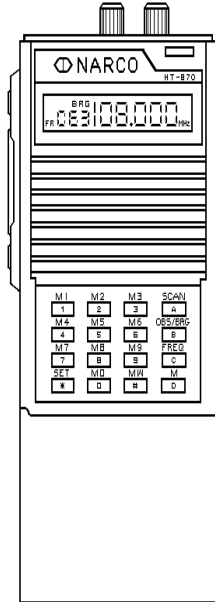


NARCO HT870 HANDHELD NAV/COM 960 CHANNELS



OPERATORS MANUAL

MANUAL PART NUMBER 03125-0621



NARCO AVIONICS INC.
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JULY, 1988

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1.1 INTRODUCTION

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.

2.1 PRODUCT DESCRIPTION

The Narco HT870 is a microprocessor controlled hand held 760 channel communication transceiver covering the band of 118 to 136.975 MHz and a 200 channel NAV receiver covering the band of 108 to 117.95 MHz. The HT870 antenna is removable and may be connected to the aircraft's COM antenna.

Nav and COM frequencies are displayed on a liquid crystal display (LCD) and are entered on an easy to use 16-key keyboard. Ten pre-programmable NAV or COM frequencies may be stored in a non-volatile memory and manually selected for use or automatically scanned. A memory lockout feature is provided in which programmable frequencies can be locked out of the automatic or manual scan.

The HT870 is powered by a rechargeable, quickly changed, NiCad battery pack. An optional nonrechargeable alkaline battery pack for emergency use is available. The user is alerted when the battery pack voltage has dropped below its useable limit by the appearance of the letters "BATT" in the display. The liquid crystal display can be illuminated to facilitate viewing in darkness.

3.1 DESIGN FEATURES

- Microprocessor controlled circuitry
- 760 COM channels
- 200 NAV channels
- 10 pre-programmable nonvolatile memory locations
- Keyboard data entry
- Large Liquid Crystal Display (LCD)
- Quickly changed, rechargeable NiCad battery pack
- Scanning Modes: Memory, Scan
- Priority channel scanning in SCAN mode
- Squelch-Adjust Control
- Nominal 2 watts RF Transmitter
- Lightweight, 1 lb. 4 oz. (570 grams)
- Receiver sensitivity 1.5 microvolts for 6 dB S+N/N
- Separate external speaker/microphone jack
- Inputs for normal and quick charge
- Quick removable (BNC) antenna
- Quick slideoff battery pack
- VOR displayed in CDI/BRG modes.

4.1 SPECIFICATIONS

GENERAL

Navigation channels: 200 (50 KHz steps) from 108.00 to 117.95 MHz
Communication channels: 760 (25 KHz steps) from 118.00 to 136.975 MHz
Memory Channels: 10 Channels
Weight: 1 lb. 4 oz (570 grams)
Dimensions: Width 2.44 in. (62 mm) Height 7.05 in. (179 mm)
Depth 1.54 in. (39 mm)

TRANSMITTER

Power: 1.5 watts carrier (minimum), 2 watts nominal
Frequency Stability: $\pm 0.002\%$
Modulation: 6A3, 70% minimum
Frequency range: 118.00 to 136.975 MHz (760 channels)
Spurious radiation: -46 dB below carrier
Antenna impedance: 50 ohms

RECEIVER

Frequency range: NAV (108.00 to 117.95 MHz)
COM (118.00 to 136.975 MHz)
Audio output: 0.5 watts into 8 ohms (speaker)
30 milliwatts into 600 ohms (headphones)
Receiver sensitivity: 1.5 microvolts max for 6 dB S+N/N
Image rejection: 50 dB or greater
Receiver selectivity: 6 dB ± 15 KHz, 60 dB ± 30 KHz
Squelch Sensitivity: Adjustable carrier, AGC type

POWER SOURCE

9.6 Vdc, 600 mA, NiCad Battery
Battery full charge time: 150 mA maximum @ 5 hrs (using optional base
charger. Part Number 50906-0001)
45 mA maximum @ 17 hrs (using supplied wall charger)
Battery life per charge: Receive only: 8 hrs.
(Approximate) 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 degrees C

5.1 PRELIMINARY INSPECTION AND UNPACKING

Upon receipt of the HT870, 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 Sections 5.2 and 5.3 and inventory the contents of your shipment.

5.2 HT870 AND SUPPLIED ACCESSORIES

An HT870 is ordered using part number 03117-0300. This part number is comprised of the following items:

<u>ITEM</u>	<u>QTY</u>	<u>DESCRIPTION</u>
1	1	HT870 Handheld NAV/COM
2	1	NiCad rechargeable Battery Pack (Part No. 50900-0001)
3	1	Battery Wall Charger (Part No. 50901-0001)
4	1	Flexible Antenna (Part No. 50902-0001)
5	1	Operator's Manual (Part No. 03125-0621)

5.3 HT870 OPTIONAL ACCESSORIES

The following list comprises the available accessories for the HT870:

<u>ITEM</u>	<u>ORDER NUMBER</u>	<u>DESCRIPTION</u>
1	50900-0002	Nonrechargeable alkaline battery pack
2	50900-0001	Rechargeable NiCad battery pack (9.6 Vdc/500 maH)
3	50905-0001	Leather cowhide case with snap-off front flap, build in belt clip.
4	50902-0001	Flexible rubberized antenna with BNC connector
5	50907-0001	Handheld remote combination speaker/microphone complete with connector ready to use. No adjustments necessary. For ground use only. Not recommend for use in aircraft.
6	50932-0001	Mobile NiCad battery charger. Plugs into cigarette lighter of aircraft or car, which permits NiCad battery charging or operation of the HT870.
7	50906-0001	Desktop quick charger and stand. The HT870 is placed upright into a well in the stand which permits the quick-charging (5 hrs.) of the HT870's installed NiCad battery pack.

5.3 Continued

- | | | |
|---|-----------------------|--|
| 7 | 50906-0001
(Cont.) | The HT870 may be operated in both receive and transmit modes while it is charging, but <u>ONLY</u> when a NiCad battery pack has been installed. |
| 8 | 50926-0101 | 6 inch adapter cable which permits the interfacing of aircraft type headphones and microphones to the HT870. One end of the cable connects to the HT870's top panel external speaker/microphone connector; installed on the other end of the cable are standard headphone and microphone jacks. An external push-to-talk switch must be supplied and installed by the owner to complete the interface. |
| 9 | 50908-0001 | External speaker/microphone connector only. Mates to the HT870's top panel external speaker/microphone connector. This connector is used when the owner wishes to design and fabricate his own interface adapter cable (see item 8). |

6.1 HT870 MAINTENANCE INFORMATION

The HT870 is not field repairable. Should a service problem arise, write a note explaining the problem. Include in the note you name, shipping address, and type of shipping desired (UPS, Federal Express, etc.) Include the note with the HT870 and ship prepaid to:

NARCO AVIONICS, INC.
270 Commerce Drive
Fort Washington Industrial Park
Fort Washington, PA 19034

Attn: Factory Service Dept.

7.1 USE OF EXTERNAL MICROPHONE

The use of a good noise cancelling microphone is highly recommended when using the HT870 in an aircraft environment. The HT870's internal microphone is rendered inoperative when an external microphone that has been connected to the top panel speaker/microphone connector and the Internal/External switch is in the "E" position.

7.1 Continued

Any current popular aircraft microphone may be used; the only exception being carbon microphones. They require more current than is available from the HT870 and therefore would not perform adequately.

8.1 USE OF EXTERNAL HEADPHONES OR SPEAKER

The HT870's internal speaker is rendered inoperative when an external speaker or headphones are connected to the HT870's top panel mic. jack. The Internal/External switch must be in the "I/E" or "E" position. Headphone impedance should be 600 ohms minimum, and speaker impedance should be 8 ohms.

9.1 HT870 LICENSE REQUIREMENTS

If the HT870 is to be used as 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 HT870 is to be used as a ground station, the 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 SPECIFICATIONS

Nominal Operating Voltage: 9.6 Vdc

Nominal Capacity: 600 milliamp hour

"Fully Charged State" Output Voltage: 10.8 to 11.6 Vdc

"Discharged State" Output Voltage: 8 Vdc

Quick Charge: 150 mA max/5-6 hours for full charge

Standard Charge: 45 mA/16-17 hours for full charge

Advisable Temperature Ranges: Charging: 10 to 40 degrees C
Discharging: -30 to 60 degrees C
Storage (3 months): -30 to 50
degrees C

10.2 Continued

Note: The HT870, when turned off, may be left on the quick charger indefinitely without harm to the battery pack.

The HT870 may be operated both in the receive and transmit modes while being charged in the Desktop quick charger/stand; however, the battery charging rate drops back to the standard rate (17 hours) because a portion of the charging current is used to power the radio.

10.3 BATTERY PACK INSTALLATION

To remove the Battery Pack, depress the Battery Lock button and slide it off in the direction of the Lock Button. To install it, slide the Battery Pack onto the bottom of the unit, ensuring the lock button clicks up.

CAUTION: Never store an HT870 with the NiCad battery pack connected. There is internal circuitry that is always connected to the battery bus that draws a small amount of current (microamperes) which will deplete that battery's charge within 3 weeks. Always store the HT870 with the battery disconnected.

10.4 QUICK CHANGING THE BATTERY PACK TO PRESERVE MEMORY

If a battery pack that needs recharging is being replaced by a second fully charged pack, the exchange must be completed within 30 seconds. Failure to do so will result in the erasure of all operator selected frequencies stored in memory (m0 to m9). Always turn the HT870's power switch OFF before installing or removing a battery pack.

10.5 OPTIONAL ALKALINE BATTERY PACK

An optional nonrechargeable alkaline battery pack is available for the HT870 (see Section 5.3). This battery pack is an ideal choice for an emergency back-up power source as it has a storage life of approximately 2 years. The service life of the battery pack is approximately 20 hours when operating the HT870 in the receive mode. Alkaline batteries may be changed within this pack.

CAUTION:

1. DO NOT try to recharge the alkaline battery.
2. Never store an HT870 with the battery pack connected. There is internal circuitry that is always connected directly to the battery bus that draws a small amount of current (microamperes) which will deplete the battery over time. Always store the HT870 with the battery disconnected. When batteries are changed with a pack observe polarity.

11.1 ADDITIONAL ANTENNA CONSIDERATIONS

When the HT870 is operated in an aircraft environment, an improvement in both COM and NAV performance will be realized if an aircraft type antenna is used in place of the supplied flexible whip antenna. The flexible antenna is quickly and easily removed as it incorporates a standard BNC connector. It is recommended that a standard 50 ohm impedance aircraft COM antenna be used for both the COM operation and VOR reception. VOR accuracy using an aircraft COM antenna is superior to the VOR accuracy using the standard HT870 flexible antenna which may vary as much as 5 degrees or more on local conditions. For maximum VOR range and accuracy, an aircraft VOR antenna may be used; however, it is not recommended that HT870 COM transmissions be made while using a VOR antenna.

12.1 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.
- Always change the battery pack in less than 30 seconds to preserve the frequencies stored in memory.
- Never turn the power switch ON while the push-to-talk (PTT) is pushed in.
- Never dispose of the NiCad battery pack in a fire.
- Never dissect a NiCad battery as they contain toxic material.
- Never store (greater than 3 weeks) the HT870 with the battery pack connected. Disconnect the battery pack.
- Be sure to observe polarity of alkaline batteries when changed in the optional alkaline battery pack.
- Never try to recharge the alkaline battery back.

CONTROL FUNCTIONS

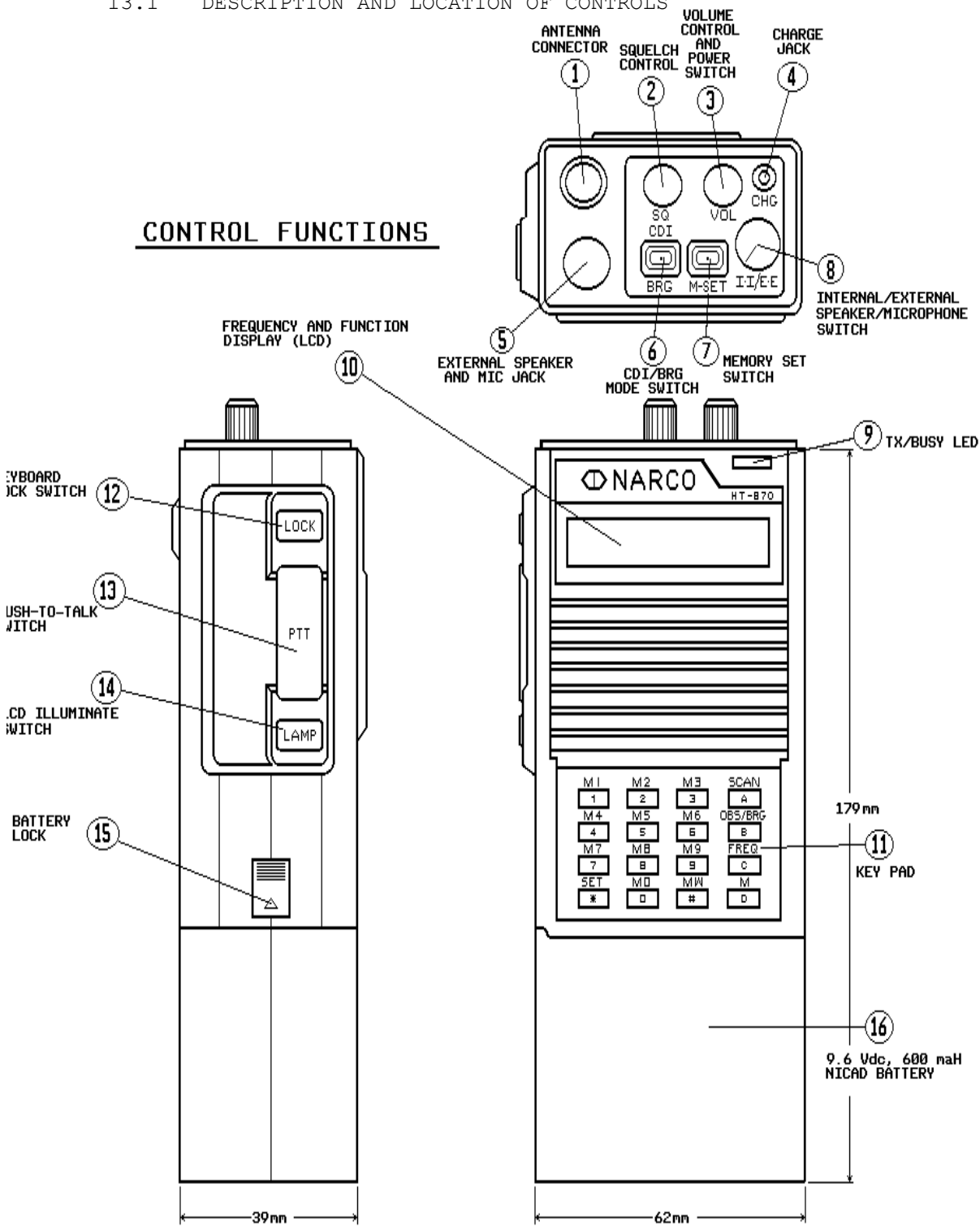
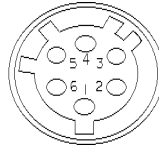


Figure 13-1 HT870 CONTROL FUNCTIONS

13.1.1 HT870 TOP PANEL DESCRIPTION



1. Microphone Input
2. Speaker Output
3. Push to Talk Switch
4. Ground
5. No Connection
6. No Connection

FIGURE 13-2 MIC CONNECTOR PIN ASSIGNMENT

13.2 16-KEY KEYBOARD DESCRIPTION

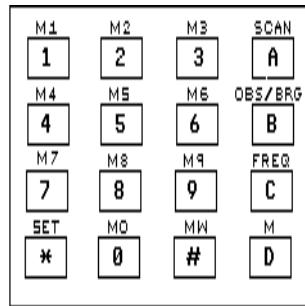


FIGURE 13-3 16-KEY KEYBOARD

The numbered keys are used to assign a frequency. 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.

13.3 PRODUCT DESCRIPTION HT870

DESCRIPTION:

The HT870 is a hand held communications band Transceiver/navigation receiver with VOR bearing or CDI Display. This unit is self contained with its own speaker, microphone, push to talk switch and flexible antenna, or it can be connected to external headset, microphone, and antenna.

OPERATION:

The operation of this unit is controlled by function switches located on the periphery of the unit in conjunction with the 16 key keypad on the front of the unit. Figure 13.1 illustrates the location of controls which is accompanied by the following text.

1. Top Panel Controls

The top panel of the unit has 8 functions, labeled 1 through 8 in Fig. 13.1. Their functions are as follows:

1. Antenna Connector: This is a standard BNC connector which connects to the flexible antenna supplied with the unit or can be connected to an external antenna through RG58 or suitable coaxial cable to an external antenna.
2. Squelch Control: This knob is used to set the desired squelch level for speaker intelligibility, and should be set for quieting with a no signal condition for maximum battery life.
3. Volume Control/Power Switch: This knob is used to turn the unit on or off and to set the desired audio level for the internal speaker or external headset.
4. Charge Jack: This connector is to be used with the wall charger to charge the nicad battery pack.
5. External Connector: This connector is used to connect to the optional external headset/microphone adapter cable.
6. CDI/BRG Switch: This is a momentary switch used to select the CDI or BRG mode of display when a VOR channel is selected.

13.3 Continued

7. M-set Switch: This switch is used to activate the memory set function. When depressed the memory set function is turned on and information can be entered or changed in the 10 memory channels. In the off mode the information in the memory can not be changed.

8. Internal/External Switch: This switch is a three position switch used to select the speaker and microphone to be used with the unit.

1. Internal position (I) - In this position the internal or built in speaker and microphone are used for operation.
2. Internal/External Position (I/E) - In this position the internal microphone is operational but the audio is sent to the external headset using the optional Headphone/Microphone Adapter.
3. External Position (E) - In this position both the received audio and microphone input to the unit are supplied through the optional Headphone/Microphone Adapter.

*NOTE: In all positions of the Internal/External switch the PTT switch on the side of the unit is active and can be used to execute a transmit function if no external PTT switch is available.

9. TX/Busy Led: This light will indicate when the channel being used is busy or when the unit is being used for transmitting.

10. LCD Display: The separate sections of the LCD display are covered in a separate explanation. See section 14.

11. Key Pad: This is a 16 key Keypad used for entering or recalling data. The keypad is used in conjunction with the function switches located on top of the radio. For ease of operation there are no second function keys. The key functions are described below:

A Key: This is the scan key and is used to activate the unit's two scan functions.

1. Scan - by striking the scan key by itself the unit will scan between the two limits set in upper limit stored in M0 and the lower limit assigned into the display prior to scan start.

13.3 Continued

2. D Key followed by the A Key - by striking the Memory Key then the Scan Key the unit will scan the 10 memory channels. If a memory channel contains a frequency which the user does not want to scan it can be locked out and the unit will skip this channel in the memory scan process.

B Key: This key is associated with the OBS/BRG Mode of operation and operates in the following manner:

1. BRG Mode - If the B key is used while in the BRG mode the bearing function will alternate cycle between the bearing TO and bearing FROM the received VOR station each time the key is struck.
2. CDI Mode - In the CDI mode of display the B key can be used in three ways as follows:
 - a. Auto To - To set the OBS to the TO radial of the VOR station you are receiving, strike the B key. At this time the OBS display will blank and the TO/FR flag will display the condition that had existed prior to striking of the key. If this is the TO function just strike the set key and the OBS will be set to the TO radial of the VOR station; if the FR flag is being displayed striking the B key again will cause the TO flag to display and by striking the set key the OBS will be set to the TO Radial of the VOR.
 - b. Auto FR - This is accomplished as explained in Auto TO with the TO/FR description reversed.
 - c. Selecting a desired OBS Radial - To select an OBS to be used for navigation purposes, just strike the B key and key in a legal 1, 2, or 3 digit number completing the entry by striking the set key. If 1 or 2 digit entries are used the unit assumes leading zero's and will fill them in for the user.

13.3 Continued

- * Note the auto functions require a received signal i.e. the TO/FR flag must be displayed in order to be utilized. If any attempt is made to use Auto Function without a received signal the unit will display the previous displayed OBS value when the set key is struck.
- C Key: This key is used in conjunction with frequency. If the C Key is struck the Frequency display will blank and inserting a valid 2, 3, 4, 5, or 6 digit number and striking the set key will channel the radio to the new frequency. For ease of operation the HT870 will accept a truncated version of the desired frequency. For example, 228 "set" would be read as 122.800 and 128 "set" would be read as 112.800, thereby reducing the workload. If any time during entry a mistake is made, it can be corrected by striking the C Key and clearing the display. If the user wishes to cancel the operation and keep his original frequency all that is necessary is to strike the "set" key when the frequency display is blank.
- 12. Keyboard Lock Switch: This switch is used to lock out inadvertent key strokes that might happen in the normal handling or use of the unit. When activated the 16 key keypad is disabled.
- 13. Push to Talk Switch (PTT): This switch is used to activate the transmit function of the radio. If the unit is channeled to a communication frequency the transmit and receive functions are on the same frequency. If the unit is channeled to a navigation frequency when the PTT switch is pressed the unit will transmit on the duplex frequency 122.100 MHZ for FSS Communications.
- 14. LCD Illuminate Switch: This switch is used to light the LCD display for viewing in the dark. The light will remain lit as long as the switch is depressed.

14.1 INTRODUCTION TO OPERATING PROCEDURES

The HT870 may be utilized as a 760 channel COM Transceiver or a 200 channel NAV Receiver/Converter. The unit may be operated in either the Memory or Frequency Modes.

14.1 Continued

The Memory Mode allows for operation over 10 NAV or COM frequencies that are operator chosen and stored in memory. Frequency scanning may be either Manual or Automatic for COM frequencies but is limited to Manual only for NAV frequencies.

The Frequency Mode allows for operation over all 760 COM channels or 200 NAV channels. Frequency scanning may be either Manual or Automatic for COM frequencies but is limited to a single frequency only for NAV frequencies.

NOTES:

1. If the letters "BATT" should appear in the upper right hand corner of the display, the battery pack voltage has fallen below its lowest operating limit. It should be fully recharged as soon as possible. During the time that the "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.
2. The Lock Key on the side of the unit above PTT key locks out the 16 Keypad functions and must be in the unlocked condition to use any Keypad function. If the Key Lock is activated the frequency display will contain the letters "LOCH" and the Lock Switch must be pressed to deactivate the Lock Function.

14.2 POWER TURN-ON AND VOLUME CONTROL

Rotate the "VOL" knob, located on the top panel, in a clockwise direction past the switch detent to turn the unit ON. Further clockwise rotation of the knob will increase the audio level. Initially set the volume to 1/2 its range.

14.3 SQUELCH CONTROL OPERATION

The squelch control knob is located on the top panel and is manually set by the operator. When the knob is rotated in a clockwise direction to its stop, the squelch is in its full open position. Receiver noise should be heard and the TX/BUSY LED on the front Panel should be annunciated. The squelch control should be set to its optimum break point by slowly turning the knob counter clockwise until the receiver noise is squelched and the TX/BUSY LED goes out.

14.3 Continued

CAUTION NOTE: If the unit is operated with the squelch "open", automatic frequency scanning will not operate normally. This is because the unit interprets the detected receiver noise as a valid received signal and "locks on" the noise.

14.4 FREQUENCY ENTRY

To enter a new frequency the user will press the "C" Key and the Frequency display will blank. At this time the new frequency can be entered by using the numeric keys. The HT870 is capable of interpreting short hand entries of frequencies by assuming the 1 of the 100 MHz and the trailing zero's if desired. This means that a minimum of 3 numeric entries are required for simple frequency entries. i.e:

228 "set" would be entered as 122.800

2282 "set" would be entered as 122.825

If the leading 1 digit is used, the 6 digit entry format should be used for frequency.

Frequency entries can be cleared if a mistake is made by striking the "C" Key; The frequency entry sequence can be terminated by striking the "C" Key while the frequency display is blank, at which time the frequency being used will be re-displayed.

14.5 FREQUENCY ASSIGNMENTS TO MEMORY

Ten pre-programmable COM or NAV frequencies may be stored in the HT870's memory. These memory locations are identified on the Keyboard as letters M0 through 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 136.975 MHz.

NOTE: Location M0 is special in that the frequency stored here determines the upper Freq Mode scanning limit when scanning.

14.5.1 PROGRAMMING OF LOCATIONS M0 TO M9

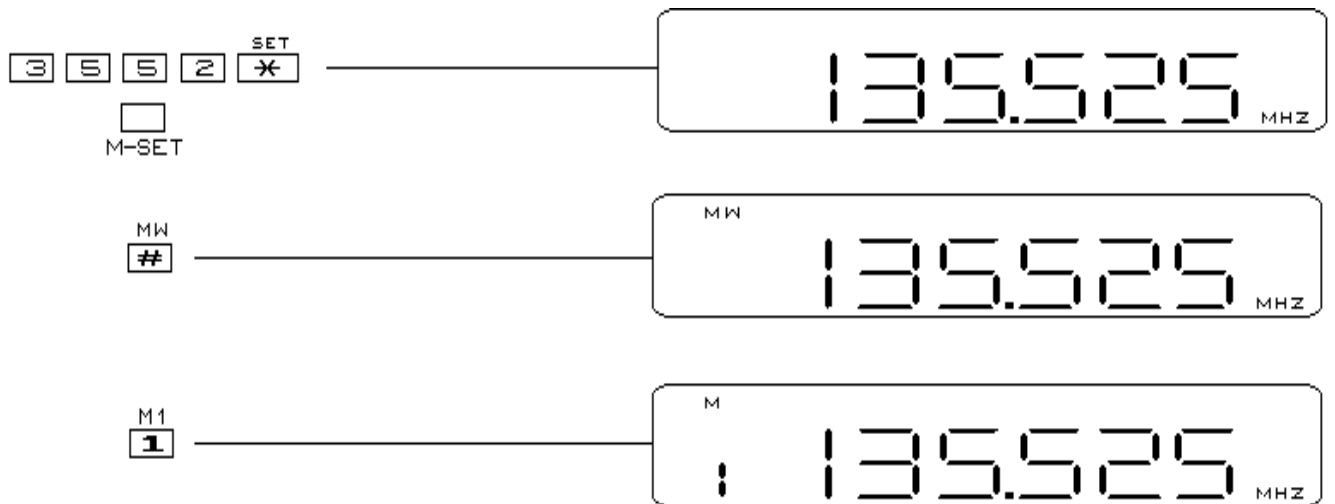
The following sequence illustrates memory programming:

1. 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 "D" Key.

14.5.1 Continued

2. Assign a NAV or COM frequency (See Section 14.4).
3. Press the "M-SET" switch to the ON position to enable the "#" Key.
4. Depress the "#" Key. Confirm that the letters "MW" appear in the display.
5. 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 in the smaller display.
6. Depress "D" Key ("M" disappears from the LCD) to take the radio out of the memory mode and put it in the frequency mode. Remember you can only assign a frequency if the "M" legend is out.
7. Assign a frequency for the next memory location.
8. Keep repeating steps 4, 5, 6, and 7 until all the desired locations are programmed.
9. Press "M-SET" switch to disable the "#" Key.

EXAMPLE: Store 135.525 MHz in memory location M1.



14.5.2 RECALLING FREQUENCY FROM MEMORY LOCATION

EXAMPLE: Recall memory location M6.

- a.If the radio is not in the Memory Mode ("M" annunciated in LCD), then depress "D" Key. Confirm LCD displays "M" (memory mode).
- b.Depress "6" Key. Frequency and channel number are displayed in LCD.

14.6 OPERATION OF THE HT870 AS A COM TRANSCEIVER

14.6.1 FREQUENCY MODE OF OPERATION (COM CHANNELS)

The Frequency Mode of Operation permits transmission and reception over any of 760 COM channels or over selected bands. The operator may choose to receive and transmit over a single channel or to automatically scan a chosen band of frequencies.

14.6.1.1 FREQUENCY MODE SINGLE FREQUENCY OPERATION

If it is required only to receive and transmit over a single channel, then follow this procedure:

1. Turn the radio ON and set the Volume control to the $\frac{1}{2}$ position.
2. Push the M-SET and LOCK buttons to the OFF position.
3. Set the Squelch to the optimum point (See section 14.3).
4. Assign the chosen frequency (See Section 14.4). Reception and transmission will be over the displayed frequency.
5. Depress the LOCK switch to the ON position to disable the keyboard.
6. To transmit, Push the Push-To-Talk (PTT) switch and confirm that the "TX/BUSY" LED is annunciated in the upper right corner of the unit.

14.6.1.2 FREQUENCY MODE SCANNING

The operator must choose the upper and lower scan limits.

A. SELECTION OF THE FREQUENCY SCANNING LIMITS

The upper limit is that frequency which is stored in memory in location M0. The microprocessor pre-programs

14.6.1.2 Continued

136.975 MHz into M0. The operator must re-program M0 to suit his requirements (See Section 14.5.1). After selecting the upper limit, the operator chooses the lower limit and assigns this frequency in the display. To start an UP scan, press the "A" Key.

The upper limit (M0) MUST BE HIGHER than the lower limit or else you CANNOT scan. The display will just blink the displayed lower limit frequency.

14.6.2 MEMORY MODE OF OPERATION

There are four differences between the Memory Mode of Operation and the Frequency Mode of Operation.

1. Reception and transmissions are possible only over those COM frequencies stored in locations M0 to M9.
NOTE:Nav frequencies may also be stored in memory.
2. There are no lower or upper scan limits to set. Scanning is from location M0 to M9 sequentially.
3. Memory Location Lockout: Locations M1 to M9 can be locked out of the scanning sequence. Location M0 cannot be locked out.
4. 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. Then scan then departs M1 and jumps back into sequence starting with the location next in sequence from the previously locked on location.

The following sequence illustrates how to set up the radio for the Memory Mode of operation:

1. Program the required COM frequencies into memory as outlined in section 14.5.1.

14.6.2 Continued

2. If the radio is not in the Memory Mode then press the "D" Key. Confirm appearance of "M" in the display. (The radio is now in Memory Mode).
3. Depress the "A" Key. The radio is now UP scanning locations M0 to M9.
4. To stop press either the "B" or "C" key.
5. To stop the scan at a particular location, press the appropriate location key (M0-M9).

NOTES:

1. When the transmitter is operated (PTT switch depressed), scanning will stop. When the PTT switch is released, scanning will resume after approximately 3 seconds.

2. Before scan of the COM frequencies is initiated, lock-out any NAV frequencies stored in memory as outlined in Section 14.6.2.1.

In order to provide the highest VOR Radial accuracy, reliable lock-on in the scanning modes was sacrificed.

Reliable lock-on to NAV frequencies is achieved by pressing the memory location key of the desired NAV channel which stops the scan at that memory location.

14.6.2.1 MEMORY LOCATION LOCKOUT

The HT870 has a memory location lockout feature that allows one or all of the locations M1 to M9 to be locked out of scanning. Location M0 cannot be locked out as this location determines the upper frequency limit of scan. This lockout feature pertains only to the Memory Mode of Operation. When a memory location is locked out, that location is passed over in the sequential scanning.

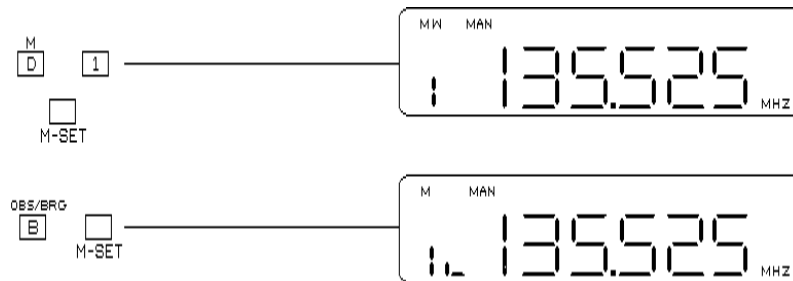
This feature will be chosen to be implemented by the operator when only a few selected stored channels need to be scanned or one or more particular channels are so busy that they interfere with the scanning of the other channels.

14.6.2.1 Continued

The following sequence illustrates the memory location lockout procedure:

1. Depress the "D" Key to switch to the Memory Mode of Operation. Confirm that the letter "M" appears in the display.
2. 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.
3. Engage M-SET switch down.
4. 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.
5. 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.
6. Release the M-SET switch.

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



14.6.2.2 RESTORING A LOCKED OUT MEMORY LOCATION TO THE SCAN SEQUENCE

To restore a locked out channel to the scanning sequence:

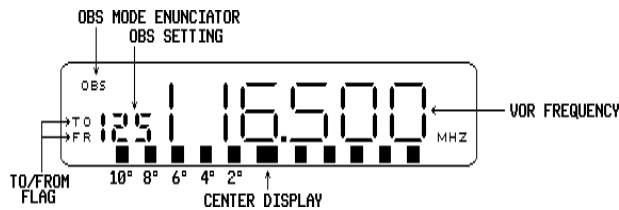
- 1.If the radio is not in Memory Mode, then press "D" Key.
- 2.Depress the memory location key (M1-M9) to recall the channel to be unlocked.
- 3.Depress M-SET switch.
- 4.Depress the "B" Key. Confirm that the letter "L" disappears from the display signifying the return of this channel to the scanning sequence.
- 5.Release M-SET switch.
- 6.Restore the scan direction.

14.7 VOR NAV OPERATION

The HT870 is capable of giving the user both CDI and Bearing modes of operation.

14.7.1 CDI MODE

In the CDI Mode the Left/Right Indicator is an 11 bar display with each bar having a 2 degree resolution.



In this mode the TO/FR legends act as the NAV flag and will indicate when a valid signal is received. The TO or FR indication will be with respect to the selected Radial or OBS setting.

14.7.1 Continued

To enter the CDI Mode, select a valid VOR channel and press the CDI/BRG mode button on the top of the radio. At this time the Left/Right display should appear at the bottom of the display and the OBS legend should appear in the display's upper left.

14.7.1.1 SETTING THE OBS

To set the OBS push the "B" Key and the OBS/BRG Display will blank. At this time the desired (000-359) OBS setting can be made; if the set key is depressed before the 3 digits are entered, leading zero's will be assumed.

14.7.1.2 AUTO CENTERING

1. Auto TO - To set the OBS to the TO radial of the VOR station you are receiving, strike the B key. At this time the OBS display will blank and the TO/FR flag will display the condition that had existed prior to the striking of the key. If this is the TO function just strike the set key and the OBS will be set to the TO Radial of the VOR station; if the FR Flag is being displayed striking the B Key again will cause the TO Flag to display and by striking the set key the OBS will be set to the TO Radial of the VOR.
2. Auto FR - This is accomplished as explained in Auto TO with the TO/FR description reversed.
- * Note the auto functions require a received signal i.e. the TO/FR flag must be displayed in order to be utilized. If any attempt is made to use Auto Function without a received signal the unit will display the previous displayed OBS value when the set key is struck.

14.7.1.3 BEARING MODE

To select the Bearing Mode of operation insure that a valid VOR Frequency has been selected and depress the OBS/BRG Key on the top of the unit. When a valid signal has been Received, the 3 digit display to the left of the frequency display will give the bearing to or from the selected VOR. To obtain the reciprocal bearing of that being displayed press the "B" Key, the TO/FR and bearing will change to the reciprocal of that being displayed. Each time the "B" Key is struck bearing TO/FR will alternate to the reciprocal of the bearing being displayed.

14.7.2 DUPLEX OPERATION IN NAV MODE

The HT870 is capable of Duplex Mode of operation when a NAV channel has been selected. This means that the unit will transmit on Flight Service Frequency 122.10 when the PTT switch is depressed, and will receive on the selected NAV frequency.

Note: Since the receiver is shut down during transmit periods, this will cause temporary interruption of NAV reception.

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