RANGLER 40D

PHASE LOCKED LOOP

40 CHANNEL

MOBILE CITIZENS BAND TRANSCEIVER

DOC APPROVED

Courier

INSTRUCTION MANUAL

STANDARD WARRANTY

Adopted and Recommended by Electronic Industries Association

COURIER COMMUNICATIONS warrants each new electronic product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part (at the Company's option) in exchange for any part of any unit of its manufacture which under normal installation, use and service disclosed such defect; provided the unit is delivered by the owner to us or to our authorized distributor from whom purchased, or authorized service station,intact, for our examination, with all transportation charges prepaid to our factory, within 1 year from the date of sale to original purchaser and provided that such examination discloses, in our judgment, that it is thus defective.

The above warranty applies also to changed ownership in the first year and to everyone in the second and third year from original purchase date, except that a $ 10.00 fee will be charged for each repair.

Written authorization must be obtained before any merchandise is returned to the factory.

This warranty does not extend to any of our electronic products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, unauthorized modifications, or to use in violation of instructions furnished by us, nor units which have been repaired or altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture.

This warranty is in lieu of all warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our electronic products.

WARRANTY NOT VALID UNLESS WARRANTY CARD RETURNED.

D. O. C. LICENSING

Before operating your RANGLER 40D you must obtain a license from the Department of Communications (DOC). A license application form can be obtained from your nearest DOC Radio Regulations Office, some of which are listed below:

St. John's Nfld.
Sir Humphrey Gilbert Building, Room 614, Duckworth St., P. O. Box 5273

Sidney, N. S.
206A Federal Building
Dorchester St., P. O. Box 281

Halifax, N. S.
Sir John Thompson Building, Room 512, 1256 Barrington St.

Quebec, P. Q.
390 Dorchester St.

Montreal, P. Q.
Port of Montreal Building, Room 256
Wing No. 21, Cite du Havre

Ottawa, Ont.
Trebla Building, Room 100B
473 Albert St.

Kingston, Ont.
273 Federal Building
Clarence St. P. O. Box 633

Toronto, Ont.
55 St. Clair Ave E, 9th Floor

Sault Ste. Marie, Ont.
118 March St. P. O. Box 1026

Winnipeg, Man.
G. P. O. Building, Room 600
266 Graham Ave.

Regina, Sask.
New Post Office Building, Room 414

Calgary, Alta.
803-205-8th Ave SE

Edmonton, Alta.
Financial Building Room 300
10621-100 Ave SE

Vancouver, B. C.
325 Granville St., Room 320

Victoria, B. C.
816 Government St., Room 116

Prince-Rupert, B. C.
Federal Building, Room 327

Address all correspondence to "Inspector, Radio Regulations". For DOC offices not listed here, consult your local telephone directory under "Government-Canada-Communications".

WARNING

This transceiver, designed and adjusted at the factory to meet the DOC rules and regulations, requires no further adjustments. The transmitter and receiver section can be adjusted only by a qualified technician. Replacement or substitution of crystals or other components, to adjust or tune the internal circuits which influence the characteristics of the transmitter section and the unwanted radiations of the receiver are especially prohibited.

WARNING

1. When you accept your CB station license you agree to tolerate all interference to the operation of your station which is caused by other stations or equipment operating in accordance with applicable laws, treaties, and regulations.

2. It is your responsibility to see that the station is properly operated at all times.

3. Discontinue operation immediately if the equipment fails to function in the normal manner. Do not tamper with the equipment. A licensed commercial operator is required for any adjustments that might affect the proper operation of the station.

4. There are height restrictions on any antenna that may be used at a fixed location by this station.

5. You should notify the D.O.C. promptly of changes in your mailing address. This may be done by letter addressed to the Department of Communications 300 Slater St,Ottawa , Ontario. Give station call sign, your name and mailing address as they appear on your license, your new mailing address, including postal code, and your signature. NO acknowledgent of such notification will be sent to you.

6. Keep informed. Your license may be revoked and/or monetary forfeitures may be imposed for failure to comply with the law and the D.O.C. Rules.

7. Only the licensee and members of his immediate family living in his household or his employees while acting within their scope of their employment may operate under his individual license. Operation under licenses issued to partnerships, associations, corporations, or governmental entities is limited to employees or members for communications relating to the business of the organization.

8. Do not make unnecessary transmissions. Remember that Citizens Radio frequencies are available only on a shared basis which requires the cooperation of all users.

9. The transmission of profane, indecent, or obscene language is prohibited by law, and severe penalties are provided for violators.

10. You may not engage in any form of broadcasting or providing communications for hire.

11. Do not transmit unless there is a definite need in a situation which requires the use of radio.

12. Your station may not be used for engaging in radio communications as a hobby or diversion, that is, operating the station as an activity in and of itself.

13. Your station must be made available for inspection upon the request of an authorized D.O.C. representative.

PLL FREQUENCY SYNTHESIZER

Most Citizens Band Transceivers in the past used Frequency Synthesizers utilizing 12 or more quartz crystals to generate the various radio signals for receiving and transmitting the assigned CB channels. The frequency stability of each channel, when receiving or transmitting, was dependent largely upon the crystals used to generate the frequencies for that channel. The frequency accuracy and stability of one channel was often better than another.

Citizens Band transceivers of recent design, such as the transceiver you have purchased, utilize the most advanced design of frequency synthesizers called Phase Locked Loop (PLL) Frequency Synthesizers. These synthesizers utilize a minimal number of crystals as reference frequencies from which transmitting and receiving frequencies are developed. The transmitting and receiving frequencies are stabilized by phase comparing to the reference frequency and thus providing a phase-locked loop.

There are several types of PLL circuits in use; the one your transceiver uses incorporates the best features of these designs. Your transceiver uses crystal controlled standards with digital type programmable frequency dividers for selection of the channel frequencies, which are always locked to the reference frequency. If for any reason the PLL is not "locked" the transmitter will not transmit.

SECTION II, INSTALLATION

A. Mobile Station

CAREFULLY READ ALL INSTALLATION INFORMATION IN THIS MANUAL BEFORE ATTEMPTING TO INSTALL THE TRANSCEIVER IN A VEHICLE OR AS A BASE STATION.

1. Location

   a) Locate the transceiver under the dash or on the hump of the vehicle. DO NOT POSITION ON TOP OF THE DASH OR ANY LOCATION THAT WILL INTERFERE WITH THE OPERATION OF THE VEHICLE.

   b) Use the VEHICLE MOUNTING BRACKET as a template to locate and mark the mounting holes. Refer to fig. 1 for identification of the mounting hardware.

   c) Position the transceiver in the mounting bracket for best view and accessibility to the front panel controls.

2. Power Connections

   a) CAUTION: Be sure the transceiver POWER SWITCH is in the OFF position before making any connections to the power source. ROTATE THE VOLUME CONTROL FULLY TO THE COUNTERCLOCKWISE POSITION.

   b) The transceiver has a polarity reversal protection diode across the power input circuit. If the polarity of the power source is reversed, the fuse in the positive power lead will burn out. CHECK CAREFULLY THE POLARITY OF THE POWER SOURCE BEFORE CONNECTING TO THE TRANSCEIVER.

   c) UNDER NO CIRCUMSTANCES SHOULD A FUSE OF GREATER AMPERAGE THAN 2 AMPERES BE USED TO REPLACE A BURNED OUT FUSE. ALSO, NEVER BYPASS THE FUSE WITH A JUMPER WIRE. IN EITHER CASE SEVERE DAMAGE WILL RESULT TO THE TRANSCEIVER AND VOID THE WARRANTY.

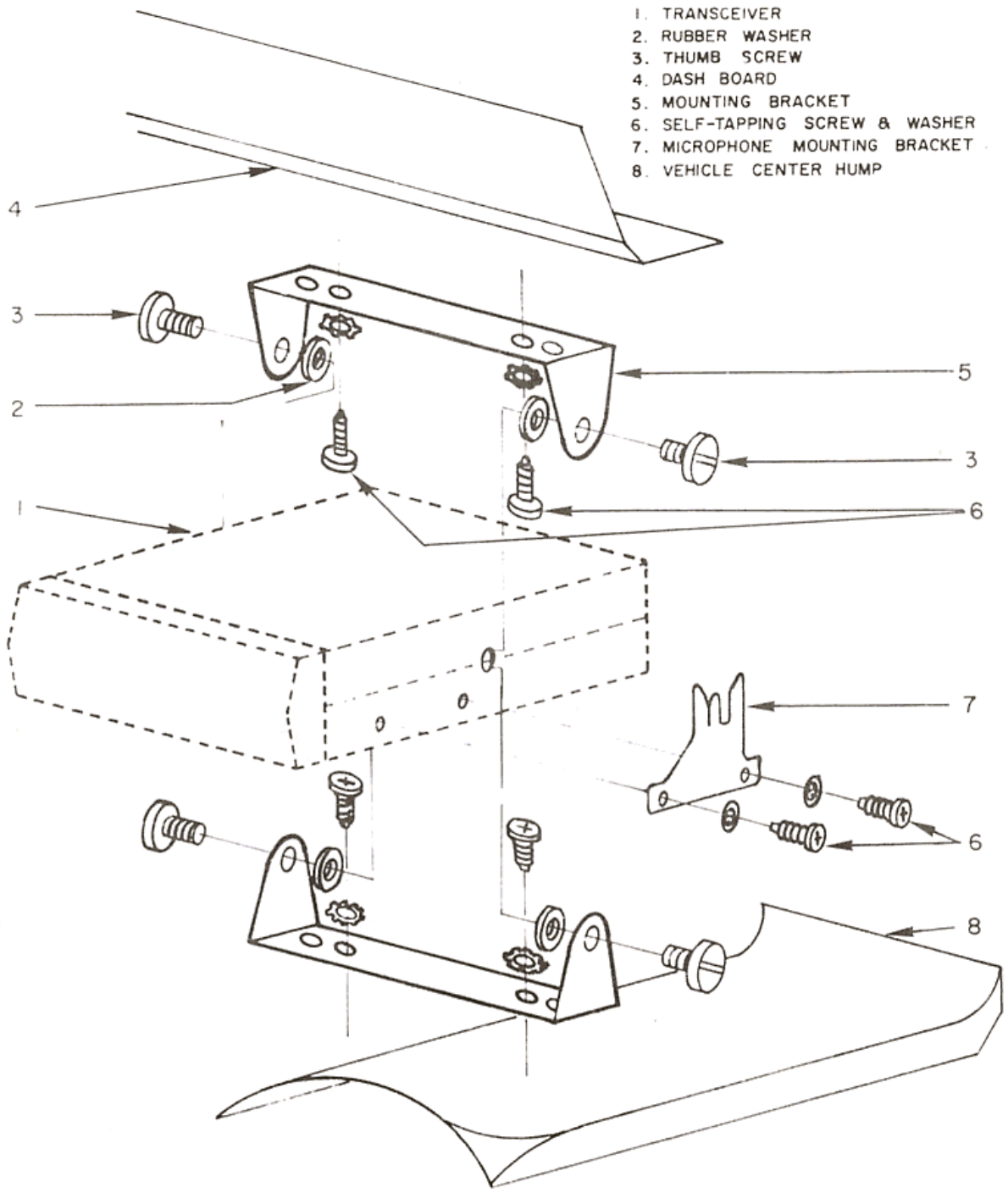


FIGURE 1, TYPICAL VEHICLE MOUNTING BRACKET INSTALLATION

d) Negative Grounded Power System Connections

Connect the FUSED power lead (RED) to the POSITIVE (+) terminal of the power source (a battery in most vehicles) or to the accessory terminal on the ignition switch or to the accessory fuse on the fuse block (refer to fig. 2).

Connect the other power lead (BLACK) to the NEGATIVE (-) terminal of the power source or to the frame of the vehicle or to the COMMON (-) ground connection.

e) Positive Grounded Power System Connections

Connect the FUSED power lead to the FRAME of the vehicle or to the POSITIVE (+) terminal of the power source (refer to fig. 2).

Connect the other lead (NEGATIVE) to the NEGATIVE terminal of the power source or to the accessory terminal on the ignition switch or to the accessory fuse on the fuse block.

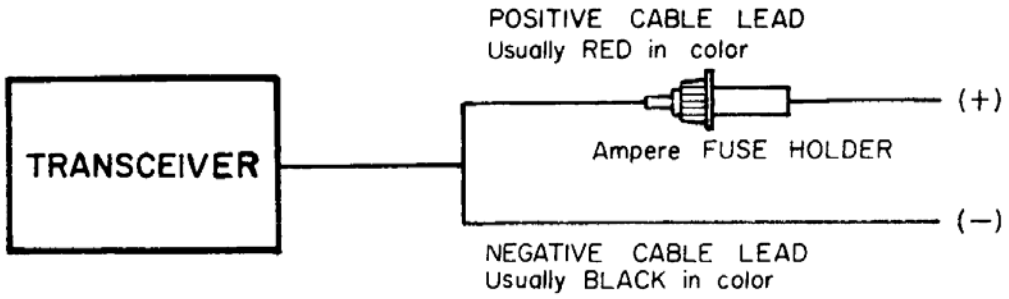


FIGURE 2, POWER CABLE, LEAD INDENTIFICATION DIAGRAM

3. Microphone

Connect microphone plug into transceiver jack and mount microphone hanger as follows:

a) In the package containing the mounting hardware, there are screws and the microphone hanging bracket. For convenience, locate the hanger on the dashboard within easy reach of the operator, so that the microphone may be grasped without the operator having to take his eyes off the road.

b) When an approximate location has been chosen, use the hanger as a template and center punch the centers of the two #30 (.120 Dia.) holes, drill and mount the hanger with the two #6 self-tapping screws.

4. Mobile Station Antennas

CAUTION: NEVER OPERATE YOUR TRANSCEIVER WITHOUT A PROPERLY MATCHED ANTENNA.

Many styles and types of mobile antennas are available for installation on just about every type of vehicle, including boats and aircraft. You should discuss this with your dealer.

Location

The position of the antenna on a vehicle is very important as it will affect the directional characteristics (radiation pattern). Figure 3 shows four possible locations for a standard "quarter wave" antenna. The ROOFTOP is usually considered the best location.

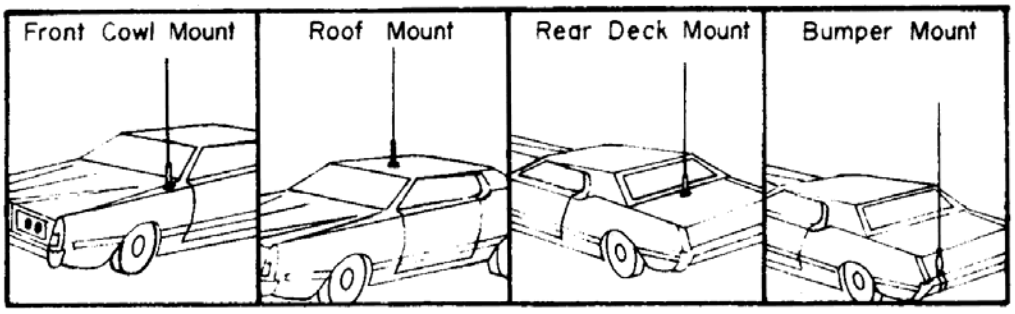


FIGURE 3, MOBILE ANTENNA LOCATION DIAGRAM

B. Base Station Installation

1. The unit was basically designed for mobile operation; however, it may be used as a base station by the addition of a 13.8VDC External Power Supply. Models are available from your local FANON/COURIER dealer.

2. Locate the transceiver on a shelf or table out of the path of foot traffic and near a 117VAC/60Hz power outlet.

3. An external rooftop antenna may be used or a simple whip type which connects directly to the antenna connector on the transceiver. See your FANON/COURIER dealer for details.

4. Refer to fig. 2 for the proper connections to the external power supply.

C. Antenna and Cable Information

1. The antenna is a very important part of your radio station, whether it is a mobile or base station. Antenna height is of prime importance. Refer to the FCC Rules and Regulations for the maximum height from the ground or building you are allowed. The higher the terrain or structure on which the antenna is mounted, the greater the range of communication will be.

2. The unit is designed to operate with any good quality Citizens Band mobile or base station antenna. The type of antenna you should use depends in large measure upon WHERE the antenna is to be mounted and the radiation pattern you require. All FANON/COURIER dealers are well qualified to assist you in selecting the proper type.

3. Transmission Cable Requirements

In most cases the coaxial cable supplied with mobile CB antennas are of the proper length for connecting directly to the antenna connector on the rear panel of the transceiver; however, if it is necessary to change the length, type RG58/U is recommended for lengths up to 50 feet.

4. Length Calculations

The length of the transmission cable is very important, as the length will vary according to the transmission "velocity factor" of the cable. The length of cables with a velocity factor of 0.66 (regular type cable) should be in odd multiples of 6 feet for a frequency of 27 MHz.

Cables with a velocity factor of 0.82 (foam type dielectric) should be in odd multiples of 7.5 feet for 27 MHz installations.

5. The formula for determining the length in feet of the cable you may use, is as follows:

$$\text{Cable length} = \frac{246\ V}{f}$$

Where V = Transmission Velocity Factor of the cable

f = Frequency in Megahertz

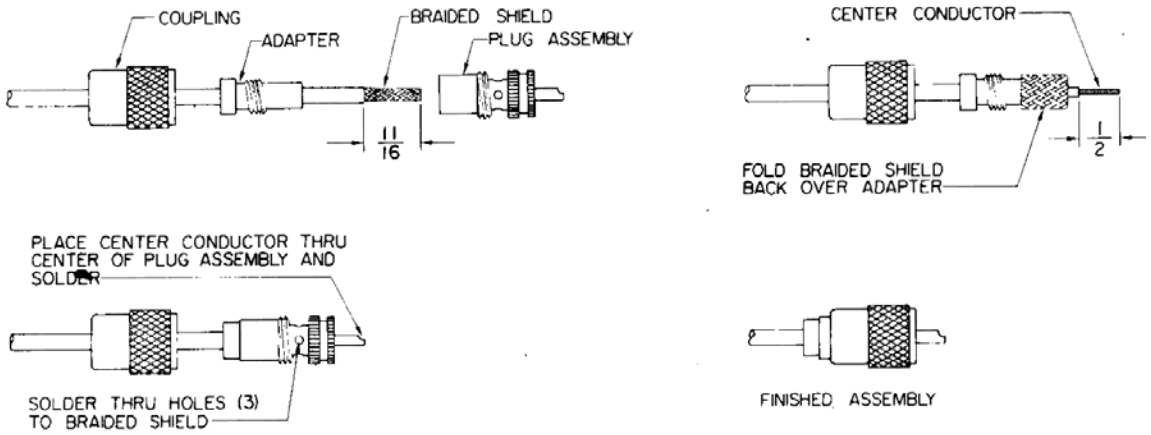


FIGURE 4, CABLE CONNECTOR ASSEMBLY DIAGRAM

D. Voltage Standing Wave Ratio (VSWR) Measurements

The VSWR of the antenna system should not be greater than 1.5 to 1. Use a COURIER Model Port-A-Lab 500 D Voltage Standing Wave Ratio Meter, or equivalent instrument; follow the instructions given with the instrument.

E. External Speaker Connections (Figure 5)

1. External Speaker

Prepare an 8 ohm speaker as shown in fig. 5 and plug into the EXT-SPK jack on the rear panel. The internal speaker will be bypassed when the external speaker plug is inserted.

CAUTION: POWER SWITCH MUST BE IN THE OFF POSITION BEFORE INSERTING THE SPEAKER PLUG INTO THE JACK ON THE REAR PANEL. THE SPEAKER LEADS MUST NOT BE CONNECTED IN ANY WAY TO THE VEHCILE CHASSIS OR TO THE TRANSCEIVER CASE, AS SHORTING MAY OCCUR AND CAUSE DAMAGE TO THE SPEAKER AND TRANSCEIVER COMPONENTS.

2. Public Address Speaker

The transceiver volume control will control the volume level of the PA speaker. Prepare an 8 ohm horn or speaker with an insulated cable. Insert the miniature phone plug into the PA SPK jack. (Refer to fig. 6).

CAUTION: BE SURE THAT THE EXTERNAL SPEAKER OR THE PUBLIC ADDRESS SPEAKER CABLE, DO NOT MAKE AN ELECTRICAL CONNECTION IN ANY WAY TO THE TRANSCEIVER CASE, AS THE UNIT MAY BE SHORTED AND CAUSE DAMAGE TO THE TRANSCEIVER COMPONENTS.

Set the Channel Selector to the PA position and press the microphone switch. Adjust the transceiver volume control for the proper audio level at the PA speaker or horn.

When the CB/PA switch is in the PA position, all other functions of the transceiver are turned off.

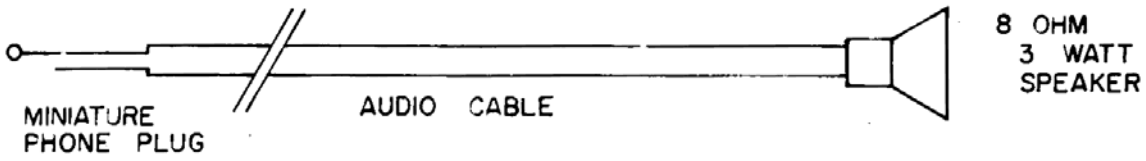


FIGURE 5, EXTERNAL SPEAKER CABLE DIAGRAM

SECTION III, STATION OPERATION

A. Function of the Controls, Indicators and Connectors (Figure 6)

VOLUME CONTROL - POWER ON/OFF SWITCH

When this control is turned fully counterclockwise, the power switch is in the OFF position. Turning the control clockwise turns the power ON and controls the volume level.

CHANNEL SELECTOR

The Channel Selector sets the channel frequencies simultaneously for the receiving and transmitting modes. Refer to the FCC Rules and Regulations for complete information on the use of the various channels.

TRANSMIT INDICATOR (XMIT)

A light emitting diode (LED) is provided, indicating when transmitter is "On the Air".

DIGITAL CHANNEL INDICATOR

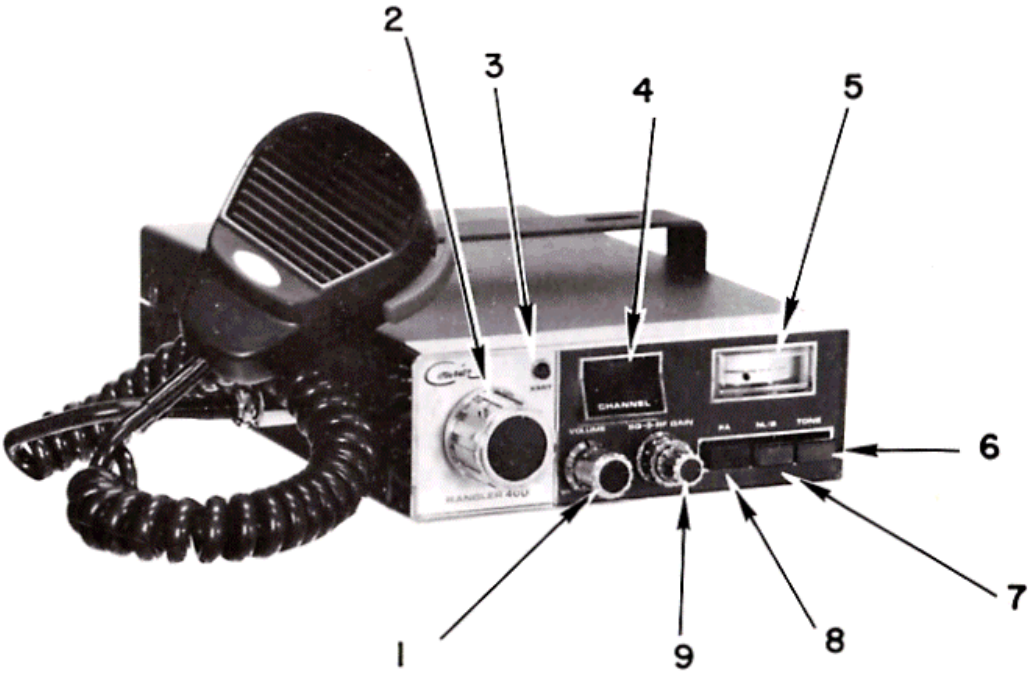
The selected transmit/receive channel is displayed digitally by light emitting diodes (LED) when transceiver is switched on.

"S"/RF METER

Meter indicates relative signal strength of incoming signals from 1 through 9. A reading of 1 indicates a weak or distant station and a reading of 9 would indicate a local or higher power station. The RF power scale indicates the relative RF power in watts being transmitted by your transmitter.

TONE SWITCH

This switch operates a filter enabling a clarification of voice frequency signals.



1 Volume ON/OFF Switch
2 Channel Selector
3 Transmit Indicator
4 Channel Indicator
5 S/RF Power Meter
6 Tone Switch
7 Noise Limiter/Blanker Switch
8 PA/CB Selector Switch
9 Squelch and RF Gain Control
10 Power Cable
11 PA Speaker Jack
12 External Speaker Jack
13 Antenna Connection

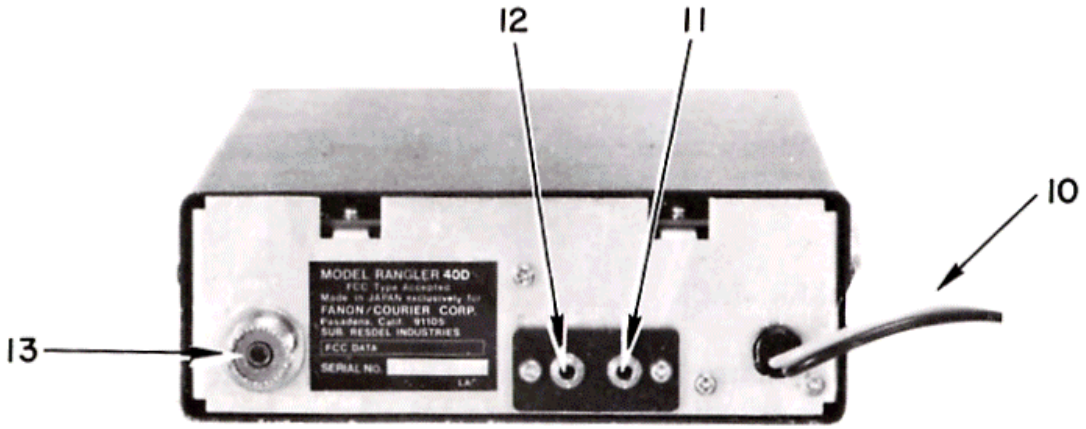


FIGURE 6, CONTROLS, INDICATORS AND CONNECTIONS

NOISE LIMITER/BLANKER SWITCH (NL/B)

Push this switch "in" to blank-out large electrical pulse pulse interference, such as electric motors, ignition or lightning static discharges.

PA SELECTOR SWITCH

This switch selects the mode of operation. When switch is "out", the transceiver will function as a Citizens Band Radio. When set "in", the PA position, and an EXTERNAL PA SPEAKER is connected to the PA jack on the rear panel, the unit operates as a public address amplifier.

SQUELCH CONTROL

The word "squelch" means to silence; therefore, the function of the control is to silence the atmospheric noise (hash) usually present in all high frequency AM radio communication. The maximum squelch is obtained when the control is in full CLOCKWISE position, minimum squelch when in COUNTERCLOCKWISE position.

RF GAIN CONTROL

This control is used to increase the sensitivity of the receiver so that distant stations may be received more clearly, or to decrease the sensitivity so that very strong stations may be received more clearly.

POWER CABLE

The DC power cable supplied with the transceiver has a fuse holder in the positive lead containing a 2 ampere fuse.

EXTERNAL SPEAKER JACK

A standard miniature phone plug fits this jack on the rear panel. When an external speaker is connected, the internal speaker is disconnected.

PA SPEAKER JACK

A standard miniature phone plug fits this jack on the rear panel, and provides for connection of an external public address speaker.

ANTENNA CONNECTOR

A standard PL-259 coaxial connector fits this connector on the rear panel. The output impedance is 50 ohms.

B. Good CB Practices

In order that all CB operators may obtain maximum benefit from their CB radio station, the D.O.C.strongly urges all CB radio operators to observe the following " Good CB Practices":

1. Channel Selection

In selecting a channel for your station, it is very important that the following factors be considered:

a. There are only a limited number of channels available for use by all CB stations.

b. Channel 9 may be used for emergency communications only (situations which require immediate assistance to a motorist, etc.).

c. Any one of the other channels are to be used to conduct personal and business radio communications.

d. Prevent unintentional "bleed over" interference to channel 9. It is recommended that all transmissions involving highway travelers be conducted on a channel other than channel 8 or 10.

2. Channel Usage

Cooperate to the fullest extent possible in sharing the CB channels. Always be courteous and considerate when using a channel. In order to assure that all CB operators will have an equal opportunity to use the frequencies, radio communications between CB stations (interstation) must be limited to no longer than 5 continuous minutes to be followed by a silent period of at least one minute. Operators should restrict their time on the air to a practical minimum.

The importance of all CB users disciplining themselves from needlessly transmitting for long periods of time cannot be stressed enough.

3. Identification

Identify your radio transmissions with your own D.O.C. issued call sign before and after each transmission. This call sign is unique in that it is unlike any other CB radio station call sign. Be proud to identify your radio transmissions with it. "Nicknames" or "handles" may also be used to identify your radio transmissions provided they are accompanied by the D.O.C. assigned call sign. It is not necessary to transmit the call sign of the station with whom you are talking.

4. Equipment

Have frequency, power and modulation measurements made at regular intervals. Do not tamper with the equipment. A licensed commercial technician is required to perform any adjustments that might affect the proper operation of the transceiver.

5. Promote "Good CB Practices"

Encourage other CB users to follow the above suggested practices.

If all CB users make a serious attempt to understand and follow the above recommended practices, we believe efficient utilization of the shared CB channels will be maximized.

CHANNEL FREQUENCY CHART

Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	26.965	21	27.215
2	26.975	22	27.225
3	26.985	23	27.255
4	27.005	24	27.235
5	27.015	25	27.245
6	27.025	26	27.265
7	27.035	27	27.275
8	27.055	28	27.285
9	27.065	29	27.295
10	27.075	30	27.305
11	27.085	31	27.315
12	27.105	32	27.325
13	27.115	33	27.335
14	27.125	34	27.345
15	27.135	35	27.355
16	27.155	36	27.365
17	27.165	37	27.375
18	27.175	38	27.385
19	27.185	39	27.395
20	27.205	40	27.405

RECEIVER OPERATION

1. Set the front panel controls as follows:

CHANNEL SELECTOR	to	Desired Channel
TONE SWITCH	to	Out
NOISE BLANKER (NL/B) SWITCH	to	Out
PA SELECTOR	to	Out
SQUELCH CONTROL	to	Full CCW
RF GAIN CONTROL	to	Full CW
VOLUME CONTROL	to	1/2 Rotation CW

2. Rotate the CHANNEL SELECTOR and locate an incoming signal.

3. Adjust the VOLUME CONTROL as desired.

4. If a very strong signal is being received, set the RF Gain control CCW and observe that the audio level is reduced. Readjust the VOLUME as required.

5. The S-Meter will indicate the strength of the station being received. A reading of 1 to 4 indicates a distant or low power signal. A reading of 5 to 9 indicates a higher power or local station.

6. Squelch Adjustment

   1) Locate a channel where there is no signal and rotate the SQUELCH CONTROL from full CCW to a point where the noise just stops.

   2) Rotate the CHANNEL SELECTOR to a channel where there is a signal and observe that the audio comes through loud and clear.

   3) Do not set the SQUELCH CONTROL too far past the quiet point, as weak signals may not overcome the squelch and will not be heard.

7. Noise Blanker

   When there is excessive electrical disturbance, set the Noise Limiter/Blanker (NL/B) switch to the IN position, observe that the noise is reduced and the signal is received clearly.

8. Tone Switch

   Set Tone Switch to prefered position.

TRANSMITTER OPERATION

BEFORE TRANSMITTING, IT IS MANDATORY THAT YOUR TEMPORARY OR PERMANENT LICENSE BE POSTED WITH YOUR TRANSMITTER.

1. Set the front panel controls as follows:

CHANNEL SELECTOR	to	Desired Channel
PA SWITCH	to	Out
SQUELCH CONTROL	to	Noise Quiet Point
RF GAIN CONTROL	to	As Set for Receive
VOLUME CONTROL	to	1/2 Rotation CW

2. Select a clear channel or wait for an opportunity to "break-in" on a desired channel.

3. Position the microphone approximately 2 inches from your mouth and hold the Press-to-Talk switch down. Speak in a normal tone and level of voice, do not speak for more than two minutes. Release the Press-to-Talk switch and listen for the reply.

PUBLIC ADDRESS AND EXTERNAL SPEAKER OPERATION

1. Public Address Speaker (Figure 5)

   With the PA/CB switch in the PA position, and speaker plugged into the PA jack, press the transmit switch and speak into the microphone. Use the transceiver volume control to set the audio level at the PA speaker. When the CB/PA switch is in the PA position all other functions of the transceiver are turned off.

2. External Speaker (Figure 5)

   When the external speaker is used, the internal speaker is disconnected. The volume control functions as normal.

SECTION IV, TECHNICAL DATA/SERVICE & MAINTENANCE

General Description

The RANGLER 40 D is an AM Citizens Radio Service Band Transceiver. The unit incorporates the most advanced design in Phase Locked Loop (PLL) Frequency Synthesizer circuitry for the generation and precision control of 40 channel frequencies.

The transceiver is designed to operate in vehicles using power supplies providing 13.8 Vdc. The unit may also be used in base station installations when used with a 13.8 Vdc external power source.

Special Features:

* Electronic Switching
* Self-contained Heavy Duty Speaker
* Digital Channel Indicator
* Illuminated S/RF Power Meter
* Channel Selector
* On-the-Air Indicator
* Volume Control - with Power ON/OFF Switch
* Squelch Control
* Noise Limiter/Blanking Switch
* External speaker and PA jacks
* Operates from 13.8V DC (positive or negative ground)
* Coaxial Antenna Connector - 50 ohm impedance
* Under dash mounting bracket for mobile installation
* Phase Locked Loop (PLL) Frequency Synthesizer
* Low Noise RF Stages
* Public Address Mode
* Automatic Transmit Inhibit Circuit
* RF Gain Control
* Automatic Level Control (A.L.C.)

Nominal Specifications

General

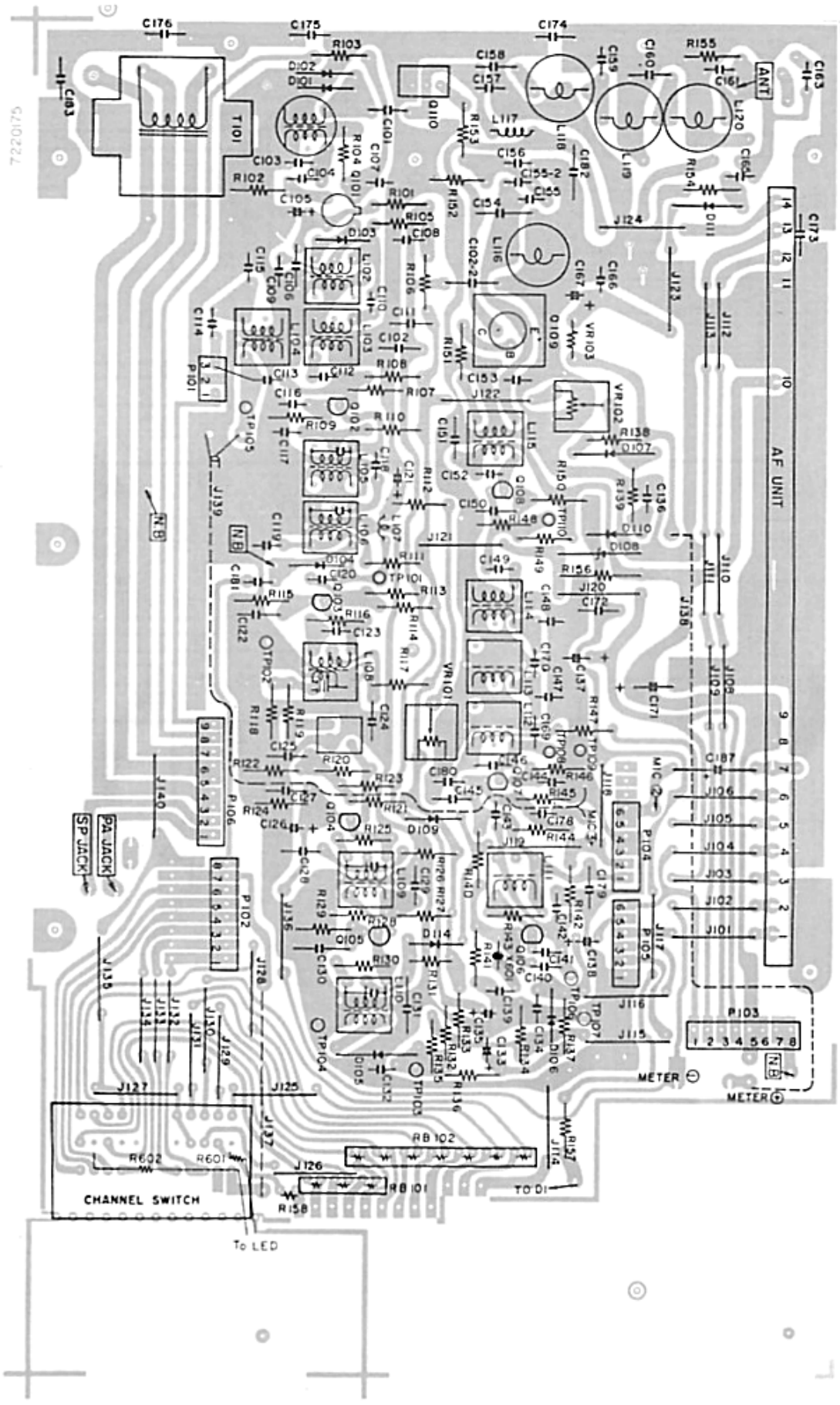
Operating Temperature Range - 30°C to +50°C
Solid State Devices
- Transistors - 24
- FETs - 3
- Diodes - 21
- Integrated Circuits (IC) - 2
- Varicaps - 1
- Zener Diodes - 2

RECEIVER SECTION

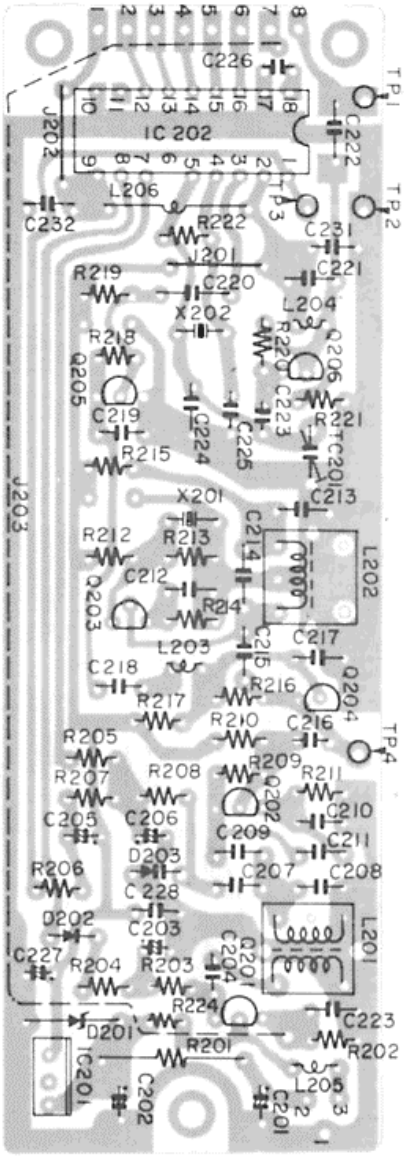
* Frequency Range	26.965 to 27.405 MHz
* Sensitivity	0.25uV for 10db S/N at 1 kHz at 30% Modulation
* Selectivity	BW 2.5 kHz min. at 6db dwn.
* Adj. Channel Rejection	Better than 60db
* Audio Distortion at 1 kHz	Less than 10% at 3W
* Squelch Sensitivity	0.2uV
* Squelch Stop Sensitivity	45 to 30,000uV (adjustable)
* Noise Limiter	Series Gate

TRANSMITTER SECTION

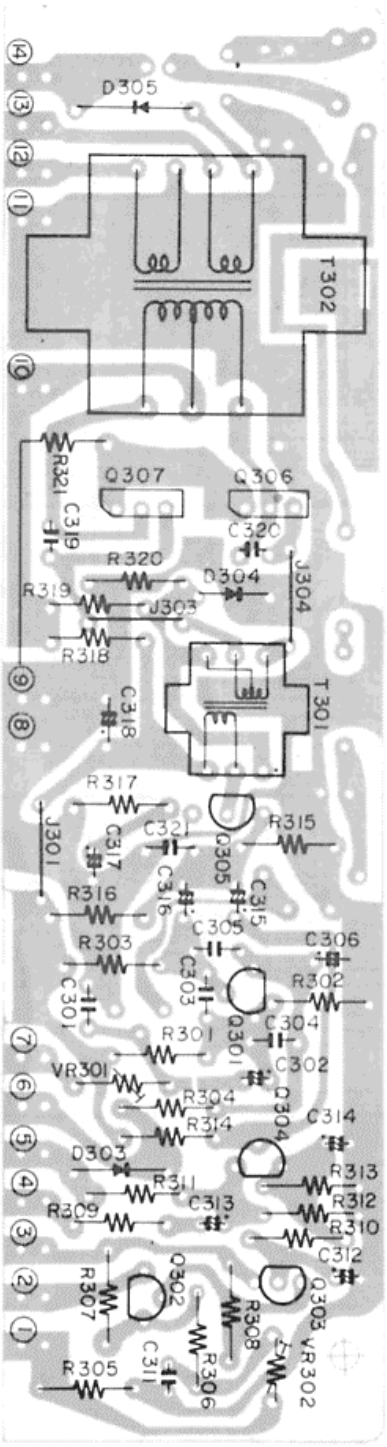
* Frequency Range	26.965 to 27.405 MHz
* Power Output at 13.8 V DC	3.5 to 4 watts
* Modulation (4mV at microphone)	100%
* Emission (Class D operation)	6A3
* Hum and Noise	Better than 40db down
* Frequency Tolerance	Better than ±.005%
* Antenna Impedance	50 ohms
* Switching	Electronic
* Modulation Distortion	Less than 10% at 95% modulation at 1 kHz



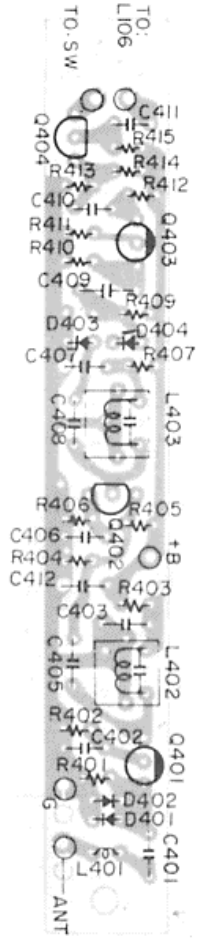
MAIN BOARD
LOCATION DIAGRAM ISSUE A



PLL SYNTHESIZER



AUDIO



NOISE LIMITE

FIGURE 8 COMPONENT

SERVICE AND MAINTENANCE

WARNING

MODIFICATION TO THE TRANSMITTER SECTION IN ANY WAY NOT RECOMMENDED BY COURIER COMMUNICATIONS IS ILLEGAL. MODIFICATIONS INCLUDE, BUT NOT LIMITED TO, SUBSTITUTION OF CRYSTALS, REPLACEMENT OF COMPONENT PARTS NOT OF THE SAME ELECTRICAL RATING, ADDITION OF ANY COMPONENT PART(S), CONNECTIONS, DEVICE OR ACCESSORY INTERNALLY TO THE TRANSMITTER.

Should your unit require service for any reason, please refer to the enclosed Authorized Warranty Station List for assistance and location in your area.

Troubleshooting assistance may be obtained by writing to COURIER COMMUNICATIONS, 80 Alexdon Road, Downsview, Ontario M3J 2B4. Adderess your inquiry to the attention of the Customer Service Department. Always state the Model, Serial Number and Issue of Schematic Diagram to which the unit was built. The schematic issue letter may be found in the lower right hand corner of the schematic or from the legend on the printed circuit board.

When ordering parts, refer to the part number listed in the Replacement Parts List and give a description of the part. Mail to attention of parts Department.

SPECIAL REPLACEMENT PARTS LIST

SYMBOL	DESCRIPTION	PART NUMBER
	SOLID STATE DEVICES	
Q102,103,106, 107	Transistor, 2SC1675	2022-03
Q104,105,301, 302,304,308	" 2SC945 (R)	1043-07
Q108,305	" 2SC815 (L)	1040-155
Q109	" 2SC781	1009-03
Q110	" 2SC1306 (I)	2022-04
Q303	" 2SA539 (L)	2020-01
Q306,307	" 2SC1096 (ZL)	2017-108
Q401,403	" 2SK19 (GR)	1009-127
Q402	" 2SC839 (H)	1077-07
Q404	" 2SC944	2022-05
Q101	FET, 3SK39 (P)	2022-06
D101,102,106, 109,110, 114,303,401, 402	Silicon Diode, 1S953	1041-66
D105,107	" " 21K60	2022-07
D108	" " RD-9.1FB	2023-41
D111	" " 1N60	294-42-9
D112	" " F-14A	2022-08
D305	" " SRIK-2	1042-17
D1	LED, Transmit Indicator	2061-09
D304	Varistor, 1S1209	2017-111
D103,104,403, 404	Silicon Diode, 1S1555	1041-66
	CRYSTALS	
X101	10.695 MHz	2061-29
	COILS AND TRANSFORMERS	
L101	Antenna Coil	2022-132
L102,103	RF Coil	2022-116
L104	Osc. Coil	2022-134
L105,106	1st IF Trans.	2022-135
L107	Filter Coil	2022-122

SPECIAL REPLACEMENT PARTS LIST (Continued)

SYMBOL	DESCRIPTION	PART NUMBER
	COILS AND TRANSFORMERS (Continued)	
L108	Mechanical Filter	2022-117
L109	IF Transformer	2022-123
L110	IF Transformer	2022-125
L111	TX. Osc. Coil	2022-133
L112,113	Filter Coil	2022-126
L114	" "	2022-127
L115	RF Coil	2022-128
L116,120	Filter Coil	2022-129
L117	Power Choke Coil	2022-119
L118	Filter Coil	2022-130
L119	RF Coil	2022-131
L401	Filter Coil SD10M	2061-67
L402	RF Coil 26 MHz	2061-68
L403	RF Coil 14 MHz	2061-69
T101	Choke Transformer	2061-39
T301	Transformer, low freq. (input)	2022-114
	CONTROLS	
	3-gang push switch	2022-195
	Rotary switch, channel selector assy.	2061-17
VR1	Squelch Control/RF Gain Control	2061-24
VR2	Volume Control w/switch	2061-25
VR101,102	Variable Resistor 10K ohm	2061-26
VR103	" " 50K "	2023-40
VR301,302	" " 1K "	2061-27
	FILTERS	
CF101	Ceramic Filter LFB-8	2022-118
	CAPACITORS	
C165	Ceramic 2pF 50V	2022-75
C170	" 3pF "	2022-76
C157	" 5pF "	2022-77
C155-2,169	" 10pF "	160-01-9

SPECIAL REPLACEMENT PARTS LIST (Continued)

SYMBOL	DESCRIPTION			PART NUMBER
	CAPACITORS (Continued)			
C110,118	Ceramic	12pF	50V	2022-78
C163	"	15pF	"	2062-08
C101,181	"	22pF	"	2022-79
C113,143	"	27pF	"	2055-147
C139,153,153-2	"	33pF	"	2022-136
C103,178	"	47pF	"	2022-81
C115	"	68pF	"	2022-83
C141	"	82pF	"	2022-84
C104,140,146, 147,152,161, 13	"	100pF	"	2022-82
C155	"	120pF	"	2018-07
C148	"	150pF	"	2022-86
C123,142	"	470pF	"	2022-72
C130,131,154, 182	"	0.1mfd	"	2022-71
C107,112,114, 136,144,158, 311,402,403, 406,407,411, 412,8,9,10	"	0.010mfd	"	2022-68
C120,410	"	0.001mfd	"	2022-73
C103,109,116, 117,119	"	0.022mfd	"	2022-69
C102,102-2, 106,111,122, 124,125,127, 128,129,145, 150,151,172, 173,174,175, 176,179,183	"	0.0047mfd	"	2022-70
C322	"	330pF	"	2061-62
C132	Mylar	0.01mfd	"	2022-246
C134,304	"	0.022mfd	"	2061-83
C303	"	0.033mfd	"	2061-82
C305	"	4700pF	"	2061-81
C319,320	"	8200pF	"	2022-103
C149,162,180, 409	Mica	150pF	"	2022-89

SPECIAL REPLACEMENT PARTS LIST (Continued)

SYMBOL	DESCRIPTION			PART NUMBER
	CAPACITORS (Continued)			
C159	Mica	220pF	50V	2022-91
C160	"	300pF	"	2022-94
C405,408	"	47pF	"	2061-71
C105,133,135, 138	Electro-lytic	1mfd	16V	2022-104
C302,313,314, 315,316	"	1mfd	50V	1011-40
C121,167	"	2.2mfd	16V	2022-105
C312	"	2.2mfd	50V	2061-80
C126	"	4.7mfd	16V	2022-107
C310	"	4.7mfd	50V	1076-41
C306,317	"	47mfd	16V	2022-108
C137,318	"	220mfd	"	2022-109
C171	"	1000mfd	"	2022-111
	MISCELLANEOUS			
	AMC Module			2061-79
	Bracket, car mounting			2022-217
	Cabinet, Front			2061-01
	Case, Bottom			2061-03
	Case, Top			2061-02
J4	Connector, Antenna			2061-28
	DC cord w/fuse holder			2022-229
	Fuse 2A			2022-234
J1,2	Jack, EXT. SP & PA			2022-225
	Knob, Channel Selector			2061-04
	" ON/OFF/Volume Control			2061-05
	" RF Gain			2061-07
	" Squelch			2061-06
	Noise Blanker Module			2061-78
	Pilot Lamp (meter lighting)			2022-227
	PLL Module			2061-77
	Push Button, PA,NL/B, Tone			2022-228
J3	Receptacle 4-pin			2022-224
SP1	Speaker (16 ohm 3W)			2061-22
M1	S/RF Meter			2061-21
	Channel selector dial			ART359
	CMM-1 Microphone Assy.			2017-116

SPECIAL REPLACEMENT PARTS LIST (Continued)
PLL SYNTHESIZER

SYMBOL	DESCRIPTION	PART NUMBER
	PLL Module Assembly	2061-77

This assembly consists of the following:

SOLID STATE DEVICES

Q201,202,203, 204,205,206	Transistor, 2SC1675	2022-03
D201	Diode Silicon, RD9.1FB	2023-41
D202	" " 1SS53	2061-44
D203	" " 1SV50 (Varicap)	2061-45
IC201	I.C. uPC14305	2061-42
IC202	I.C. REC86345	2061-43

CRYSTALS

X201	10.24 MHz	2049-05
X202	36.38 MHz	2061-49

COILS AND TRANSFORMERS

L201,202	Coil, Osc.	2022-134
L203	" Filter S101 K	2061-46
L204	" " S2R2K	2061-47
L205	" " S330K	2061-48

CAPACITORS

C215,216	Ceramic	2pF	50V	2052-41
C223	"	3pF	"	2061-53
C204	"	10pF	"	1002-72
C222	"	22pF	"	2022-79
C208	"	27pF	"	2061-64
C207,209	"	47pF	"	2022-81
C214	"	68pF	"	2022-83
C221	"	100pF	"	160-04-9
C218,228,229, 230,231,232	"	10000pF	"	2022-68
C213	"	22000pF	"	2022-69

SPECIAL REPLACEMENT PARTS LIST (Continued)
PLL SYNTHESIZER

SYMBOL	DESCRIPTION			PART NUMBER
	CAPACITORS (Continued)			
C220	Ceramic	47000pF	50V	2022-70
C203	Electro-lytic	1mfd	"	170-53-9
C202,227	"	10mfd	16V	170-23-9
C201	"	33mfd	"	170-48-9
C205,206	Tantalum	0.1pF	35V	2061-54
C225	Mica	22pF	50V	2061-58
C212,217,219	"	47pF	"	2061-56
C224	"	120pF	"	2061-57
C210,211	"	680pF	"	2061-55
C226	Mylar	1000pF	"	2061-59
TC201	Trimmer			2061-60

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