OFF

2. SET RADIO CONTROLS AS FOLLOWS.

VOLUME	HALF
SQUELCH	CCW
PWR	LOW
SCAN	ON
PRIORITY	OFF

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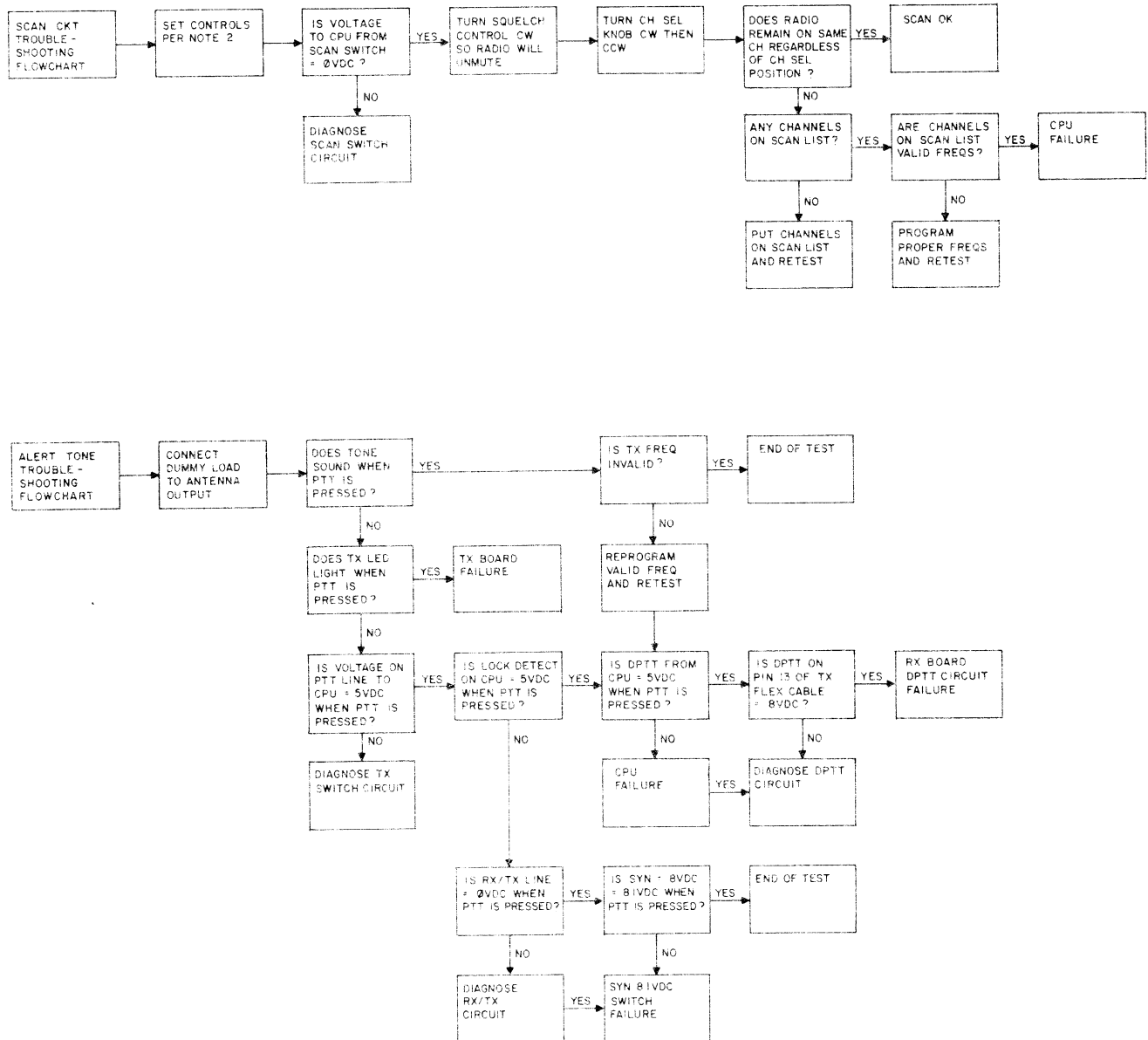


FIGURE 5-5 LPH SYSTEM TROUBLESHOOTING FLOWCHART
(Dwg No 696-0775-09 Rev 0)
(Sheet 2 of 2)

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ILLUSTRATED PARTS LIST

INTRODUCTION

This Illustrated Parts List (IPL) provides for the proper identification of replacement parts. Individual Bills of Material (BOM) within this IPL are arranged in numerical order by BOM number. Each BOM is followed by the Assembly Drawing and Schematic Diagram for that assembly.

Parts identified in this IPL by King Part Number meet design specifications for this equipment and are the recommended replacement parts. Warranty information concerning King replacement parts are contained in Service Memo #1, KPN 600-8001-XX.

BILL OF MATERIAL DESCRIPTION

This section describes the various items that appear on the Bills of Material. A sample BOM is included in this section as Figure 6-1.

1. BOM Number

The Bill of Material Number appears at the top of the BOM as a 9-digit number which is also the King Part Number for the assembly. The BOM Number is followed by the assembly description and the revision level of the BOM.

2. Symbol Column

This column contains the Reference Designators of the electrical components of the assembly. Mechanical parts are not assigned Reference Designators. The Reference Designator consists of a letter abbreviation which indicates the type of component followed by the number assigned to that part (C101, Q101, etc). Common Reference Designator abbreviations are listed below.

C	Capacitor	P	Plug
CJ	Circuit Jumper	R	Resistor
CR	Diode	S	Switch
DS	Lamp	T	Transformer
F	Fuse	TP	Test Point
FL	Filter	U	Resistor/Capacitor Network
I	Integrated Circuit	V	Photocell/Vacuum Tube
J	Jack	WG	Waveguide
L	Inductor	Y	Crystal
Q	Transistor		

3. Part Number Column

This column contains the King Part Number for each part. Special purpose 999-9999-XX series part numbers may appear in the BOM and are described below.

1. CR401 999-9999-96 RESERVED

The Reference Designator CR 401 has been reserved for future use; the assembly does not currently include a CR401.

2. CR401 999-9999-97 SEE NEXT ASSEMBLY

CR401 is a part of the electrical circuit but due to assembly or testing requirements is actually part of a different assembly.

3. CR401 999-9999-98 NOT USED

The Reference Designator CR401 is available for future assignment. The assembly does not currently include a CR 401.

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4. CR401 999-9999-99 DO NOT USE

The Reference Designator CR401 has been previously used for this assembly and later deleted. It may not be reassigned on this assembly.

4. Description Column

This column contains the description of each part in the assembly. Common abbreviations which may appear in this column are listed below.

AL	Aluminum	PC	Polycarbonate
BIFLR	Bifilar	PF	Precision Film
BOM	Bill of Material	PP	Paper
CC	Carbon Composite	PS	Polystrene
CF	Carbon Film	QW	Quarter Watt
CH	Choke	RES	Resistor
CAP	Capacitor	S	Silicon
CR	Ceramic	SCR	Screw
DC	Disc Ceramic	SM	Silver Mica
DIO	Diode	STDF	Standoff
EL	Electrolytic	SW	Switch
FC	Fixed Composition	TERM	Terminal
FERR	Ferrite	TN	Tantalum
FLTR	Filter	TST PT	Test Point
FT	Feedthru	TW	Tenth Watt
HV	High Voltage	VA	Variable
HW	Half Watt	WW	Wire Wound
IC	Integrated Circuit	XFMR	Transformer
MC	Monolithic Ceramic	XSTR	Transistor
MY	Mylar	XTAL	Crystal

5. Assembly (A) Column

An "A" in this column indicates that the part indicated is an assembly. If the KPN and description reads "200-XXXX-99 COMMON BOM" the parts for that assembly are included in the same BOM. The parts breakdown for an assembly with any other KPN will be found in the BOM with the same number.

6. Unit of Measure (UM) Column

This column indicates the Unit of Measure for each part. Common abbreviations found in this column are listed below.

EA	Each
FT	Foot
AR	As Required

7. Quantity and Flavor Columns

Individual flavors of an assembly are identified by the last two digits of the KPN. Part quantities for each flavor will be indicated under headings numbered 00 through 99 as required. The parts indicated in the 99 Column are common to all other flavors of the assembly and are considered the Common Bill of Material for the assembly.

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BOM NUMBER		200-6178-00 Rev. 29 CONV/DSPLY-00 KNS0081 200-6178-10 Rev. 16 CONV/DSPLY-VOR KNS0081 200-6178-11 Rev. 17 CONV/DSPLY-VOR/WNB KNS0081 200-6178-30 Rev. 17 CONV/DSPLY-TAC KNS0081 200-6178-31 Rev. 16 CONV/DSPLY-TAC/WNB KNS0081									
		ASSEMBLY FLAVOR									
	SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	10	11	30	31	
		009-6178-00	PC BD CONV/DISPLAY	EA	1.00						
		009-6178-10	PC BD CONV/DISPLAY	EA		1.00	1.00	1.00	1.00	1.00	
		016-1040-00	COATING TYPE AR	AR	0.00	0.00	0.00	0.00	0.00	0.00	
		047-5400-01	FENCE W/F	A	EA	1.00	1.00	1.00	1.00	1.00	
		090-0296-00	FUSE CLIP	EA	2.00						
		C 300 096-1082-08	CAP TN 100UF 15V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 301 096-1082-08	CAP TN 100UF 15V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 302 108-6005-10	CAP TRKG SET/4 10C	EA	1.00	1.00	1.00	1.00	1.00	1.00	
REFERENCE DESIGNATOR		C 303 999-9999-99	DO NOT USE	EA	0.00	0.00	0.00	0.00	0.00	0.00	
		C 304 096-1082-08	CAP TN 47UF 15V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 305 111-0001-17	CAP CR 180PF 50V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 306 109-0007-00	CAP DC 01UF 25V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 307 109-0007-00	CAP DC 01UF 25V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 308 109-0007-00	CAP DC 01UF 25V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
KING PART NUMBER		C 309 111-0001-13	CAP CR 1UF 50V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 310 108-6001-03	CAP PF 002UF 50V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 311 114-5222-01	CAP DC 2200PF 500V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 312 999-9999-99	DO NOT USE	EA	0.00	0.00	0.00	0.00	0.00	0.00	
		C 313 999-9999-99	DO NOT USE	EA	0.00	0.00	0.00	0.00	0.00	0.00	
		C 314 109-0007-00	CAP DC 01UF 25V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 315 096-1082-08	CAP TN 47UF 15V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 316 105-0031-69	CAP MY 1UF 80V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
DESCRIPTION		C 317 111-0001-17	CAP CR 180PF 50V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 318 108-6001-02	CAP PF 001UF 50V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 319 096-1082-18	CAP TN 2.2UF 20V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 320 108-5013-04	CAP PC 33UF 100V	EA	1.00	1.00	1.00	1.00	1.00	1.00	
		C 321 105-0031-82	CAP MY 008UF 80V	EA	1.00	1.00	1.00	1.00	1.00	1.00	

FIGURE 6-1 TYPICAL BILL OF MATERIAL

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MODEL NUMBER

L P H	L P H	L P H	L P H
2	2	5	5
0	1	0	1
2	4	2	4

SUBASSEMBLY NUMBER

REC. FRAME ASS. KPN 200-3218-00	X		X	
REC. FRAME ASSY KPN 200-3218-01		X		X
2 WATT TX/VCO ASSY KPN 200-3220-00	X	X		
5 WATT TX/VCO ASSY KPN 200-3220-01			X	X
FRONT COVER ASSY KPN 200-3222-00	X	X	X	X
KEYBRD/DSPLY ASSY KPN 200-3223-00		X		X
2 CHAN SYSTEM BRD KPN 200-6877-00	X		X	
14 CHAN SYSTEM BRD KPN 200-6877-01		X		X

FIGURE 6-2 MODEL VERSUS SUBASSEMBLY CHART
(Dwg No 696-0775-04 Rev 0)

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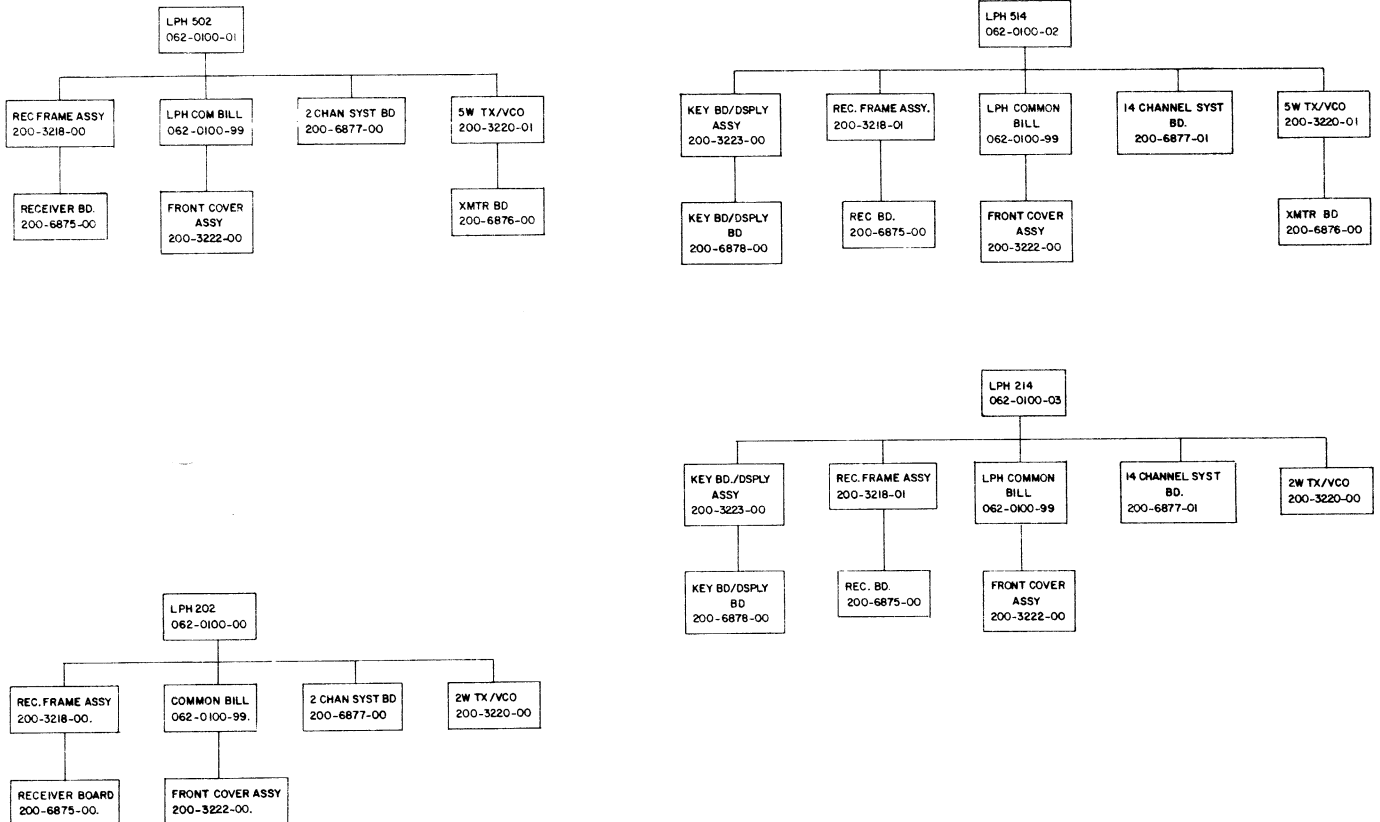


FIGURE 6-3 ASSEMBLY FLOWCHARTS
(Dwg No 696-0775-05 Rev 0)

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VHF FM COMM TRANSCEIVER

062-0100-00 REV 5 FINAL ASSY LPH2020
062-0100-01 REV 4 FINAL ASSY LPH5020
062-0100-02 REV 5 FINAL ASSY LPH5141
062-0100-03 REV 7 FINAL ASSY LPH2141
062-0100-04 REV 5 FINAL ASSY LPH5140
062-0100-05 REV 5 FINAL ASSY LGH214A
062-0100-06 REV 6 FINAL ASSY LGH2142A
062-0100-07 REV 6 FINAL ASSY LGH5143A
062-0100-08 REV 5 FINAL ASSY LQH5142A
062-0100-09 REV 1 FINAL ASSY

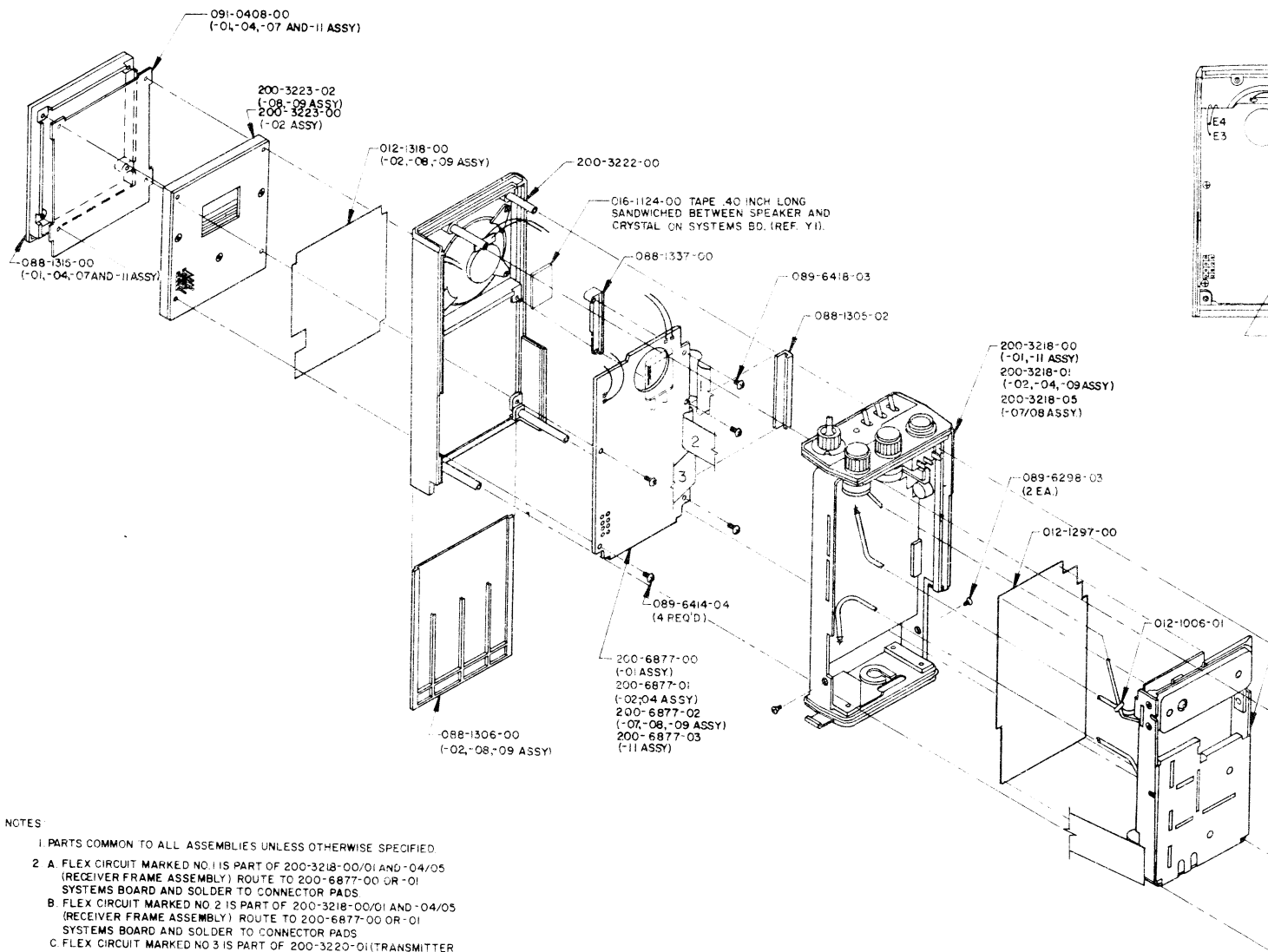
SYMBOL	PART NUMBER	DESCRIPTION	A	UN	00	01	02	03	04	05	06	07	08	09
	012-1318-00	INSULATOR MYLAR	EA	.	.	1.00	1.00	.	.	1.00	.	1.00	1.00	
	062-0100-99	COMMON BOM	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-1293-00	BACK CVR W/HS BLK	EA	.	1.00	1.00	.	1.00	.	.	1.00	1.00	1.00	
	088-1293-04	BACK COVER ASSY	A	EA	1.00	.	1.00	1.00	.	1.00	1.00	.	.	.
	088-1306-00	DOOR KEYBOARD BLK	EA	.	.	1.00	1.00	.	.	1.00	1.00	1.00	1.00	
	088-1315-00	INSRT FRNT CVR BLK	EA	1.00	1.00	.	.	1.00	1.00	.	1.00	.	.	.
	091-0408-00	SPACER BD	EA	1.00	1.00	.	.	1.00	1.00	.	1.00	.	.	.
	200-3218-00	RX FRAME ASSY	A	EA	.	1.00	.	.	.	.	.	.	.	.
	200-3218-01	RX FRAME ASSY	A	EA	.	.	1.00	.	1.00	.	.	.	.	1.00
	200-3218-05	RX FRAME ASSY	A	EA	.	.	.	.	.	.	1.00	1.00	.	.
	200-3218-06	RX FRAME ASSY	A	EA	1.00	.	.	.	.	.	.	.	.	.
	200-3218-07	RX FRAME ASSY	A	EA	.	.	.	1.00	.	.	.	.	.	.
	200-3218-10	RX FRAME ASSY	A	EA	.	.	.	.	1.00	1.00	.	.	.	.
	200-3220-00	2W TX/VCO	A	EA	1.00	.	.	1.00	.	1.00	1.00	.	.	.
	200-3220-01	XMTR SBFRAME	A	EA	.	1.00	1.00	.	1.00	.	.	1.00	1.00	1.00
	200-3223-02	KBD/DSPL ASSY-TONE	A	EA	.	.	1.00	1.00	.	.	1.00	.	1.00	1.00
	200-6877-00	2 CH SYSTEM BD	A	EA	1.00	1.00	.	.	.	.	.	.	.	.
	200-6877-01	14 CH SYSTEM BD	A	EA	.	.	1.00	1.00	1.00	.	.	.	.	.
	200-6877-02	14 CH/TONE SYS BD	A	EA	.	.	.	.	.	1.00	1.00	1.00	1.00	1.00
REF 1	300-3219-00	FINAL ASSY	RF	.	X.	X.	.	X.	.	.	.	X.	X.	X.
REF 1	300-3219-01	FINAL ASSY	RF	X.	.	.	X.	.	X.	X.	X.	.	.	.
REF 2	002-0675-00	PORT XCVR INTCON	RF	X.	X.	X.	X.	X.	X.	X.	X.	X.	X.	X.
REF 4	004-0483-00	WPS LPH	RF	X.	X.	X.	X.	X.	X.	X.	X.	X.	X.	X.

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062-0100-10 REV 2 FINAL ASSY
062-0100-11 REV 1 FINAL ASSY LPH 5023
062-0100-12 REV 1 FINAL ASSY LPH 2023
062-0100-99 REV 13 COMMON BOM LPH0000

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	10	11	12	99
	006-8401-00	*OPERATORS MANUAL	EA	.	.	.	.	1.00
	012-1006-01	LACING CORD 20DR	AR	.	.	.	.	1.00
	012-1297-00	INSULATOR	EA	.	.	.	.	1.00
	012-1318-00	INSULATOR MYLAR	EA	1.00	.	.	.	.
	012-1353-00	COPPER TAPE SHLD	EA	.	.	.	.	2.00
	012-1354-00	INSUL MYLAR	EA	.	.	.	.	2.00
	016-1008-04	GLYPTAL 7526 BL	AR	.	.	.	.	1.00
	016-1124-00	FOAM TAPE V1002	IN	.	.	.	.	0.40
	026-0030-00	WIRE CU24AWG TIN	IN	.	.	.	.	2.00
	035-1580-00	LPH PKG INSTR	EA	.	.	.	.	1.00
	062-0100-99	COMMON BOM	A	EA	1.00	1.00	1.00	.
	088-1293-00	BACK CVR W/HS BLK	EA	.	1.00	.	.	.
	088-1293-04	BACK COVER ASSY	A	EA	1.00	.	1.00	.
	088-1305-02	EXT STRN RLF 1.50	EA	.	.	.	.	1.00
	088-1306-00	DOOR KEYBOARD BLK	EA	1.00	.	.	.	.
	088-1315-00	INSRT FRNT CVR BLK	EA	.	1.00	1.00	.	.
	088-1337-00	STRAIN RELIEF	EA	.	.	.	.	1.00
	089-6298-03	SCR FHPP 3-48X3/16	EA	.	.	.	.	2.00
	089-6414-04	SCR PHP 2-28X1/4	EA	.	.	.	.	4.00
	089-6418-03	SCR PHP 0-40X3/16	EA	.	.	.	.	1.00
	089-7071-08	PHP W2.5-.45X8 BK	EA	.	.	.	.	3.00
	089-7071-20	PH[W2.5-.45X20 BK	EA	.	.	.	.	1.00
	091-0408-00	SPACER BD	EA	.	1.00	1.00	.	.
	195-0018-00	FCC DCL OPTIONS	EA	.	.	.	.	1.00
	200-3218-00	RX FRAME ASSY	A	EA	.	1.00	.	.
	200-3218-06	RX FRAME ASSY	A	EA	.	.	1.00	.
	200-3218-07	RX FRAME ASSY	A	EA	1.00	.	.	.
	200-3220-00	2W TX/VCO	A	EA	1.00	.	1.00	.
	200-3220-01	XWTR SBFRAME	A	EA	.	1.00	.	.
	200-3222-00	FRONT COVER ASSY	A	EA	.	.	.	1.00
	200-3223-02	KBD/DSPL ASSY-TONE	A	EA	1.00	.	.	.
	200-6877-02	14 CH/TONE SYS BD	A	EA	1.00	.	.	.
	200-6877-03	2 CHNL/TONE SYS BD	A	EA	.	1.00	1.00	.
REF	1	300-3219-00	FINAL ASSY	RF	.	X.	.	X.
REF	1	300-3219-01	FINAL ASSY	RF	X.	.	X.	.
REF	2	002-0675-00	PORT XCVR INTCON	RF	X.	X.	X.	.
REF	4	004-0483-00	MPS LPH	RF	X.	X.	X.	.

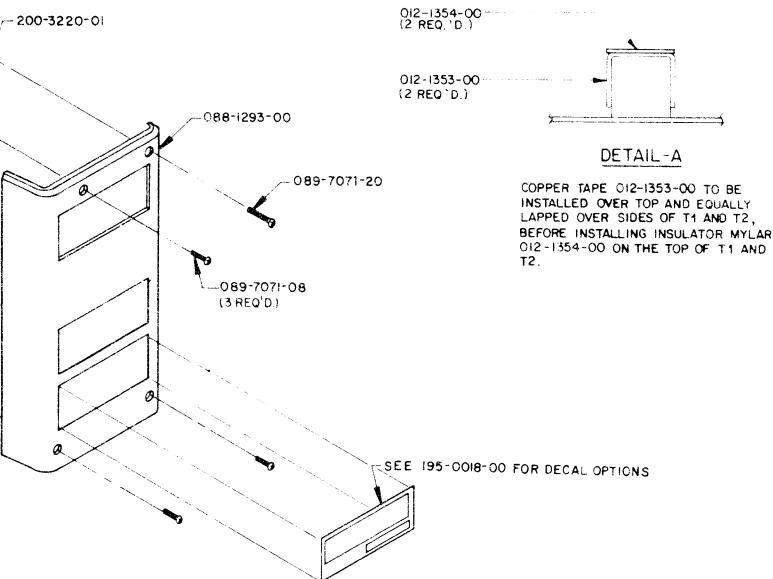
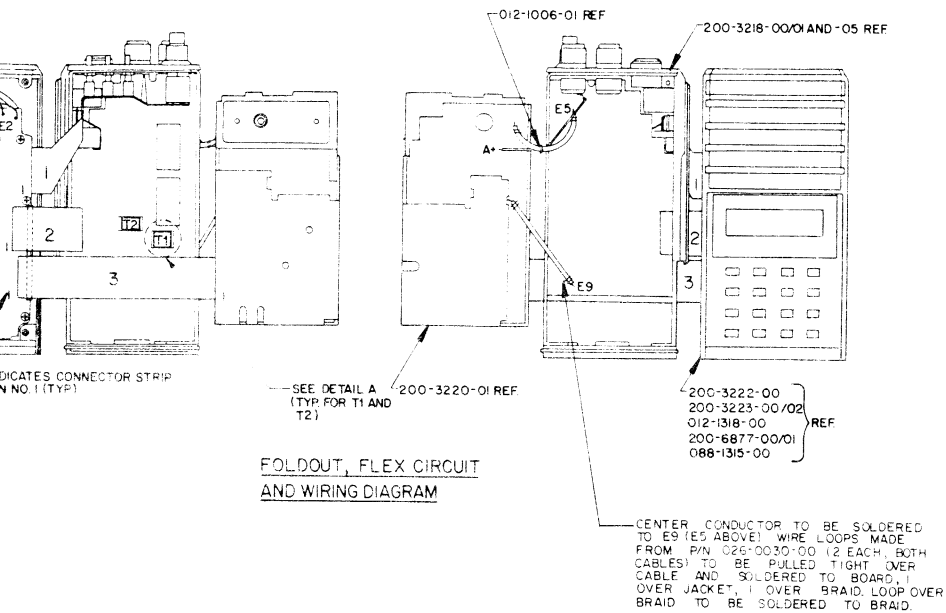
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VHF FM COMM TRANSCEIVER



NOTES

- 1 PARTS COMMON TO ALL ASSEMBLIES UNLESS OTHERWISE SPECIFIED
- 2 A. FLEX CIRCUIT MARKED NO 1 IS PART OF 200-3218-00/01 AND -04/05 (RECEIVER FRAME ASSEMBLY) ROUTE TO 200-6877-00 OR -01 SYSTEMS BOARD AND SOLDER TO CONNECTOR PADS
 B. FLEX CIRCUIT MARKED NO 2 IS PART OF 200-3218-00/01 AND -04/05 (RECEIVER FRAME ASSEMBLY) ROUTE TO 200-6877-00 OR -01 SYSTEMS BOARD AND SOLDER TO CONNECTOR PADS
 C. FLEX CIRCUIT MARKED NO 3 IS PART OF 200-3220-01 (TRANSMITTER FRAME ASSEMBLY) ROUTE TO 200-6877-00 OR -01 SYSTEMS BOARD AND SOLDER TO CONNECTOR PADS
- 3 REFERENCE- OPERATORS MANUAL KPN 006-8401-00
- 4 REFERENCE-PORTABLE TRANSCEIVER INTERCONNECTION DIAGRAM KPN 002-0675-00.
- 5 REFERENCE-LPH PACKING INSTRUCTIONS KPN 035-1560-00.
- 6 REFERENCE-MINIMUM PERFORMANCE SPECIFICATIONS KPN 004-0483-00.

FIGURE 6-4 FINAL ASSEMBLY
(Dwg No 300-3219-00 Rev 6)



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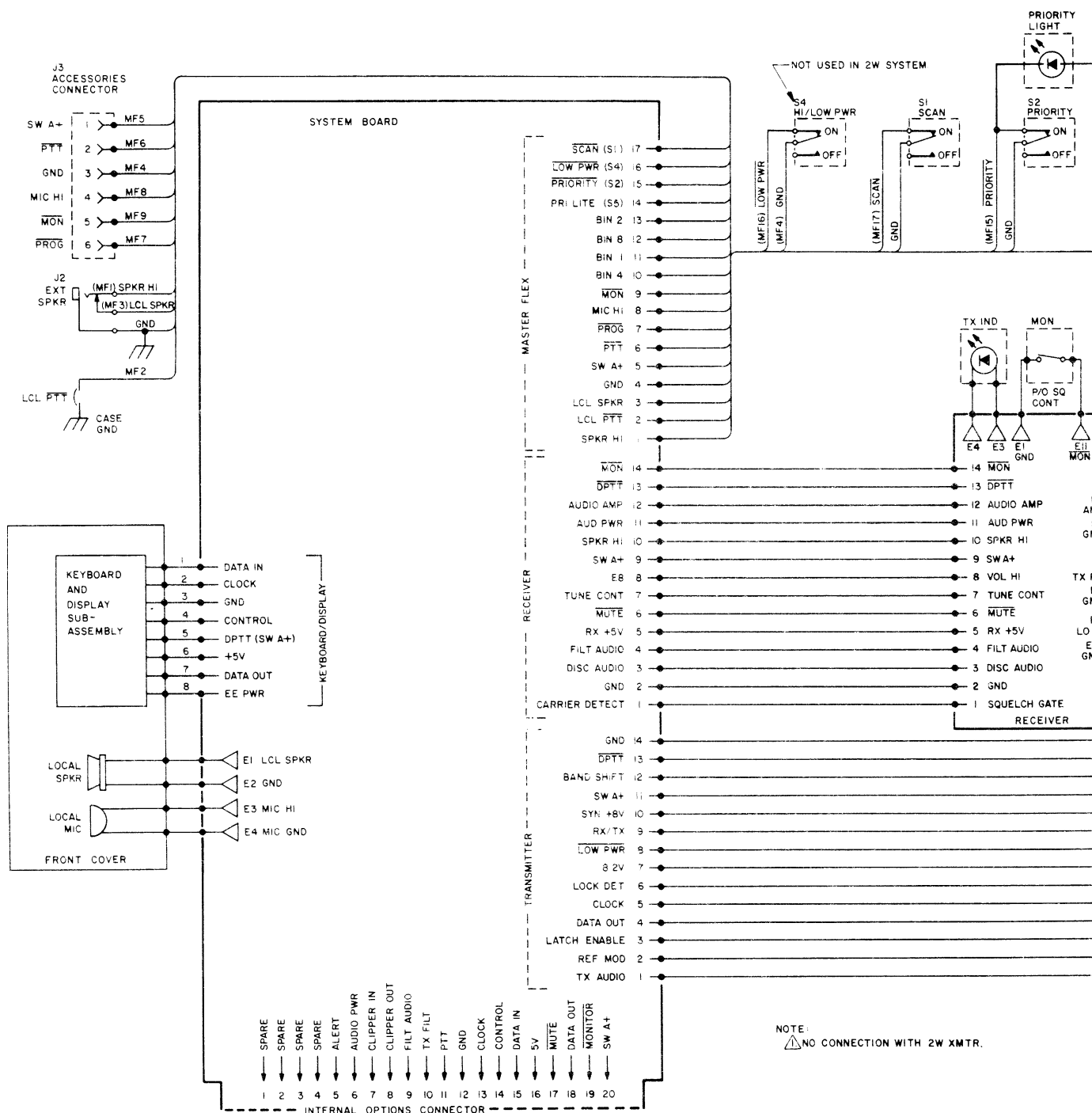
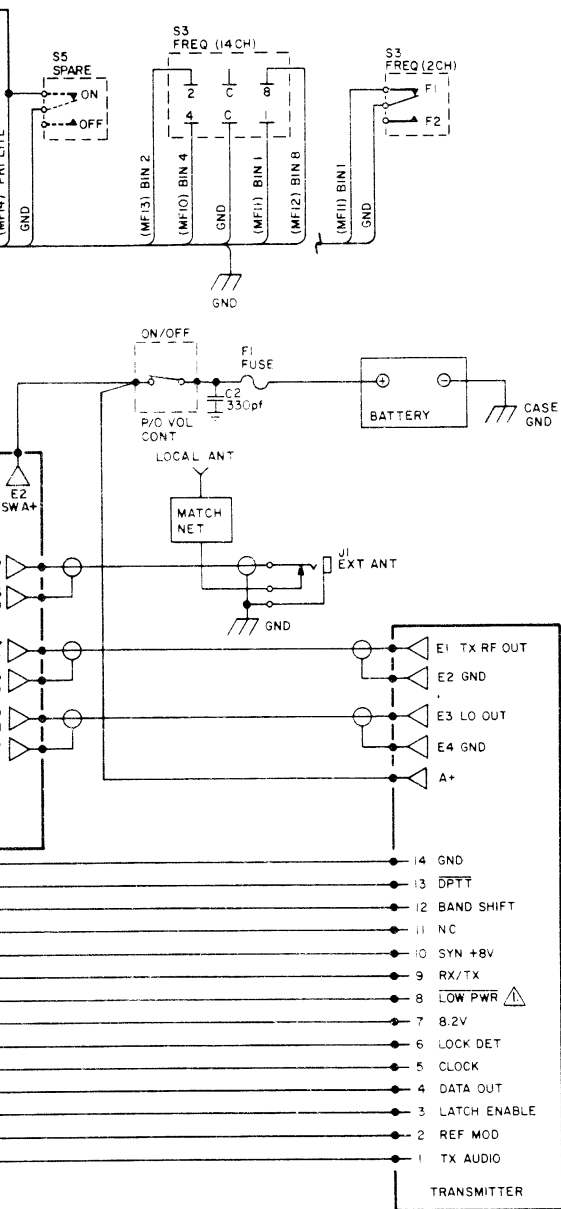


FIGURE 6-5 PORTABLE TRANSCEIVER INTERCONNECT
(Dwg No 002-0675-00 Rev 3)



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200-3218-00 REV 13 RX FRAME ASSY LPH0000
 200-3218-01 REV 14 RX FRAME ASSY LPH0000
 200-3218-02 REV 12 RX/FRAME ASSY
 200-3218-03 REV 14 RX/FRAME ASSY
 200-3218-04 REV 8 RX FRAME ASSY LPH 202 LPH 514
 200-3218-05 REV 9 RX FRAME ASSY LPH 202 LPH 514
 200-3218-06 REV 5 RX FRAME ASSY
 200-3218-07 REV 6 RX FRAME ASSY
 200-3218-08 REV 5 RX FRAME ASSY
 200-3218-09 REV 5 RX FRAME ASSY

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01	02	03	04	05	06	07	08	09
	030-0242-00	RCPT BNC CONN	EA	.	.	.	.	1.00	1.00	.	.	.	1.00	
	047-6739-01	BNC ANT NUT W/F	EA	.	.	.	.	1.00	1.00	.	.	.	1.00	
	047-7465-00	WSHR CHNL SLCT	EA	.	1.00	.	1.00	.	1.00	.	1.00	.	.	
	057-3100-00	INLAY LPH514	EA	.	1.00	.	.	.	1.00	.	.	.	.	
	057-3100-01	INLAY LPH502	EA	1.00	.	.	.	1.00	.	.	.	.	.	
	057-3100-02	INLAY LPH202	EA	.	.	.	.	.	.	1.00	.	.	1.00	
	057-3100-03	INLAY LPH214	EA	.	.	.	.	.	.	.	1.00	.	.	
	057-3101-00	INLAY JPH514	EA	.	.	.	1.00	.	.	.	.	.	.	
	057-3101-01	INLAY JPH502	EA	.	.	1.00	.	.	.	.	.	.	.	
	057-3101-02	INLAY JPH202	EA	.	.	.	.	.	.	.	.	1.00	.	
	073-0601-03	KNOB ASSY	A	EA	2.00	2.00	.	.	2.00	2.00	2.00	2.00	.	2.00
	073-0602-03	CHNL KNOB ASSY	A	EA	.	2.00	.	.	1.00	.	.	.	.	
	073-0604-03	KNOB ASSY	A	EA	.	.	2.00	2.00	.	.	.	.	2.00	
	076-1438-00	ADAPTER ANTENNA	EA	1.00	1.00	1.00	1.00	.	.	1.00	1.00	1.00	.	
	076-1439-00	NUT SLOT W5X0.50	EA	1.00	3.00	1.00	3.00	1.00	3.00	.	3.00	.	.	
	076-1439-02	NUT SLOW 1/4-40	EA	.	1.00	.	1.00	.	.	.	1.00	.	.	
	076-1444-00	NUT ALIGNMENT	EA	1.00	.	1.00	.	1.00	.	1.00	.	1.00	1.00	
	076-1449-01	BSHG BNC ANT W/F	A	EA	.	.	.	1.00	1.00	.	.	.	1.00	
	088-1294-00	PTT HOUSING	EA	1.00	1.00	.	.	1.00	1.00	1.00	1.00	.	1.00	
	088-1294-01	PTT HOUSING	EA	.	.	1.00	1.00	.	.	.	.	1.00	.	
	088-1301-00	ANTENNA BUSHING	EA	1.00	1.00	1.00	1.00	.	.	1.00	1.00	1.00	.	
	088-1304-00	LTCH PLT HSG BLK	EA	1.00	1.00	.	.	1.00	1.00	1.00	1.00	.	1.00	
	088-1304-01	LTCH PLT HSG BRN	EA	.	.	1.00	1.00	.	.	.	.	1.00	.	
	088-1307-00	TOP PLATE	EA	1.00	1.00	.	.	1.00	1.00	1.00	1.00	.	1.00	
	088-1310-00	ANTENNA NUT	EA	1.00	1.00	1.00	1.00	.	.	1.00	1.00	1.00	.	
	088-1311-00	LED BUSHING	EA	.	1.00	.	1.00	.	1.00	.	1.00	.	.	
	088-1325-00	TOP PLATE	EA	.	.	1.00	1.00	.	.	.	.	1.00	.	
	088-1328-08	KNOB INSERT ASSY	A	EA	.	.	1.00	.	.	.	.	.	.	
	088-2052-01	SWITCH BEZEL W/DCR	A	EA	.	1.00	.	.	1.00	.	1.00	.	.	
	088-2052-03	SWITCH BEZEL W/DCR	A	EA	.	.	1.00	.	.	.	.	.	.	
	089-6004-05	SCR FHP 2-56X5/16	EA	.	.	1.00	1.00	.	.	.	.	1.00	.	
	089-6159-05	SCR FHP 2-56X5/16	EA	1.00	1.00	.	.	1.00	1.00	1.00	1.00	.	1.00	
	090-0492-00	STOP PIN	EA	.	2.00	.	2.00	.	2.00	.	2.00	.	.	
	150-0002-10	TUBING TFLN 28AWG	IN	0.60	1.20	0.60	1.20	0.60	1.20	0.60	1.20	0.60	0.60	
	200-3218-99	COMMON B/M	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
C	1	109-0012-01	CAP DC 4.7PF 100V	EA	1.00	1.00	1.00	1.00	.	.	1.00	1.00	1.00	
C	1	111-0001-52	CAP CR 3.9PF 100V	EA	.	.	.	1.00	1.00	.	.	.	1.00	
DS	2	007-6176-02	DIO MVS374C	EA	.	1.00	.	1.00	.	1.00	.	1.00	.	
L	1	019-2401-03	COIL 6T	EA	.	.	.	.	1.00	1.00	.	.	1.00	
L	1	019-2401-06	COIL 6T	EA	1.00	1.00	1.00	1.00	.	.	1.00	1.00	1.00	
REF	1	300-3218-00	RCVR ASSY LPH 2CH	RF	X.	.	X.	.	X.	.	X.	.	X.	
REF	1	300-3218-01	RCVR ASSY 14CH	RF	.	X.	.	X.	.	X.	.	X.	.	
S	1	031-0473-00	SWITCH TOGGLE	EA	.	1.00	.	1.00	.	1.00	.	1.00	.	
S	2	031-0473-00	SWITCH TOGGLE	EA	.	1.00	.	1.00	.	1.00	.	1.00	.	
S	3	031-0473-00	SWITCH TOGGLE	EA	1.00	.	1.00	.	1.00	.	1.00	.	1.00	
S	3	031-0474-10	DIP SW MOD	A	EA	.	1.00	.	1.00	.	1.00	.	1.00	
S	4	031-0473-00	SWITCH TOGGLE	EA	1.00	1.00	1.00	1.00	1.00	1.00	.	.	.	

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VHF FM COMM TRANSCEIVER

200-3218-10 REV 6 RX FRAME ASSY
200-3218-99 REV 3 COMMON B/M LPH

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	10	99
	009-6881-00	PCB PTT SWITCH	EA	.	1.00	
	009-6883-00	FLEX CKT TOP CONT	EA	.	1.00	
	009-6884-00	FLEX CIRCUIT	EA	.	1.00	
	010-0019-93	TERM STDF WHT	EA	.	2.00	
	012-1021-08	TAPE ELEC 1/2 WD	IN	.	1.00	
	012-1037-00	TAPE POLY FILM	IN	.	1.25	
	012-1277-01	SNAP DOME ALGNMNT	EA	.	1.00	
	012-1317-00	INSULATOR MYLAR	EA	.	1.00	
	025-0001-01	WIRE 26 BRN	IN	.	1.00	
	025-0001-19	WIRE 26 PNK	IN	.	7.00	
	026-0002-00	WIRE COP TIN 24G	IN	.	2.00	
	030-0242-00	RCPT BNC CONN	EA	1.00	.	
	031-0475-00	SNAP DOME SWITCH	EA	.	2.00	
	047-6701-02	RCVR SUBFRAME W/F	EA	.	1.00	
	047-6702-00	BTRY LATCH PLATE	EA	.	1.00	
	047-6703-00	LATCH SPRING	EA	.	1.00	
	047-6739-01	BNC ANT NUT W/F	EA	1.00	.	
	047-7465-00	WSHR CHNL SLCT	EA	1.00	.	
	057-3100-03	INLAY LPH214	EA	1.00	.	
	073-0601-03	KNOB ASSY	A	EA	2.00	.
	073-0602-03	CHNL KNOB ASSY	A	EA	1.00	.
	076-1437-00	BLIND PRESS NUT	EA	.	1.00	
	076-1439-00	NUT SLDT W5X0.50	EA	2.00	.	
	076-1439-01	NUT SLDT W6X0.70	EA	.	2.00	
	076-1446-00	POSITIVE CONTACT	EA	.	1.00	
	076-1449-01	BSHG BNC ANT W/F	A	EA	1.00	.
	088-1294-00	PTT HOUSING	EA	1.00	.	
	088-1295-00	PTT SWITCH BOOT	EA	.	1.00	
	088-1303-00	PTT ACTUATOR	EA	.	1.00	
	088-1304-00	LTCH PLT HSG BLK	EA	1.00	.	
	088-1305-01	EXT STRN RLF .75	EA	.	1.00	
	088-1307-00	TOP PLATE	EA	1.00	.	
	088-1311-00	LED BUSHING	EA	1.00	.	
	088-1313-00	OPTIONS PLUG COVER	EA	.	1.00	
	088-1321-00	OPTIONS PLUG SPCR	EA	.	1.00	
	088-2052-01	SWITCH BEZEL W/DCR	A	EA	1.00	.
	089-6004-05	SCR FHP 2-56X5/16	EA	.	4.00	
	089-6159-05	SCR FHP 2-56X5/16	EA	1.00	.	
	089-6615-05	SCR PHP 2MX5MM	EA	.	2.00	
	089-8335-00	WSHR CURVED SPRING	EA	.	1.00	
	090-0019-00	RING RTNR .125	EA	.	1.00	
	090-0492-00	STOP PIN	EA	2.00	.	
	092-5099-00	RIVET .125 L	EA	.	2.00	
	150-0002-10	TUBING TFLN 26AWG	IN	1.20	.	
	150-0042-10	SHRINK TUBING .187	IN	.	0.25	
	155-2219-00	CABLE COAX 1.15	EA	.	1.00	
	200-3218-99	COMMON B/M	A	EA	1.00	.
ASY 1	200-6875-00	RECEIVER BOARD	A	EA	.	1.00

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	10	99
C	1 111-0001-52	CAP CR 3.9PF 100V	EA	1.00	.	
C	2 111-0001-15	CAP CR 330PF 50V	EA	.	1.00	
DS	1 007-6176-03	DIO MV5774C	EA	.	1.00	
DS	2 007-6176-02	DIO MV5374C	EA	1.00	.	
F	1 036-0057-09	FUSE 275 125V 4A	EA	.	1.00	
J	1 033-0128-00	JACK 3.5MM	EA	.	1.00	
J	2 033-0127-00	JACK 2.5MM	EA	.	1.00	
J	3 030-2529-00	CONN RECEPTACLE	EA	.	1.00	
L	1 019-2401-03	COIL 6T	EA	1.00	.	
REF	1 300-3218-01	RCVR ASSY 14CH	RF	X.	.	
S	1 031-0473-00	SWITCH TOGGLE	EA	1.00	.	
S	2 031-0473-00	SWITCH TOGGLE	EA	1.00	.	
S	3 031-0474-10	DIP SW MOD	A EA	1.00		

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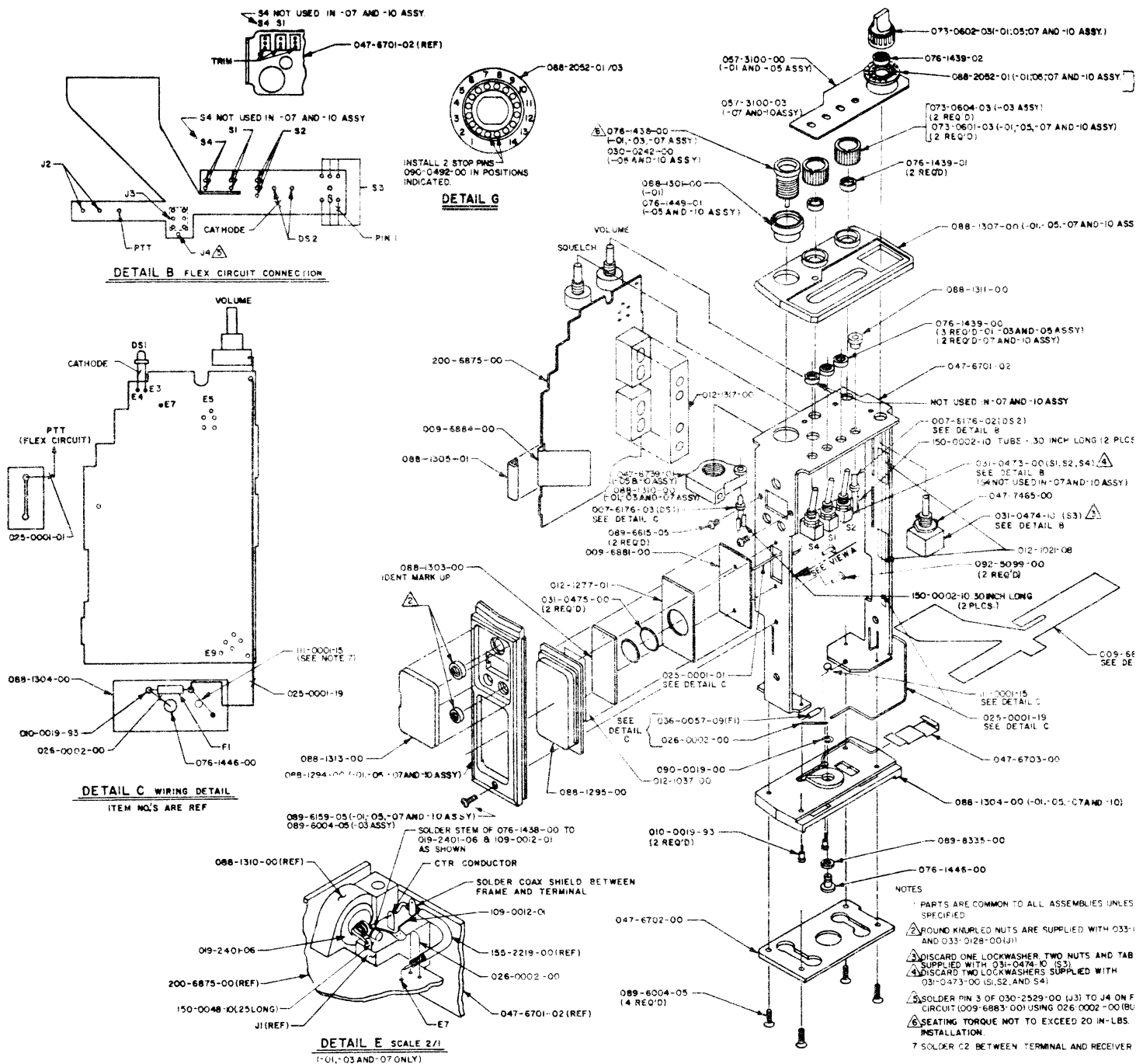
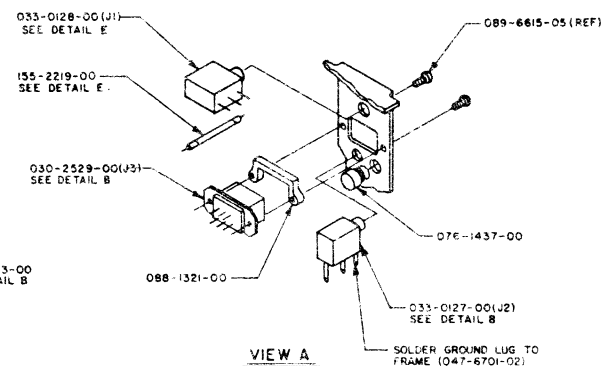
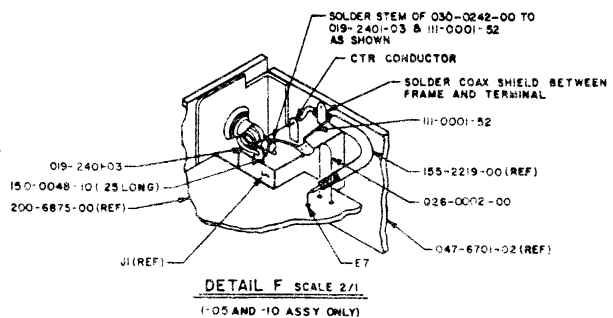


FIGURE 6-7 RECEIVER FRAME ASSEMBLY, LPH 14 CHANNEL
 (Dwg No 300-3218-01/03/05 Rev 8)

SEE DETAIL G
FOR STOP PIN DETAILS.



OTHERWISE
27-00 (J2)

WASHER

EX
WIRE)
URING

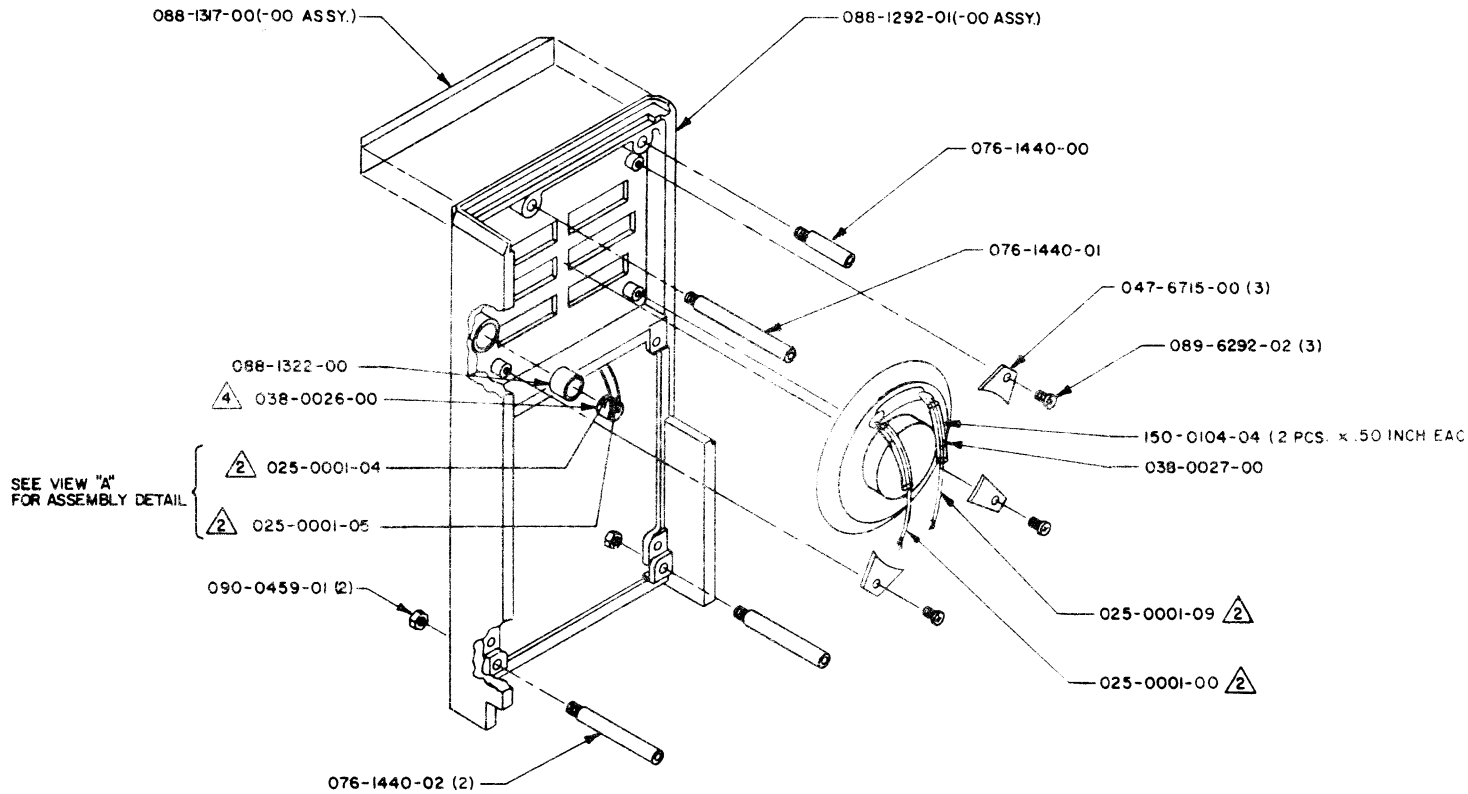
FRAME

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200-3222-00 REV 7 FRONT COVER ASSY LPH0000

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
	016-1112-00	HOT MELT 1943	AR	1.00	
	025-0001-00	WIRE 26 BLK	IN	2.50	
	025-0001-09	WIRE 26 WHT	IN	2.50	
	025-0017-04	WIRE INSUL YL	IN	2.50	
	025-0017-05	WIRE 30 GRN	IN	2.50	
	047-6715-00	SPEAKER CLIP	EA	3.00	
	076-1440-00	STANDOFF .550	EA	1.00	
	076-1440-01	STANDOFF 1.125	EA	1.00	
	076-1440-02	STANDOFF 1.105	EA	2.00	
	088-1292-01	FRT PLASTIC COVER	EA	1.00	
	088-1317-00	NAMEPLATE INLAY	EA	1.00	
	088-1322-00	BUSHING MICROPHONE	EA	1.00	
	089-6292-02	SCR PHP 2-56X1/8	EA	3.00	
	090-0459-01	NUT HEX M2.5X0.45	EA	2.00	
	150-0042-10	SHRINK TUBING .187	IN	1.00	
LS	1 038-0027-00	SPEAKER 45MM	EA	1.00	
WK	1 038-0026-00	MIC CARTRIDGE	EA	1.00	
REF	1 300-3222-00	FRONT COVER ASSY	RF	X.	

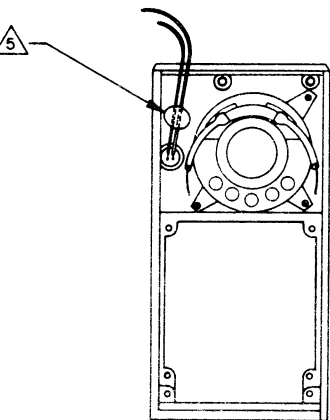
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NOTES:

- ② WIRES ON MICROPHONE AND SPEAKER TO BE 2.5" LONG MIN.
 - 3. PARTS ARE COMMON TO ALL ASSEMBLIES UNLESS OTHERWISE SPECIFIED.
 - ④ WIRING DIAGRAM FOR MICROPHONE 038-0026-00
-
- ⑤ USE HOT MELT ADHESIVE 016-1112-00 AS REQUIRED TO SECURE MICROPHONE WIRES TO COVER.

FIGURE 6-8 FRONT COVER ASSEMBLY
(Dwg No 300-3222-00 Rev 5)



VIEW "A"

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LPH 202/214/502/514
VHF FM COMM TRANSCEIVER

200-3223-00 REV 5 KBD/DSPLY ASSY LPH0000
200-3223-01 REV 7 KYDB/DISPLAY ASSY
200-3223-02 REV 1 KBD/DSPL ASSY-TONE
200-3223-99 REV 2 KYDB/DSPLY ASSY LPH0000

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01	02	99
	030-2530-00	ZEBRA CONNECTOR	EA	.	.	.	.	1.00
	031-0472-02	KEYPAD	A	EA	.	.	.	1.00
	043-0011-00	LAND MOBILE LCD	EA	.	.	.	.	1.00
	057-2846-00	OVERLAY KYBD BLK	EA	1.00	.	1.00	.	.
	057-2846-01	OVERLAY KYBD BRN	EA	.	1.00	.	.	.
	088-1299-00	DISPLAY LENS	EA	.	.	.	.	1.00
	088-1308-00	INSR KYBD/DSPL BLK	EA	1.00	.	1.00	.	.
	088-1308-01	INSR KYBD/DSPL BRN	EA	.	1.00	.	.	.
	088-1327-00	DISPLAY SPACER	EA	.	.	.	.	1.00
	089-6297-03	SCR FHPH 2-56X3/16	EA	.	.	.	.	3.00
	200-3223-99	KYDB/DSPLY ASSY	A	EA	1.00	1.00	1.00	.
	200-6878-01	KYBD/DSPL BD TONE	A	EA	.	.	1.00	.
ASY 1	200-6878-00	KYBD/DSPLY BD	A	EA	1.00	.	.	.
ASY 1	200-6878-01	KYBD/DSPL BD TONE	A	EA	.	1.00	.	.
REF 1	300-3223-00	KBD/DSPLY ASSY	RF	X.	.	.	.	.
REF 1	300-3223-01	*KYBD/DSPL ASSY	RF	.	X.	.	.	.
REF 1	300-3223-02	*KYBD/DSPL ASSY	EA	.	.	1.00	.	.

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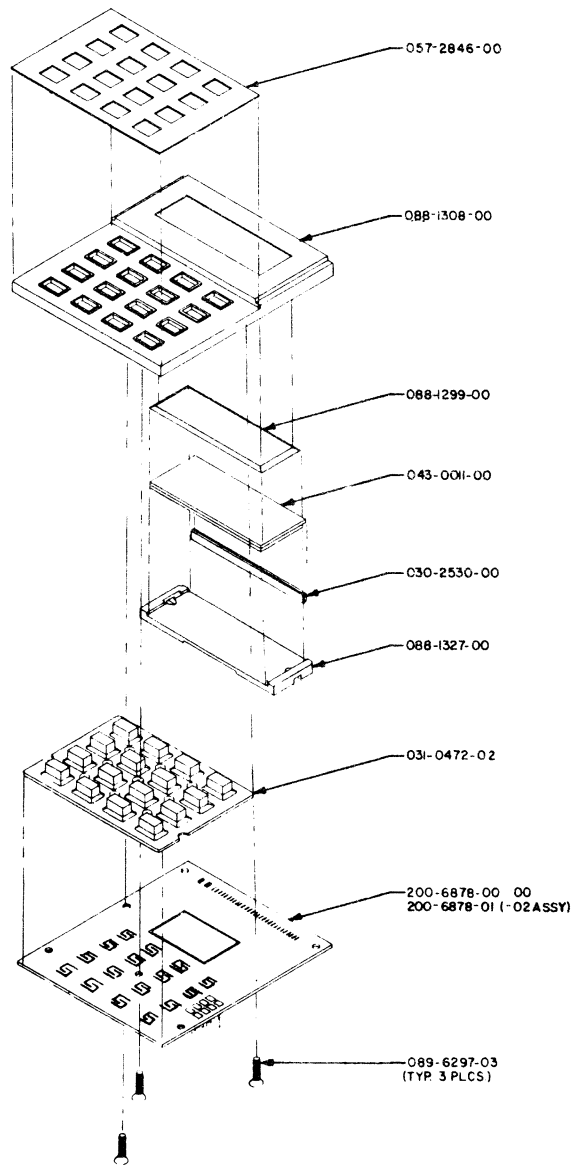


FIGURE 6-9 KEYBOARD/DISPLAY ASSEMBLY
(Dwg No 300-3223-00 Rev 3)

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200-6875-00 REV 14 RECEIVER BOARD LPH0000

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
	009-6875-00	PC BD RECEIVER	EA	1.00	
	012-1316-00	INSULATOR MYLAR	EA	1.00	
	016-1124-00	FOAM TAPE V1002	AR	1.00	
	025-0001-19	WIRE 26 PNK	IN	4.00	
	026-0002-00	WIRE COP TIN 24G	IN	2.00	
	047-6735-00	CAN DUAL-COIL	EA	2.00	
	047-6737-01	SHLD DSCRMNTR W/F	EA	1.00	
C	1	106-0072-63 *CAP CH 18PF 50V 2%	EA	1.00	
C	2	106-0072-64 *CAP CH 33PF 50V 2%	EA	1.00	
C	3	106-0072-64 *CAP CH 33PF 50V 2%	EA	1.00	
C	4	106-0072-62 *CAP CH 12PF 50V 2%	EA	1.00	
C	6	106-0072-63 *CAP CH 18PF 50V 2%	EA	1.00	
C	7	106-0072-64 *CAP CH 33PF 50V 2%	EA	1.00	
C	8	106-0072-62 *CAP CH 12PF 50V 2%	EA	1.00	
C	9	106-4103-47 CAP CH 10K X7R/50V	EA	1.00	
C	12	106-0072-32 CAP CH 47PFNP0/50V	EA	1.00	
C	14	106-0072-11 CAP CH8.2PFNP0/50V	EA	1.00	
C	15	106-0072-11 CAP CH8.2PFNP0/50V	EA	1.00	
C	16	106-4102-47 CAP CH 1K X7R/50V	EA	1.00	
C	17	106-4102-47 CAP CH 1K X7R/50V	EA	1.00	
C	18	096-1113-19 CAP CH10.0UF10%15V	EA	1.00	
C	19	106-4121-16 CAP CH120PFNP0/50V	EA	1.00	
C	20	106-0072-42 CAP CH 33PFNP0/50V	EA	1.00	
C	21	106-4473-48 CAP CH 47K X7R/50V	EA	1.00	
C	22	106-4473-48 CAP CH 47K X7R/50V	EA	1.00	
C	23	106-4121-16 CAP CH120PFNP0/50V	EA	1.00	
C	24	097-0109-06 CAP EL 100UF 16V	EA	1.00	
C	25	106-4102-47 CAP CH 1K X7R/50V	EA	1.00	
C	26	106-4103-47 CAP CH 10K X7R/50V	EA	1.00	
C	27	106-4103-47 CAP CH 10K X7R/50V	EA	1.00	
C	28	106-4121-16 CAP CH120PFNP0/50V	EA	1.00	
C	29	106-4682-46 CAP CH 6.8K 50V 5%	EA	1.00	
C	30	106-4682-46 CAP CH 6.8K 50V 5%	EA	1.00	
C	31	106-4682-46 CAP CH 6.8K 50V 5%	EA	1.00	
C	32	106-4103-46 CAP CH 10K X7R/50V	EA	1.00	
C	33	106-4102-47 CAP CH 1K X7R/50V	EA	1.00	
C	34	106-4103-47 CAP CH 10K X7R/50V	EA	1.00	
C	35	113-3220-00 CAP DC 22PF 500V	EA	1.00	
C	36	106-4103-46 CAP CH 10K X7R/50V	EA	1.00	
C	37	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	39	113-3220-00 CAP DC 22PF 500V	EA	1.00	
C	42	106-4102-46 CAP CH 1K 50V 5%	EA	1.00	
C	44	106-0072-01 CAP CH1.8PFNP0/50V	EA	1.00	
C	45	106-4102-47 CAP CH 1K X7R/50V	EA	1.00	
C	46	106-4102-47 CAP CH 1K X7R/50V	EA	1.00	
C	47	113-3220-00 CAP DC 22PF 500V	EA	1.00	
C	48	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	49	106-4102-47 CAP CH 1K X7R/50V	EA	1.00	
C	51	113-3220-00 CAP DC 22PF 500V	EA	1.00	
C	53	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	55	096-1113-71 CAP CH.47UF20%20V	EA	1.00	
C	56	106-4682-46 CAP CH 6.8K 50V 5%	EA	1.00	
C	57	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	58	096-1113-71 CAP CH.47UF20%20V	EA	1.00	
C	59	106-4222-46 CAP CH 2.2K 50V 5%	EA	1.00	
C	60	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	61	097-0109-00 CAP EL 2.2UF 50V	EA	1.00	
C	62	106-4473-48 CAP CH 47K X7R/50V	EA	1.00	
C	63	097-0109-07 CAP EL 100UF 25V	EA	1.00	
C	66	106-4102-46 CAP CH 1K 50V 5%	EA	1.00	
C	67	097-0109-08 CAP EL 1UF 50V	EA	1.00	
C	70	106-4223-46 CAP CH 22K X7R/50V	EA	1.00	

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
C	71 106-4223-46	CAP CH 22K X7R/50V	EA	1.00	
C	72 106-4223-46	CAP CH 22K X7R/50V	EA	1.00	
C	73 106-4563-46	CAP CH 56K X7R/50V	EA	1.00	
C	74 106-4333-46	CAP CH 33K X7R/50V	EA	1.00	
C	75 106-4393-46	CAP CH 39K X7R/50V	EA	1.00	
C	76 106-4822-46	CAPCH.0082MX7R/50	EA	1.00	
C	77 106-4273-46	CAP CH 27K X7R/50V	EA	1.00	
C	79 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	81 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	82 106-4102-46	CAP CH 1K 50V 5%	EA	1.00	
C	83 097-0109-07	CAP EL 100UF 25V	EA	1.00	
C	84 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	88 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	89 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	90 106-4100-16	CAP CH 10PF NPO/50	EA	1.00	
C	92 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	93 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	94 106-4101-16	CAP CH100PFNPO/50V	EA	1.00	
C	95 106-4561-46	CAP CH 560 50V 5%	EA	1.00	
C	96 106-4561-46	CAP CH 560 50V 5%	EA	1.00	
C	97 106-4561-46	CAP CH 560 50V 5%	EA	1.00	
C	98 106-4101-16	CAP CH100PFNPO/50V	EA	1.00	
C	99 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	100 097-0109-02	CAP EL 10UF 35V	EA	1.00	
C	101 097-0109-02	CAP EL 10UF 35V	EA	1.00	
C	102 106-4473-47	CAP CH 47K X7R/50V	EA	1.00	
C	103 106-4561-46	CAP CH 560 50V 5%	EA	1.00	
CR	1 007-6191-00	DIO PIN	EA	1.00	
CR	2 007-6191-00	DIO PIN	EA	1.00	
CR	3 007-6184-00	DIO DUAL SWITCHING	EA	1.00	
CR	4 007-4058-00	DIO VARI MV209M4	EA	1.00	
CR	8 007-6177-00	SMD DIO SI MMB0914	EA	1.00	
CR	10 007-6188-00	DIO HOT CARRIER	EA	1.00	
CR	11 007-6188-00	DIO HOT CARRIER	EA	1.00	
CR	12 007-6188-00	DIO HOT CARRIER	EA	1.00	
CR	13 007-6188-00	DIO HOT CARRIER	EA	1.00	
CR	14 007-6188-00	DIO HOT CARRIER	EA	1.00	
CR	15 007-6180-00	DIO SW MMB06050	EA	1.00	
FL	1 017-0106-00	FLTR CR 455KHZ	EA	1.00	
FL	2 017-0131-00	CERAMIC DSCRMNTR	EA	1.00	
FL	4 017-0096-00	XTAL FLTR 16.9MHZ	EA	1.00	
I	1 120-3193-00	IC FM/IF MC3357D	EA	1.00	
I	2 120-3196-00	IC LM2902D	EA	1.00	
I	3 120-3129-02	IC LM386N-3	EA	1.00	
L	1 019-2401-06	COIL 6T	EA	1.00	
L	2 019-2401-14	*COIL 2TX.08	EA	1.00	
L	3 019-2084-21	CH 1UH 10%	EA	1.00	
L	4 019-2401-01	COIL 6T	EA	1.00	
L	5 019-2401-01	COIL 6T	EA	1.00	
L	6 019-2401-02	COIL 6T	EA	1.00	
L	7 019-3157-02	COIL MOD IND	EA	1.00	
L	8 019-3157-03	COIL MOD IND	EA	1.00	
L	9 019-3157-03	COIL MOD IND	EA	1.00	
L	10 019-3157-01	COIL MOD IND	EA	1.00	
L	12 019-2401-15	*COIL 3TX.08	EA	1.00	
Q	2 007-0529-00	XSTR NPN MMBTH24	EA	1.00	
Q	4 007-0530-00	XSTR NPN MMBT3903	EA	1.00	
Q	5 007-0537-00	XSTR PNP MMBT5087	EA	1.00	
Q	7 007-0530-00	XSTR NPN MMBT3903	EA	1.00	
Q	8 007-0530-00	XSTR NPN MMBT3903	EA	1.00	
Q	9 007-0539-00	XSTR MMBTH10	EA	1.00	
Q	10 007-0536-00	XSTR MMBR920	EA	1.00	
Q	11 007-0535-00	XSTR JFET MMBF4393	EA	1.00	

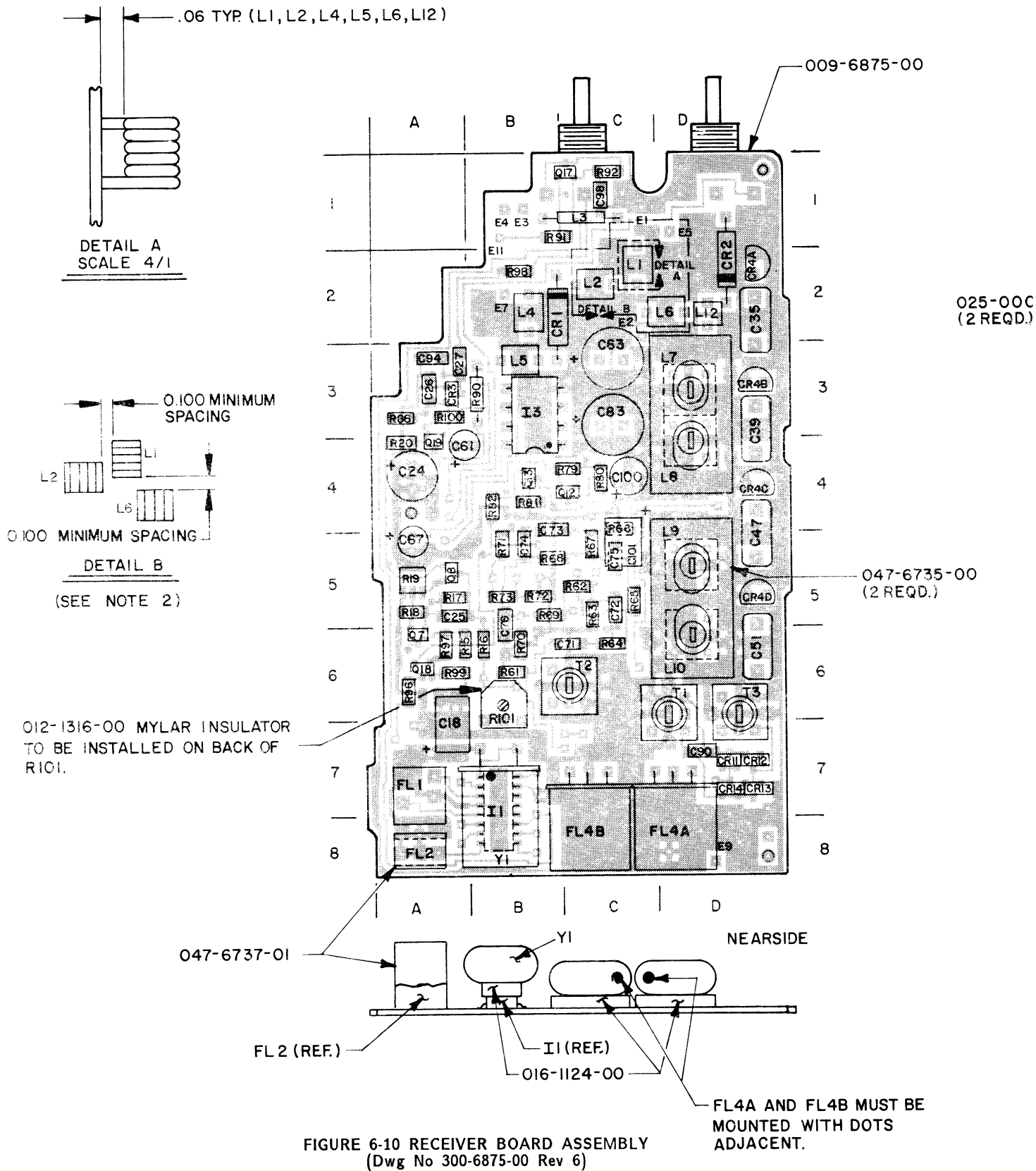
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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
Q	12 007-0537-00	XSTR PNP MMBT5087	EA	1.00	
Q	13 007-0530-00	XSTR NPN MMBT3903	EA	1.00	
Q	14 007-0542-00	XSTR PNP MMBTA64	EA	1.00	
Q	15 007-0065-01	XSTR 2N3906 (SOT)	EA	1.00	
Q	16 007-0187-02	XSTR SOT-23 2N5089	EA	1.00	
Q	17 007-0065-01	XSTR 2N3906 (SOT)	EA	1.00	
Q	18 007-0065-01	XSTR 2N3906 (SOT)	EA	1.00	
Q	19 007-0537-00	XSTR PNP MMBT5087	EA	1.00	
R	3 130-5274-23	RES CHIP 270K $\pm$ 5%	EA	1.00	
R	4 130-5472-23	RES CHIP 4.7K $\pm$ 5%	EA	1.00	
R	5 130-5360-23	RES CHIP 36.0 $\pm$ 5%	EA	1.00	
R	6 130-5202-23	RES CHIP 2K5 $\pm$ 5%	EA	1.00	
R	7 130-5202-23	RES CHIP 2K5 $\pm$ 5%	EA	1.00	
R	8 130-5473-23	RES CHIP 47K $\pm$ 5%	EA	1.00	
R	9 130-5152-23	RES CHIP 1.5K $\pm$ 5%	EA	1.00	
R	10 130-5104-23	RES CH 100K $\pm$ 5%	EA	1.00	
R	11 130-5203-23	RES CHIP 20K $\pm$ 5%	EA	1.00	
R	13 130-5103-23	RES CH 10K $\pm$ 5%	EA	1.00	
R	14 130-5563-23	RES CHIP 56K5 $\pm$ 5%	EA	1.00	
R	15 130-5563-23	RES CHIP 56K5 $\pm$ 5%	EA	1.00	
R	16 130-5623-23	RES CHIP 62K $\pm$ 5%	EA	1.00	
R	17 130-5104-23	RES CH 100K $\pm$ 5%	EA	1.00	
R	18 130-5104-23	RES CH 100K $\pm$ 5%	EA	1.00	
R	19 133-0271-13	RES VAS 15K 100V	EA	1.00	
R	20 130-5473-23	RES CHIP 47K $\pm$ 5%	EA	1.00	
R	22 133-0270-00	RES VA 20K .06W20%	EA	1.00	
R	23 130-5104-23	RES CH 100K $\pm$ 5%	EA	1.00	
R	24 130-5391-23	RES CHIP 390 $\pm$ 5%	EA	1.00	
R	25 130-5103-23	RES CH 10K $\pm$ 5%	EA	1.00	
R	26 130-5431-23	RES CHIP 430 $\pm$ 5%	EA	1.00	
R	27 130-5202-23	RES CHIP 2K5 $\pm$ 5%	EA	1.00	
R	28 130-5223-22	RES CHIP 22K $\pm$ 5%	EA	1.00	
R	29 130-5273-23	RES CHIP 27K $\pm$ 5%	EA	1.00	
R	30 130-5433-22	RES CHIP 43K $\pm$ 5%	EA	1.00	
R	31 130-5204-23	RES CHIP 200K $\pm$ 5%	EA	1.00	
R	32 130-5103-23	RES CH 10K $\pm$ 5%	EA	1.00	
R	33 130-5124-23	RES CHIP 120K $\pm$ 5%	EA	1.00	
R	34 130-5124-23	RES CHIP 120K $\pm$ 5%	EA	1.00	
R	35 130-5471-23	RES CHIP 470 $\pm$ 5%	EA	1.00	
R	39 130-5203-23	RES CHIP 20K $\pm$ 5%	EA	1.00	
R	41 130-5471-23	RES CHIP 470 $\pm$ 5%	EA	1.00	
R	42 130-5103-23	RES CH 10K $\pm$ 5%	EA	1.00	
R	44 130-5124-23	RES CHIP 120K $\pm$ 5%	EA	1.00	
R	45 130-5124-23	RES CHIP 120K $\pm$ 5%	EA	1.00	
R	47 130-5101-23	RES CH 100 $\pm$ 5%	EA	1.00	
R	48 130-5103-23	RES CH 10K $\pm$ 5%	EA	1.00	
R	49 130-5474-23	RES CHIP 470K $\pm$ 5%	EA	1.00	
R	50 130-5223-23	RES CHIP 22K $\pm$ 5%	EA	1.00	
R	51 130-5273-23	RES CHIP 27K $\pm$ 5%	EA	1.00	
R	52 130-5124-23	RES CHIP 120K $\pm$ 5%	EA	1.00	
R	53 130-5153-23	RES CHIP 15K $\pm$ 5%	EA	1.00	
R	54 130-5104-23	RES CH 100K $\pm$ 5%	EA	1.00	
R	55 130-5273-23	RES CHIP 27K $\pm$ 5%	EA	1.00	
R	56 130-5122-23	RES CHIP 1.2K $\pm$ 5%	EA	1.00	
R	57 130-5100-23	RES CH 10 $\pm$ 5%	EA	1.00	
R	58 133-0270-01	RES VA 10K .08W20%	EA	1.00	
R	60 130-5102-23	RES CH 1K $\pm$ 5%	EA	1.00	
R	61 130-5153-23	RES CHIP 15K $\pm$ 5%	EA	1.00	
R	62 130-5584-23	RES CHIP 560K $\pm$ 5%	EA	1.00	
R	63 130-5584-23	RES CHIP 560K $\pm$ 5%	EA	1.00	
R	64 130-5362-23	RES CHIP 3.6K5 $\pm$ 5%	EA	1.00	
R	65 130-5102-23	RES CH 1K $\pm$ 5%	EA	1.00	
R	66 130-5622-23	RES CHIP 6.2K $\pm$ 5%	EA	1.00	
R	67 130-5203-23	RES CHIP 20K $\pm$ 5%	EA	1.00	
R	68 130-5433-23	RES CHIP 43K $\pm$ 5%	EA	1.00	

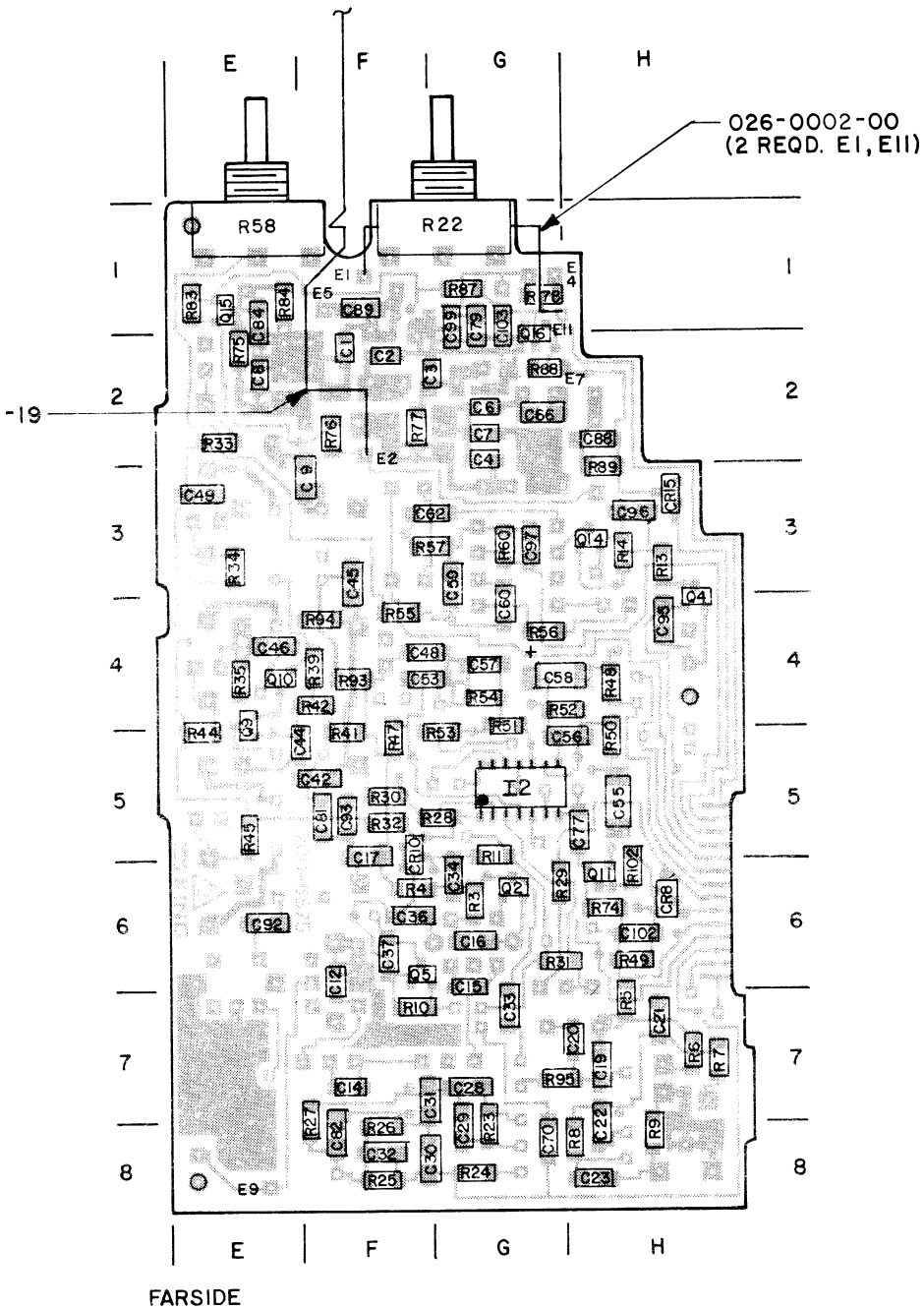
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VHF FM COMM TRANSCEIVER

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
R	69	130-5623-23	RES CHIP 62KEW5%	EA	1.00
R	70	130-5823-23	RES CHIP 82KEW5%	EA	1.00
R	71	130-5562-23	RES CHIP 5.6KEW5%	EA	1.00
R	72	130-5133-22	RES CHIP 13K EW 2%	EA	1.00
R	73	130-5123-22	RES CHIP 12K EW 2%	EA	1.00
R	74	130-5133-23	RES CHIP 13KEW5%	EA	1.00
R	75	130-5334-23	RES CHIP 330KEW5%	EA	1.00
R	76	130-5471-23	RES CHIP 470KEW5%	EA	1.00
R	77	130-5334-23	RES CHIP 330KEW5%	EA	1.00
R	78	130-5334-23	RES CHIP 330KEW5%	EA	1.00
R	79	130-5104-23	RES CH 100K EW 5%	EA	1.00
R	80	130-5153-23	RES CHIP 15K EW 5%	EA	1.00
R	81	130-5393-23	RES CHIP 39K EW 5%	EA	1.00
R	82	130-5104-23	RES CH 100K EW 5%	EA	1.00
R	83	130-5203-23	RES CHIP 20K EW 5%	EA	1.00
R	84	130-5203-23	RES CHIP 20K EW 5%	EA	1.00
R	86	130-5104-23	RES CH 100K EW 5%	EA	1.00
R	87	130-5203-23	RES CHIP 20K EW 5%	EA	1.00
R	88	130-5104-23	RES CH 100K EW 5%	EA	1.00
R	89	130-5474-23	RES CHIP 470KEW5%	EA	1.00
R	90	131-0033-13	RES CF 3.3 EW 5%	EA	1.00
R	91	130-5103-23	RES CH 10K EW 5%	EA	1.00
R	92	130-5682-23	RES CHIP 6.8KEW5%	EA	1.00
R	93	130-5822-23	RES CHIP 8.2KEW5%	EA	1.00
R	94	130-5382-23	RES CHIP 3.6KEW5%	EA	1.00
R	95	130-5753-23	RES CHIP 75KEW 5%	EA	1.00
R	96	130-5101-23	RES CH 100 EW 5%	EA	1.00
R	97	130-5154-23	RES CHIP 150K5%EW	EA	1.00
R	98	130-5471-23	RES CHIP 470KEW5%	EA	1.00
R	99	130-5104-23	RES CH 100K EW 5%	EA	1.00
R	100	130-5433-23	RES CHIP 43KEW5%	EA	1.00
R	101	133-0141-11	RES VA 100K 20%	EA	1.00
R	102	130-5244-23	RES CHIP 240K5%EW	EA	1.00
REF	1	300-6875-00	RECEIVER BD ASSY	RF	X.
T	1	019-8134-00	XFMR IF T	EA	1.00
T	2	019-8133-00	XFMR IF	EA	1.00
T	3	019-8135-00	XFMR MIXER	EA	1.00
Y	1	044-0152-00	XTAL 17.355MHZ	EA	1.00

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LOOSE WIRE TO BE
TERMINATED AT TOP ASSY.



NOTES: UNLESS OTHERWISE SPECIFIED ;

1. DUE TO HEIGHT RESTRICTIONS ALL LEADED DEVICES MUST BE MOUNTED AS CLOSE TO BOARD SURFACE AS POSSIBLE
CR4A,B,C&D CONSTITUTE A MATCHED SET AND MUST BE MOUNTED IN THIS MANNER FOR ELECTRICAL REASONS AS WELL.
2. COILS MUST BE AXIALLY ALIGNED WITH PADS. IN ADDITION L1 MUST BE PERPENDICULAR TO L2.

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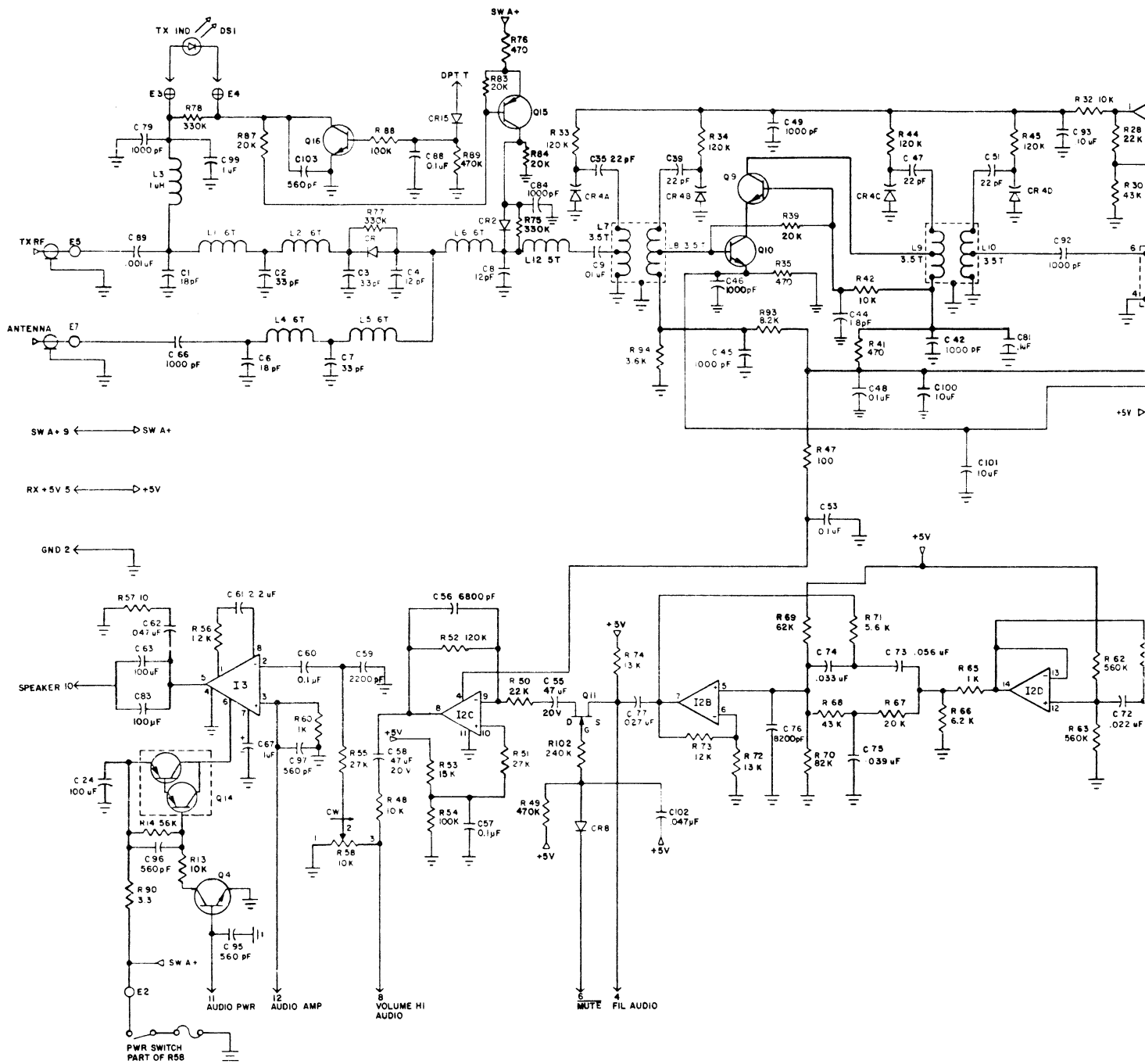
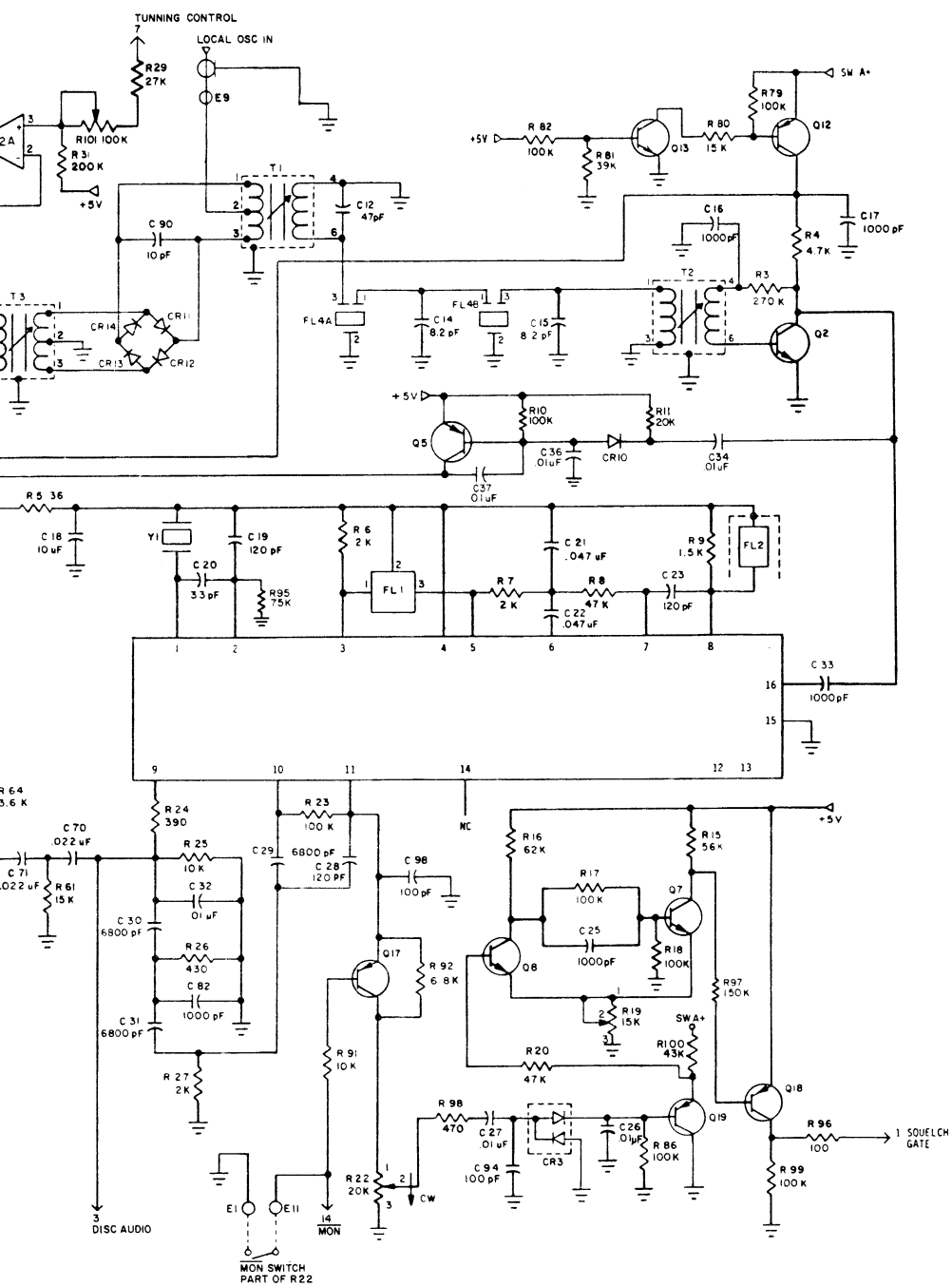


FIGURE 6-11 RECEIVER BOARD SCHEMATIC
(Dwg No 002-6875-00 Rev 4)

RECEIVER BRD



KING
LPH 202/214/502/514
VHF FM COMM TRANSCEIVER

200-6876-00 REV 17 TRANSMITTER BOARD LPH0000

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
	009-6876-00	PC BD TRANSMITTER	EA	1.00	
	016-1004-00	COMPOUND THRML JNT	AR	1.00	
	016-1124-00	FOAM TAPE V1002	AR	1.00	
	016-1184-00	ELASTOMERIC ADHES	AR	1.00	
	026-0002-00	WIRE COP TIN 24G	IN	5.00	
	047-6714-01	ADAPTER HEAT SINK	EA	1.00	
	047-6716-02	SHIELD ASSY W/F	EA	1.00	
	047-6717-01	SHIELD VCO W/F	EA	1.00	
	047-6718-01	SHIELD L/L AMP W/F	EA	1.00	
	047-6720-01	SHIELD NEAR SIDE	EA	1.00	
	047-6722-01	SHIELD BUFFER W/F	EA	1.00	
	090-0307-00	HEAT SINK FOR T0-5	EA	1.00	
	091-0320-00	INSUL T0-5	EA	1.00	
	155-2219-01	CABLE COAX .020	EA	1.00	
	155-2219-03	CABLE COAX .020	EA	1.00	
	195-0011-00	CRYSTAL KIT	EA	1.00	
C	1	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	2	097-0109-02	CAP EL 10UF 35V	EA	1.00
C	3	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	4	106-0072-34	CAP CH 56PFNPO/50V	EA	1.00
C	5	097-0109-08	CAP EL 10UF 50V	EA	1.00
C	6	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	7	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	8	106-0072-13	CAP CH 10PFNPO/50V	EA	1.00
C	9	106-0072-44	CAP CH 1.5PF	EA	1.00
C	10	106-0072-32	CAP CH 47PFNPO/50V	EA	1.00
C	11	106-0072-01	CAP CH 1.8PFNPO/50V	EA	1.00
C	12	106-4102-47	CAP CH 1K X7R/50V	EA	1.00
C	13	106-4102-47	CAP CH 1K X7R/50V	EA	1.00
C	14	106-4102-47	CAP CH 1K X7R/50V	EA	1.00
C	15	106-4104-78	CAP CH 100KZ5U/50V	EA	1.00
C	16	106-4102-47	CAP CH 1K X7R/50V	EA	1.00
C	17	106-4104-78	CAP CH 100KZ5U/50V	EA	1.00
C	18	106-0072-24	CAP CH 22PFNPO/50V	EA	1.00
C	20	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	21	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	22	106-4104-78	CAP CH 100KZ5U/50V	EA	1.00
C	23	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	24	097-0109-02	CAP EL 10UF 35V	EA	1.00
C	25	106-4104-78	CAP CH 100KZ5U/50V	EA	1.00
C	26	106-0072-31	CAP CH 39PFNPO/50V	EA	1.00
C	27	106-0072-32	CAP CH 47PFNPO/50V	EA	1.00
C	28	102-0054-01	CAP CERAMIC TRIM	EA	1.00
C	29	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	30	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	31	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	32	106-0072-04	CAP CH 4.7PFNPO/50V	EA	1.00
C	33	106-0072-12	CAP CH 10PF NPO/50V	EA	1.00
C	34	106-4102-47	CAP CH 1K X7R/50V	EA	1.00
C	35	106-4104-78	CAP CH 100KZ5U/50V	EA	1.00
C	36	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	37	106-0072-15	CAP CH 12PFNPO/50V	EA	1.00
C	38	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	39	106-0072-24	CAP CH 22PFNPO/50V	EA	1.00
C	40	106-0072-21	CAP CH 20PFNPO/50V	EA	1.00
C	41	106-0072-32	CAP CH 47PFNPO/50V	EA	1.00
C	42	106-5102-48	CAP CH 1K X7R/50V	EA	1.00
C	43	106-4104-78	CAP CH 100KZ5U/50V	EA	1.00
C	44	106-0072-32	CAP CH 47PFNPO/50V	EA	1.00

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
C	45	097-0109-02 CAP EL 10UF 35V	EA	1.00	
C	46	106-4222-46 CAP CH 2.2K 50V 5%	EA	1.00	
C	47	106-5101-16 CAP CH100PFNPO/50V	EA	1.00	
C	48	097-0109-02 CAP EL 10UF 35V	EA	1.00	
C	49	106-0072-38 CAP CH 82PFNPO/50V	EA	1.00	
C	50	106-5102-48 CAP CH 1K X7R/50V	EA	1.00	
C	51	106-5103-48 CAP CH 10K X7R/50V	EA	1.00	
C	52	106-5102-48 CAP CH 1K X7R/50V	EA	1.00	
C	53	106-4221-47 CAP CH220PFX7R/50V	EA	1.00	
C	54	106-0072-06 CAP CH5.6PFNPO/50V	EA	1.00	
C	56	106-4102-47 CAP CH 1K X7R/50V	EA	1.00	
C	57	106-4102-47 CAP CH 1K X7R/50V	EA	1.00	
C	58	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	59	106-5221-48 CAP CH 220X7R/50V	EA	1.00	
C	60	106-5102-48 CAP CH 1K X7R/50V	EA	1.00	
C	61	106-4102-47 CAP CH 1K X7R/50V	EA	1.00	
C	62	106-0072-36 CAP CH 68PFNPO/50V	EA	1.00	
C	63	106-0072-36 CAP CH 68PFNPO/50V	EA	1.00	
C	64	106-5102-48 CAP CH 1K X7R/50V	EA	1.00	
C	65	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	66	106-0072-32 CAP CH 47PFNPO/50V	EA	1.00	
C	67	106-0072-21 CAP CH 20PFNPO/50V	EA	1.00	
C	68	096-1113-28 CAP CH 22UF10%35V	EA	1.00	
C	69	106-5077-01 CAP PC 1.0UF30V10%	EA	1.00	
C	70	106-0072-24 CAP CH 22PFNPO/50V	EA	1.00	
C	72	106-5102-48 CAP CH 1K X7R/50V	EA	1.00	
C	74	097-0109-08 CAP EL 1UF 50V	EA	1.00	
C	75	097-0109-02 CAP EL 10UF 35V	EA	1.00	
C	76	097-0109-08 CAP EL 1UF 50V	EA	1.00	
C	77	097-0109-08 CAP EL 1UF 50V	EA	1.00	
C	78	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	79	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	80	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	81	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	83	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	84	106-5102-48 CAP CH 1K X7R/50V	EA	1.00	
C	85	106-4561-47 CAP CH560PFX7R/50V	EA	1.00	
C	86	106-4561-47 CAP CH560PFX7R/50V	EA	1.00	
C	87	106-4561-47 CAP CH560PFX7R/50V	EA	1.00	
C	88	106-5561-48 CAP CH 560 X7R/50V	EA	1.00	
C	89	106-5561-48 CAP CH 560 X7R/50V	EA	1.00	
C	90	106-5561-48 CAP CH 560 X7R/50V	EA	1.00	
C	91	106-5561-48 CAP CH 560 X7R/50V	EA	1.00	
C	92	106-5561-48 CAP CH 560 X7R/50V	EA	1.00	
C	93	106-4561-47 CAP CH560PFX7R/50V	EA	1.00	
C	94	106-4561-47 CAP CH560PFX7R/50V	EA	1.00	
C	95	106-5561-48 CAP CH 560 X7R/50V	EA	1.00	
C	96	106-5561-48 CAP CH 560 X7R/50V	EA	1.00	
C	97	106-4104-78 CAP CH 100KZ5U/50V	EA	1.00	
C	98	097-0109-08 CAP EL 1UF 50V	EA	1.00	
C	99	106-5102-48 CAP CH 1K X7R/50V	EA	1.00	
C	100	106-5102-48 CAP CH 1K X7R/50V	EA	1.00	
CR	1	007-4057-00 DIO V MMBV105G	EA	1.00	
CR	2	007-6178-00 DIO PIN MMBV3401	EA	1.00	
CR	3	007-6178-00 DIO PIN MMBV3401	EA	1.00	
CR	4	007-4016-15 DIO V MV2115	EA	1.00	
CR	6	007-4016-15 DIO V MV2115	EA	1.00	
CR	7	007-4056-00 DIO V MMBV109	EA	1.00	
CR	8	007-6180-00 DIO SW MMBD6050	EA	1.00	
CR	9	007-6177-00 SMD DIO SI MMBD914	EA	1.00	
CR	10	007-6178-00 DIO PIN MMBV3401	EA	1.00	
I	1	120-3194-00 IC OP AMP MC1741CD	EA	1.00	
I	2	120-6132-02 IC FREQ SYN	EA	1.00	
I	3	120-0203-00 VHF PRESCALER	EA	1.00	
I	4	120-6131-00 IC QUAD ANLG SW	EA	1.00	
I	5	120-3195-00 IC LM2904D	EA	1.00	

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
L	1 019-3156-00	COIL ADJ	EA	1.00	
L	2 019-2084-21	CH 1UH 10%	EA	1.00	
L	3 019-2084-04	CH .22UH 5%	EA	1.00	
L	4 019-2084-06	CH .27UH 5%	EA	1.00	
L	5 019-2084-06	CH .27UH 5%	EA	1.00	
L	6 019-2084-04	CH .22UH 5%	EA	1.00	
L	7 019-2099-04	CHOKE .027UH 10%	EA	1.00	
L	8 013-0006-00	FERR BEAD	EA	1.00	
L	10 019-2400-06	COIL 9T	EA	1.00	
L	11 019-2084-21	CH 1UH 10%	EA	1.00	
L	12 019-2099-02	CHOKE .10UH 5%	EA	1.00	
L	13 019-2099-02	CHOKE .10UH 5%	EA	1.00	
L	14 019-2084-21	CH 1UH 10%	EA	1.00	
L	15 019-2400-02	COIL 3T	EA	1.00	
L	18 019-2400-09	COIL 5T	EA	1.00	
L	19 019-2400-07	COIL 3T	EA	1.00	
L	20 019-2099-04	CHOKE .027UH 10%	EA	1.00	
L	21 013-0006-00	FERR BEAD	EA	1.00	
L	22 019-2400-06	COIL 9T	EA	1.00	
L	23 019-2400-07	COIL 3T	EA	1.00	
L	24 019-2084-04	CH .22UH 5%	EA	1.00	
L	31 019-2400-02	COIL 3T	EA	1.00	
L	32 019-2400-08	COIL 4T	EA	1.00	
L	33 019-2400-02	COIL 3T	EA	1.00	
L	36 019-2084-00	CH .15UH 5%	EA	1.00	
L	37 019-2084-06	CH .27UH 5%	EA	1.00	
L	38 013-0006-00	FERR BEAD	EA	1.00	
L	39 019-2099-02	CHOKE .10UH 5%	EA	1.00	
Q	1 007-0539-00	XSTR MMBTH10	EA	1.00	
Q	3 007-0539-00	XSTR MMBTH10	EA	1.00	
Q	4 007-0530-00	XSTR NPN MMBT3903	EA	1.00	
Q	5 007-0540-00	XSTR MXT3906	EA	1.00	
Q	7 007-0539-00	XSTR MMBTH10	EA	1.00	
Q	8 007-0541-00	XSTR RF MXR3866	EA	1.00	
Q	9 007-0545-00	XSTR RF PWR 2N6255	EA	1.00	
Q	10 007-0539-00	XSTR MMBTH10	EA	1.00	
Q	11 007-0538-00	XSTR RF POWER	EA	1.00	
Q	12 007-0537-00	XSTR PNP MMBT5087	EA	1.00	
Q	13 007-0537-00	XSTR PNP MMBT5087	EA	1.00	
Q	14 007-0187-02	XSTR SOT-23 2N5089	EA	1.00	
R	1 130-5753-23	RES CHIP 75K Ω 5%	EA	1.00	
R	2 130-5473-23	RES CHIP 47K Ω 5%	EA	1.00	
R	3 130-5243-23	RES CHIP 24K Ω 5%	EA	1.00	
R	4 130-5152-23	RES CHIP 1.5K Ω 5%	EA	1.00	
R	5 130-5100-23	RES CH 10 Ω 5%	EA	1.00	
R	6 130-5112-23	RES CERAMIC CHIP	EA	1.00	
R	7 130-5112-23	RES CERAMIC CHIP	EA	1.00	
R	8 130-5104-23	RES CH 100K Ω 5%	EA	1.00	
R	9 130-5101-23	RES CH 100 Ω 5%	EA	1.00	
R	10 130-5103-23	RES CH 10K Ω 5%	EA	1.00	
R	11 130-5392-23	RES CHIP 3.9K Ω 5%	EA	1.00	
R	12 130-5561-23	RES CHIP 560 Ω 5%	EA	1.00	
R	13 130-5102-23	RES CH 1K Ω 5%	EA	1.00	
R	14 130-5271-23	RES CHIP 270 Ω 5%	EA	1.00	
R	15 130-5331-23	RES CHIP 330 Ω 5%	EA	1.00	
R	16 130-5102-23	RES CH 1K Ω 5%	EA	1.00	
R	17 130-5471-23	RES CHIP 470 Ω 5%	EA	1.00	
R	18 130-5103-23	RES CH 10K Ω 5%	EA	1.00	
R	19 130-5563-23	RES CHIP 56K Ω 5%	EA	1.00	
R	20 130-5363-23	RES CHIP 36K Ω 5%	EA	1.00	
R	21 133-0141-11	RES VA 100K 20%	EA	1.00	
R	22 133-0141-11	RES VA 100K 20%	EA	1.00	
R	23 130-5433-23	RES CHIP 43K Ω 5%	EA	1.00	
R	24 130-5472-23	RES CHIP 4.7K Ω 5%	EA	1.00	
R	25 132-0135-00	RES WW .18 1W 5%	EA	1.00	
R	28 130-5682-23	RES CHIP 6.8K Ω 5%	EA	1.00	
R	29 130-5202-23	RES CHIP 2K5 Ω 5%	EA	1.00	

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
R	30	130-5151-23	RES CHIP 150KΩ 5%	EA	1.00
R	31	130-5104-23	RES CH 100K Ω 5%	EA	1.00
R	32	130-5683-23	RES CHIP 68K Ω 5%	EA	1.00
R	33	130-5102-23	RES CH 1K Ω 5%	EA	1.00
R	34	130-5753-23	RES CHIP 75KΩ 5%	EA	1.00
R	35	130-5682-23	RES CHIP 6.8KΩ 5%	EA	1.00
R	36	130-5473-23	RES CHIP 47KΩ 5%	EA	1.00
R	37	130-5102-23	RES CH 1K Ω 5%	EA	1.00
R	38	130-5103-23	RES CH 10K Ω 5%	EA	1.00
R	39	130-5624-23	RES CHIP 620KΩ 5%	EA	1.00
R	40	130-5163-23	RES CHIP 16KΩ 5%	EA	1.00
R	41	130-5303-23	RES CHIP 30KΩ 5%	EA	1.00
R	42	130-5472-23	RES CHIP 4.7KΩ 5%	EA	1.00
R	43	130-5623-23	RES CHIP 62KΩ 5%	EA	1.00
R	45	130-5103-23	RES CH 10K Ω 5%	EA	1.00
R	46	133-0141-06	RES VA 47K 20%	EA	1.00
R	49	133-0141-11	RES VA 100K 20%	EA	1.00
R	52	130-5302-23	RES CHIP 3K Ω 5%	EA	1.00
R	53	130-5103-23	RES CH 10K Ω 5%	EA	1.00
R	55	130-5622-23	RES CHIP 6.2KΩ 5%	EA	1.00
R	56	130-5104-23	RES CH 100K Ω 5%	EA	1.00
R	57	130-5104-23	RES CH 100K Ω 5%	EA	1.00
R	60	130-5472-23	RES CHIP 4.7KΩ 5%	EA	1.00
R	62	130-5333-23	RES CHIP 33K Ω 5%	EA	1.00
R	63	130-5333-23	RES CHIP 33K Ω 5%	EA	1.00
R	64	130-5332-23	RES CHIP 3.3KΩ 5%	EA	1.00
R	65	131-0030-23	RES CF 3 pF 5%	EA	1.00
R	66	130-5202-23	RES CHIP 2K5Ω 5%	EA	1.00
R	67	130-5513-23	RES CHIP 51K Ω 5%	EA	1.00
R	68	130-5303-23	RES CHIP 30KΩ 5%	EA	1.00
R	69	130-5153-23	RES CHIP 15K Ω 5%	EA	1.00
REF	1	300-6876-00	XMTR BD ASSY	RF	X.
RT	1	134-1012-01	THMS 1K 10%	EA	1.00
Y	1	044-0151-00	XTAL 10.00MHZ QRTZ	EA	1.00

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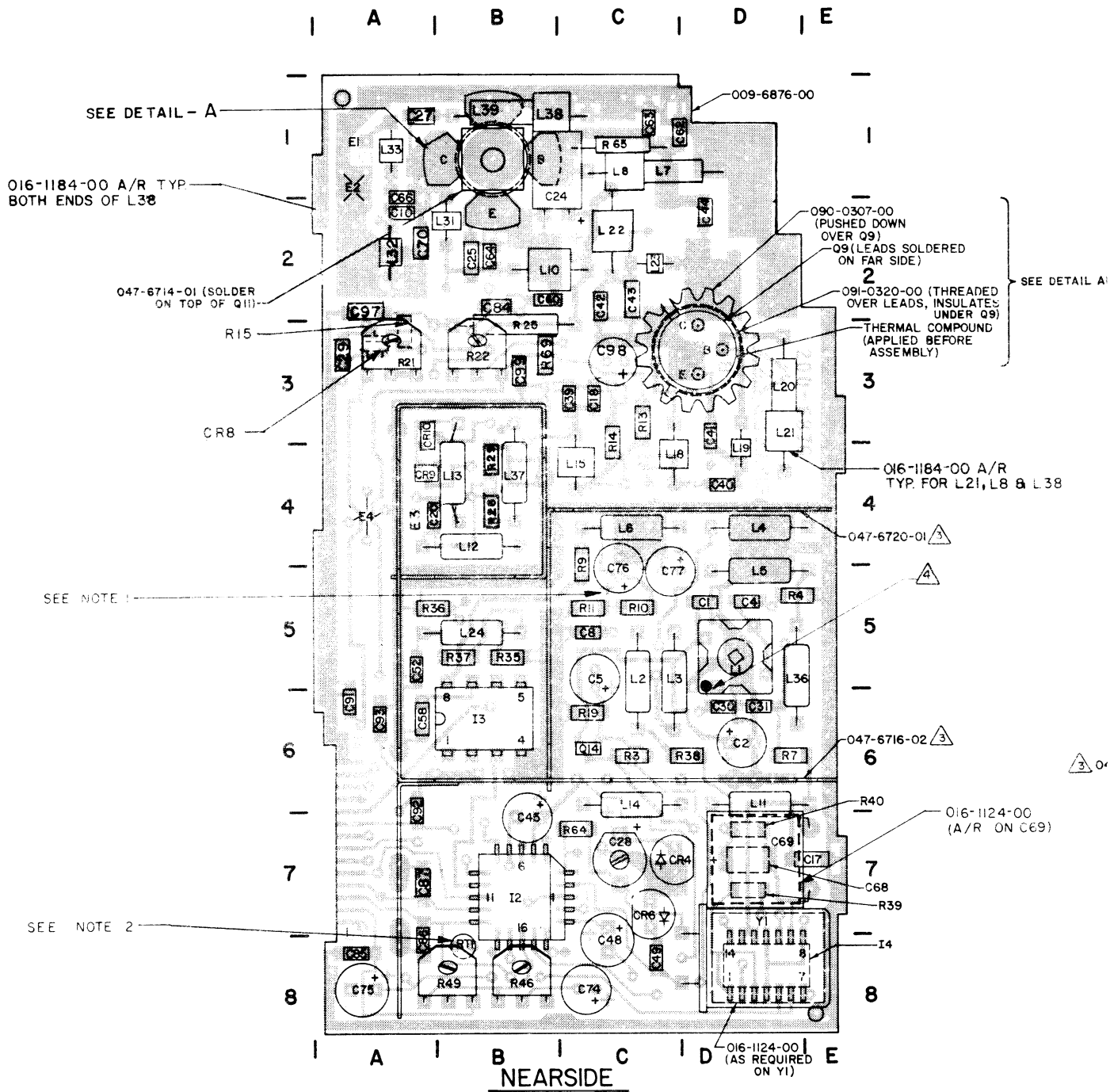
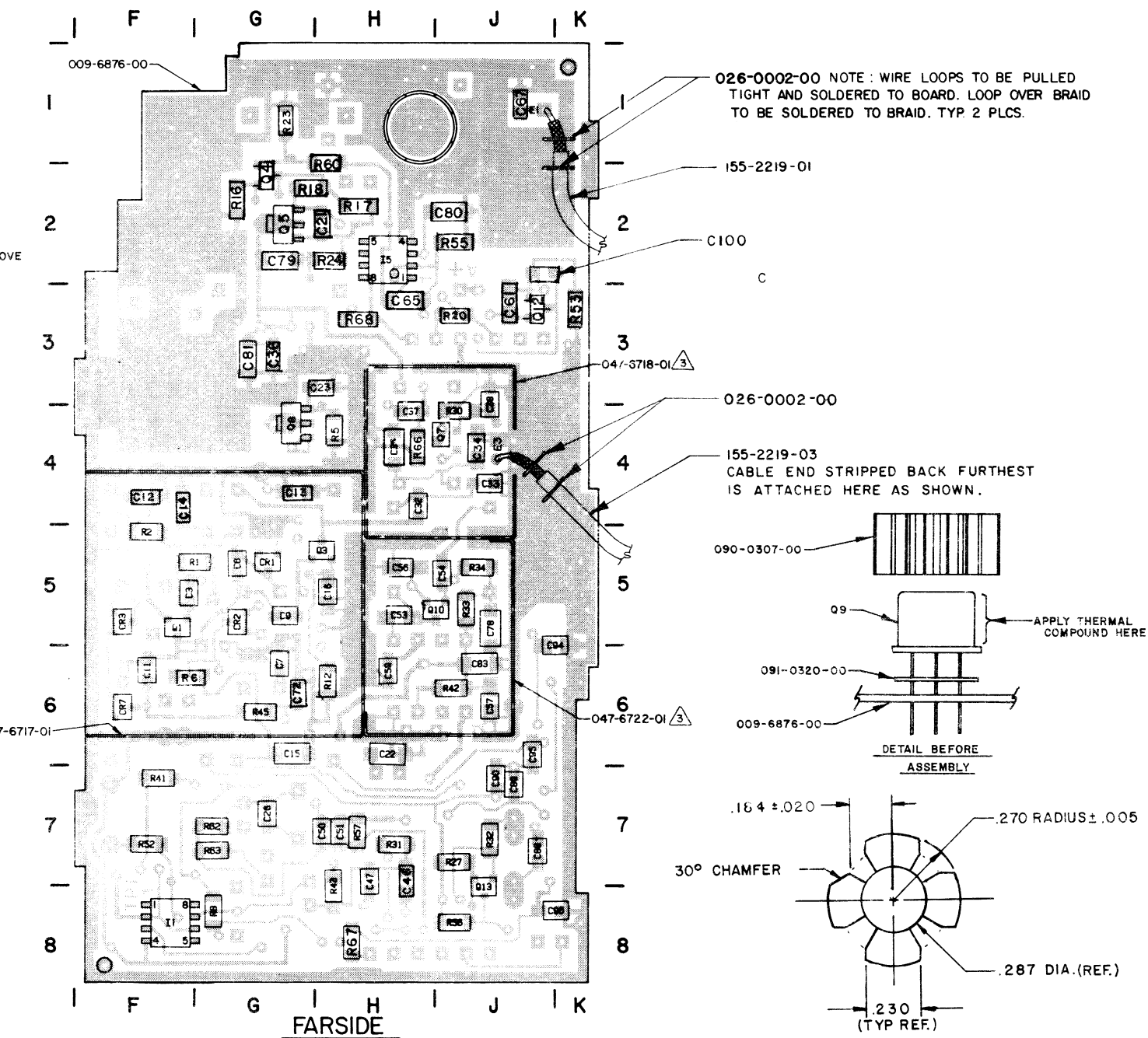


FIGURE 6-12 5 WATT TRANSMITTER BOARD ASSEMBLY
(Dwg No 300-6876-00 Rev 7)



NOTES

1 C2, C5, C45, C48, C74, C75, C76, C77, CR4, CR6 AND Q9 HEIGHT SHOULD NOT EXCEED .315 INCH ABOVE BOARD SURFACE.

2 RT1 - USE HEAT SINK DEVICE WHILE SOLDERING TO PREVENT THERMAL DAMAGE.

3 SOLDER BOTTOM EDGES OF FENCES TO GROUND PLANE ON BOARD WHERE SOLDERMASK IS OPEN TO ENSURE GOOD ELECTRICAL CONTINUITY THRUOUT. FENCES TO BE SNUGGED DOWN ON BOARD SURFACE. GAP BETWEEN FENCE EDGE AND BOARD SURFACE NOT TO EXCEED .007 INCH.

4 ● DENOTES PIN #1 OF LI.

DETAIL - A
SCALE: 2/1
KPN 007-0538-00 MODIFIED

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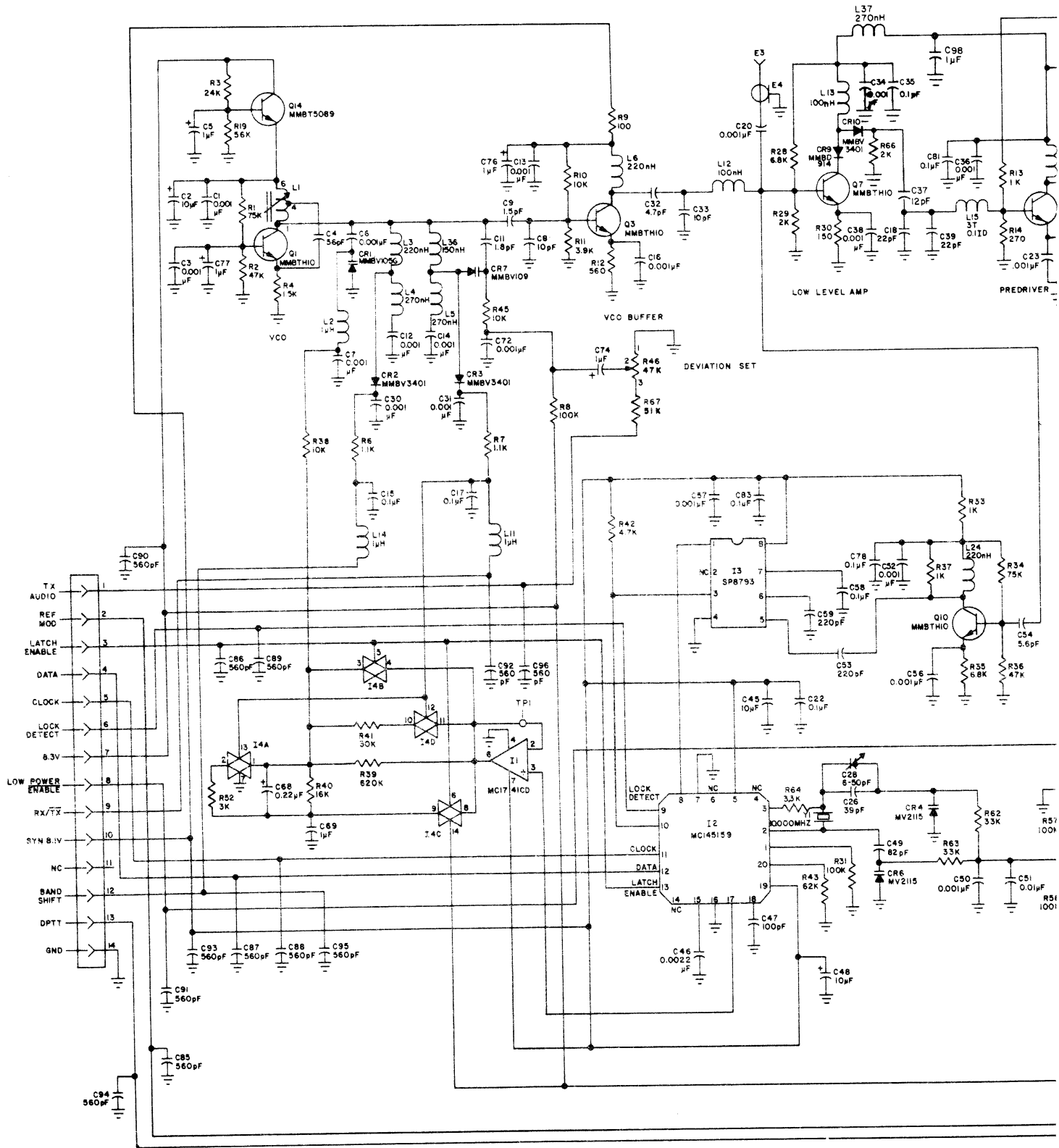
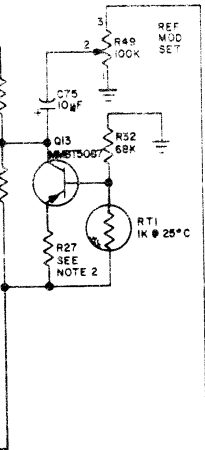


FIGURE 6-13 5 WATT TRANSMITTER BOARD SCHEMATIC
(Dwg No 002-6876-00 Rev 3)



NOTES:

- 1 RESISTORS ARE IN OHMS $\pm 5\%$, $1/8W$ UNLESS OTHERWISE SPECIFIED
- 2 R27 IS DETERMINED BY CRYSTAL (Y1) MARKING AS FOLLOWS:
RED = 82K
BLACK = 36K
YELLOW = 27K
GREEN = 20K

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200-6880-00 REV 5 2W TX PC LPH0000

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
	009-6880-00	PC BD 2W TX	EA	1.00	
	016-1004-00	COMPOUND THRML JNT	AR	1.00	
	016-1124-00	FOAM TAPE V1002	AR	1.00	
	016-1184-00	ELASTOMERIC ADHES	AR	1.00	
	026-0002-00	WIRE COP TIN 24G	IN	1.00	
	047-6716-02	SHIELD ASSY W/F	EA	1.00	
	047-6717-01	SHIELD VCO W/F	EA	1.00	
	047-6718-01	SHIELD L/L AMP W/F	EA	1.00	
	047-6720-01	SHIELD NEAR SIDE	EA	1.00	
	047-6722-01	SHIELD BUFFER W/F	EA	1.00	
	090-0307-00	HEAT SINK FOR TO-5	EA	1.00	
	091-0320-00	INSUL TO-5	EA	2.00	
	155-2219-01	CABLE COAX .020	EA	2.00	
	155-2219-03	CABLE COAX .020	EA	1.00	
	195-0011-00	CRYSTAL KIT	EA	1.00	
C	1 097-0109-08	CAP EL 1UF 50V	EA	1.00	
C	2 097-0109-02	CAP EL 10UF 35V	EA	1.00	
C	3 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	4 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	5 097-0109-08	CAP EL 1UF 50V	EA	1.00	
C	6 106-0072-34	CAP CH 56PFNPO/50V	EA	1.00	
C	7 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	8 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	9 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	10 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	11 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	12 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	13 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	14 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	15 097-0109-08	CAP EL 1UF 50V	EA	1.00	
C	16 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	17 106-0072-01	CAP CH 1.8PFNPO/50V	EA	1.00	
C	18 106-0072-44	CAP CH 1.5PF	EA	1.00	
C	19 106-0072-13	CAP CH 10PFNPO/50V	EA	1.00	
C	20 097-0109-08	CAP EL 1UF 50V	EA	1.00	
C	21 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	22 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	23 106-0072-04	CAP CH 4.7PFNPO/50V	EA	1.00	
C	24 106-0072-12	CAP CH 10PF NPO/50V	EA	1.00	
C	25 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	26 106-0072-15	CAP CH 12PFNPO/50V	EA	1.00	
C	27 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	28 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	29 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	30 106-0072-30	CAP CH 39PFNPO/50V	EA	1.00	
C	32 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	33 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	34 106-0072-26	CAP CH 27PFNPO/50V	EA	1.00	
C	35 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	36 106-0072-19	CAP CH 18PFNPO/50V	EA	1.00	
C	37 106-0072-34	CAP CH 56PFNPO/50V	EA	1.00	
C	38 106-0072-34	CAP CH 56PFNPO/50V	EA	1.00	
C	39 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	40 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	41 106-0072-26	CAP CH 27PFNPO/50V	EA	1.00	
C	42 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	43 106-0072-32	CAP CH 47PFNPO/50V	EA	1.00	
C	44 106-0072-30	CAP CH 39PFNPO/50V	EA	1.00	
C	46 106-5561-48	CAP CH 560 X7R/50V	EA	1.00	
C	47 106-4561-47	CAP CH 560PFX7R/50V	EA	1.00	
C	48 106-5561-48	CAP CH 560 X7R/50V	EA	1.00	
C	49 106-5561-48	CAP CH 560 X7R/50V	EA	1.00	

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
C	50 106-5561-48	CAP CH 560 X7R/50V	EA	1.00	
C	51 096-1113-28	CAP CH .22UF10%35V	EA	1.00	
C	52 108-5077-01	CAP PC 1.0UF30V10%	EA	1.00	
C	53 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	
C	54 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	
C	56 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	
C	57 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	
C	58 106-5561-48	CAP CH 560 X7R/50V	EA	1.00	
C	59 106-5561-48	CAP CH 560 X7R/50V	EA	1.00	
C	60 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	61 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	62 106-5221-48	CAP CH 220X7R/50V	EA	1.00	
C	63 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	64 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	65 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	66 106-4221-47	CAP CH220PFX7R/50V	EA	1.00	
C	67 097-0109-02	CAP EL 10UF 35V	EA	1.00	
C	68 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	69 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	70 106-0072-06	CAP CH5.6PFNP0/50V	EA	1.00	
C	71 106-4222-47	CAPCH2200PFX7R/50V	EA	1.00	
C	72 106-5101-16	CAP CH100PFNP0/50V	EA	1.00	
C	73 097-0109-02	CAP EL 10UF 35V	EA	1.00	
C	74 102-0054-01	CAP CERAMIC TRIM	EA	1.00	
C	75 106-0072-31	CAP CH 39PFNP0/50V	EA	1.00	
C	76 106-0095-20	CAP CH 82PF 5%	EA	1.00	
C	77 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	78 106-5103-48	CAP CH 10K X7R/50V	EA	1.00	
C	79 097-0109-02	CAP EL 10UF 35V	EA	1.00	
C	80 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	81 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	82 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	83 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	84 106-5102-48	CAP CH 1K X7R/50V	EA	1.00	
C	85 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	86 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
C	87 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	
C	88 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	
CR	1 007-4057-00	DIO V MMBV105G	EA	1.00	
CR	2 007-6178-00	DIO PIN MMBV3401	EA	1.00	
CR	3 007-6178-00	DIO PIN MMBV3401	EA	1.00	
CR	4 007-4056-00	DIO V MMBV109	EA	1.00	
CR	5 007-6178-00	DIO PIN MMBV3401	EA	1.00	
CR	6 007-4016-15	DIO V MV2115	EA	1.00	
CR	7 007-4016-15	DIO V MV2115	EA	1.00	
CR	8 007-6180-00	DIO SW MMBD6050	EA	1.00	
CR	9 007-6177-00	SMD DIO SI MMBD914	EA	1.00	
I	1 120-3194-00	IC OP AMP MC1741CD	EA	1.00	
I	2 120-6132-02	IC FREQ SYN	EA	1.00	
I	3 120-0203-00	VHF PRESCALER	EA	1.00	
I	4 120-6131-00	IC QUAD ANLG SW	EA	1.00	
I	5 120-3195-00	IC LM2904D	EA	1.00	
L	1 019-3156-00	COIL ADJ	EA	1.00	
L	2 019-2084-21	CH 1UH 10%	EA	1.00	
L	3 019-2084-04	CH .22UH 5%	EA	1.00	
L	4 019-2084-06	CH .27UH 5%	EA	1.00	
L	5 019-2084-00	CH .15UH 5%	EA	1.00	
L	6 019-2084-06	CH .27UH 5%	EA	1.00	
L	7 019-2084-21	CH 1UH 10%	EA	1.00	
L	8 019-2084-21	CH 1UH 10%	EA	1.00	
L	9 019-2084-04	CH .22UH 5%	EA	1.00	
L	10 019-2099-02	CHOKE .10UH 5%	EA	1.00	
L	11 019-2099-02	CHOKE .10UH 5%	EA	1.00	
L	12 019-2084-04	CH .22UH 5%	EA	1.00	
L	13 019-2400-16	COIL 4T	EA	1.00	
L	14 019-2400-14	COIL 1T	EA	1.00	
L	15 019-2400-11	COIL 4T	EA	1.00	
L	16 019-2099-03	CH .047UH 5%	EA	1.00	

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
L	17 013-0006-00	FERR BEAD	EA	1.00	
L	18 019-2400-12	COIL 8T	EA	1.00	
L	19 019-2400-02	COIL 3T	EA	1.00	
L	20 019-2400-02	COIL 3T	EA	1.00	
L	21 019-2084-02	CH .18UH 5%	EA	1.00	
L	22 013-0006-00	FERR BEAD	EA	1.00	
L	23 019-2084-06	CH .27UH 5%	EA	1.00	
L	24 019-2084-06	CH .27UH 5%	EA	1.00	
Q	1 007-0187-02	XSTR SOT-23 2N5089	EA	1.00	
Q	2 007-0539-00	XSTR MMBTH10	EA	1.00	
Q	3 007-0539-00	XSTR MMBTH10	EA	1.00	
Q	4 007-0539-00	XSTR MMBTH10	EA	1.00	
Q	5 007-0250-00	XSTR 2N4427	EA	1.00	
Q	6 007-0545-00	XSTR RF PWR 2N6255	EA	1.00	
Q	7 007-0539-00	XSTR MMBTH10	EA	1.00	
Q	8 007-0537-00	XSTR PNP MMBT5087	EA	1.00	
Q	9 007-0537-00	XSTR PNP MMBT5087	EA	1.00	
Q	10 007-0530-00	XSTR NPN MMBT3903	EA	1.00	
Q	11 007-0540-00	XSTR MXT3906	EA	1.00	
R	1 130-5243-23	RES CHIP 24K EW 5%	EA	1.00	
R	2 130-5563-23	RES CHIP 56K5%EW	EA	1.00	
R	3 130-5753-23	RES CHIP 75K5%EW	EA	1.00	
R	4 130-5473-23	RES CHIP 47K5%EW	EA	1.00	
R	5 130-5152-23	RES CHIP 1.5K5%EW	EA	1.00	
R	6 130-5103-23	RES CH 10K EW 5%	EA	1.00	
R	7 130-5112-23	RES CERAMIC CHIP	EA	1.00	
R	8 130-5112-23	RES CERAMIC CHIP	EA	1.00	
R	9 130-5104-23	RES CH 100K EW 5%	EA	1.00	
R	10 130-5103-23	RES CH 10K EW 5%	EA	1.00	
R	11 130-5392-23	RES CHIP 3.9K5%EW	EA	1.00	
R	12 130-5391-23	RES CHIP 3905%EW	EA	1.00	
R	13 130-5103-23	RES CH 10K EW 5%	EA	1.00	
R	14 130-5101-23	RES CH 100 EW 5%	EA	1.00	
R	15 133-0141-06	RES VA 47K 20%	EA	1.00	
R	16 130-5472-23	RES CHIP 4.7K5%EW	EA	1.00	
R	17 130-5182-23	RES CHIP 1.8K5%EW	EA	1.00	
R	18 130-5151-23	RES CHIP 1505%EW	EA	1.00	
R	23 130-5302-23	RES CHIP 3K EW 5%	EA	1.00	
R	24 130-5163-23	RES CHIP 16K5%EW	EA	1.00	
R	25 130-5303-23	RES CHIP 30K5%EW	EA	1.00	
R	26 130-5624-23	RES CHIP 620K5%EW	EA	1.00	
R	28 130-5823-23	RES CHIP 62K5%EW	EA	1.00	
R	29 130-5104-23	RES CH 100K EW 5%	EA	1.00	
R	30 130-5333-23	RES CHIP 33K EW 5%	EA	1.00	
R	31 130-5333-23	RES CHIP 33K EW 5%	EA	1.00	
R	32 130-5104-23	RES CH 100K EW 5%	EA	1.00	
R	33 130-5104-23	RES CH 100K EW 5%	EA	1.00	
R	34 130-5472-23	RES CHIP 4.7K5%EW	EA	1.00	
R	35 130-5683-23	RES CHIP 68K EW 5%	EA	1.00	
R	36 133-0141-11	RES VA 100K 20%	EA	1.00	
R	37 130-5102-23	RES CH 1K EW 5%	EA	1.00	
R	38 130-5753-23	RES CHIP 75K5%EW	EA	1.00	
R	39 130-5682-23	RES CHIP 6.8K5%EW	EA	1.00	
R	40 130-5473-23	RES CHIP 47K5%EW	EA	1.00	
R	41 130-5331-23	RES CHIP 330 5%EW	EA	1.00	
R	42 132-0116-10	RES WW .47 3W 10%	EA	1.00	
R	43 130-5103-23	RES CH 10K EW 5%	EA	1.00	
R	44 130-5622-23	RES CHIP 6.2K5%EW	EA	1.00	
R	45 130-5202-23	RES CHIP 2K5%EW	EA	1.00	
R	46 130-5822-23	RES CHIP 8.2K5%EW	EA	1.00	
R	47 133-0141-11	RES VA 100K 20%	EA	1.00	
R	48 130-5472-23	RES CHIP 4.7K5%EW	EA	1.00	
R	49 130-5433-23	RES CHIP 43K5%EW	EA	1.00	
R	50 130-5102-23	RES CH 1K EW 5%	EA	1.00	
R	51 130-5103-23	RES CH 10K EW 5%	EA	1.00	
R	52 130-5471-23	RES CHIP 4705%EW	EA	1.00	

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
R	53 130-5472-23	RES CHIP 4.7K 5%	EA	1.00	
R	54 130-5332-23	RES CHIP 3.3K 5%	EA	1.00	
R	55 130-5102-23	RES CH 1K 5%	EA	1.00	
R	56 130-5513-23	RES CHIP 51K 5%	EA	1.00	
REF	1 300-6880-00	2W TX BD ASSY	RF	X.	
REF	2 002-6880-00	SCH XMTR BD	RF	X.	
RT	1 134-1012-01	THMS 1K 10%	EA	1.00	
Y	1 044-0151-00	XTAL 10.00MHZ QRTZ	EA	1.00	

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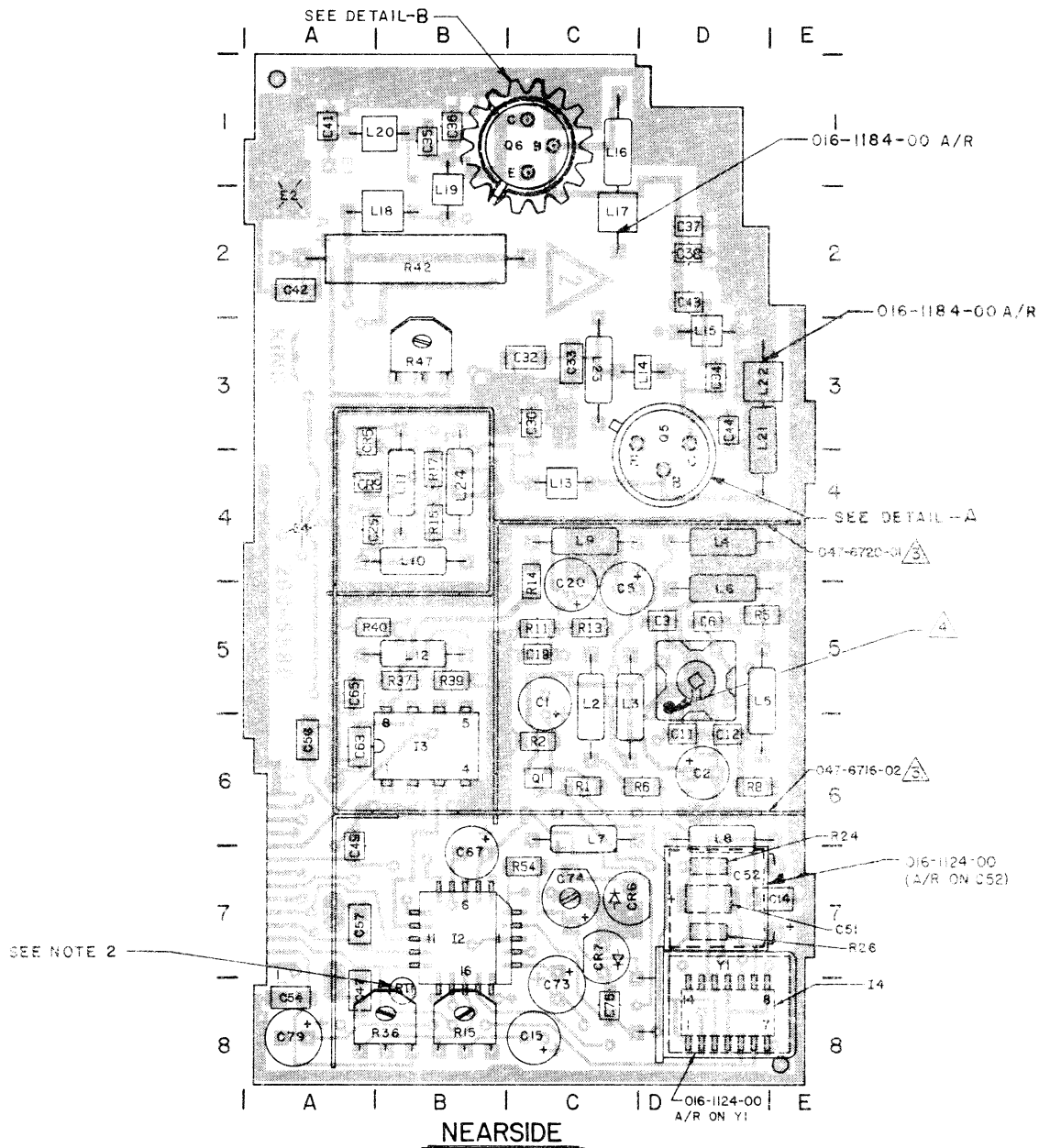
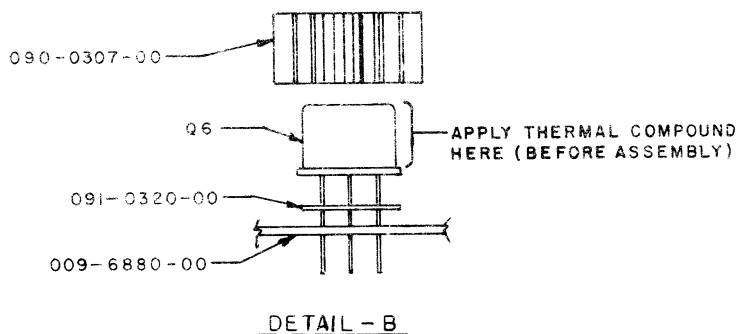
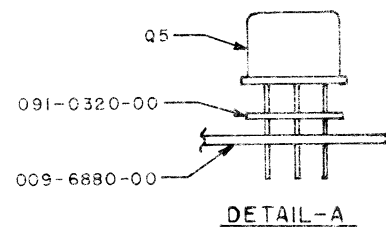
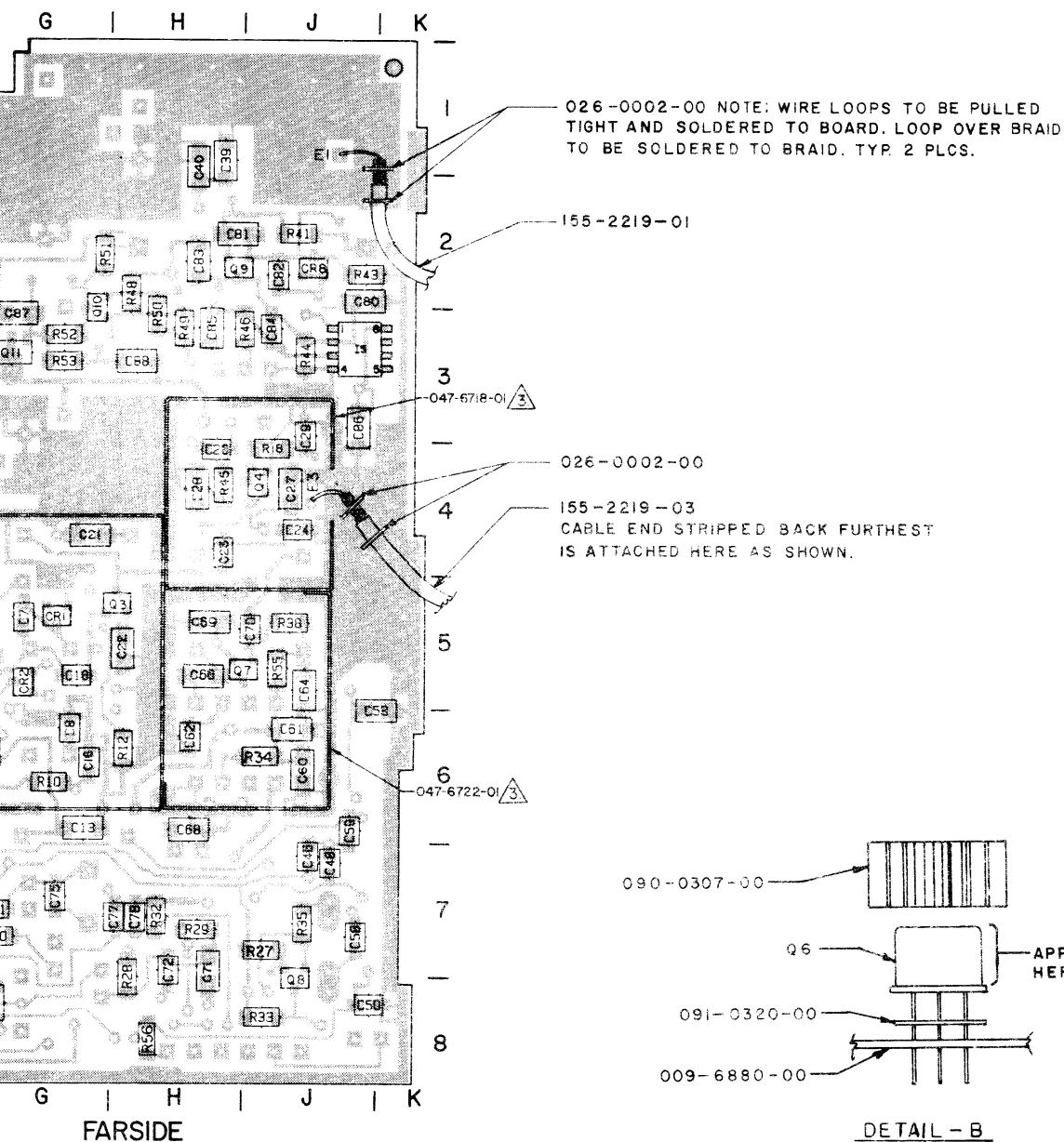


FIGURE 6-14 2 WATT TRANSMITTER ASSEMBLY
(Dwg No 300-6880-00 Rev 4)



NOTES:

1. C1, C2, C5, C15, C20, C67, C73, C79, CR6, CR7 AND Q5 HEIGHT SHOULD NOT EXCEED .315 INCH ABOVE BOARD SURFACE.

2. RTI USE HEAT SINK DEVICE WHILE SOLDERING TO PREVENT THERMAL DAMAGE.

Δ 3. SOLDER BOTTOM EDGES OF FENCES TO GROUND PLANE ON BOARD WHERE SOLDERMASK IS OPEN TO INSURE GOOD ELECTRICAL CONTINUITY THRUOUT. FENCES WILL BE SNUGGED DOWN ON BOARD SURFACE. GAP BETWEEN FENCE EDGE AND BOARD SURFACE NOT TO EXCEED .007 INCHES.

Δ 4. ● DENOTES PIN#1 OF LI.

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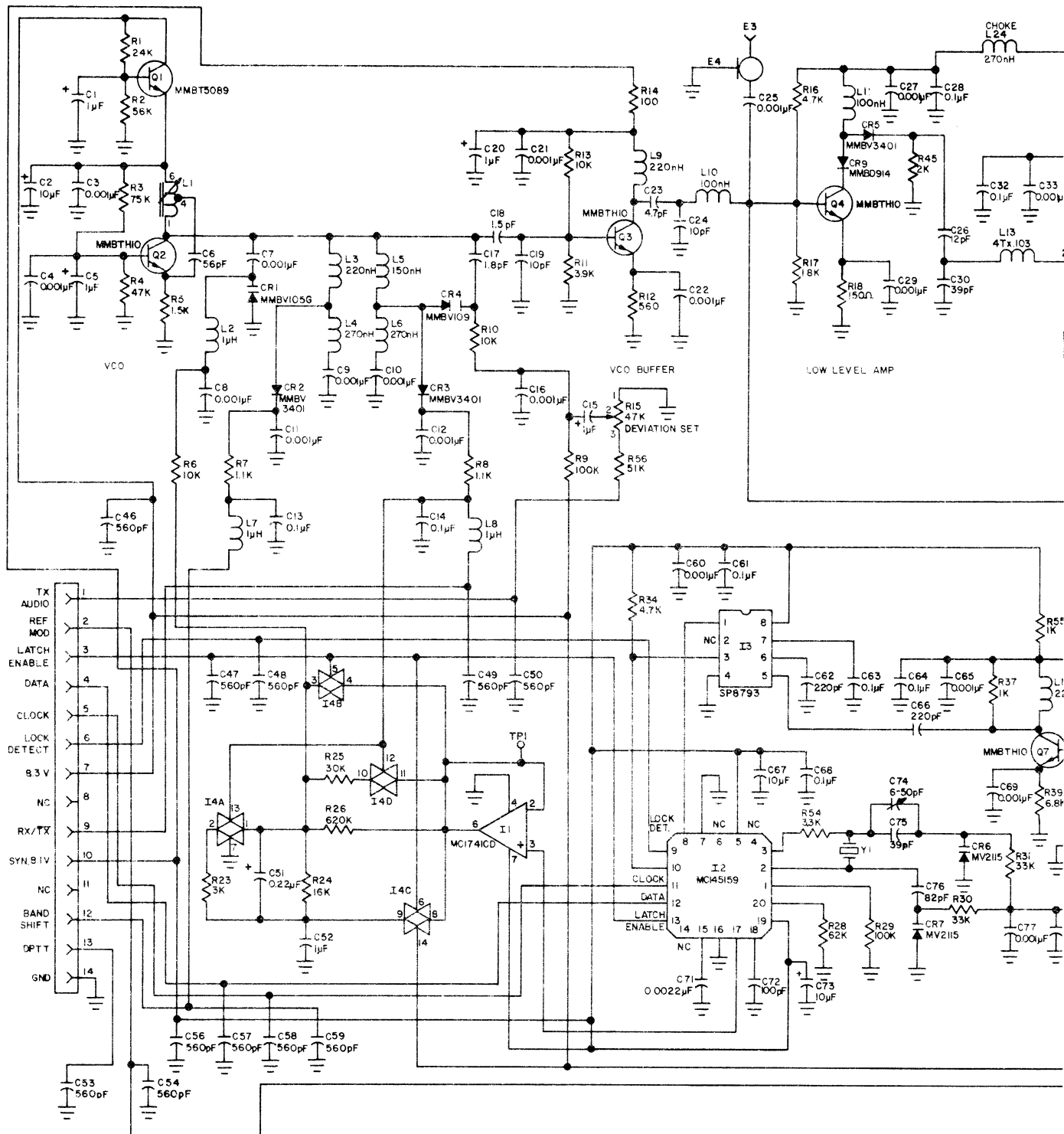
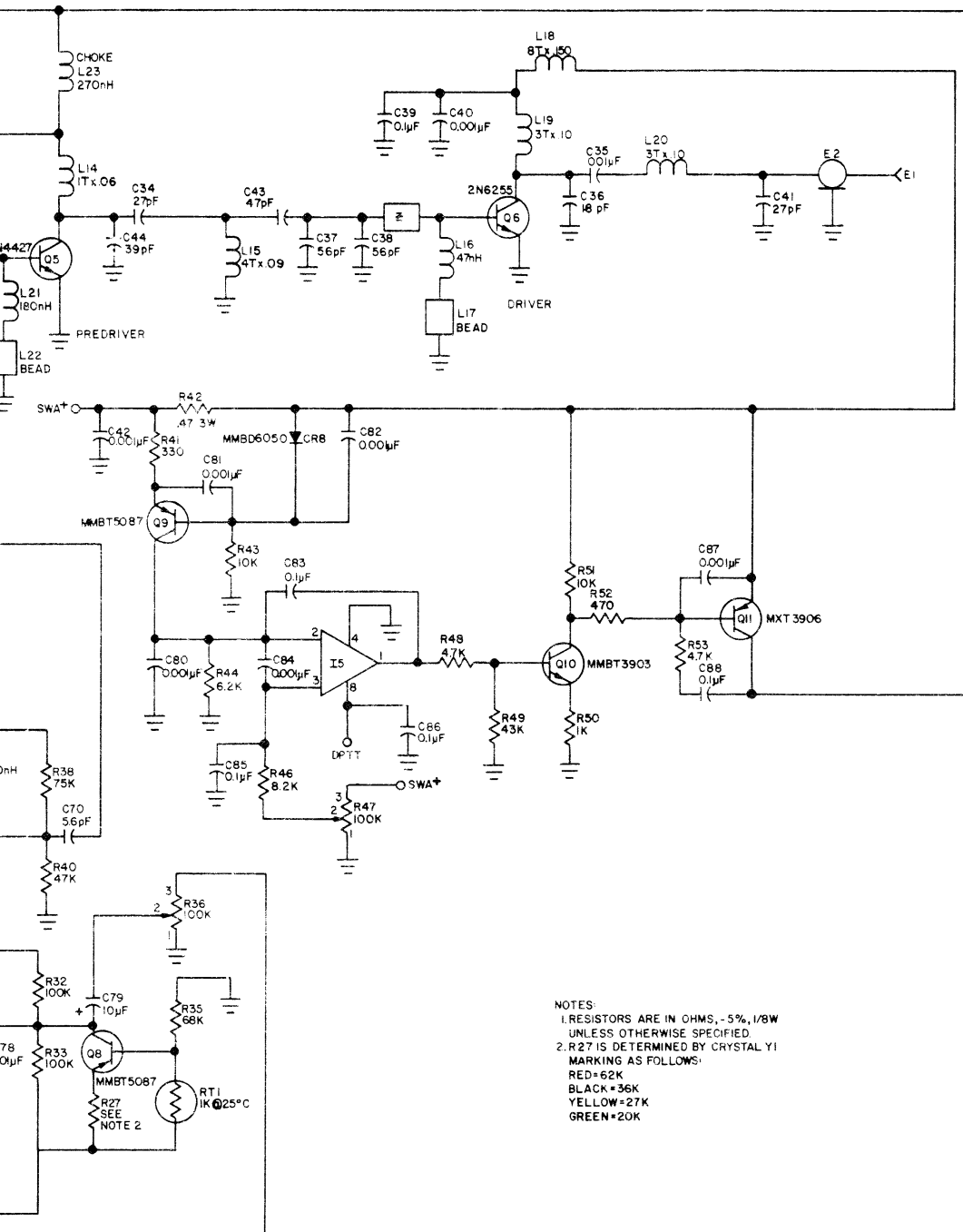


FIGURE 6-15 2 WATT TRANSMITTER SCHEMATIC
(Dwg No 002-6880-00 Rev 5)



- NOTES:
1. RESISTORS ARE IN OHMS, -5%, 1/8W UNLESS OTHERWISE SPECIFIED.
 2. R27 IS DETERMINED BY CRYSTAL Y1 MARKING AS FOLLOWS:
RED=62K
BLACK=36K
YELLOW=27K
GREEN=20K

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200-6877-00 REV 16 2 CH SYSTEM BD LPH0000
200-6877-01 REV 18 14 CH SYSTEM BD LPH0000

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01
	009-6877-00	PC BD SYSTEM	EA	1.00	1.00	
	012-1316-00	INSULATOR MYLAR	EA	1.00	1.00	
	016-1124-00	FOAM TAPE V1002	IN	.	0.30	
	026-0012-08	WIRE COP 30G	IN	.	2.00	
C	1 106-4333-46	CAP CH 33K X7R/50V	EA	1.00	1.00	
C	2 106-4222-46	CAP CH 2.2K 50V 5%	EA	1.00	1.00	
C	3 106-4563-46	CAP CH 56K X7R/50V	EA	1.00	1.00	
C	4 097-0109-08	CAP EL 1UF 50V	EA	1.00	1.00	
C	5 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	1.00	
C	6 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	1.00	
C	7 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	1.00	
C	8 106-4100-16	CAP CH 10PF NPO/50	EA	1.00	1.00	
C	9 106-4100-16	CAP CH 10PF NPO/50	EA	1.00	1.00	
C	12 106-6683-48	CAPCH68KX7R50V20%	EA	1.00	1.00	
C	13 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	1.00	
C	14 106-4153-47	CAP CH 15K X7R/50V	EA	1.00	1.00	
C	16 106-4103-47	CAP CH 10K X7R/50V	EA	1.00	1.00	
C	17 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	1.00	
C	18 096-1113-71	CAP CH .47UF20%20V	EA	1.00	1.00	
C	20 097-0109-08	CAP EL 1UF 50V	EA	1.00	1.00	
C	25 097-0109-08	CAP EL 1UF 50V	EA	1.00	1.00	
C	27 106-5223-48	CAP CH 22K X7R/50V	EA	1.00	1.00	
C	28 106-4821-47	CAP CH820PFX7R/50V	EA	1.00	1.00	
C	29 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	1.00	
C	30 106-4103-47	CAP CH 10K X7R/50V	EA	1.00	1.00	
C	31 106-4104-78	CAP CH 100KZ5U/50V	EA	1.00	1.00	
C	35 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	1.00	
C	36 096-1113-72	CAP CH1.0UF20%20V	EA	1.00	1.00	
C	37 106-4101-16	CAP CH100PFNPO/50V	EA	1.00	1.00	
C	38 106-4101-16	CAP CH100PFNPO/50V	EA	1.00	1.00	
C	39 106-4101-16	CAP CH100PFNPO/50V	EA	1.00	1.00	
C	40 106-4101-16	CAP CH100PFNPO/50V	EA	1.00	1.00	
C	41 106-4101-16	CAP CH100PFNPO/50V	EA	1.00	1.00	
C	42 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	1.00	
C	43 106-4101-16	CAP CH100PFNPO/50V	EA	1.00	1.00	
C	44 106-4102-47	CAP CH 1K X7R/50V	EA	1.00	1.00	
C	45 106-4821-47	CAP CH820PFX7R/50V	EA	1.00	1.00	
C	46 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	1.00	
C	47 106-5561-48	CAP CH 560 X7R/50V	EA	1.00	1.00	
C	48 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	1.00	
C	49 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	1.00	
C	50 106-4561-47	CAP CH560PFX7R/50V	EA	1.00	1.00	
C	51 106-4822-46	CAPCH.0082MX7R/50	EA	1.00	1.00	
C	52 106-4103-46	CAP CH 10K X7R/50V	EA	1.00	1.00	
C	53 106-4103-46	CAP CH 10K X7R/50V	EA	1.00	1.00	
CR	1 007-5117-07	DIO Z 6.2V SOT	EA	1.00	1.00	
CR	2 007-5117-07	DIO Z 6.2V SOT	EA	1.00	1.00	
CR	3 007-6184-00	DIO DUAL SWITCHING	EA	1.00	1.00	
CR	4 007-6181-00	DIO DUAL MM802835	EA	1.00	1.00	
CR	7 007-5117-09	DIO Z 7.5V SOT	EA	1.00	1.00	
CR	8 007-6181-00	DIO DUAL MM802835	EA	1.00	1.00	
I	1 122-0059-00	LMR/VHF/SYS/PROC	EA	1.00	1.00	
I	2 120-3196-00	IC LM2902D	EA	1.00	1.00	
I	3 120-2156-00	16X16 BIT EEPROM	EA	1.00	.	
I	3 120-2157-00	64X16 BIT EEPROM	EA	.	1.00	
I	4 120-3126-04	IC LM317LZ	EA	1.00	1.00	
I	5 120-3196-00	IC LM2902D	EA	1.00	1.00	
I	6 120-3192-00	OP AMP MC4558CD	EA	1.00	1.00	
I	7 120-6135-00	QUAD VOLTAGE SHFTR	EA	1.00	1.00	

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01
J	1 030-1249-04	SCKT MIN SPRING	EA	.	8.00	
Q	1 007-0065-01	XSTR 2N3906 (SOT)	EA	1.00	1.00	
Q	2 007-0530-00	XSTR NPN MMBT3903	EA	1.00	1.00	
Q	3 007-0065-01	XSTR 2N3906 (SOT)	EA	1.00	1.00	
Q	4 007-0065-01	XSTR 2N3906 (SOT)	EA	1.00	1.00	
Q	6 007-0537-00	XSTR PNP MMBT5087	EA	1.00	1.00	
Q	7 007-0065-01	XSTR 2N3906 (SOT)	EA	1.00	1.00	
Q	8 007-0530-00	XSTR NPN MMBT3903	EA	1.00	1.00	
Q	9 007-0530-00	XSTR NPN MMBT3903	EA	1.00	1.00	
Q	11 007-0065-01	XSTR 2N3906 (SOT)	EA	1.00	1.00	
Q	13 007-0530-00	XSTR NPN MMBT3903	EA	1.00	1.00	
Q	14 007-0065-01	XSTR 2N3906 (SOT)	EA	1.00	1.00	
Q	15 007-0530-00	XSTR NPN MMBT3903	EA	1.00	1.00	
Q	16 007-0530-00	XSTR NPN MMBT3903	EA	1.00	1.00	
Q	17 007-0065-01	XSTR 2N3906 (SOT)	EA	1.00	1.00	
R	1 130-5102-23	RES CH 1K EW 5%	EA	1.00	1.00	
R	2 130-5223-23	RES CHIP 22K EW 5%	EA	1.00	1.00	
R	3 130-5102-23	RES CH 1K EW 5%	EA	1.00	1.00	
R	4 130-5823-23	RES CHIP 82KEW5%	EA	1.00	1.00	
R	5 130-5104-23	RES CH 100K EW 5%	EA	1.00	1.00	
R	6 130-5913-23	RES CHIP 91KEW5%	EA	1.00	1.00	
R	7 130-5204-23	RES CHIP 200KEW5%	EA	1.00	1.00	
R	8 130-5752-22	RES CHIP 7.5KEW2%	EA	1.00	1.00	
R	13 130-5153-22	RES CHIP 15KEW2%	EA	1.00	1.00	
R	14 130-5303-22	RES CHIP 30KEW2%	EA	1.00	1.00	
R	15 130-5823-22	RES CHIP 82KEW2%	EA	1.00	1.00	
R	16 130-5124-22	RES CHIP 120KEW2%	EA	1.00	1.00	
R	17 130-5103-23	RES CH 10K EW 5%	EA	1.00	1.00	
R	20 130-5203-23	RES CHIP 20K EW 5%	EA	1.00	1.00	
R	22 130-5152-23	RES CHIP 1.5KEW5%	EA	1.00	1.00	
R	23 130-5472-23	RES CHIP 4.7KEW5%	EA	1.00	1.00	
R	24 130-5473-23	RES CHIP 47KEW5%	EA	1.00	1.00	
R	25 130-5103-23	RES CH 10K EW 5%	EA	1.00	1.00	
R	26 130-5822-23	RES CHIP 8.2KEW5%	EA	1.00	1.00	
R	27 130-5103-23	RES CH 10K EW 5%	EA	1.00	1.00	
R	28 130-5104-23	RES CH 100K EW 5%	EA	1.00	1.00	
R	29 130-5105-23	RES CHIP 1W EW 5%	EA	1.00	1.00	
R	31 130-5104-23	RES CH 100K EW 5%	EA	1.00	1.00	
R	32 130-5104-23	RES CH 100K EW 5%	EA	1.00	1.00	
R	33 130-5223-23	RES CHIP 22K EW 5%	EA	1.00	1.00	
R	34 130-5104-23	RES CH 100K EW 5%	EA	1.00	1.00	
R	35 130-5104-23	RES CH 100K EW 5%	EA	1.00	1.00	
R	36 130-5104-23	RES CH 100K EW 5%	EA	1.00	1.00	
R	37 130-5104-23	RES CH 100K EW 5%	EA	1.00	1.00	
R	39 130-5183-23	RES CHIP 16KEW5%	EA	1.00	1.00	
R	40 130-5223-23	RES CHIP 22K EW 5%	EA	1.00	1.00	
R	41 130-5153-23	RES CHIP 15K EW 5%	EA	1.00	1.00	
R	42 130-5433-23	RES CHIP 43KEW5%	EA	1.00	1.00	
R	43 130-5913-23	RES CHIP 91KEW5%	EA	1.00	1.00	
R	44 130-5184-23	RES CH 180K EW 5%	EA	1.00	1.00	
R	45 130-5304-23	RES CHIP 300KEW5%	EA	1.00	1.00	
R	46 130-5153-23	RES CHIP 15K EW 5%	EA	1.00	1.00	
R	47 130-5473-23	RES CHIP 47KEW5%	EA	1.00	1.00	
R	48 130-5822-23	RES CHIP 8.2KEW5%	EA	1.00	1.00	
R	50 130-5303-23	RES CHIP 30KEW5%	EA	1.00	1.00	
R	51 130-5822-23	RES CHIP 8.2KEW5%	EA	1.00	1.00	
R	52 130-5912-23	RES CHIP 9.1K5EW	EA	1.00	1.00	
R	53 130-5913-23	RES CHIP 91KEW5%	EA	1.00	1.00	
R	54 130-5183-23	RES CHIP 16KEW5%	EA	1.00	1.00	
R	55 130-5223-23	RES CHIP 22K EW 5%	EA	1.00	1.00	
R	56 130-5184-23	RES CHIP 180K EW5%	EA	1.00	1.00	
R	57 130-5154-23	RES CHIP 150K5EW	EA	1.00	1.00	
R	58 130-5102-23	RES CH 1K EW 5%	EA	1.00	1.00	
R	59 130-5113-23	RES CHIP 11K EW 5%	EA	1.00	1.00	
R	60 130-5302-23	RES CHIP 3K EW 5%	EA	1.00	1.00	
R	61 130-5582-23	RES CHIP 5.6KEW5%	EA	1.00	1.00	
R	62 130-5304-23	RES CHIP 300KEW5%	EA	1.00	1.00	
R	65 130-5513-22	RES CHIP 51K EW 2%	EA	1.00	1.00	

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01
R	66	130-5333-22	RES CHIP 33K	EA	1.00	1.00
R	72	130-5823-23	RES CHIP 82K	EA	1.00	1.00
R	73	130-5103-23	RES CH 10K	EA	1.00	1.00
R	74	130-5103-23	RES CH 10K	EA	1.00	1.00
R	76	130-5101-23	RES CH 100	EA	1.00	1.00
R	78	130-5104-23	RES CH 100K	EA	1.00	1.00
R	79	130-5104-23	RES CH 100K	EA	1.00	1.00
R	80	130-5104-23	RES CH 100K	EA	1.00	1.00
R	81	130-5472-23	RES CHIP 4.7K	EA	1.00	1.00
R	82	130-5103-23	RES CH 10K	EA	1.00	1.00
R	83	130-5752-23	RES CHIP 7.5K	EA	1.00	1.00
R	85	130-5154-23	RES CHIP 150K	EA	1.00	1.00
R	86	130-5683-23	RES CHIP 68K	EA	1.00	1.00
R	87	130-5683-23	RES CHIP 68K	EA	1.00	1.00
R	88	130-5222-23	RES CHIP 2.2K	EA	1.00	1.00
R	89	130-5473-23	RES CHIP 47K	EA	1.00	1.00
R	91	130-5103-23	RES CH 10K	EA	1.00	1.00
R	92	130-5104-23	RES CH 100K	EA	1.00	1.00
R	93	130-5562-23	RES CHIP 5.6K	EA	1.00	1.00
R	94	130-5104-23	RES CH 100K	EA	1.00	1.00
R	96	130-5103-23	RES CH 10K	EA	1.00	1.00
R	97	130-5274-23	RES CHIP 270K	EA	1.00	1.00
R	98	130-5244-23	RES CHIP 240K	EA	1.00	1.00
R	99	130-5244-23	RES CHIP 240K	EA	1.00	1.00
R	100	133-0141-05	RES VA 500	EA	1.00	1.00
R	101	130-5102-23	RES CH 1K	EA	1.00	1.00
R	102	130-5103-23	RES CH 10K	EA	1.00	1.00
R	103	130-5104-23	RES CH 100K	EA	1.00	1.00
R	104	130-5104-23	RES CH 100K	EA	1.00	1.00
R	105	130-5104-23	RES CH 100K	EA	1.00	1.00
R	106	130-5103-23	RES CH 10K	EA	1.00	1.00
R	107	130-5103-23	RES CH 10K	EA	1.00	1.00
R	108	130-5753-23	RES CHIP 75K	EA	1.00	1.00
R	109	130-5913-23	RES CHIP 91K	EA	1.00	1.00
REF	1	300-6877-00	SYSTEM BD ASSY	RF	X.	X.
Y	1	044-0150-00	XTAL 3.994375MHZ	EA	1.00	1.00

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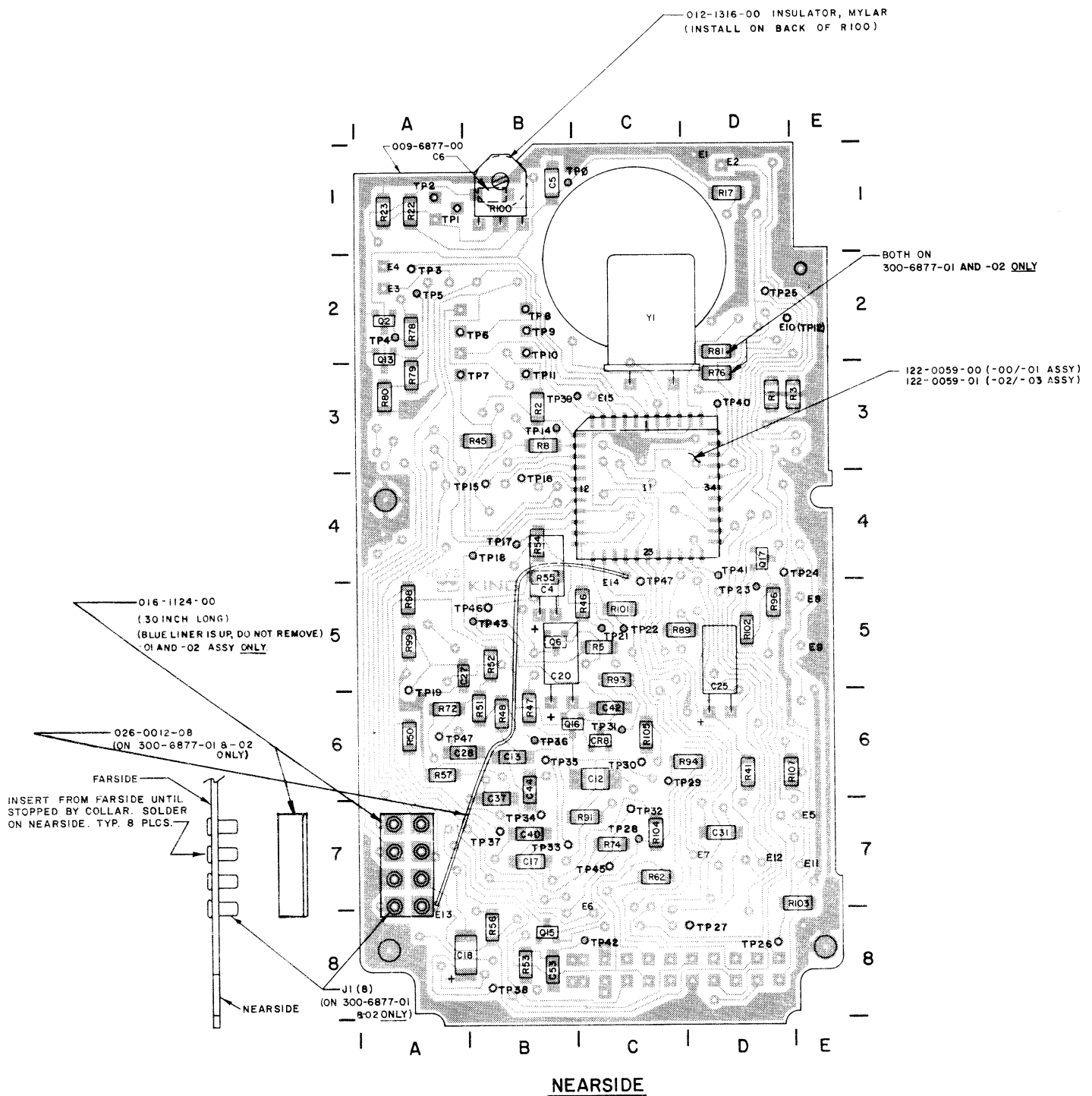
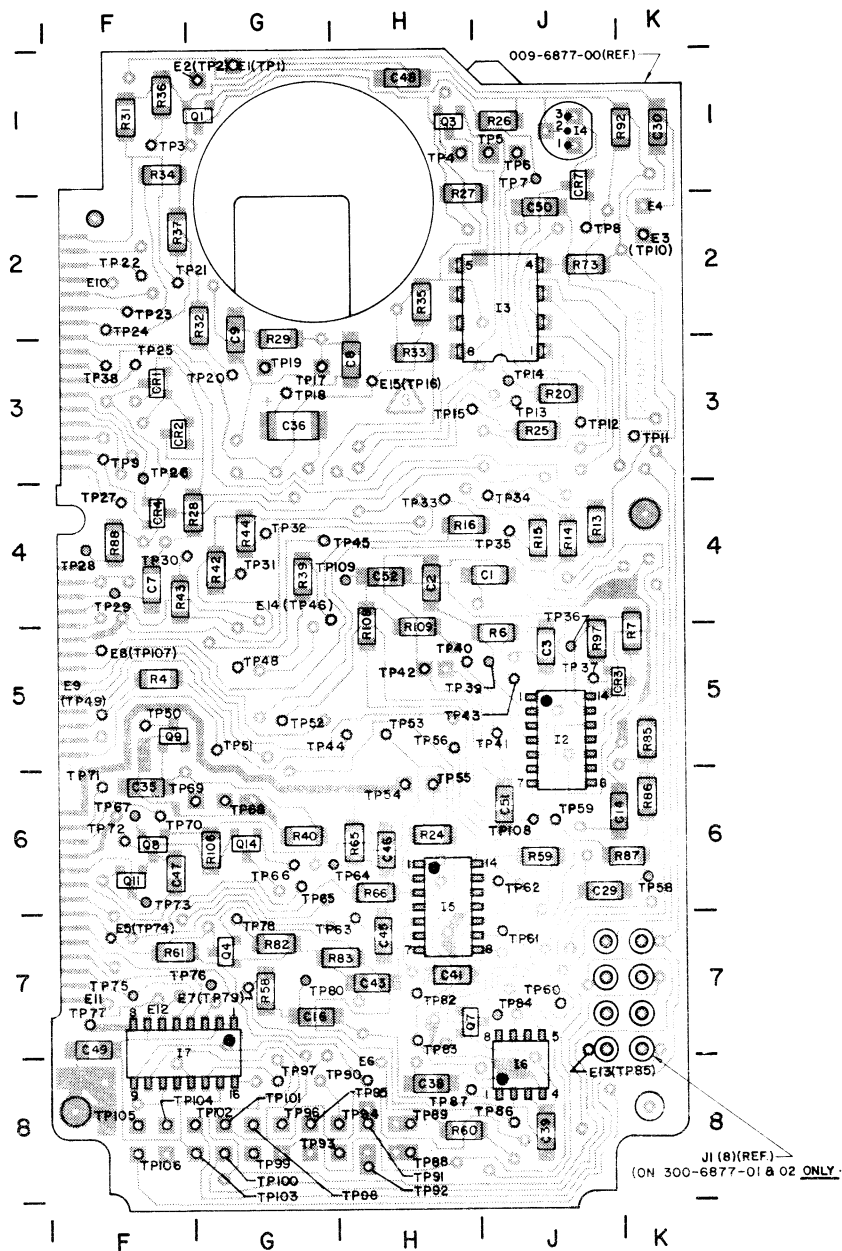


FIGURE 6-16 SYSTEM BOARD ASSEMBLY
(Dwg No 300-6877-00 Rev 7)



FARSIDE

NOTES:

1. ALL PARTS USED ON THE 300-6877-00 THRU -03 ASSY'S WITH THE FOLLOWING EXCEPTIONS:
 - A. ON -00 AND -01 ASSY'S ONLY -
I22-0059-00
 - B. ON -02 AND -03 ASSY'S ONLY -
I22-0059-01
 - C. ON -01 AND -02 ASSY'S ONLY -
JI (8 PLCS.)
R81
R76
026-0012-08
016-1124-00
2. ADD 200 TO ALL TEST POINTS (TP) NUMBERS ON NEARSIDE ONLY.
3. 300-6877-00 AND -03 ASSY'S GO IN 2 CHANNEL RADIOS.
300-6877-01 AND -02 ASSY'S GO IN 4 CHANNEL RADIOS.

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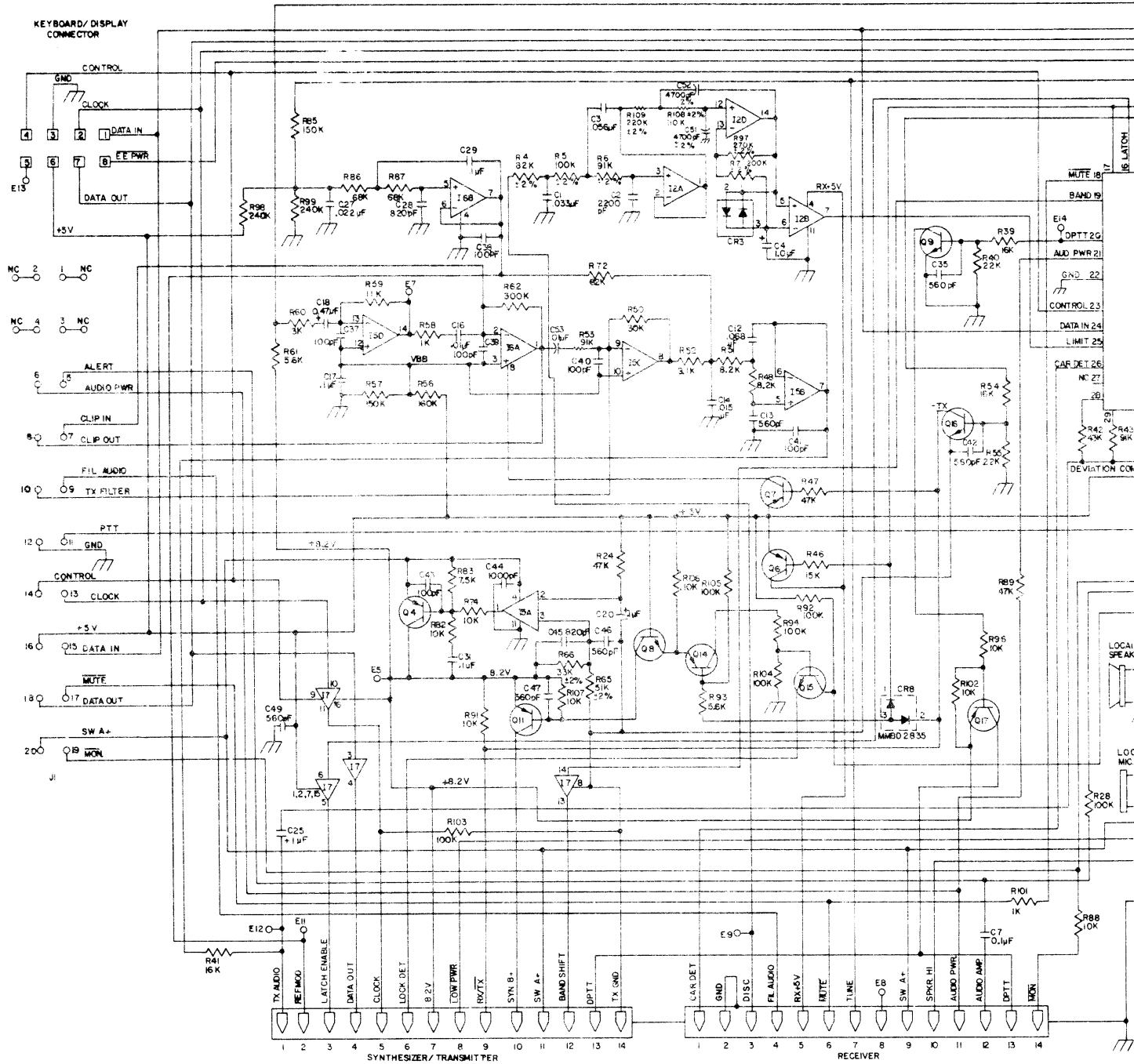
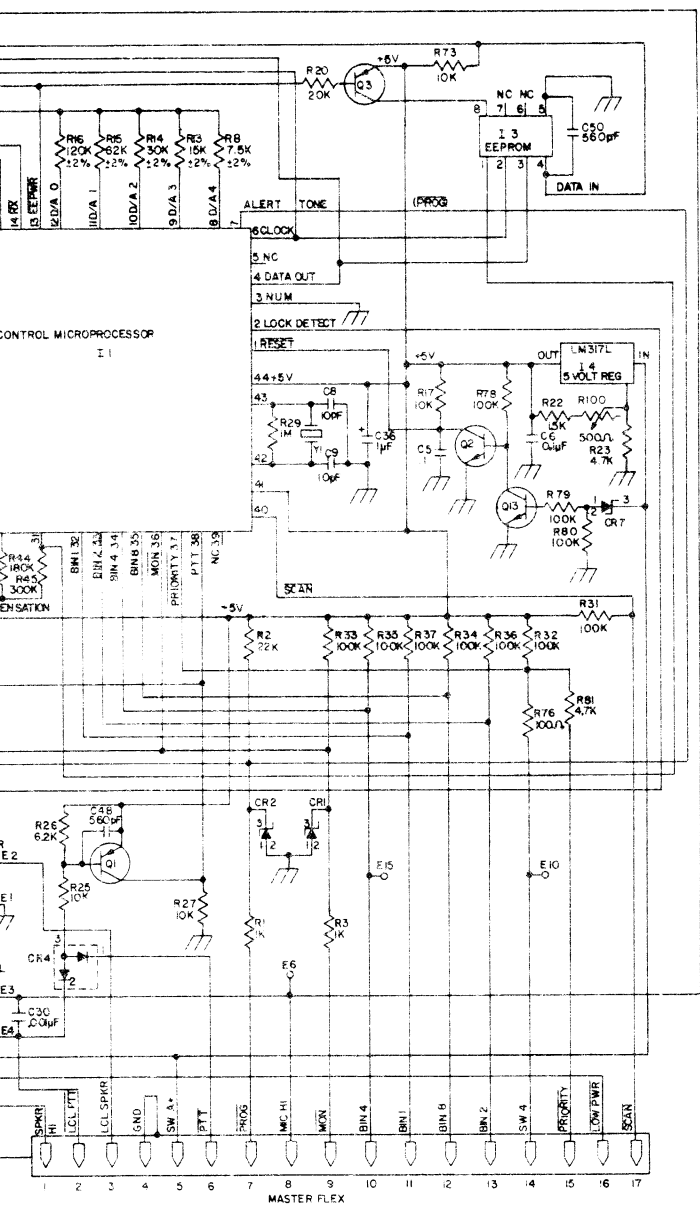


FIGURE 6-17 SYSTEM BOARD SCHEMATIC
(Dwg No 002-6877-00 Rev 7)

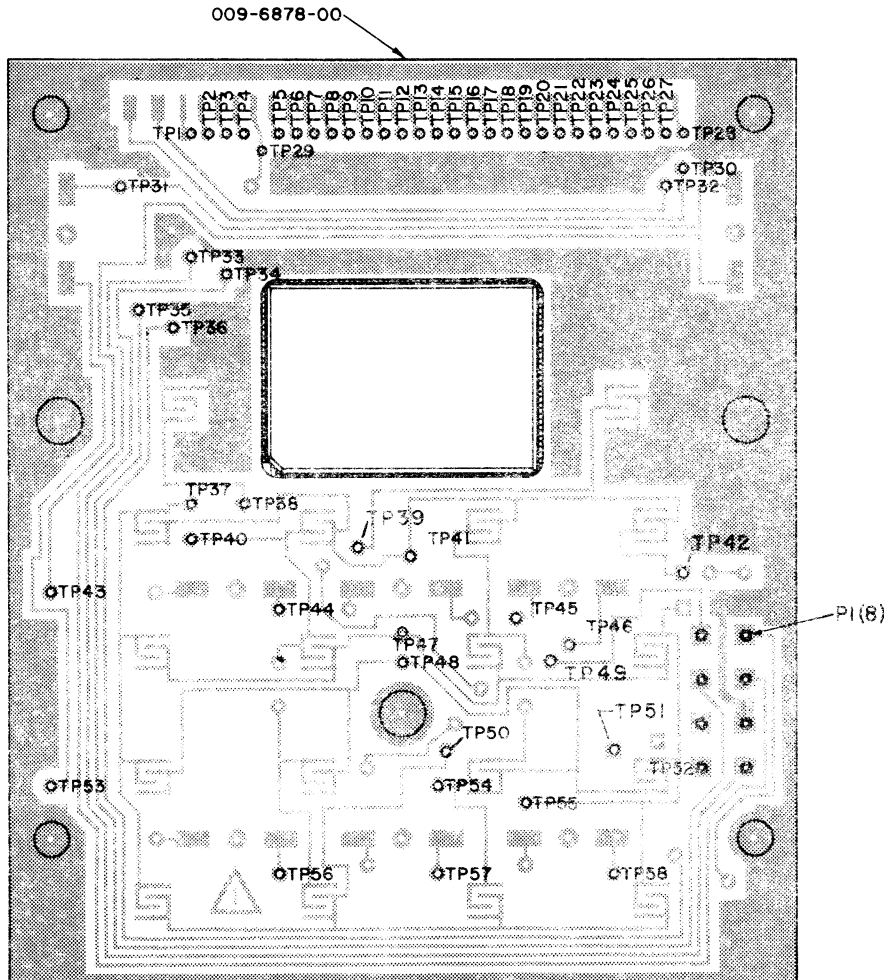


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200-6878-00 REV 7 KEYBOARD/DISPLAY BD LPH0000
200-6878-01 REV 1 KYBD/DISPLAY BD TONE LPH 514
200-6878-99 REV 1 KEYBOARD/DISPLAY BD LPH0000

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01	99
	009-6878-00	PC BD KYBD/DSPLY	EA	.	.	1.00	
	030-2174-04	PIN CONTACT	EA	.	.	8.00	
	200-6878-99	KYBD/DSPLY BD	A	EA	1.00	1.00	.
C	1 106-4104-78	CAP CH 100KZ5U/50V	EA	.	.	1.00	
C	2 106-4104-78	CAP CH 100KZ5U/50V	EA	.	.	1.00	
I	1 122-0058-00	LMR/KYBD/DSPL/PROC	A	EA	1.00	.	.
I	1 122-0058-01	LMR/KYBD/DSPL/PROC	A	EA	.	1.00	.
Q	1 007-0530-00	XSTR NPN MMBT3903	EA	.	.	1.00	
R	1 130-5103-23	RES CH 10K EW 5%	EA	.	.	1.00	
R	2 130-5202-23	RES CHIP 2K5%EW	EA	.	.	1.00	
R	3 130-5103-23	RES CH 10K EW 5%	EA	.	.	1.00	
R	4 130-5103-23	RES CH 10K EW 5%	EA	.	.	1.00	
R	5 130-5104-23	RES CH 100K EW 5%	EA	.	.	1.00	
R	6 130-5202-23	RES CHIP 2K5%EW	EA	.	.	1.00	
R	7 130-5202-23	RES CHIP 2K5%EW	EA	.	.	1.00	
R	8 130-5202-23	RES CHIP 2K5%EW	EA	.	.	1.00	
R	9 130-5202-23	RES CHIP 2K5%EW	EA	.	.	1.00	
R	10 130-5101-23	RES CH 100 EW 5%	EA	.	.	1.00	
R	11 130-5203-23	RES CHIP 20K EW 5%	EA	.	.	1.00	
REF	1 300-6878-00	KYBD/DSPLY BD ASSY	RF	X.	.	.	

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NEAR SIDE

FIGURE 6-18 KEYBOARD/DISPLAY BOARD ASSEMBLY
(Dwg No 300-6878-00 Rev 4)

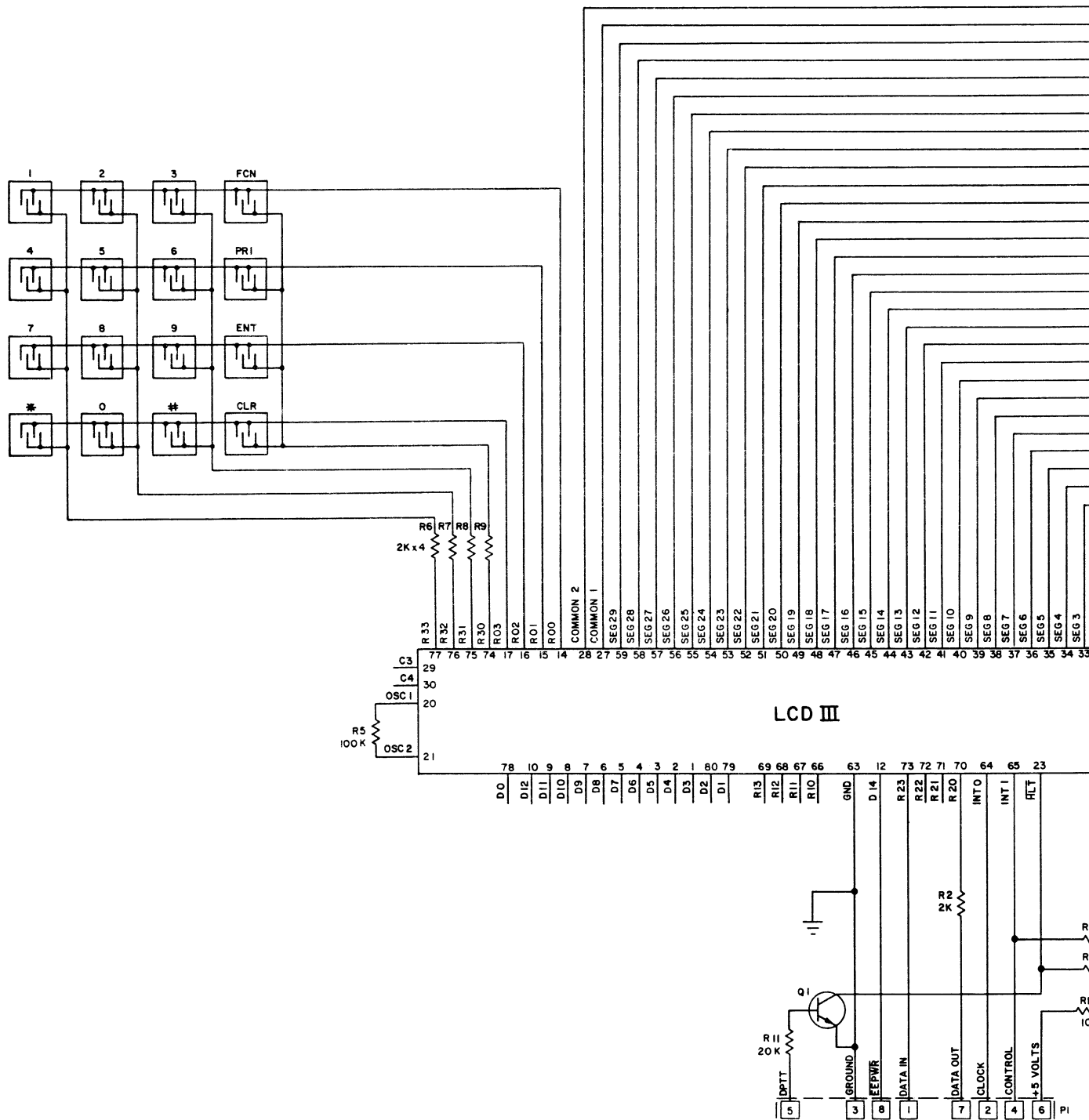
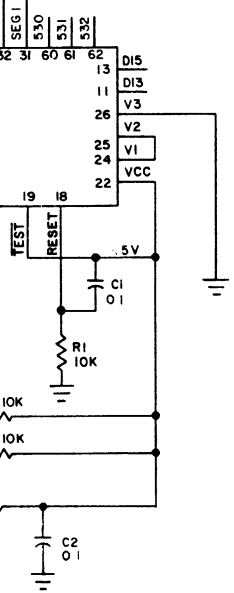
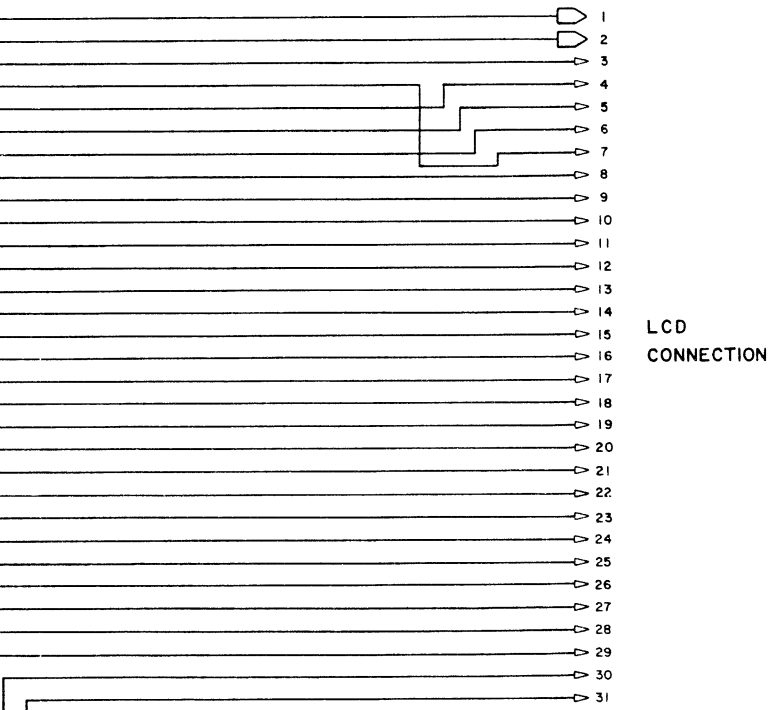


FIGURE 6-19 KEYBOARD/DISPLAY BOARD SCHEMATIC
(Dwg No 002-6878-00 Rev 2)



- NOTES:
1. RESISTORS ARE IN OHMS $\pm$ 5% 1/8W
UNLESS OTHERWISE NOTED
 2. CAPACITORS ARE IN MICROFARADS $\pm$ 20 50V