Midland 13-925 Owner's Manual

MIDLAND
ELECTRONICS COMPANY

INTEGRATED CIRCUIT

MODEL 13-925

Hi-Lo VHF Dual Band FM Scanning Monitor

OWNER'S GUIDE

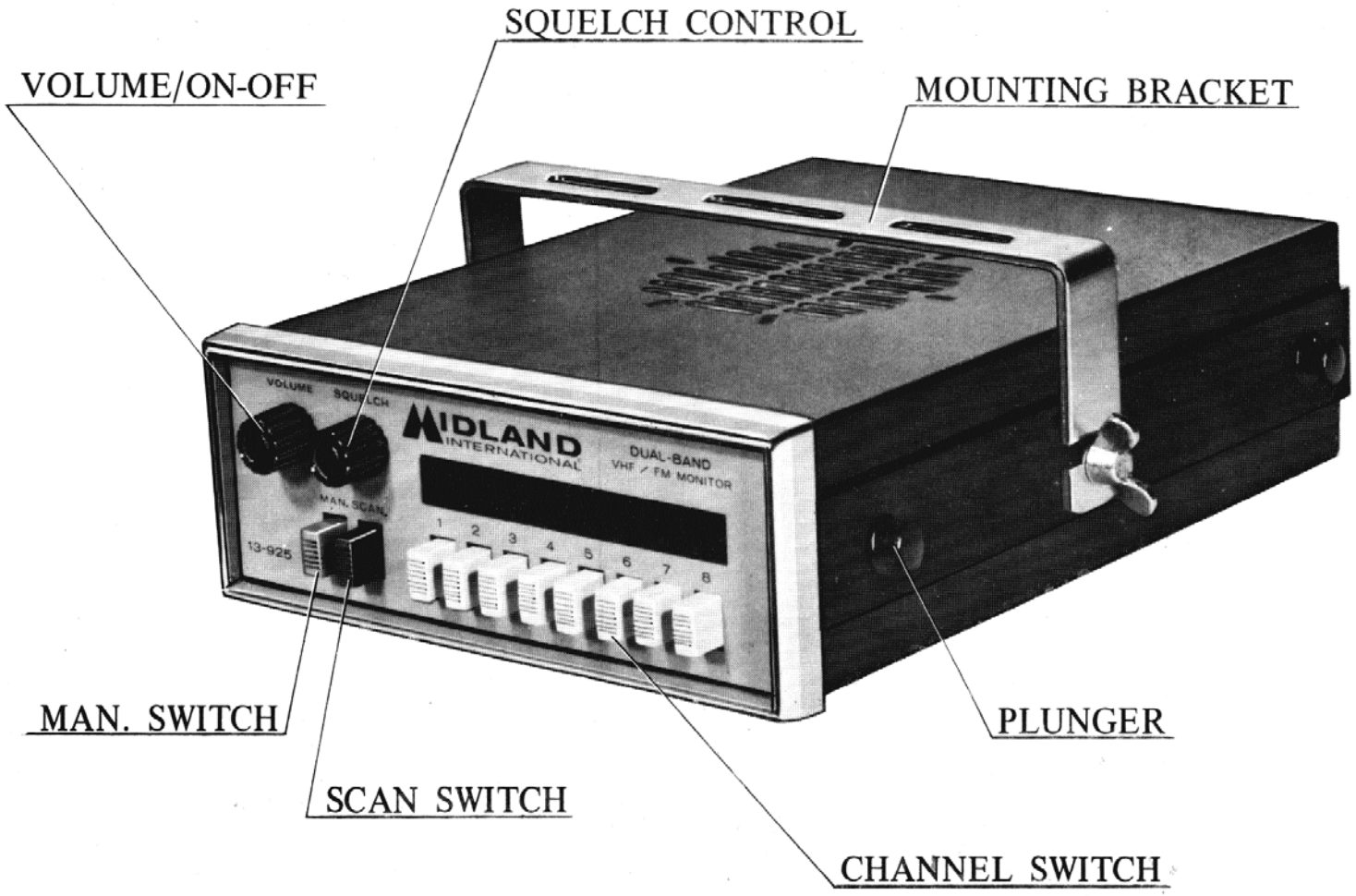

SQUELCH CONTROL
VOLUME/ON-OFF
MOUNTING BRACKET
VOLUME
SQUELCH
MIDLAND
INTERNATIONAL
DUAL-BAND
VHF / FM MONITOR
MAN. SCAN
13-925
1 2 3 4 5 6 7 8
MAN. SWITCH
PLUNGER
SCAN SWITCH
CHANNEL SWITCH

Figure 1

OPERATING CONTROLS AND FUNCTIONS (Figures 1 and 2)

VOLUME – ON/OFF

Controls the sound output from the speaker and the power on/off. Rotate to the right to turn the power on and increase the volume.

SQUELCH

Mutes the receiver to provide a quiet stand-by operation when signals are not being received and does not affect the volume when signals are received.

In the automatic scanning mode, the squelch adjusts itself automatically.

In the manual scanning mode, the squelch should be adjusted in the following manner. With the unit on and set to any channel equipped with a crystal but with no signal present, carefully rotate the squelch control to the right until the receiver is quiet. Incoming signals will automatically release the squelch enabling you to receive normally. Careful adjustment is necessary, as settings to far to the right will not allow weaker signals to release the squelch.

INDIVIDUAL CHANNEL SELECTORS 1 – 8

These pushbuttons allow individual channel selection for programming either the automatic or manual scanning operation. Push the buttons in to select the desired channels.

MAN. SCAN (Scanning Selector)

These two push buttons control the automatic and manual scanning operation. For automatic scanning, push in the button marked SCAN. For manual scanning, push the button marked MAN. This defeats the automatic scanning and you may manually scan by pushing the MAN button each time you want to advance to another channel.

EXTERNAL SPEAKER

A rear panel jack is provided to allow the use of an external speaker. When the plug is inserted into the external speaker jack the built-in speaker is automatically disconnected and the external speaker will operate.

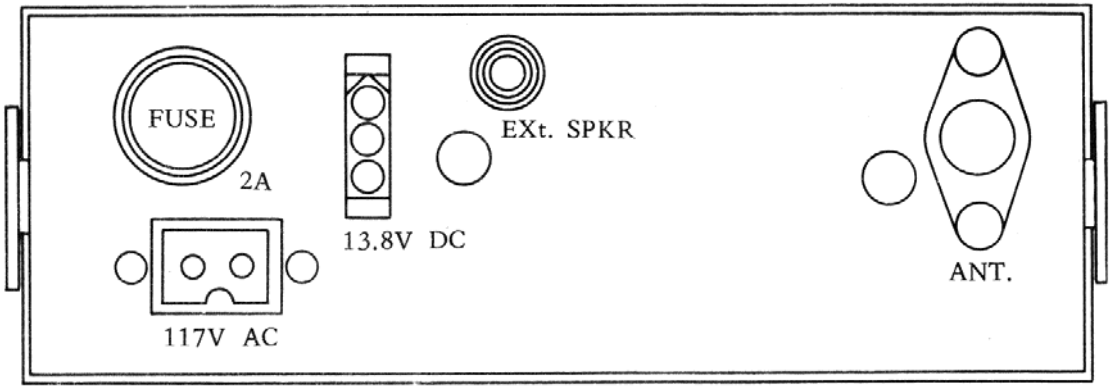


FIGURE 2

CABINET REMOVAL

The cabinet has been designed with a unique locking device to provide easy access to the crystals.

CAUTION: Always disconnect the power cord before removing the cabinet.

To remove the cabinet, pull out the 4 small plungers located on the sides of the cabinet (see Figure 1) and remove the side binding strips. Either the top or the bottom of the cabinet may then be removed by gently prying it up away from the chassis. To reassembly the cabinet, simply reverse the procedure.

FREQUENCIES AND CRYSTALS

Being a crystal controlled receiver, this unit requires 1 crystal for each frequency you want to monitor.

This unit is supplied with one sample crystal for 162.55 MHz installed in the channel 8 position. This is the frequency of the national weather service broadcasts. Currently more than 25 major metropolitan centers are receiving these 24 hour continuous broadcasts but if your area is not served, you may remove this crystal and replace it with one more appropriate to your area.

Generally speaking, frequencies for the various radio services such as police, fire, business, etc. vary from area to area and it is suggested that you contact your local authorities for frequency information for your area. You should also verify that the area in which you will use this monitor does not have laws or regulations prohibiting its use.

Once you have determined the frequencies you want to monitor, crystals may be ordered from your Midland dealer or by writing directly to a crystal manufacturer.

The following information may be required by the crystal manufacturer in order to properly prepare the crystals.

For VHF High Band, the fundamental crystal frequency	=	$\frac{\text{Desired Frequency} - 10.7\ \text{MHz}}{3}$
For VHF Low Band, the fundamental crystal frequency	=	Desired Frequency + 10.7 MHz
Crystal Type	:	HC – 25U Third overtone (Should meet MIL-C-3098E)
Frequency Tolerance	:	0.002% (–20°C –+40°C)
Resonance	:	Series
Load Capacitance	:	32pF + 0.0005%
Drive Level	:	2.0 mW
Resistance (Rs)	:	Less than 35 ohm
Shunt Capacitance	:	Less than 6 PF

CRYSTAL INSTALLATION

To install crystals, remove the top of the cabinet according to the cabinet removal instructions and carefully and gently plug in the crystals in whatever order you desire. High or low band crystals may be intermixed in any order.

AC – DC OPERATION

The 13-925 may be installed in mobile service, (13.8 volt DC) or used for base station operation by selecting either of the two power cords supplied.

MOBILE INSTALLATION

Safety and operating convenience are the primary factors to consider when mounting any piece of equipment in an automobile. Be sure that the controls may be easily reached by the operator. Also be sure that connecting cables do not interfere with the operation of the brake, accelerator, etc.

POWER CONNECTION

When used in mobile operation, the vehicle's battery supplies the power.

CAUTION: The 13-925 is designed to be used in a 12 volt DC negative ground system only. If you are unsure of your vehicle's polarity, ask your dealer or local service station.

The red wire from the 13-925 is positive and may be connected directly to the positive or + battery terminal or to a fuse block or ignition switch or other convenient point.

The black wire is negative or ground and should be connected to be metal part of the vehicle body or frame or – battery terminal.

To insure proper operation, care should also be taken in attaching the unit and mounting bracket to the vehicle in such a way as to obtain good ground connection at this point.

ANTENNAS

As is the case with all high quality communications receivers, the better the antenna, the better the performance of the receiver. The antenna supplied with the 13-925 should provide satisfactory performance in strong signal areas. If you desire even better reception, or are in a weak signal area, a suitable outdoor antenna should be used. In many cases, your regular car radio antenna will provide satisfactory performance or a mobile antenna specifically designed for VHF may be used.

OPERATING INSTRUCTIONS

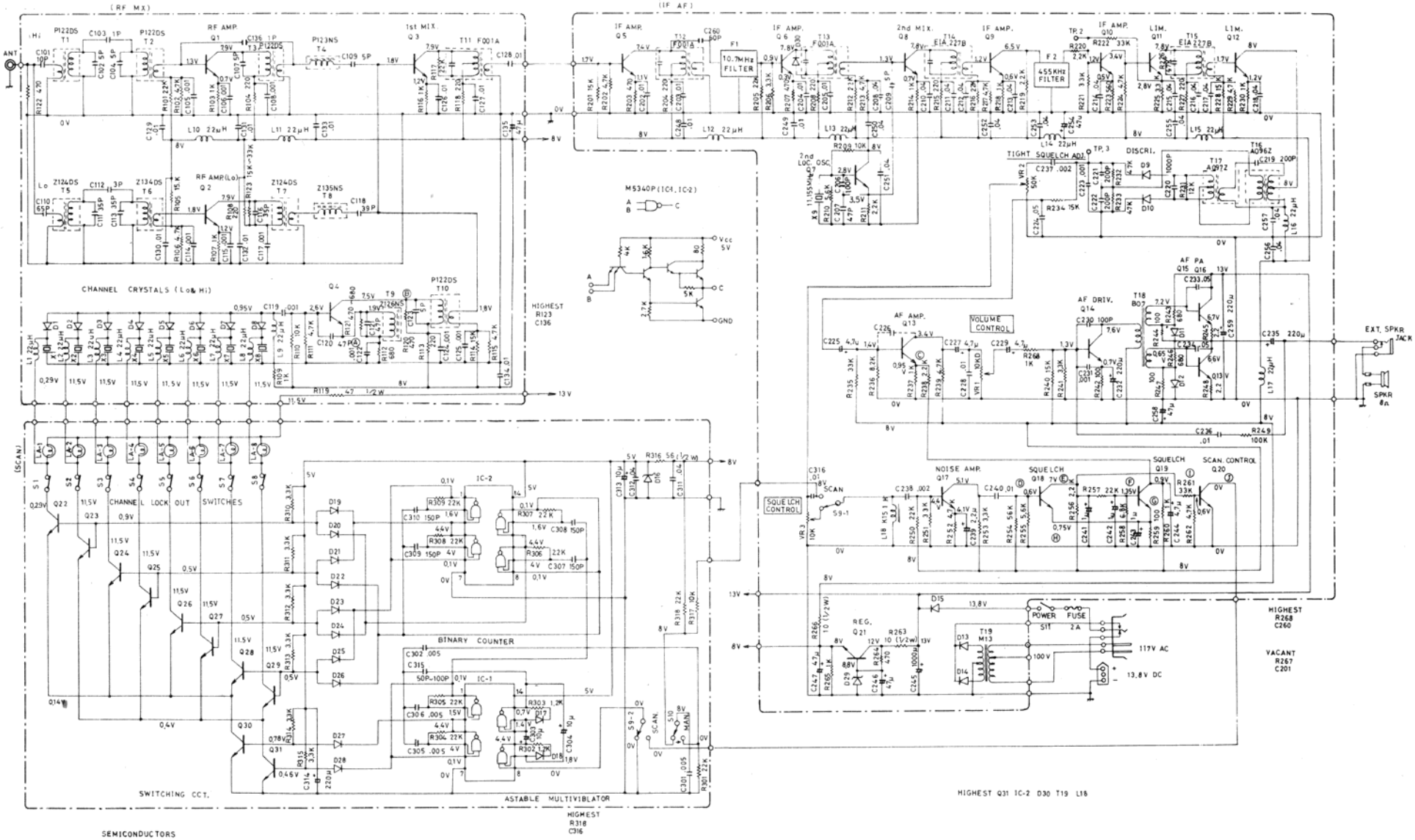
The explanations of operating controls and functions should be read and understood before actual operation of this receiver.

1. Connect an antenna and the proper power cable.
2. Select either automatic or manual scanning operation.
3. Select the channels you want to monitor.
4. Turn the unit on and adjust the volume and squelch controls.
   NOTE: In the case of a continuous broadcast such as the 162.55 MHz weather service, the scanning circuit will lock on this channel and not scan. Any continuous broadcast channel may be disabled by releasing the front panel channel selector button for that channel.

SPECIFICATIONS

Circuitry:	31 transistors, 29 diodes, 2 Integrated Circuits
Frequency:	33–47 and 144–173 MHz (162.55 MHz crystal installed)
Channels:	8 – any sequence of high or low
Sensitivity 20dB Q.S.:	less than 0.5μV
Adjacent Channel Rejection:	more than 60 dB
Scan Rate:	16 channels per second
Power Supply:	117 volts AC, 12 volts DC
Audio Output:	1 watt or more
Intermediate Frequencies:	1st IF 10.7 MHz 2nd IF 455 KHz
Accessories:	a. 1 AC Power Cord unit b. 1 DC Power Cord unit c. 1 Spare Lamp d. 1 Spare Fuse e. 1 Mounting bracket unit f. 8 Hardwares (Wing Bolts, Screws, Nuts and Washers) g. 1 Owners Guide h. 1 Wire antenna with plug

SCHEMATIC DIAGRAM



SEMICONDUCTORS

Q1 ~ Q4	2SC784 · 2SC535 2SC763	D1 ~ D8	CD8457 1S1052
Q5 ~ Q12	2SC839, 2SC460, 2SC710	D9, D10, D30	1N34A 1N60P
Q13, Q14 Q17 ~ Q20 Q22 ~ Q31	2SC945, 2SC458, 2SC619	D11 ~ D12	1S1905
		D13 ~ D15	10D-4
		D29	BZ090 1N757A
		D16	1S330 1N751A
Q15, Q16, Q21	2SD261	D17 ~ D28	1N34A 1N60P
IC-1, IC-2	M5340P		

ALL CIRCUIT VOLTAGES MEASURED WITH A 20KΩ/V DC VOLTMETER THROUGH A 20μH INDUCTOR, WHEN SWITCHING DIODE D1 IS ON.

UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS. ALL CAPACITORS ARE IN μF.

	Ⓐ	Ⓑ
CRYSTAL	1.9V	7.5V
NO CRYSTAL	1.85V	7.6V

	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ	Ⓘ
UN SQUELCHED	0.95V	0.58V	7V	1.35V	0.9V	0.75V	0.6V
SQUELCH	1.85V	0.54V	1V	0.2V	0.2V	0.35V	0.1V

	Ⓙ
NOT SCAN.	0.04V
SCAN.	0.9V

Drawing No. E0224-2132 E
Ser, No. 11400001 ~ up

WARRANTY POLICY

Midland Communications Company warrants each new Midland product to be free from defects in material and workmanship under normal use and service for a period of 90 days after delivery to the ultimate user and will replace or repair the product at our option, at no charge should it become defective and which our examination shall disclose to be defective and under warranty.

This warranty shall not apply to any Midland product which has been subject to misuse, neglect, accident, incorrect wiring not of our own installation, or to use in violation of instructions furnished by us, nor extended to units which have been repaired or altered outside of our factory.

This warranty does not cover carrying cases, earphones, batteries, antennas, broken or cracked cabinets, or any other accessory used in connection with this product.

This warranty is in lieu of all other 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 products.

Sales receipt must accompany product to validate the date of purchase.

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