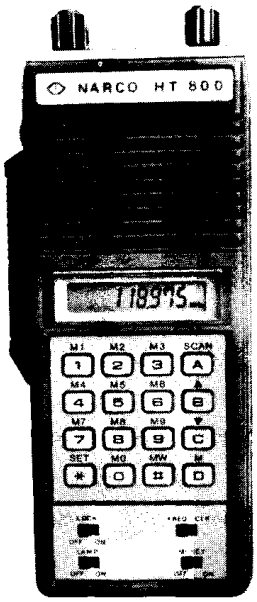
NARCO AVIONICS INC.

MODEL HT 800
HANDHELD TRANSCEIVER

720 CHANNELS



OPERATORS MANUAL

MANUAL PART NUMBER 03116-0620

NARCO AVIONICS INC.
270 COMMERCE DRIVE
FORT WASHINGTON PENNSYLVANIA 19034

PRINTED IN U.S.A.

JULY 1983

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF ILLUSTRATIONS

LIST OF TABLES

1. GENERAL

This manual contains product description, features, specifications, available options and operating instructions. It is not intended as a maintenance manual; therefore, service information in the form of theory, alignment or schematics is not provided.

2. PRODUCT DESCRIPTION

The Narco HT-800 is a 720 channel microprocessor controlled handheld transceiver covering the communication band of 118 to 135.975 MHz. It is light, compact, easy to use and ideal for the sport or ultralight pilot. It also may be used as a back-up transceiver in conventional aircraft. The HT-800 antenna is removable and may be connected to the aircraft COM antenna.

Frequencies are displayed on a liquid crystal display (LCD) and are entered on an easy to use 16-Key Keyboard. The user is alerted when an illegal setting is made by the appearance of the letter"E" (error) in the display. Ten pre-programmable frequencies may be stored in a non-volatile memory. Manual or three automatic modes of scanning, in either the up or down direction, may be selected. A memory lockout feature is provided in which programmable frequencies can be locked out of the manual or automatic scan.

The HT-800 provides a clock that displays time in the military 24-hour format of hours, minutes and seconds. The unit is powered by a rechargeable, quick change, 500 mA NiCad battery. The user is alerted when the battery requires recharging by the appearance of the letters "BATT" IN THE DISPLAY. The liquid crystal display can be illuminated to facilitate viewing in darkness.

3. DESIGN FEATURES

- Microprocessor controlled circuitry
- 10 pre-programmable non-volatile memory locations
- 24 hour clock
- Keyboard entry
- Large liquid crystal display (LCD)
- Quick change, rechargeable NiCad Battery
- 4 Scanning Functions: MAN, SCAN, SRCH, OPEN
- Priority channel scanning in SCAN mode
- Illumination for use in darkness
- Squelch-Adjust control
- 2.0 watts RF carrier nominal (1.5 minimum)
- Lightweight, 1 lb. 4 oz. (560 grams)
- Receiver sensitivity 1.5 uV for 6 dB s+n/n
- Separate phone jack
- Separate external speaker/microphone jack
- Terminals for normal and quick charge
- Quick removable (BNC) antenna

4. SPECIFICATIONS

GENERAL

Communication channels: 720 (25 KHz steps) from 118.00 to 135.975 MHz
Memory channels: 10 channels
Weight: 1 lb. 4 oz. (560 grams)
Dimensions: Width 2.75 in. (69.85 mm) Height 6.75 in. (171.45 mm)
Depth 2 in. (50.8 mm)

TRANSMITTER

Power: 1.5 watts carrier minimum
Frequency stability: ±0.002%
Modulation: 6A3, 70% minimum
Frequency range: 118.000 to 135.975 MHz (720 ch.)
Spurious radiation: -46 dB below carrier
Antenna impedance: 50 ohms

RECEIVER

Frequency range: 118.00 to 135.975 MHz (720 ch.)
Audio output: 0.5 watts into 8 ohm (speaker) available at speaker/microphone jack or ear jack
10 mw into 600 ohms (headphones) available at EAR jack
Receiver sensitivity: 1.5 uv max for 6 dB s+n/n
Image rejection: 60 dB or greater
Receiver selectivity: 6 dB ±15 KHz, 60 dB ±30 KHz
Squelch sensitivity: Adjustable carrier, AGC type (1.5 uV maximum)

POWER REQUIREMENTS

Power source: 9.6 Vdc, 500 mA, NiCad Battery
Battery full charge time: 150 mA maximum @ 5 hours (using optional base charger)
45 mA maximum @ 17 hours (using supplied wall charger)
Battery life per charge (approximate): Receive only: 8 hrs.
Transmit 10% duty: 4 - 6 hrs.
Transmit 30% duty: 2 - 4 hrs.
Number of battery recharges (full discharge to full charge): up to 300

TEMPERATURE

Operating range: -30 to +50°C.

5.1 PRELIMINARY INSPECTION AND UNPACKING

Upon receipt of the unit, inspect the shipping container to attempt to determine if equipment may have been damaged during shipment. Note damage, if any.

Carefully unpack the unit and inspect it for any damage that may have occurred during shipment. Refer to Tables 5.1 and 5.2 and inventory the contents of your shipment.

5.2 UNITS AND ACCESSORIES

Table 5.1 Unit and Supplied Accessories

ITEM	ORDER NUMBER	DESCRIPTION	ACCESSORY PART NO.
1	03116-300	HT-800 Transceiver with:	
		Battery Pack	50900-0001
		Wall Charger	50901-0001
		Antenna	50902-0001
		Hand Strap	50903-0001
		Earphone	50904-0001
		Operator's Manual	03116-0620

5.3 OPTIONAL ACCESSORIES

Table 5.2 Available Accessories

ITEM	ORDER NUMBER	DESCRIPTION
1	50905-0001	Leather cowhide case with snap-off front flap, built-in belt clip and shoulder strap
2	50902-0001	Flexible rubberized antenna with BNC connector
3	50900-0001	Rechargeable battery pack, 9.6 Vdc @ 500 MAH
4	50908-0001	External speaker/microphone connector
5	50907-0001	Handheld remote combination speaker/microphone complete with connector ready to use. No adjustments necessary.
6	50906-0001	Basecharger and stand with extra battery charging socket permitting the simultaneous quick charging of both the unit's battery and an extra battery pack. The unit may be operated in both receive and transmit modes while charging **only** when the unit has a battery pack installed.
7	50926-0101	6-inch adapter cable for aircraft type headphones and microphone. Connects to external speaker/microphone jack. Ready to use.
8	50932-0001	Mobile adapter cigarette lighter plug for operating the **HT-800** on the aircraft 14 Vdc system

6. HT-800 MAINTENANCE INFORMATION

The **HT-800** is not field repairable. Should a service problem arise, a written note explaining the problem should be included with the unit and shipped to:

Narco Avionics Inc.
270 Commerce Drive
Fort Washington Industrial Park
Fort Washington, PA 19034
Attn: Factory Service Department

7. EXTERNAL MICROPHONE REQUIREMENT

The internal microphone is rendered inoperative when an external microphone, that has been connected to the top panel speaker/microphone jack, is keyed. Any current popular aircraft microphone may be used; the only exception being carbon microphones. They require more current from the **HT-800** than is available; and, thus, would not perform satisfactorily.

8. EXTERNAL SPEAKER/HEADPHONE REQUIREMENT

The internal speaker is rendered inoperative when an external speaker or headphones are connected to the top panel "EAR" jack. Headphone impedance should be 600 ohms minimum, and speaker impedance should be 8 ohms. If an external speaker is connected to the speaker/microphone jack, it will be in parallel with the unit's internal speaker. The external speaker impedance should be 8 ohms.

9. LICENSE REQUIREMENTS

If the **HT-800** is to be used an an aircraft transceiver, the Federal Communications Commission requires that FCC Form 404 titled "Application for Aircraft Radio Station License" be submitted prior to operation.

If the **HT-800** is to be used as a ground station, then FCC Form 406 titled "Application for Ground Station Authorization in the Aviation Services" must be submitted prior to operation.

10.1 NICKEL CADMIUM (NiCad) BATTERY PACK

The power source for the **HT-800** is a 9.6 Vdc/500 MAH NiCad rechargeable battery pack. Prior to an **HT-800** shipment, battery packs are fully charged and installed in the **HT-800** but are **NOT** connected. Some discharge can be expected during shipment or storage. It is strongly recommended that the battery pack be fully charged prior to initial installation and operation. Whenever the letters **"BATT"** appear in the liquid crystal display, the battery voltage has fallen below the lower limit of useable charge and should be fully charged. Please take note of the following cautions:

CAUTIONS

- **Never store the HT-800 with the battery pack in a discharged state.**
- **Never dispose a NiCad battery pack in a fire.**
- **Never dissect NiCad batteries as they contain toxic material.**
- **Never short circuit a NiCad battery pack as the massive discharge current will damage the pack.**
- **Never exceed the rated quick charge current and charging time.**

10.2 NiCad BATTERY PACK CHARGING

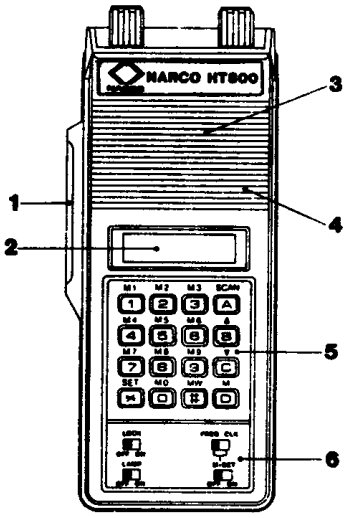
A NiCad battery pack may be recharged from a fully discharged state to a fully charged state up to 300 times, provided that recharging limits are strictly adhered to. Overcharging is far worse than undercharging; however, both contribute to a shortened battery life. The recharging limits are as follows:

CHARGING DEVICE	CHARGING CURRENT	CHARGING TIME
Wall charger (supplied with HT-800	45 mA	15-17 hours for full charge; however, charger may be left on indefinitely.
Optional base charger & stand	150 mA	5 hours maximum for a full charge. .Radio may be operated both in receive and transmit modes while being charged.

11. DESCRIPTION AND LOCATION OF CONTROLS

11.1 FRONT PANEL DESCRIPTION

Figure 11-1 illustrates the layout of the HT-800 front panel.

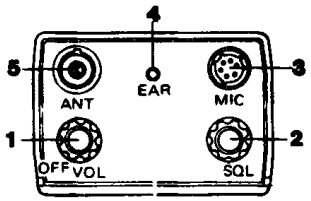


1. PTT (Push to talk) switch
2. LCD (Liquid Crystal Display)
3. Speaker
4. Microphone
5. 16-Key Keyboard
6. Slide Switch Board

FIGURE 11-1 HT-800 FRONT PANEL

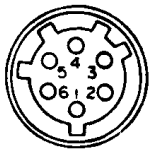
11.2 TOP PANEL DESCRIPTION

Figure 11-2 illustrates the controls and connectors found on the top panel. Figure 11-3 illustrates the pin assignments of the MIC connector.



1. ON-OFF Power and Sound-Volume Control
2. Squelch-Adjust
3. External Speaker/Microphone Jack
4. Earphone Jack
5. BNC Antenna Connector

FIGURE 11-2 HT-800 TOP PANEL

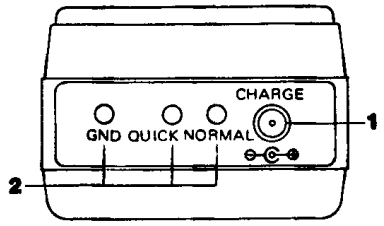


1. Microphone Input
2. Speaker Output
3. PTT
4. GND
5. NC
6. NC

FIGURE 11-3 MIC CONNECTOR PIN ASSIGNMENT

11.3 BOTTOM PANEL DESCRIPTION

Figure 11-4 illustrates the layout of the bottom panel.

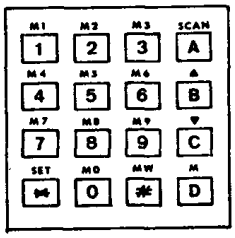


1. Jack for External Charger Adapter
2. Terminals for Quick Charger

FIGURE 11-4 HT-800 BOTTOM PANEL

11.4 DESCRIPTION OF 16-KEY KEYBOARD

11.4.1 RECEIVING MODE



MEMORY LOCATIONS AND FREQUENCY AND CLOCK ASSIGNMENT KEYS

The numbered keys are used to assign a frequency or clock time. The letters M0-M9 define 10 memory locations where assigned frequencies may be stored. These keys are also used to recall or access these stored frequencies.

SET

SET KEY

This key is used to set the assigned frequency or start the clock. After a frequency is selected and displayed, the **SET KEY must** be depressed. When this key is depressed, a decimal will appear after the third digit. After a "clock time" has been assigned (clock mode), depressing the **SET KEY** WILL START THE CLOCK.

SCAN

A

SCAN MODE SELECTOR KEY

This key selects any one of the 4 modes (MAN, SCAN, SRCH, OPEN) in sequence as the key is repeatedly depressed. Each mode appears in the display.

▲

B

SCAN UP AND MEMORY LOCKOUT KEY

1. In Frequency Mode, when this key is depressed, scanning starts toward a frequency higher than the frequency displayed.
2. In Memory Mode, scanning starts toward the next higher numbered memory channel (M0-M9) in sequence until all 10 memory channels have been scanned.
3. Memory Lockout: Any memory location, M1 to M9, may be locked out of the scanning sequence when the **M-SET** slide switch is **ON** and this key is depressed. Location M0 cannot be locked out.

▼

C

SCAN DOWN KEY

1. When operating in the Frequency Mode and this key is depressed, scanning starts down from the frequency displayed.
2. In the Memory Mode, when this key is depressed, scanning starts toward the next lower numbered memory location that appears in the display.

11.4.1 Continued

M
D MEMORY MODE KEY

When this key is depressed, the radio switches from the Frequency Mode to the Memory Mode of operation. Simultaneously letter **"M"** (memory) appears in the upper corner of the display.

MW
MEMORY WRITE KEY

The function of this key is to place the radio in a "write to memory location" mode. This key is disabled when the **M-SET** slide switch is turned **OFF**. When the **M-SET** slide switch is turned **ON** and the Memory Write Key depressed, the letters **"MW"** will appear in the upper left corner of the display.

11.4.2 TRANSMIT MODE

All of the keys are disabled in transmit mode.

11.5.1 LOCK SWITCH 

If the **LOCK-ON** position is set, all 16 keys are disabled and no keyboard operation is possible.

11.5.2 LAMP SWITCH 

If the **LAMP-ON** position is set, the LCD is illuminated by an internal lamp to facilitate viewing in low ambient light.

11.5.3 FREQ CLK SWITCH 

1. When this switch is placed in the **FREQ** position, the radio is set to the Frequency Mode of operation.
2. When the **FREQ CLK** switch is placed in the **CLK** position, and the radio is turned on, the LCD indicates time. The time displayed (hours, minutes, seconds) is in a military (24 hr.) format.

11.5.4 M-SET SWITCH 

1. When the **M-SET ON** position is selected and the **FREQ CLK** switch is set to **FREQ**, the Memory Write Key MW # is enabled permitting the programming of memory locations M0 to M9.
2. When the **M-SET** and **FREQ** slide switches are both **ON** and the radio is in the Memory Mode of operation, the Memory Lock Out Key B is enabled.
3. When the **M-SET** and **CLK** slide switches are both **ON**, the clock starting key * is enabled.

11.6 DESCRIPTION OF THE LIQUID CRYSTAL DISPLAY (LCD)
(Refer to Figure 11-5)

The following appears in the display:

1. Numerical frequency in MHz is displayed in both the Frequency and Memory Modes. The MHz letters are fixed and never extinguish. Shown displayed is 135.525 MHz.
2. The letter **"L"** is displayed when the HT-800 is in the Memory Mode of operation and one of the memory locations M1 to M9 has been "locked out". The display shows memory location M1 has been locked out of the scanning sequence.
3. Memory Location digit. When the HT-800 is placed in the Memory Mode of operation, and a memory location key (M0 to M9) is depressed, that location digit will appear here. Shown displayed is memory location M1.
4. The letters **RX** will appear here when the receiver locks on to a valid re-received signal. The received frequency will also be displayed.
5. The letters **TX** will appear here when the **PTT** switch is depressed. The displayed frequency is the transmitting frequency.
6. The letter **E** (Error) appears here whenever an illegal setting is made into the display. In addition, all of the numerical display will blank.
7. Two modes can be displayed here. The letter **M** (Memory Mode) will be displayed whenever the M [D] key is depressed. The letters **MW** (Memory Write) will be displayed whenever the **M-SET** slide switch is **ON** and the MW [#] Key is depressed.
8. Scanning Modes. Four distinct sets of letters will appear here indicating the selected scan mode. When the SCAN [A] Key is depressed repeatedly, the following letters will sequentially appear: **MAN** (manual), **SCAN, SRCH** search), **OPEN.**
9. Battery Alert. The letters **BATT** will appear here when the battery pack voltage has fallen below the lower limit of useable charge.
10. UP/DOWN Scanning. When the ▲ [B] Key is depressed, the arrow ▲ will appear (UP scan). When the ▼ [C] Key is depressed, the arrow ▼ appears (DOWN scan).
11. Numerical Time. When the **FREQ CLK** switch is set to the **CLK** position, the time in military format will be displayed here.
Example: 8-25 26 (8:25:26 am) or 13-55 25 (1:55:25 pm)

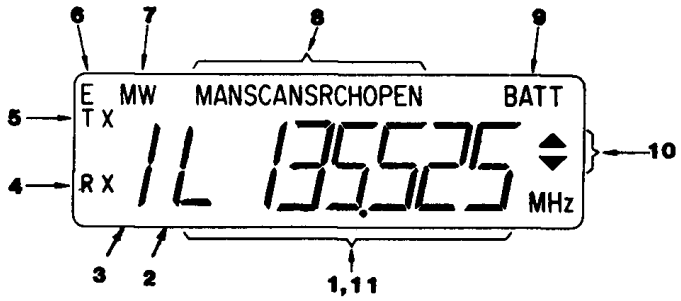


FIGURE 11-5

12. BATTERY INSTALLATION

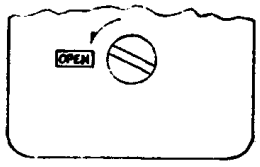
12.1 BATTERY PACK

All HT-800's are shipped from the factory with the battery pack installed but **NOT** connected. Please observe the following precautions:

1. Check and charge the battery before using (45 mA charger supplied with radio).
2. Do not overcharge the battery by putting it on an unlimited charge or power supply. Quick charge is 150 mA maximum for 5 hours.
3. Before installing or removing the battery, turn the power switch **OFF.**
4. Do not turn the power switch on with the PTT switch activated. If the battery pack is being installed for the first time, remember that memory locations M1 to M9 are automatically pre-programmed to 121.5 MHz and M0 to 135.975 MHz. If the battery is being exchanged with a new one, the exchange must be completed within 30 seconds. Failure to do this will result in all previously chosen frequencies in locations M0 to M9 to drop out. In this case, when the battery is finally installed, locations M0 to M9 will revert to their pre-programmed values.

12.2 BATTERY ACCESS (Refer to Figure 12-1)

To gain access to the battery compartment, insert a coin in the large screw located on the rear panel and turn in the direction of the arrow. Remove the rear panel.



BATTERY ACCESS

FIGURE 12-1

12.3 BATTERY INSTALLATION (Refer to Figure 12-2)

Place the battery in its compartment such that the 3-pin battery connector is located at the right hand bottom side of the compartment. Route the battery connector and leads through the notch located at the right hand side of the battery compartment partition. Insert the 3-pin connector into the receptacle observing the polarity as shown in Figure 12-3.

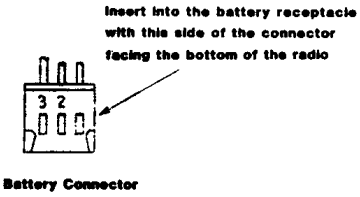


FIGURE 12-3

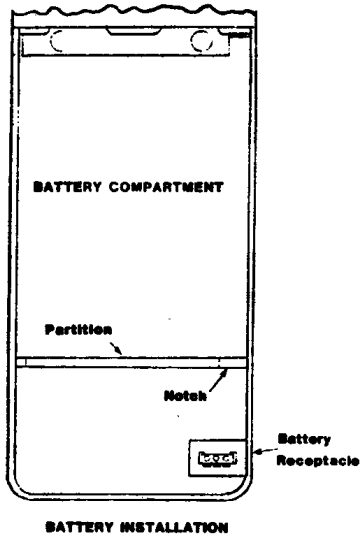


FIGURE 12-2

13. CAUTIONS TO OPERATORS:

- Ensure that the battery pack is properly charged before operating.
- Never operate the transmitter without an antenna installed.
- Turn the power switch **OFF** before installing or removing a battery pack.
- Always change a battery pack in less than 30 seconds to preserve the frequencies stored in memory and correct clock time.
- Never turn the power switch **ON** while the push-to-talk (PTT) switch is pushed in.
- Never overcharge the battery pack.
- Never substitute a bench power supply in place of the battery pack.

13.1 OPERATING PROCEDURES

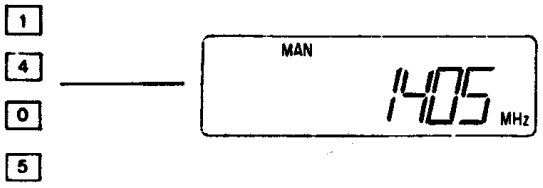
Before explaining the operating procedures, consider the three following facts:

1. If the letters **"BATT"** should appear in the upper right hand corner of the display (see Figure 11-5), the battery pack voltage has fallen below its lowest operating limit. It should be fully recharged as soon as possible. During the time that **"BATT"** is displayed, the radio may be capable of a few more transmissions. However, complete discharge of the batteries is not recommended since it will require the reprogramming of memory locations M0 to M9 and also the resetting of the clock.
2. Whenever an illegal entry or slide switch setting is made on a clock or frequency assignment, an **"E"** (Error) will appear in the upper lefthand corner of the display and the numerical part of the display will blank. This is called an "Error Display". To remove the error, depress any Key.
3. If a clock or frequency assignment is **NOT SET** within 5 seconds of entry, an Error Display will result.

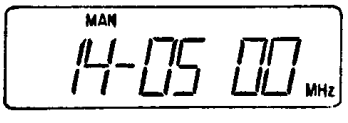
13.2 SETTING OF THE CLOCK

At the moment the battery pack was installed, the clock started to count from 00-00 00. The clock is always running, even when the radio is turned **OFF**. The clock displays time in the military (24 hr.) format. Time is entered in military format using **ONLY** 4 digits (hours and minutes).
Examples: 8:25 AM is entered as 0825; 6:15 PM is entered at 1815; 2 AM is entered as 0200. The following procedure illustrates how to enter 2:05 PM (or any valid time) into the clock:

a. Turn the radio **ON** by means of the **ON-OFF** volume control.
b. Set the **FREQ CLK** slide switch to the **CLK** position.
c. Look at the display. The display must show a valid time. If the display indicates **"E"**, then depress any key to recall the previous time. The clock time **CANNOT** be entered if the display shows an **"E"**.
d. Set the **M-SET** slide switch to the **ON** position.
e. Change 2:05 PM into the 24 hour format: 1405
f. 5 seconds before minute 4 changes to minute 5, key in the 4 digits.



g. At the minute change press the **SET** key [SET] —
h. Turn **M-SET** slide switch **OFF**.
i. Set the **FREQ CLK** slide switch to the **FREQ** position.



13.2 Continued

NOTE: If an "Error Display" was generated when the **SET** Key was depressed, then one or more of the following violations occurred:

1. Waiting **MORE** than 5 seconds to press the **SET** key.
2. Entering an illegal 4 digit time or more than 4 digits.
3. **M-SET** slide switch not turned **ON.**

The clock runs continuously as long as a useable battery pack is installed in the radio. Time may be recalled at any time by turning the radio **ON** and setting the **FREQ CLK** switch to the **CLK** position. A lamp slide switch is provided to facilitate viewing under low ambient light.

13.3 FREQUENCY ASSIGNMENT

Frequency assignments of **ANY** of the 720 channels (118.000 to 135.975 MHz) can be accomplished by using a 4, 5 or 6 digit entry format. A limited number of frequencies can be assigned using a 1, 2 or 3 digit format.

Before proceeding with the frequency assignment instructions, the operator must now store in his own memory the following information:

- **A FREQUENCY ENTRY MUST BE ACCOMPLISHED WITHIN 5 SECONDS.**
- **A FREQUENCY ENTRY CANNOT BE ACCOMPLISHED IF THE LETTERS "E" OR "M" APPEAR IN THE DISPLAY.**

MEMORY MODE DISPLAY

ERROR DISPLAY

To clear the display of the unwanted letter:

- **"M"** - - - - depress the [M D] Key
- **"E"** - - - - depress any key

One of four scan modes (MAN, SCAN, SRCH, OPEN) will always appear in the LCD. They have no effect on frequency assignment and can be ignored.

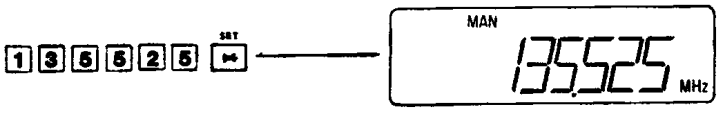
13.3.1 6 DIGIT ENTRY OF FREQUENCY

All 6 digits of the frequency are entered on the keyboard. Example: Enter 135.525 MHz . Perform steps **"b"** and **"c"** within 5 seconds.

a. Set the **FREQ CLK** slide switch to the **FREQ** position.
b. Depress in sequence numbered keys 1, 3, 5, 5, 2, 5. The data is displayed with each stroke of a key.

13.3.1 Continued

c. Depress the [SET] Key. A decimal will appear after the third digit.



An error will be generated if:

- The display is not cleared of the letter "M" or "E" if one is present before entry.
- An illegal frequency is entered.
- The total entry takes more than 5 seconds.
- Only the first 5 digits are entered.

Digit number 6 (last digit) is a self-correcting digit. If any number other than a 0 or 5 is entered for the 6th digit, it will automatically be corrected and displayed as a 0 or 5 by the microprocessor when the [SET] Key is depressed.

For example, if the illustrated frequency were entered as 135.529, when the SET Key is depressed, the 6th digit will change from the number 9 to the number 5. The microprocessor has been programmed to scan digit entry number 5 (which is the number 2 in this example) and recognizes that a "0" 5th digit is followed by a "0", a "2" 5th digit is followed by a "5", a "5" 5th digit is followed by a "0", and a "7" 5th digit is followed by a "5". Take our word for it, you can't fool the microprocessor.
REMEMBER: If an Error is generated, depress any key to bring back the previously set frequency and then proceed to make the correct entry.

13.3.2 4 OR 5 DIGIT ENTRY OF FREQUENCY

Every one of the 720 channels has as its first digit the number 1. The leading number 1 may be omitted and only the last 4 or 5 digits entered.
Example: Enter 135.525 MHz. Perform steps b and c within 5 seconds.

a. Set the **FREQ CLK** slide switch to the **FREQ** position.
b. Depress in sequence the numbered keys 3,5,5,2,5 or 3,5,5,2. The data is displayed with each key stroke.
c. Depress the [SET] key. All 6 digits and decimals will appear in the display.

An error will be generated if:

- The display is not cleared of the letter "E" or "M" if one is present before entry.
- An illegal frequency is entered.
- The total entry takes more than 5 seconds.

13.3.2 Continued

As explained in the 6 digit entry procedure, (Section 13.3.1), the last digit in a 5 digit entry format is also self correcting. If the 5th digit entered is other than a **0** or **5**, the microprocessor will automatically correct the entry. **REMEMBER:** If an error is generated, depress any key to bring back the previously set frequency and then proceed to make the correct entry. The 5th digit may be omitted since the microprocessor knows whether the last digit is a **0** or **5**, thus allowing **ALL** frequencies to be entered as a 4 digit number.

13.3.3 LESS THAN 4 DIGIT ENTRY OF FREQUENCY

When the leading **1** is omitted from the entry, the microprocessor will assume zeros for the 5th and 6th digits, when less than 4 digits are entered. Thus, all frequencies with 100 KHz spacing (118.1, 118.2, 118.3, etc.) are entered by using the 2nd, 3rd and 4th digits.

All whole numbered MHz frequencies (118, 119, 120, etc.) are entered by using the 2nd and 3rd digits.

There are two channels that can be entered using only a one digit entry. They are 120 and 130 MHz. They are entered by using the 2nd digit.

13.4 FREQUENCY ASSIGNMENTS TO MEMORY LOCATIONS M0 TO M9

When the battery pack is first installed, the microprocessor automatically pre-programs locations M1 to M9 to 121.500 MHz and location M0 to 135.975 MHz. Location M0 is special in that the frequency stored here determines the upper scan limit when scanning upward, either manually or automatically. To check the frequencies at each location, depress the [M D] Key and then, one by one, depress each location key M0 to M9. Each location frequency will be displayed.

Any frequency assigned to locations M0 to M9 are retained in a non-volatile memory. The scan mode selected (MAN, SCAN, SRCH, OPEN) has no effect on frequency assignments and is ignored in these instructions. To program the memory locations, the operator must know how to assign a frequency as explained in Section 13.3.

13.4.1 PROGRAMMING OF LOCATIONS M0 TO M9

The following sequence illustrates memory programming:

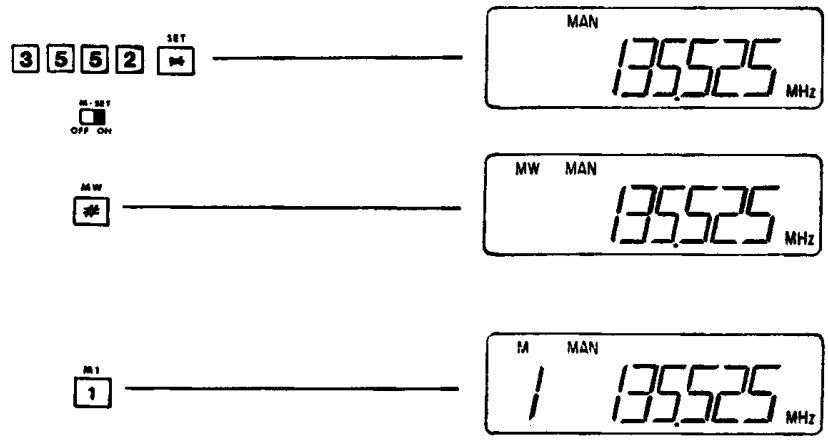
1. Set the **FREQ CLK** slide switch to the **FREQ** position.
2. Clear the display of the letter **"E"** or **"M"** if one is present. To clear an **"E"**, depress any key. To clear an **"M"**, depress [M D] Key.
3. Assign a frequency (see Section 13.3).
4. Turn the **M-SET** slide switch to the **ON** position to enable the [MW #] Key.
5. Depress the [MW #] Key. Confirm that the letters **"MW"** appear in the display.

13.4.1 Continued

6. Depress that location key (M0 to M9) at which the frequency is to be stored. When the key is depressed, the frequency is stored. Confirm that when the location key is depressed that the letters **"MW"** change to **"M"** (memory mode), and that a numeral corresponding to the location number appears to the left of the frequency in the display.
7. Depress [D] Key to take the radio out of the memory mode. Remember, you cannot assign a frequency in the memory mode of operation.
8. Assign a frequency for the next memory location.
9. Keep repeating Steps 5,6,7 and 8 until all the desired locations are programmed.
10. Turn **M-SET** slide switch **OFF** to disable the [#] Key.

REMEMBER: The frequency that you store in location M0 determines the upper limit when scanning in the up direction.

EXAMPLE: Store 135.525 MHz in memory location **M1**.



13.4.2 RECALLING FREQUENCY FROM MEMORY LOCATION

EXAMPLE: Recall memory location **M6**.

a. Depress [D] Key. Confirm LCD displays **"M"** (memory mode).
b. Depress [6] Key. Frequency and channel number are displayed in LCD.

13.5 FREQUENCY MODE OF OPERATION

When the **FREQ CLK** slide switch is in the **FREQ** position and the letter **"M"** (memory mode) does **NOT** appear in the display, then the radio is in the Frequency Mode of Operation. If the letter **"M"** appears in the display, then the radio is in the Memory Mode of Operation. The [M D] Key must be depressed to switch the radio out of the Memory Mode and Into the Frequency Mode of Operation.

The Frequency Mode of Operation permits transmission and reception over all 720 channels or over selected bands. The operator must choose one of four types of scanning modes, the upper and lower scan limits, and the direction of scan, **UP** or **DOWN**.

If it is required only to monitor and transmit over a single channel, then the operator can choose to operate the radio in the Frequency Mode and select **MAN** scan. He has only to assign the frequency into the display and everything is ready.

13.5.1 SELECTION OF SCANNING MODE

To select one of the four scanning modes (MAN, SCAN, SRCH, OPEN), depress [SCAN A] Key repeatedly while observing the display. The display shows MAN, SCAN, SRCH, OPEN, MAN-----in repeated order.

13.5.2 DESCRIPTION OF SCANNING MODES

13.5.2.1 MAN: To select this mode, repeatedly depress the [SCAN A] Key until **MAN** appears in the display. The **MAN** (manual) scanning mode permits the operator to manually shift the frequency in 25 KHz steps by repeatedly depressing either the **UP** scan Key [▲ B] or **DOWN** scan Key [▼ C]. Each time the [▲ B] Key is depressed, an arrow ▲ appears at the right hand side of the display signifying that the previously displayed frequency was shifted up by 25 KHz. Each time the [C] Key is depressed an arrow ▼ appears at the far right hand side of the display signifying that the previously displayed frequency was shifted down by 25 KHz. The frequency that appears in the display is the one the operator can receiver (RX) or transmit (TX) over. When a signal is received, the letters "RX" appear at the lower left hand edge of the display. If the operator transmits, the letters "TX" appear at the upper left hand edge of the display.

13.5.2.2 SCAN: To select this mode, repeatedly depress the [A] Key until **SCAN** appears in the display. When the **SCAN** mode is selected, the radio will automatically scan up or down (selected by operator) in 25 KHz steps (scan rate 6 steps/sec) between upper and lower frequency limits that are selected by the operator. When a busy channel is encountered (**RX** appears in display) the scan stops for 10 seconds and then resumes. When the scanning limit is reached, up or down, the scan automatically returns to the opposite limit and resumes.

13.5.2.3 SRCH: To select the **SRCH** (search) mode, repeatedly depress the SCAN A Key until **SRCH** appears in the display. When the **SRCH** mode is selected, searching will be identical to the **SCAN** mode except that when a busy channel (**RX** appears in the display) is encountered, the search **STOPS** and **WILL NOT RESUME.** The search will remain frozen at this channel until the operator depresses either the ▲ B or ▼ C Key to resume the search scan. When the upper or lower search limit is reached, the search automatically returns to the opposite limit and resumes.

13.5.2.4 OPEN: To select the **OPEN** mode, repeatedly depress the SCAN A Key until **OPEN** appears in the display. Scanning in the **OPEN** mode is identical to the **SCAN** mode, except that when a busy channel is encountered, the scan stops and monitors the busy channel for as long as the channel remains active. Three seconds after the signal opens, the scan is automatically resumed between its limits.

SUMMARY OF SCAN MODES

- **MAN:** Scanning UP/DOWN is accomplished manually.
- **SCAN:** Scanning UP/DOWN is automatic. Station lock-on time is 10 seconds maximum, then scan automatically resumes.
- **SRCH:** Scanning UP/DOWN is automatic. Station lock-on time is permanent. Operator must resume the search.
- **OPEN:** Scanning UP/DOWN is automatic. Station lock-on time is until 3 seconds after the signal opens, then scan automatically resumes.

13.5.3 MEMORY LOCATION LOCKOUT

The **HT-800** has a memory location lockout feature that allows one or all of the locations M1 to M9 to be locked out of manual or automatic scanning. Location M0 cannot be locked out as this location determines the upper frequency limit of an UP scan. This lockout feature pertains only to the Memory Mode of Operation. When a memory location is locked out, then this location is passed over in the sequential up or down scanning. When location M1 is locked out, then the scanning sequence will be M0, M2------M9. When locations M1 and M4 are locked out, then the scanning sequence will be M0, M2, M3, M5-----M9.

This feature will be chosen to be implemented by the operator when only a few selected stored channels need to be scanned or one or more particular channels are so busy that they interfere with the scanning of the other channels.

13.5.3 Continued

The following sequence illustrates the memory location lockout procedure:

a. Set the **FREQ.CLK** slide switch to the **FREQ** position.

b. Depress the [D] Key to switch to the Memory Mode of Operation. Confirm that the letter **"M"** appears in the display.

c. Depress a memory location key (M1 to M9) to recall the location that is to be locked out. Confirm that the channel numeral is present in the display.

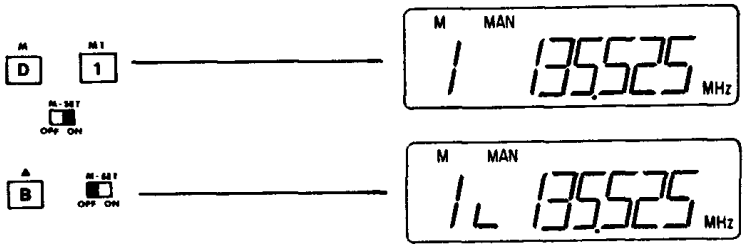
d. Turn the **M-SET** slide switch **ON.**

e. Depress the [B] Key. When the key is depressed, the channel is locked out. Confirm the presence of the letter **"L"** (lockout) next to the channel number in the display. The **"L"** signifies that this channel is locked out.

f. If more locations are to be locked out, recall each location by first depressing its key and then the [B] Key. Follow this sequence until all desired locations are locked out.

g. Turn the **M-SET** slide switch **OFF.**

EXAMPLE: Lock out memory location M1. Stored in M1 is 135.525 MHz.



13.5.4 RESTORING A LOCKED OUT MEMORY LOCATION TO THE SCAN SEQUENCE

To restore a locked out channel to the scanning sequence:

1. Depress [D]
2. Depress the memory location key (M1-M9) to recall the channel to be unlocked.
3. Turn the **M-SET** slide switch **ON.**
4. Depress the [B] Key. Confirm that the letter **"L"** disappears from the display signifying the return of this channel to the scanning sequence.
5. Turn the **M-SET** slide switch **OFF.**

13.5.5 SELECTION OF FREQUENCY SCANNING LIMITS

Both the **UP** and **DOWN** scanning directions require that the operator choose scanning limits.

13.5.5.1 UP SCAN LIMITS

The upper limit is that frequency which is stored in memory location M0. The microprocessor pre-programs 135.975 MHz into M0. The operator must re-program M0 to suit his requirements. After selecting the upper limit, the operator chooses the lower limit and assigns this frequency in the display. The scan mode is next selected and then the **UP** scan is initiated.

The upper limit (M0) **MUST BE HIGHER** than the lower limit or else you **CANNOT** scan up. The display will just blink the displayed lower limit frequency. **EXAMPLE: UP** scan in the **SRCH** mode between 126.525 and 131.175 MHz.

1. Set **FREQ CLK** slide switch to the **FREQ** position.
2. Clear the display of the letters **"E"** or **"M"**, if any are present.
3. Depress numbered Keys 3, 1, 1, 7 (upper limit).
4. Depress [SET M] Key.
5. Turn **M-SET** slide switch **ON.**
6. Depress [MW #] Key.
7. Depress [M0 0] Key (upper limit is now stored in location M0).
8. Turn **M-SET** slide switch **OFF.**
9. Depress [M D] Key (Radio returns to frequency mode of operation).
10. Depress [SCAN A] Key repeatedly to place **SRCH** in the display.
11. Depress numbered Keys 2, 6, 5, 2 (lower limit).
12. Depress [SET M] Key.
13. Depress [▲ B] Key. Confirm that the **UP** arrow appears in the display.

The radio is now scanning upward in the **SRCH** mode between the chosen limits.

13.5.5.2 DOWN SCAN LIMITS

The upper limit in a **DOWN** SCAN **IS NOT** the frequency stored in location M0. Location M0 is **ONLY** a limit for the **UP** scan mode. The upper limit for the **DOWN** scan mode is the one the operator assigns into the display. This frequency is not stored anywhere. The lower limit is fixed and not changeable. The lower limit is 118.000 MHz. After the operator assigns the upper limit into the display, the search mode is selected and then the down scan is initiated. **EXAMPLE:** Down scan in the **OPEN** mode from 119.700 MHz.

1. Set the **FREQ CLK** slide switch to the **FREQ** position.
2. Clear the display of the letters **"E"** or **"M"** if any are present in the display.

13.5.5.2 Continued

3. Depress [SCAN A] Key repeatedly to place **OPEN** in the display.
4. Depress the numbered Keys 1, 9, 7 (upper limit).
5. Depress the [SET] Key.
6. Depress the [▼ C] Key. Confirm that the down arrow ▼ appears in the display.

   The radio is now scanning downward in the **OPEN** mode between 119.700 and 118.000 MHz.

13.5.6 STOPPING AND CHANGING THE SCAN DIRECTION

To stop an **UP** scan, depress the [▲ B] Key. The up arrow will disappear from the display. Some frequency between the **UP** scan limits will appear in the display. The displayed frequency will be the upper limit of the **DOWN** scan. If this is not the desired upper limit, then another choice must be assigned into the display and the **DOWN** scan key depressed.

To stop a **DOWN** scan, depress [▼ C] Key. The down arrow will disappear from the display. Some frequency between the **DOWN** scan limits will appear in the display. If the operator desires to scan upward, he should be aware that the displayed frequency will be his lower scan limit (upper limit is always location M0). If this is not a desired lower limit, then another choice must be assigned into the display and then the **UP** scan initiated.

SUMMARY OF SCAN LIMITS

- **UP Scan:** **upper limit is stored in location M0**
  upper limit MUST be higher than lower limit
  lower limit is assigned into the display prior to scan start
- **DOWN Scan:** **upper limit is assigned into the display prior to scan start**
  upper limit MUST be higher than 118.000 MHz
  lower limit is fixed at 118.000 MHz

It should be obvious to the reader, by now, that the smallest band of frequencies that can be scanned is that between adjacent channels while the largest band possible is top to bottom (135.975-118.000).

13.6 MEMORY MODE OF OPERATION ([M D] Key)

There are four differences between the Memory Mode of Operation and the Frequency Mode of Operation; and, they are:

- Reception and transmissions are possible only over ten selected (and changeable) frequencies stored in locations M0 to M9.

13.6 Continued

- There are no lower or upper scan limits to set. **UP** scanning is from location M0 to M9 sequentially. **DOWN** scanning is from location M9 to M0 sequentially.

- Memory Location Lockout: Locations M1 to M9 can be locked out of the scanning sequence. Location M0 cannot be locked out.

- PCS (priority channel scanning): This feature is restricted to the **SCAN** scanning mode and, in addition, only when the radio is in the Memory Mode of Operation. The **SCAN** mode of scanning has an added feature called "priority channel scanning". When the radio locks onto a busy channel for 10 seconds and then resumes the scan, the scan does not begin with the next memory channel in sequence. The scan departs the normal sequence and shifts over to location M1, the designated priority channel. If M1 is not active, the scan jumps back in sequence starting with the next location above the previously locked on location. However, if M1 is busy when it is scanned, then the radio will lock onto M1 and stay locked on until the signal opens. The scan then departs M1 and jumps back into sequence starting with the location next in sequence from the previously locked on location.

The radio is placed in the Memory Mode by depressing the [M D] Key.

13.6.1 STOPPING AND CHANGING THE MEMORY SCAN DIRECTION

To stop an **UP** or **DOWN** scan, depress either [▲ B] or [▼ C] Key. To stop a scan at a particular location, depress the appropriate location key (M0-M9).

To shift a scan to the opposite direction, depress the appropriate scan direction key twice in succession (once to stop and once to restart).

EXAMPLE: **UP** scan the memory locations in the **OPEN** scan mode.

- Depress the [M D] Key. Confirm appearance of **"M"** in the display. (Radio now in Memory Mode.)
- Depress the [SCAN A] Key repeatedly to place **OPEN** in the display.
- Depress the [▲ B] Key. Confirm appearance of **UP** arrow in the display. The radio is now **UP** scanning locations M0 to M9. Now lockout location M5 and **DOWN** scan.
- Depress [M5 5] Key. (The scan stops at location M5.)
- Turn the **M-SET** slide switch **ON.**
- Depress the [▲ B] Key. (Confirm the appearance of the letter **"L"** next to location number 5.)
- Turn the **M-SET** slide switch **OFF.**

13.6.1 Continued

- Depress the [C] Key. Confirm the appearance of the down arrow in the display. The radio is now **DOWN** scanning locations M9, M8, M7, M6, M4-----M0. Now recall location M2.
- Depress the [2] Key. Confirm the appearance of the number **2** in the display. (The scan stops at location M2.) Now assign 120.000 MHz to M2.
- Depress the [D] Key. (Confirm the disappearance of the letter **"M"**.)

The radio is now in Frequency Mode.

- Depress the numbered Key [2] . (120.000 MHz)
- Depress the [SET] Key. (Must enter within 5 seconds.) Confirm 120.000 MHz in the display.
- Turn the **M-SET** slide switch **ON** (enables [MW] Key.)
- Depress the [MW] Key. Confirm appearance of **"MW"** in the display. (Write to memory.)
- Depress the [2] Key. Confirm the appearance of the number **"2"** (location M2) and that the letters **"MW"** are replaced by the letter **"M"** in the display.
- Turn the **M-SET** slide switch **OFF**.

The radio is now in the Memory Mode and the scan is sitting at location M2 awaiting the command to scan **UP** or **DOWN**.

Now scan the memory channels **UP** and use the **SRCH** scan mode.

- Depress the [SCAN A] Key repeatedly to place **SRCH** in the display.
- Depress the [B] Key. Cofirm the appearance of the **UP** arrow in the display.

The radio is now **UP** scanning locations M0 to M9 in the **SRCH** scan mode. Now return the radio to the Frequency Mode of Operation.

- Depress the [D] Key. Confirm the disappearance of the **"M"** from the display.
- Confirm that one of the memory location frequencies is displayed in the display.
- Confirm that neither the **UP** or **DOWN** arrow appears in the display.

The radio is now in the Frequency Mode with the **SRCH** scan mode frozen. The scan is awaiting a command to scan **UP** or **DOWN**.

13.6.1 Continued

At this point, the reader should remember that the frequency that now appears in the display will be either the upper limit for a **DOWN** scan or the lower limit of an **UP** scan. The operator must remember that when shifting from the Memory Mode to the Frequency Mode, scan limits must always be reassigned. The only exception being the upper limit for the **UP** scan which is stored in location M0, unless of course, the operator wishes to choose a new upper limit.

13.7 SQUELCH

The squelch control is located on the top panel and is manually set by the operator. The squelch may be operated in the full open position by turning the control fully clockwise or it may be set to break at its optimum point of 2 uV. The optimum point is set by slowly turning the control, starting from its full clockwise position, in a counter clockwise direction until the receiver noise stops.

13.8 USING THE LOCK SLIDE SWITCH

The operator should remember that when he has fully programmed the radio to operate according to his need, he should position the **LOCK** slide switch to the **ON** position. This locks out all 16 keys and no keyboard operation is possible. If this safety feature is not used, any accidental depression of a key will alter his program in some fashion.

13.9 USING THE LAMP SLIDE SWITCH

When ambient light conditions are low and the display cannot be seen, turn the **LAMP** slide switch **ON** to illuminate the display.

> **CAUTION**
>
> **Whenever the LAMP slide switch is in the ON position, the internal lamp will light, even when the radio's ON-OFF switch is OFF. Accidentally leaving the LAMP slide switch ON will accelerate the discharge of the battery pack.**

13.10 OPERATING THE TRANSMITTER

When the PTT (push to talk) switch is depressed, the following occurs:

- The transmitter is turned **ON**. Transmission is over the frequency displayed.
- The 16 Keyboard is locked out. No keyboard operation is possible for as long as the PTT switch is depressed. When PTT switch is released, keyboard is again operational. The PTT switch is operational even when the LOCK slide switch is **ON**.
- Automatic scanning (SCAN, SRCH, OPEN) is frozen. When PTT is released, the automatic scanning will not resume. The operator must restart the scan.

13.10 Continued

Another requirement could be like this: A FBO is using the **HT-800** as a unicom base station (122.8 MHz). He wishes to scan automatically over ten selected non-sequential frequencies with 122.8 MHz being the most important to him as he will be communicating frequently with local traffic. Here's how to meet this requirement:

- Program memory location M1 to 122.8 MHz. Program the remaining 9 locations with the other selected frequencies.
- Select the SCAN scan mode.
- Start SCAN either **UP** or **DOWN**.
- Turn LOCK slide switch **ON**.

Why were these choices made? First, if ten non-sequential frequencies are to be scanned, then only the Memory Mode of Operation meets this requirement. The Frequency Mode can be programmed to scan over ten frequencies; however, those ten frequencies will be and can **ONLY** be sequential (Example: 118.000, 118.025, 118.050-----118.225). Next, if 122.8 MHz is **THE** most important frequency, shouldn't it be given a "Priority" over the other channels? When you want a "Priority" feature, you must choose the SCAN scan mode as this is the only automatic scan mode with this feature. Remember, when operating in SCAN, the lock-on time for any memory location other than M1 is a maximum of 10 seconds after which it breaks lock and then jumps out of sequence to scan M1. If M1 is busy, it will lock on and stay locked on until the signal opens, if not busy, it will jump back in the scan sequence and continue scanning. This is just what the FBO needs. Any activity encountered on other channels will only temporarily halt the scan which always restarts by looking at M1. If one of the other channels is too busy and becomes a nuisance, then that channel can always be LOCKED OUT of the scan.

How do you answer a call received on M1?:

- Turn the LOCK slide switch **OFF**.
- Depress the [M1 1] Key. The scan stops permanently at location M1 permitting a response to be initiated. This is the recommended procedure.

An immediate response to a call on M1 is possible, without touching any key, provided the response is initiated with 3 seconds upon termination of the incoming call. When the signal disappears from M1, there is a 3-second delay before scanning resumes. If the PTT is depressed within 3 seconds, the scan stops permanently at this location permitting a transmission to proceed.

However, if the scan resumes just before the PTT is depressed, then the scan will stop permanently at some other memory location. If the operator does not look at the display to see what location the scan has stopped at, he may make an illegal transmission. Why an illegal transmission? Because what if one of the selected scan frequencies was 121.5 MHz (emergency channel) and this was the channel he accidentally transmitted over? This constitutes careless and irresponsible operation of the radio. If the 3-second scan delay is missed, stop the scan the recommended way.