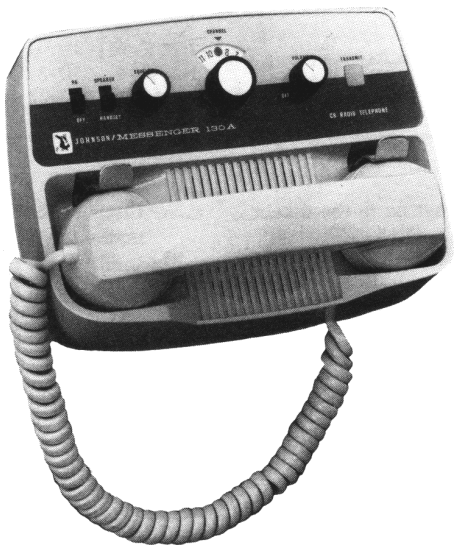
MESSENGER 130/130A CB RADIO TELEPHONE
SERVICE MANUAL ADDITION



GENERAL

This service manual addition contains installation, service and alignment information for the Messenger® 130 and 130A CB Radio Telephone transceivers. Also included is a schematic diagram, a components layout with wiring terminations and a complete parts list. For complete transceiver service information and test setups, refer to the Messenger® 122-123A Service Manual, Part No. 001-0122-001.

TRANSCEIVER DESCRIPTIONS

The Messenger 130 CB Radio Telephone, Part No. 242-0130-001 and the Messenger 130A CB Radio Telephone, Part No. 242-0130-002 are completely solid state, 23 channel citizens radio transceivers. Both transceivers have a three watt public address feature and utilize a telephone type handset. All transmitter and receiver frequencies are generated by a 14 crystal frequency synthesizer assembly.

The Messenger 130A comes fully equipped for mobile operation in a vehicle with either a positive or negative ground 12 VDC electrical system. The correct polarity voltage may be connected to the transceiver by connecting either the red lead to ground for positive ground operation or the black lead to ground for negative ground operation.

The Messenger 130 can be adapted to operate from positive ground supply voltage with the Positive Ground Conversion Kit, Part No. 023-3326-001.

INSTALLATION

The Messenger 130 and 130A can be mounted under the dash or on the transmission hump of a vehicle utilizing the CB Universal Mounting Bracket. Since each installation is unique, the following outline is provided to familiarize the installer with the items supplied for installation. It is important to note the various mounting angles possible with the mounting bracket and mounting arms on the transceiver. Refer to Table 1 for a list of items supplied for installation. For more detailed information concerning antenna, antenna coax, transceiver and accessory installation, refer to E. F. Johnson Publication "Installing Your Citizens Radio", Part No. 004-2000-001.

E. F. JOHNSON COMPANY
WASECA, MINNESOTA 56093
9-75EFJ 001-0130-002
Printed in U.S.A.

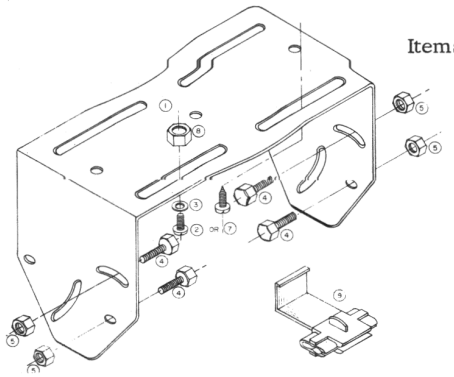


TABLE 1
Items Supplied For Installation

Item	Qty	Part Description	Part Number
1	1	Universal Mounting Bracket	017-1803-001
2	4	10 32 x 1/2" Screw	575 2410 016
3	4	#10 Internal Tooth Lockwasher	596-2110-012
4	4	1/4-20 x 1/2" Hex Head Screw	575-1914-016
5	4	1/4-20 Hex Nut	560-1114-016
6	4	10-16 Panhead Screw	575-9510-048
7	4	10-32 Thread Forming Screw	575-9510-024
8	4	10-32 Hex Nut	560-2110-012
9	1	Tap Connector	023-2209-001

a. Select a mounting location that will not be in the direct air stream of the vehicle heater.

b. Install the antenna following the manufacturer's installation instructions. Route the antenna coax to the intended transceiver mounting location.

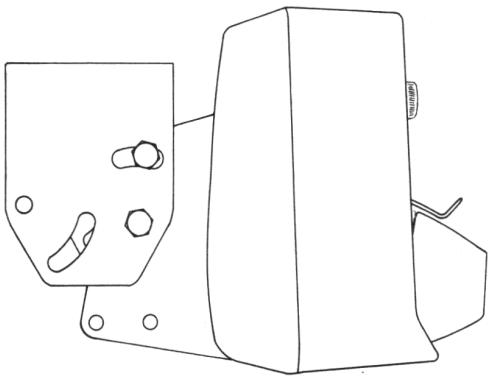
c. Refer to Figure 1 which shows the transceiver and mounting bracket in the dash mount configuration or Figure 2 which shows the hump mount configuration. Assemble the transceiver and mounting bracket and hold the assembly in the intended mounting location. Check for clearance and mark the mounting hole locations.

d. Drill the mounting holes and install the bracket only.

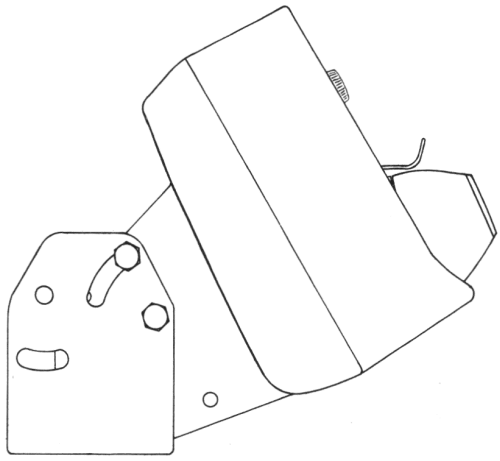
e. Connect the DC power cable to an existing "hot" lead under the dash using the tap connector. Observe polarity when connecting the Messenger 130A: for positive ground operation, connect the red lead to ground and for negative ground operation, connect the black lead to ground.

f. Connect the antenna coax to the transceiver. If an external speaker is required, install the speaker and connect it to the transceiver at this time.

g. Mount the transceiver in the mounting bracket, select the desired angle and height by using any of the various holes in the mounting arms.



DASH MOUNTED TRANSCEIVER
FIGURE 1



HUMP MOUNTED TRANSCEIVER
FIGURE 2

SPECIFICATIONS

(Measurements are made per EIA Standard RS-382 and are nominal unless otherwise stated.)

GENERAL

Channels	23
Frequency Range	26.965 to 27.255 MHz
Frequency Control	±0.005% crystal, -30°C to +60°C transmit and receive
Overall Dimensions	22.6 cm W x 16.5 cm H x 17.5 cm D (8.9 in W x 6.5 in H x 6.9 in D)
Weight	
Unit	2.5 kg (5.5 lbs)
Shipping	3.6 kg (8 lbs)
Handset	High impedance ceramic microphone element, push to talk switch
Circuitry	17 transistors, 18 diodes and 1 thermistor
Antenna Impedance	50 ohms
Compliance	FCC Type Acceptance Part 95 DOC Type Approved RSS-136
Power Requirements	1.3A at 13.8 VDC positive or negative ground
Circuit Protection	2 Ampere fuse

RECEIVER

Sensitivity	10 dB (S+N)/N at 0.5 μV input
Selectivity	6 kHz minimum bandwidth at -6 dB 30 kHz maximum bandwidth at -60 dB
Spurious Rejection	50 dB except image of 10 dB and 1/2 IF of 30 dB
Tight Squelch	30 μV minimum to 2000 μV maximum
Squelch Sensitivity	1 dB or less signal change for 40 dB of quieting at 1 μV
Intermediate Frequency	455 kHz
AGC Characteristics	Flat within ±6 dB from 100,000 μV to 5 μV with 12 dB of rolloff from 5 to 0.5 μV
Noise Limiting	3 dB maximum
Speaker Impedance	8 ohms
Audio Frequency Response	2 dB, -16 dB from 300 to 3000 Hz
Audio Output Power	3 watts

TRANSMITTER

Emission	6A3
RF Power Output	4 watts maximum at 13.8 VDC
RF Spurious and Harmonic Attenuation	-50 dB minimum
Audio Frequency Response	1 dB, -16 dB from 300 to 3000 Hz
Modulation	80% minimum

MINIMUM PERFORMANCE SPECIFICATIONS (The specifications listed in this section are absolute service minimums.)

RECEIVER

Sensitivity	7 dB (S+N)/N at 0.5 μV input
Spurious Rejection	40 dB except image of 5 dB and 1/2 IF of 30 dB
Audio Output Power	0.075 watt minimum at 0.5 μV, 2.5 watts with less than 10% distortion at 1000 μV input
Tight Squelch	30 μV minimum and 2000 μV maximum
AGC Characteristics	15 ±4 dB rolloff from 500 to 0.5 μV

TRANSMITTER

RF Power Output	2.8 watts minimum at 13.8 VDC
Modulation	80% minimum positive and negative

SERVICE

For transceiver servicing, refer to the Messenger 122-123A Service Manual Servicing Section. The Messenger 130 and 130A circuitry is similar to the Messenger 123A and the service information listed for the Messenger 123A applies to all three transceivers. Only the unique functions of the Messenger 130 and 130A are discussed in this service manual addition.

CRYSTAL REPLACEMENT

As a quick check of the transmit crystal activity, connect a frequency counter to the unmodulated transmitter output and count the carrier frequency on channels 1, 6, 11, 16, 20 and 23. Compare your readings with those listed in Table 2.

TABLE 2
Transmitter Channel Frequency Limits

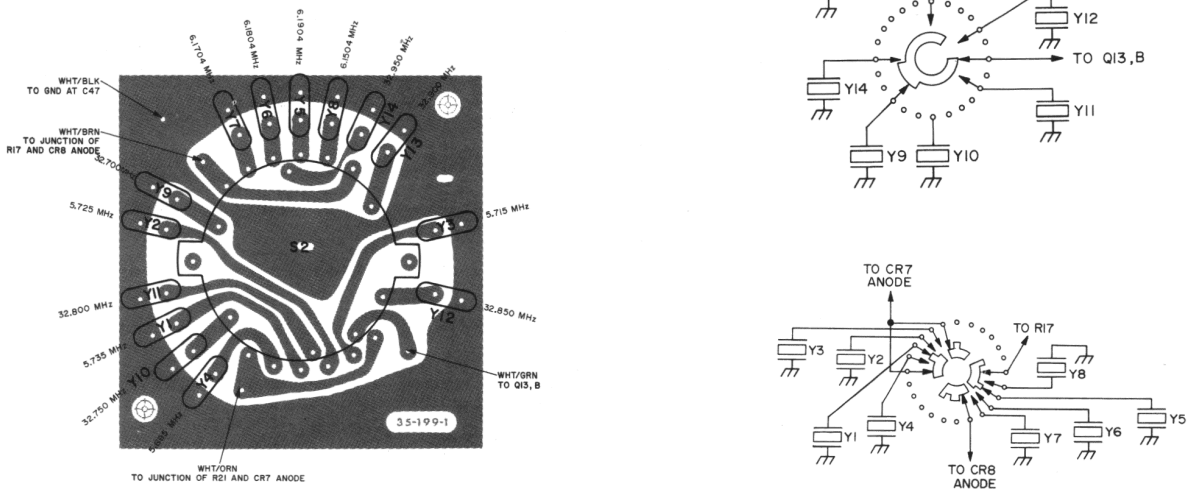
Channel No.	Crystal	Low Limit, kHz	High Limit, kHz
1	Y9	26,966.348	26,963.652
6	Y10	27,026.351	27,023.649
11	Y11	27,086.354	27,083.646
16	Y12	27,156.357	27,153.643
20	Y13	27,206.360	27,203.640
23	Y14	27,256.362	27,253.638

If channels 1, 6, 11, 20 or 23 are either off frequency or completely inoperative, other channels may be affected. Refer to Table 3 for a more complete analysis of the frequency synthesizer crystal scheme.

TABLE 3
Frequency Synthesizer Analysis

Channel No.	Faulty Receive	Faulty Transmit	Faulty Crystal
1,2,3 and 4	X	X	Y9
5,6,7 and 8	X	X	Y10
9,10,11 and 12	X	X	Y11
13,14,15 and 16	X	X	Y12
17,18,19 and 20	X	X	Y13
21,22 and 23	X	X	Y14
1,5,9,13,17 and 21	X		Y5
2,6,10,14,18 and 22	X		Y6
3,7,11,15 and 19	X		Y7
4,8,12,16,20 and 23	X		Y8
1,5,9,13,17 and 21		X	Y1
2,6,10,14,18 and 22		X	Y2
3,7,11,15 and 19		X	Y3
4,8,12,16,20 and 23		X	Y4

To replace a defective crystal, remove the two screws from the crystal circuit board and gently pull the board away from the switch detent. Figure 3 shows the crystal printed circuit board layout and switch wiring. The switch is shown in the channel 1 position as viewed from the knob end of the shaft. Channel numbers increase with clockwise rotation.

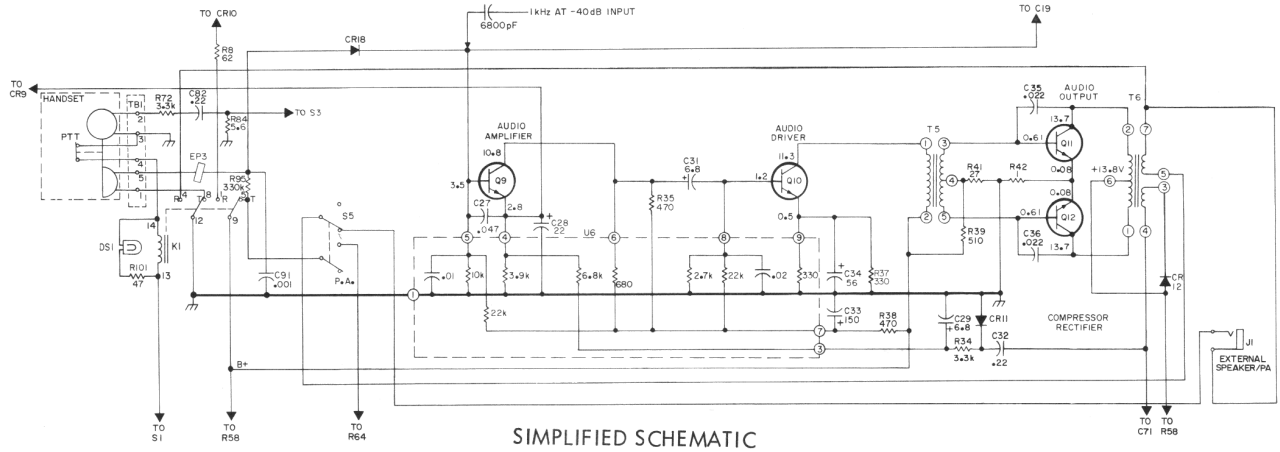


CRYSTAL SWITCH
(SOLDER SIDE VIEW)
FIGURE 3

PUBLIC ADDRESS (PA)

The PA circuit utilizes the audio amplifier section of the transceiver without activating the transmitter. When using the PA function, a PA speaker must be connected to the external speaker jack. Refer to the E. F. Johnson booklet, Part No. 004-2000-001, for details on PA speaker installation.

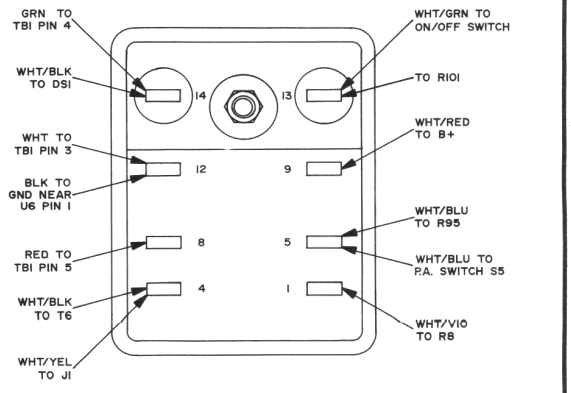
When S5, the OFF/PA switch, is in the PA position, the external speaker jack is connected across the audio output at terminals 5 and 7 of T6 and the transmit B+ line is opened. Therefore, when the handset push to talk switch is depressed, CR18 is forward biased through contacts 5 and 9 of K1 which allows audio from the microphone to be applied to the base of Q9.



SIMPLIFIED SCHEMATIC
PUBLIC ADDRESS

RELAY

Because of the switching requirements of the Messenger 130 and 130A handset, relay K1 is included to provide increased switching capability when used in conjunction with the handset push to talk (PTT) switch. In the receive mode, the receive B+ is supplied through contacts 1 and 9 of K1. When the PTT switch is depressed, the relay coil is activated and B+ is applied to the transmit circuits through contacts 5 and 9 of K1. The microphone portion of the handset is provided a ground through contacts 8 and 12 of K1. Refer to Figure 4 for relay wiring terminations.



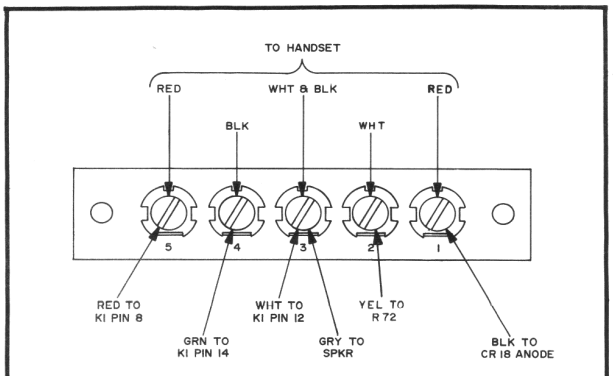
RELAY WIRING DETAILS
FIGURE 4

HANDSET

The telephone type handset contains a speaker element and a ceramic microphone cartridge. The push to talk (PTT) switch is located in the handle and is used to switch the transmit and receive functions of the transceiver. The audio level to the earpiece is set by R72 to provide a comfortable listening level.

With the handset in the cradle, the audio is coupled to the speaker through S3. The audio can be switched to the handset earpiece, the speaker or both by S3 and S4.

The handset is connected to the transceiver through a terminal board, TB1. Refer to Figure 5 for TBI wiring terminations.



TERMINAL BOARD WIRING
FIGURE 5

RECEIVER ALIGNMENT

Before aligning the transceiver, refer to the alignment section of the Messenger 122-123A Service Manual for a list of alignment tools and test setups. Refer to Figure 6 on the foldout page in this manual for the alignment points location.

NOTE

The low pass filter adjustments, L6 and L7, should be adjusted for 3.8 watts output power before the receiver is aligned. Refer to the transmitter tuneup section for details.

FREQUENCY SYNTHESIZER

a. High Frequency Oscillator Adjustment

1. Set the channel selector switch to channel 23 and connect the RF voltmeter to junction of CR14 and CR15.

2. Adjust T7 to the peak RF voltmeter reading point. Approximately 0.3 VRF should be measured.

b. Synthesizer Mixer Adjustment

1. Set the channel selector switch to channel 12 and connect the RF voltmeter probe to the collector of Q15.

2. Key the transmitter into the RF load and adjust T8, T9, T10 and T11 for a maximum meter reading.

RF AND IF SECTION (CHANNEL PEAKING METHOD)

a. RF Adjustment

1. Set the channel selector switch to channel 12 and connect a 1 kHz, 30% modulated RF signal to the antenna connector.

2. Adjust T1 and T2 for a maximum audio output while keeping the RF signal generator output to a minimum.

b. IF Adjustment

1. Set the channel selector switch to channel 12 and connect a 1 kHz, 30% modulated RF signal to the antenna connector.

2. Adjust Z1A, Z1B, T3 and T4 for a maximum audio output while keeping the RF signal generator output to a minimum.

3. Set the RF signal generator output level to 0.5 μV, modulated 30% at 1 kHz.

4. Readjust T1, T2, Z1A, Z1B, T3 and T4 for a maximum audio output and make final adjustment of T1 for the best signal to noise ratio.

RF AND IF SECTION (455 kHz GENERATOR METHOD)

a. IF Adjustment

1. Connect a 455 kHz signal generator through a 0.01 μF capacitor to the base of Q2.

2. Adjust Z1A, Z1B, T3 and T4 for maximum audio voltmeter indication while reducing the generator output level (an excessive generator output level will cause improper IF amplifier alignment).

b. RF Adjustment

1. Remove the 455 kHz signal generator and connect the RF signal generator to the antenna connector. Set the generator level to 0.5 μV, modulated 30% at 1 kHz on channel 12 (27.105 MHz).

2. Adjust T1 and T2 for a maximum audio output and make final adjustment of T1 for best signal to noise ratio.

AUTOMATIC GAIN CONTROL (AGC) ROLLOFF

a. Refer to the receiver test setup in the alignment section of the Messenger 122-123A Service Manual.

b. Set the RF signal generator output for 500 μV on channel 11 frequency (27.085 MHz), modulated with 1 kHz at 30%.

c. Set the transceiver channel selector to channel 11 and adjust the volume control for a 0 dB indication on the VTVM.

d. Reduce the RF signal generator output to 0.5 μV. The VTVM reading should decrease 15 ±4 dB. Adjust R7 and repeat steps c and d if unable to obtain the 15 ±4 dB reading.

TRANSMITTER TUNEUP

PREDRIVER AND POWER AMPLIFIER

Connect a 5 watt RF wattmeter (Bird Model 43 or equivalent) and a dummy load to the antenna connector. Key the microphone and proceed as follows:

a. Adjust T10, T11, T12 and T13 for maximum power output.

b. Adjust L6 and L7 for a power output of between 2.8 and 3.8 watts. Make final adjustment of L6 for minimum current drain while maintaining a power output between 2.8 and 3.8 watts.

TRANSMITTER FREQUENCY CHECK

To check the transmitter frequency proceed as follows:

a. Loop couple a frequency counter or meter to L7. Refer to Figure 5-4 in the Messenger 122-123A Service Manual for pickup loop fabrication.

b. Refer to Table 4 for a list of channel frequencies. Replace crystals as necessary to maintain a channel frequency tolerance of ±0.005%.

TABLE 4
Channel Frequencies

Channel	Minimum Limit (kHz)	Center Frequency (MHz)	Maximum Limit (kHz)	Channel	Minimum Limit (kHz)	Center Frequency (MHz)	Maximum Limit (kHz)
1	26,963.652	26.965	26,966.348	13	27,113.645	27.115	27,116.355
2	26,973.652	26.975	26,976.348	14	27,123.644	27.125	27,126.356
3	26,983.651	26.985	26,986.349	15	27,133.644	27.135	27,136.356
4	27,003.651	27.005	27,006.350	16	27,153.643	27.155	27,156.357
5	27,013.650	27.015	27,016.350	17	27,163.642	27.165	27,166.358
6	27,023.649	27.025	27,026.351	18	27,173.642	27.175	27,176.358
7	27,033.649	27.035	27,036.351	19	27,183.641	27.185	27,186.359
8	27,053.648	27.055	27,056.352	20	27,203.640	27.205	27,206.360
9	27,063.647	27.065	27,066.353	21	27,213.640	27.215	27,216.360
10	27,073.647	27.075	27,076.353	22	27,223.638	27.225	27,226.361
11	27,083.646	27.085	27,086.354	23	27,253.638	27.255	27,256.362
12	27,103.645	27.105	27,106.355				

NOTE:

FCC regulations require all transmitter frequencies to be within ±0.005% of the center frequency.

CRYSTAL STARTING AND MODULATION CHECK

a. Check between channels 1 and 23 and check for normal crystal starting.

b. Check for normal waveform and percent of modulation.

1. Loop couple the oscilloscope to L7. Refer to Figure 5-4 in the Messenger 122-123A Service Manual for fabrication details.

2. Set the audio generator frequency to 1 kHz and couple a -27 dB audio input through a 6800 pF series capacitor to the base of Q9. The oscilloscope should indicate at least 50% modulation.

3. Increase the audio generator level to -11 dB. The oscilloscope should indicate not less than 80% nor more than 100% modulation on both negative and positive peaks.

c. Check each channel for clean modulation and absence of oscillations. Adjust T12 and T13 as necessary to eliminate modulation distortion.

d. Check for normal modulation by speaking into the handset.

FINAL CHECKOUT PROCEDURE

a. Connect a Bird Model 43 with a 10A element or equivalent wattmeter into the transmission line, temporarily install an antenna meter in the transmission line.

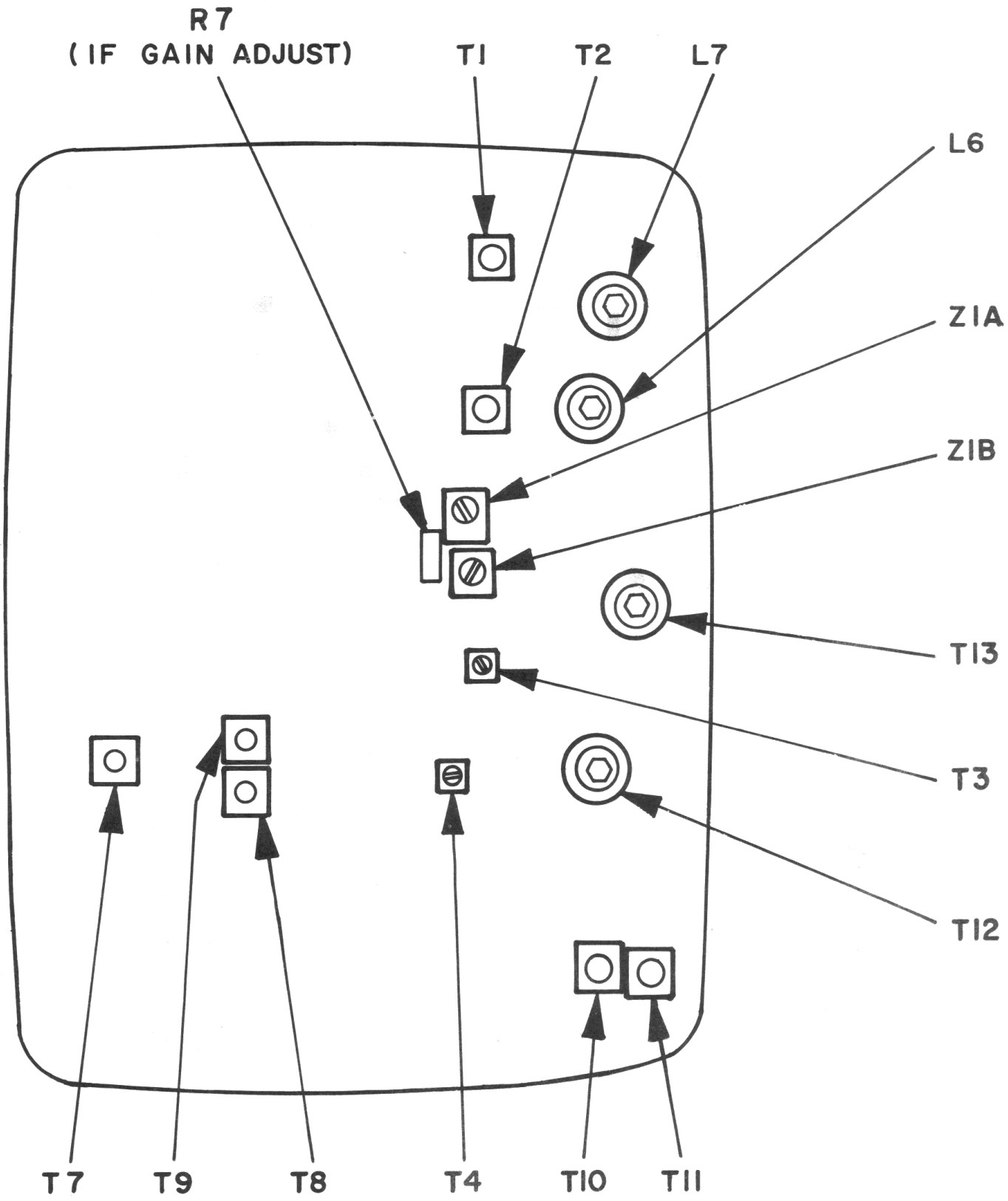
b. Adjust the antenna for best VSWR as indicated on the antenna meter following the manufacturer's instructions. The transceiver has been aligned at the factory and the output network will not normally require realignment to match it to the antenna. The measured VSWR should be 1.5 to 1 or less.

c. Check the transmitter power output. The typical power output is 3.5 watts.

d. Check the transmitter frequency, the maximum allowable tolerance from the center frequency is ±0.005%. Refer to Table 4 for frequency limits.

e. Check the modulation, minimum acceptable is 80% upward and downward.

f. Give the transceiver a complete operational checkout. Make several contacts with other units in the system and correct any problems that may affect transceiver performance.



ALIGNMENT POINTS
(COMPONENTS SIDE VIEW)
FIGURE 6

PARTS LIST

SYMBOL NO.	DESCRIPTION	PART NO.
	CHASSIS PARTS	
BK101	Relay mounting bracket	017-1866-001
BK102	Transformer mounting bracket	017-1867-001
BK103	Speaker mounting bracket (M130)	017-1818-001
CH1	Left side end plate (M130)	017-1793-001
CH2	Right side end plate (M130)	017-1793-002
CH3	Case, rear (M130)	032-0359-002
	Case, rear (M130A)	032-0395-001
CH4	Case, front (M130)	032-0358-002
	Case, front (M130A)	032-0394-001
CH5	Right side mounting arm (M130)	017-1794-002
CH6	Left side mounting arm (M130)	017-1794-001
CH101	Chassis (M130)	017-1792-001
CH102	Handset clamps (M130)	017-1796-002
CH103	Handset clamps (M130A)	017-1865-001
CH104	Speaker grille	017-1875-001
CH201	Connector plate (M130)	017-1797-001
MP104	Channel indicator dial	032-0154-002
MP107	Handset switch actuator button	013-1414-001
MP110	Antenna jack mount (M130A)	032-0396-001
MP111	Antenna connector retaining nut (M130A)	032-0397-001
MP112	Extension spring (M130)	580-0001-021
MP113	Extension spring (M130A)	580-0001-022
MP115	Speaker grille cloth	018-0827-017
MP116	Speaker foam pad	018-0963-006
MP117	Printed circuit board support (M130A)	032-0417-001
NP101	Upper overlay (M130)	559-2079-001
NP101	Upper overlay (M130A)	559-2079-002
NP102	Blank medallion	559-2018-003
	KNOBS	
MP105	Volume knob (M130)	547-0005-001
	Squelch knob (M130)	547-0005-001
	Volume knob (M130A)	547-0008-001
	Squelch knob (M130A)	547-0008-001
MP106	Channel selector knob	547-0008-005
	CAPACITORS	
C1	1000 pF ±20% 1KV Y5S disc	510-3261-102
C2	6.8 μF ±20% 35V dipped	510-2045-689
C4	27 pF ±5% 200V N150 cera	510-3216-270
C5	5.1 pF ±5% 200V NPO cera	510-3213-519
C6	0.010 μF ±20% 50V Y5U	510-3202-103
C7	Same as C6	
C8	1 pF ±5% 500V composition	510-9002-109
C9	Same as C8	
C10	4700 pF ±20% 50V Y5U disc	510-3204-472
C11	150 pF ±5% 100V 1DM15	510-0001-151
C12	6.8 μF ±20% 35V dipped	510-2045-689
C13	0.010 μF ±20% 50V Y5U	510-3202-103
C14	Same as C13	
C15	4700 pF ±20% 50V Y5U disc	510-3204-472
C16	0.01 μF ±10% 250V	510-1003-103
C17	1.0 μF ±20% 35V dipped	510-2045-109
C18	Same as C17	
C19	Same as C17	
C21	820 pF ±5% 100V 1DM15	510-0001-821
C22	390 pF ±5% 100V 1DM15	510-0001-391
C23	0.010 μF ±20% 50V Y5U	510-3202-103
C24	Same as C23	
C25	100 μF 10V aluminum	510-4003-005
C26	47 μF 25V aluminum	510-4006-012
C27	0.047 μF ±20% 16V Y5S	510-3210-473
C28	22 μF ±20% 15V tubular	510-2003-220
C29	6.8 μF ±20% 35V dipped	510-2045-689
C30	4700 pF ±20% 50V Y5U disc	510-3204-472
C31	6.8 μF ±20% 35V dipped	510-2045-689
C32	1.0 μF ±20% 35V	510-2005-109
C33	150 μF 25V aluminum	510-4006-006
C34	56 μF ±20% 6V tubular	510-2001-560
C35	0.022 μF ±20% 50V Y5U	510-3202-223
C36	Same as C35	
C37	0.010 μF ±20% 50V Y5U	510-3202-103
C38	220 μF 16V aluminum	510-4006-004
C39	1000 μF 16V aluminum	510-4006-005
C41	0.010 μF ±20% 50V Y5U	510-3202-103
C42	8.2 pF ±5% 200V N750	510-3220-829
C43	22 pF ±5% 200V N150	510-3216-220
C44	100 pF ±5% 200V N150 cera	510-3216-101
C45	0.010 μF ±20% 50V Y5U	510-3202-103
C46	Same as C45	
C47	0.010 μF ±20% 16V Y5S disc	510-3010-103
C48	180 pF ±5% 200V N750 cera	510-3220-181
C49	0.010 μF ±20% 50V Y5U	510-3202-103
C51	1 pF ±5% 500V composition	510-9002-109
C52	33 pF ±5% 200V N150 cera	510-3216-330
C53	Same as C52	
C54	0.010 μF ±20% 50V Y5U	510-3202-103
C55	220 μF 26V aluminum	510-4006-004
C56	0.010 μF ±20% 50V Y5U	510-3202-103
C57	Same as C56	
C58	1 pF ±5% 500V composition	510-9002-109
C59	33 pF ±5% 200V N150 cera	510-3216-330
C60	0.047 μF ±20% 16V Y5S	510-3002-473
C61	33 pF ±5% 200V N150 cera	510-3216-330
C62	1000 pF ±5% 100V 1DM15	510-0001-102
C64	22 pF ±5% 200V NPO cera	510-3213-220
C65	0.010 μF ±20% 50V Y5U disc	510-3002-103
C66	12 pF ±5% 200V N750 cera	510-3220-120
C67	1000 pF ±20% 1KV Y5S disc	510-3261-102
C68	43 pF ±5% 200V N150 cera	510-3216-430
C69	4700 pF ±20% 50V Y5U disc	510-3204-472
C70	0.047 μF ±20%	510-3210-473
C71	0.047 μF ±20% 50V Y5U	510-3202-473
C72	1000 pF ±5% 100V 1DM15	510-0001-102
C73	27 pF ±5% 200V NPO cera	510-3213-270
C74	1000 pF ±20% 1KV Y5S disc	510-3261-102
C75	100 pF ±5% 200V N150 cera	510-3216-101
C76	300 pF ±5% 100V 1DM15	510-0001-301
C77	Same as C76	
C78	4700 pF ±20% 1.4 KV Z5U	510-3001-472
C79	Same as C78	
C82	0.22 μF ±20% 250V flatfoil	510-1004-224
C90	470 pF ±5% 100V 1DM15	510-0001-471
C91	1000 pF ±20% 1KV Y5S disc	510-3261-102
C101	1000 pF ±20% 50V Y5U	510-3002-102
C121	0.010 μF ±20% 50V Y5U	510-3202-103
	DIODES	
CR1	1N67A germ. diode	523-1500-067
CR2	1N4148 silicon diode	523-1000-883
CR3	1N67A germ. diode	523-1500-067

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.
CR4	Same as CR3	
CR5	1N4148 silicon diode	523-1500-883
CR6	1N881 silicon diode	523-1500-881
CR7	Same as CR6	
CR8	Same as CR6	
CR9	1N67A germ. diode	523-1500-067
CR10	10V ±5% 1W zener	523-2503-100
CR11	1N4148 silicon diode	523-1500-883
CR12	1N4003 200V 1A rect.	523-0501-002
CR13	10V ±5% 1W zener	523-2003-100
CR14	1N4148 silicon diode	523-1500-883
CR15	Same as CR14	
CR16	1N881 silicon diode	523-1500-881
CR17	1N4148 silicon diode	523-1500-883
CR18	1N881 silicon diode	523-1000-881
	LAMPS	
DS1	2193D 14.4V 0.12A clear (Transmit indicator)	549-3001-003
DS2	1705D 14.0V,0.08A clear (ON/OFF indicator)	549-3001-011
	ELECTRICAL PARTS	
EP3	0.14 x 0.13 ferrite bead	517-2002-001
EP48	0.14 x 0.24 ferrite bead	517-2002-002
	FUSE	
F1	Fuse 2A 250V FB AGC	534-0003-024
	CONNECTORS	
J1	External speaker jack	515-2001-011
J2	Antenna connector	142-0101-002
	RELAY	
K1	Relay DPDT 12V coil	567-0020-001
	INDUCTORS	
L2	20 mH audio choke	542-8001-011
L3	20 μH choke	542-3002-002
L4	13 μH choke	542-3003-001
L5	Same as L4	
L6	10 1/2T ind. 0.75-1.0 μH	542-1005-010
L7	4 1/2T ind. 0.24-0.32 μH	542-1005-004
L8	6.8 μH RF choke	542-3004-689
L18	20 μH choke	542-3002-002
	SPEAKER	
LS1	Speaker 3-5/8 8 ohm 1W	589-1003-002
	TRANSISTORS	
Q1	Silicon NPN 50 MHz amp TO92	576-0003-018
Q2	Silicon NPN gen. purp. TO92	576-0003-011
Q3	Same as Q2	
Q4	Same as Q2	
Q5	Same as Q2	
Q6	Same as Q2	
Q7	Same as Q2	
Q8	Same as Q2	
Q9	Same as Q2	
Q10	Same as Q2	
Q11	MJE2480 silicon NPN pwr. aud.	576-0002-029
Q12	Same as Q11	
Q13	Silicon NPN 50 MHz amp. TO92	576-0003-018
Q14	Silicon NPN gen. purp. TO92	576-0003-011
Q15	Silicon NPN 27 MHz OSC	576-0004-035
Q16	27 MHz amp. TO39	576-0004-004
Q17	27 MHz amp. TO39	576-0004-005
	RESISTORS	
R2	10K ohm ±10% 1/2 W	569-1504-103
R3	47 ohm ±10% 1/2 W	569-1504-470
R4	1.0K ohm ±10% 1/2 W	569-1504-102
R7	1.0K trim pot. (IF gain adjust)	562-0019-102
R8	62 ohm ±5% 1/2 W	569-1503-620
R9	4.7K ohm ±10% 1/2 W	569-1504-472
R12	10K ohm ±10% 1/2 W	569-1504-103
R13	10K 1/8 W A 5/8 SPST (Volume)	562-0016-004
R14	150K ohm ±10% 1/2 W	569-1504-154
R15	68K ohm ±10% 1/2 W	569-1504-683
R16	100K ohm ±10% 1/2 W	569-1504-104
R17	1.5K Ω ±10% 1/2 W	569-1504-152
R19	Same as R17	
R21	2.7K Ω ±10% 1/2 W	569-1504-272
R22	680 ohm ±10% 1/2 W	569-1004-681
R23	330 ohm ±10% 1/2 W	569-1504-331
R24	22K ohm ±10% 1/2 W	569-1504-223
R25	330 ohm ±10% 1/2 W	569-1504-331
R26	680 ohm ±10% 1/2 W	569-1504-681
R27	5K 1/8 W BD 5/8 (Squelch)	562-0002-011
R29	1.0K ohm ±10% 1/2 W	569-1504-102
R31	3.3K ohm ±10% 1/2 W	569-1504-332
R32	120 ohm ±10% 1/2 W	569-1504-121
R34	3.3K ohm ±10% 1/2 W	569-1504-332
R35	680 ohm ±10% 1/2 W	569-1504-681
R37	330 ohm ±10% 1/2 W	569-1504-331
R38	470 ohm ±10% 1/2 W	569-1504-471
R39	510 ohm ±5% 1/2 W	569-1503-511
R41	27 ohm ±10% 1/2 W	569-1504-270
R42	1.0 ohm ±10% 1/2 W	569-2503-109
R43	2.2K ohm ±10% 1/2 W	569-1504-222
R45	470 ohm ±10% 1/2 W	569-1504-471
R46	82 ohm ±10% 1/2 W	569-1504-820
R47	2.2K Ω ±10% 1/2 W	569-1504-222
R48	120 ohm ±10% 1/2 W	569-1504-121
R49	680 ohm ±10% 1/2 W	569-1504-681
R50	22 ohm ±10% 1/4 W	569-1002-220
R51	120 ohm ±10% 1/2 W	569-1504-121
R52	390 ohm ±10% 1/2 W	569-1504-391
R53	39K ohm ±10% 1/2 W	569-1504-393
R54	6.8K ohm ±10% 1/2 W	569-1504-682
R55	120 ohm ±10% 1/2 W	569-1504-121
R56	220 ohm ±10% 1/2 W	569-1504-221
R57	120 ohm ±10% 1/2 W	569-1504-121
R58	27 Ω ±10% 1/2 W	569-1504-270
R59	2.2K ohm ±10% 1/2 W	569-1504-222
R61	3.3K ohm ±10% 1/2 W	569-1504-332
R62	470 ohm ±10% 1/2 W	569-1504-471
R63	27 ohm ±10% 1/2 W	569-1504-270
R64	470 ohm ±10% 1/2 W	569-1504-471
R65	120 ohm ±10% 1/2 W	569-1504-121
R66	47 ohm ±10% 1/2 W	569-1504-470
R67	1.2K ohm ±10% 1/2 W	569-1504-122
R68	47K ohm ±10% 1/2 W	569-1004-473
R70	330 ohm ±10% 1/2 W	569-1504-331
R72	3.3K ohm ±10% 1/2 W	569-1504-332

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.
R82	27 ohm ±10% 1/2 W	569-1504-270
R84	5.6 ohm ±10% 2 W	569-2004-569
R95	330K ohm ±10% 1/2 W	569-1504-334
R101	47 ohm ±10% 1/2 W	569-1004-470
	THERMISTOR	
RT1	Thermistor, 8K ohm ±10%	569-3001-001
RT71	Same as RT1	
	SWITCHES	
S1	ON/OFF, SPST (Volume Control)	562-0016-004
S2	Channel switch assembly	
	Includes:	
	Knob	547-0008-005
	Detent plate	018-1009-001
	Channel indicator dial	032-0154-002
	24 position detent	583-9004-012
	Switch spacers	013-1422-001
	Switch spacers, threaded	013-1365-002
	Printed circuit board	035-0199-001
	Switch wafer	583-2009-211
Y1	5.735 MHz HC-18/U	519-0023-104
Y2	5.725 MHz HC-18/U	519-0023-103
Y3	5.715 MHz HC-18/U	519-0023-102
Y4	5.695 MHz HC-18/U	519-0023-101
Y5	6.1904 MHz HC-18/U	519-0023-108
Y6	6.1804 MHz HC-18/U	519-0023-107
Y7	6.1704 MHz HC-18/U	519-0023-106
Y8	6.1504 MHz HC-18/U	519-0023-105
Y9	32.700 MHz HC-18/U	519-0024-001
Y10	32.750 MHz 30T HC-18/U	519-0024-002
Y11	32.800 MHz 30T HC-18/U	519-0024-003
Y12	32.850 MHz 30T HC-18/U	519-0024-004
Y13	32.900 MHz 30T HC-18/U	519-0024-005
Y14	32.950 MHz 30T HC-18/U	519-0024-006
S3	Handset switch	583-1002-001
S4	Handset/speaker switch	583-3001-003
S5	PA/OFF switch	583-3001-003
	TRANSFORMERS	
T1	10MM 27 MHz ant.	592-5015-001
T2	10MM 27 MHz mix.	592-5015-002
T3	7MM 455 kHz IF	592-5020-004
T4	Same as T3	
T5	Input/driver	592-1007-004
T6	Out/Mod	592-1013-006
T7	10MM 27 MHz osc.	592-5015-006
T8	10MM 27 MHz auto.	592-5015-005
T9	Same as T8	
T10	Same as T8	
T11	Same as T8	
T12	25-40 MHz osc.	592-5014-001
T13	25-50 MHz driver	592-5014-002
	TERMINAL BOARD	
TB1	Handset terminal board	586-1007-005
	PACKAGED ELECTRONIC CIRCUITS	
U1	PEC R.F. amp. silicon	544-0003-011
U2	PEC 1st mixer silicon	544-0002-011
U3	PEC 1st I.F. 120 silicon	544-0003-043
U4	PEC 2nd I.F. silicon	544-0002-014
U5	PEC noise limit. germ.	544-0002-015
U6	PEC audio silicon	544-0002-026
	PRINTED CIRCUIT BOARD	
U7	Printed circuit board	035-0181-015
	FILTER	
Z1	Mech. filter 455-7	532-1004-001
	HANDSET	
	Handset assembly	023-3267-001
	Includes:	
	Handset resonator	023-2858-001
	Handset with coiled cord	589-9002-010
	Transmitter cup	589-9002-012
	Mouthpiece	589-9002-013
	ACCESSORY PACKAGE	
	Accessory package	023-3262-001/ -002
	Includes:	
	Operating manual (M130)	002-0130-001
	Operating manual (M130A)	002-0130-002
	Installation instructions(M130)	004-0130-001
	Installation instructions(M130A)	004-0130-002
	FCC Rules Part 95	022-1635-001
	FCC license application form 505	022-1636-001
	Tap connector package	023-2209-001
	Hardware envelope	023-2615-005
	CB warranty card	041-0419-014
	Transmitter ID card	564-1001-001
	Reduced schematic	564-3001-130
	Spade terminal	586-0003-020
	0.250 tab receptacle	586-3005-001
	POWER CABLE	
	DC power cable	023-2780-003

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