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HH7700

5W VHF Handheld Transceiver

Operator Manual

Datron World Communications, Inc.
Part No. HH7700-MSOP
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Change Description

Date of Revision	Revision Letter	Description of Changes	Pages Affected
01/08	A	New manual.	All
02/08	B	Updates.	All

Datron World Communications, Inc.

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but in no event later than 15 months from the date of shipment. If the equipment does not provide satisfactory service due to defects covered by this warranty, Datron will, at its option, replace or repair the equipment free of charge.

Should it be impractical to return the equipment for repair, Datron will provide replacements for defective parts contained in the equipment for a period of 12 months from the date of installation of the equipment, but in no event later than 15 months from the date of shipment.

This warranty is limited to the original purchaser and is not transferable. Repair service performed by Datron is warranted for the balance of the original warranty or 90 days, whichever is longer.
Exclusive Warranty: There are no other warranties beyond the warranty as contained herein. No agent, employee, or representative of Datron has any authority to bind Datron to any affirmation, representation, or warranty concerning the equipment or its parts that is not in conformity with the warranties contained herein.

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Limitations of Warranty: This warranty does not cover:
Physical damage to the equipment or its parts that does not involve defects in design, material, or workmanship, including damage by impact, liquids, temperature, or gases.

Damage to the equipment or its parts caused by lightning, static discharge, voltage transients, or application of incorrect supply voltages.

Defects or failures caused by unauthorized attempts to repair or modify the equipment. Defects or failures caused by Buyer abuse or misuse.

Return of Equipment - Domestic: To obtain performance of any obligation under this warranty, the equipment must be returned freight prepaid to the Technical Support Services. Datron World Communications Inc., 3030 Enterprise Court, Vista, California 92081. The equipment must be packed securely. Datron shall not be responsible for any damage incurred in transit. A letter containing the following information must be included with the equipment.

a. Model, serial number, and date of installation.

b. Name of dealer or supplier of the equipment.

c. Detailed explanation of problem.

d. Return shipping instructions.

e. Telephone or fax number where Buyer may be contacted.

Datron will return the equipment prepaid by United Parcel Service, Parcel Post, or truck. If alternate shipping is specified by Buyer, freight charges will be made collect. Return of Equipment - International: Contact Datron or your local Representative for specific instructions. Do not return equipment without authorization. It is usually not possible to clear equipment through U.S. Customs without the correct documentation. If equipment is returned without authorization, Buyer is responsible for all taxes, customs duties, clearance charges, and other associated costs.

Parts Replacement: The following instructions for the supply of replacement parts must be followed:

a. Return the parts prepaid to “Parts Replacement” Datron World Communications Inc., 3030 Enterprise Court, Vista, California 92081; and
b. Include a letter with the following information:

1. Part number

2. Serial number and model of equipment

3. Date of installation

Parts returned without this information will not be replaced. In the event of a dispute over the age of the replacement part, components date-coded over 24 months previously will be considered out of warranty.

Remedies: Buyer’s sole remedies and the entire liability of Datron are set forth above. In no event will Datron be liable to Buyer or any other person for any damages, including any incidental or consequential damages, expenses, lost profits, lost savings, or other damages arising out of use of or inability to use the equipment.

Safety Considerations

This product and manual must be thoroughly understood before attempting installation and operation. To do so without proper knowledge can result in equipment failure and bodily injury.

Caution: Before applying ac power, be sure that the equipment has be properly configured for the available line voltage. Attempted operation at the wrong voltage can result in damage and voids the warranty. See the manuals section on installation. DO NOT operate equipment with cover removed.

Earth Ground: All Datron products are supplied with a standard, 3-wire, grounded ac plug. DO NOT attempt to disable the ground terminal by using 2-wire adapters of any type. Any disconnection of the equipment ground causes a potential shock hazard that could result in personal injury. DO NOT operate any equipment until a suitable ground has been established. Consult the manual section on grounding.

Servicing: Only trained personnel should carry out servicing. To avoid electric shock, DO NOT open the case unless qualified to do so. Various measurements and adjustments described in this manual are performed in ac power applied and the protective covers removed. Capacitors (particularly the large power supply electrolytics) can remain charged for a considerable time after the unit has been shut off. Use particular care when working around them, as a short circuit can release sufficient energy to cause damage to the equipment and possible injury.

To protect against fire hazard, always replace line fuses with ones of the same current rating and type (normal delay, slow-blow, etc.). DO NOT use higher value replacements in an attempt to prevent fuse failure. If fuses are failing repeatedly this indicates a probable defect in the equipment that needs attention.

Use only genuine Datron factory parts for full performance and safety of this product.

CONTENTS

1: INTRODUCTION

The HH7700 VHF Radio

Datron's HH7700 is a compact and lightweight VHF handheld transceiver that provides communications capability in the 30 to 88 MHz band. RF power output levels of 500 mW, 2W and 5W can be selected. It offers up to 2320 channels at 25 kHz spacing or 4640 channels at 12.5 kHz spacing. The HH7700 has a programmable 100 channel memory selectable via keypad, and up to fifteen programmable preset channels selectable via rotary knob.

The HH7700 is interoperable in FM clear-voice mode with Datron's squad radio family (PRC1060/70/80), the SpectreV series (PRC2100/2150), the new PRC7700V and most other single-channel 30 to 88 MHz VHF/FM radios using a 150 Hz tone-squelch or CTCSS squelch system.

Most of the radio's settings and buttons are already programmed into the radio using the HH7700 Programmer software. Request a list of the functions that are assigned to the buttons and knobs on the radio. For details about programming the radio, refer to the HH7700-PROG-MSOP Programmer Guide.

Features include:

- Ease of operation
- Selectable power levels
- Computer programmable
- Cloning
- 100 Channel memory
- LCD display
- Vox (standard)
- Whisper (standard)
- Full range of accessories

Technical Specifications

Note: *Specifications are subject to change without notice or obligation.*

Characteristic	Description
General	
Frequency Range	30 MHz to 87.9875 MHz
CCIR Emission	16K0F3E (wide), 11K0F3E (narrow)
Mode	Simplex
Channel Spacing	25 kHz (wide), or 12.5 kHz (narrow)
Preset Channels	15
Modulation	FM (300 Hz to 3000 Hz)
Display	Alphanumeric, 14 segments, 5 digits, icons
Programming	Computer programmable
Current Consumption	Transmit mode: Less than 2.0A Receive mode: Less than 0.6A
Battery Life	4000 mAH Li-Ion: ~18 hours (5-5-90, high power) 2200 mAH Ni-MH: ~10 hours (5-5-90, high power)
Environmental	
Temperature	-30°C to +60°C
Humidity	90%
Water Resistance	Splash proof
Receiver	
Receiver Type	Dual conversion, super heterodyne
Sensitivity	Better than 0.35µV for 12 dB SINAD
Squelch	150 Hz tone, CTCSS (39 tones)
Audio Distortion	≤3%
Audio Output	400mW (≤5% distortion), 500mW max.
Output Impedance	8Ω

Characteristic	Description
Transmitter	
Output Power	Hi: 5W, Mid: 2W, Low: 500mW (nominal)
Antenna Impedance	50Ω
Frequency Stability	±2.5 ppm (-30°C to +60°C)
FM Hum and Noise	≥45dB (wide), ≥40dB (narrow)
Spurious Response	≤50dB
Modulation	Direct frequency modulation

Referenced Manuals

- HH7700-PROG-MSOP Programmer guide
- TVS-2-DT1 Hopping Code Scrambler manual


Antenna
Channel Knob
Power/ Volume Knob
LED Indicator
PTT
Shift
Monitor
Accessory Connectors
LCD Display
Programmable/ Scroll Buttons
CH-06
P1
P2

2: RADIO BASICS

Radio Controls

Channel Knob

For access to frequently used channels. Turning it to **F** allows a display off all 100 channels programmed into the radio.

Power/Volume Knob

Turns the radio on and off and adjusts the volume of the radio.

LED Indicator

Indicates radio status. Red light indicates transmission; green light indicates the receive monitor is on.

Push-to-talk (PTT)

Press and hold down to talk; release to listen.

Shift

Used with the **MONITOR** button to set squelch levels. Used with the scroll buttons to select power settings and tones. Performs programmable functions when used with the **P1** and **P2** buttons.

Monitor

Used to control squelch/muting (keeps the speaker quiet and free from static). Enables/disables the keylock function and is used with the **SHIFT** button to set squelch levels.

Accessory Connectors

Connections for programming cable and microphone. Keep the dust cap on when not in use.

LCD Display

Five-character single line display with up to 13 icons.

Programmable Buttons

Buttons **P1** and **P2** can be programmed to perform scan, dual watch, scramble, VOX and whisper functions. Can be used in combination with the **SHIFT** button to perform secondary functions.

Scroll Buttons

Used for scrolling through channels and squelch settings. Down scroll is used to access the programming mode and up scroll the cloning mode.

Programmable Buttons

Buttons **P1** and **P2** are programmed using the Programmer. **P1** and **P2** can have secondary functions when the **SHIFT** button is pressed with one of them. These combinations of buttons can be programmed for None, Scan, Dual Watch, VOX or Whisper.

Function	Description
None	When the button assigned to None is pressed, there is no action.
Scan	When the button assigned to Scan is pressed, the radio proceeds to scan the memory list.
Dual Watch	When the button assigned to Dual Watch is pressed, the radio proceeds to scan a preset channel with a priority channel.
Scramble	When the button assigned to Scramble is pressed, voice is scrambled.
VOX	When the button assigned to VOX is pressed, the radio goes into VOX mode.
Whisper	When the button assigned to Whisper is pressed, the radio goes into whisper mode.

In the example below, pressing **P1** would activate Scan. Pressing **SHIFT** and **P1** would activate Dual Watch. Pressing **P2** would activate Scramble. Pressing **SHIFT** and **P2** would activate VOX.

=== Button ===	===== Primary =====	===== Secondary =====
P1	Scan	Dual Watch
P2	Scramble	VOX

Check with your administrator for a list of the functions your radio supports.

Scroll Buttons

Scroll ▼

- To scroll down programmed channels when the channel knob is in the **F** position.
- To scroll down through the squelch levels.
- To access the programming mode when **MONITOR** is also pressed.

Scroll ▲

- To scroll up programmed channels when the channel knob is in the **F** position.
- To scroll up through the squelch levels.
- To access the cloning mode when **MONITOR** is also pressed.

Shift Button

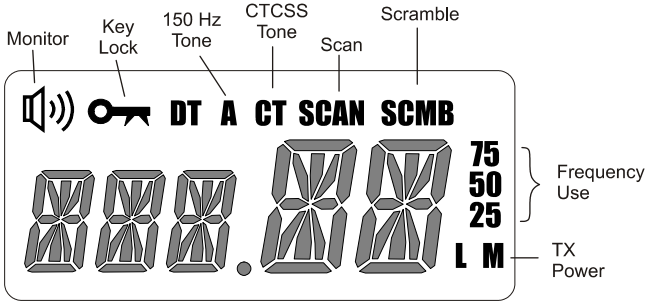
- To select high, medium and low power settings for channels when the ▼ button is also pressed.
- To select CTCSS (**CT**) or 150 MHz (**A**) tones when the ▲ button is also pressed.
- To use in combination with **P1** and **P2** (for Scan, Dual Watch, VOX, Whisper, or None) when programmed to do so.
- To set squelch levels when pressed simultaneously with the **MONITOR** button.

Monitor Button

- To disable the mute/squelch function.
- To enable or disable keylock (except **PTT** and **MONITOR**). To release the lock, press **MONITOR** again for 2 seconds.
- To set squelch levels when pressed with **SHIFT**.
- To access the programming mode when ▼ is also pressed.
- To access the cloning mode when ▲ is also pressed.

Note: *If* **MONITOR** *is pressed longer than 2 seconds, the radio locks. To unlock, press* **MONITOR** *again for 2 seconds.*

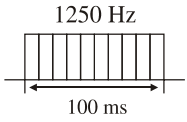
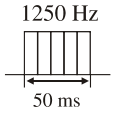
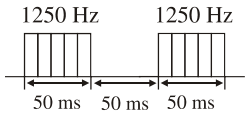
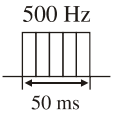
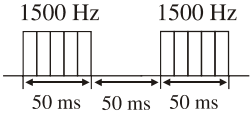
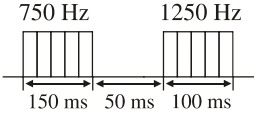
LCD Display and Icons



Icon	Description
	Monitor indicator. If displayed, monitoring is activated. Its activation disables audio mute.
	If displayed, the key lock is activated. Its activation prevents the buttons from functioning (with the exception of **PTT** and **MONITOR**). Unlock by pressing **MONITOR** at least 2 seconds.
DT	Unused at this writing.
A	If displayed, the 150 Hz tone has been programmed into the radio for the displayed channel.
CT	If displayed, the CTCSS tone has been programmed into the radio for the displayed channel.
SCAN	If displayed, channels are being scanned.
SCMB	If displayed, the scrambler is installed in the radio and activated.
75 **50** **25**	The last two digits of a frequency when the frequency exceeds the 5 digits.
L M	Transmit power **L** (low), **M** (medium) or high (default with no icon displayed).

Audio Signal Tones

Refer to this table to ascertain the high or low pitched (tone) frequency beeps. Knowledge of these tones allows monitoring of the radio without looking at the display.

Reason for Beep	Output (1 cycle)	Remark
Power on		Enable/disable using Programmer
SHIFT or **MONITOR** button enabled or channel knob turned		Enable/disable using Programmer
SHIFT or **MONITOR** button released		Enable/disable using Programmer. Two beeps.
P1 or **P2** disabled, Tx inhabit, or no channel assigned		No TX frequency programmed or busy channel lockout
Timeout timer		Beeps 10 seconds prior to timeout
Low battery		Enable/disable using Programmer. One beep at low battery

Battery Information

If the battery is new (it is shipped empty) or its charge level is low, it needs to be charged before use. The radio beeps if the voltage goes below 6.5V. Detection and beep is only indicated once.

To charge the battery:

1. Turn the radio off and plug the charger into the power source.
2. Place the battery (with or without the radio attached) into the charging pocket.
3. Remove the battery when the indicator is a steady green.

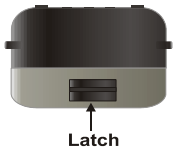
LED Indicator	Status
No indication	Charger not plugged into outlet or charger is damaged.
Flashing red	Battery not inserted or not detected. Remove and replace the battery in the charger. If it continues to flash red, replace the charger.
Steady red	Battery is charging.
Steady green	Battery is fully charged.

Accessory Information

Attaching and Removing the Battery

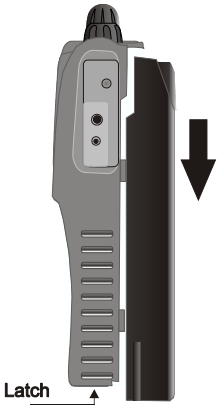
To attach the battery:

1. Align the battery to the battery rails on the back of the radio (about 1 cm from the top of the radio).
2. Press the battery firmly onto the radio and slide the battery upward until the battery latch snaps into place.



To remove the battery:

1. Turn off the radio.
2. Slide the battery latch toward the front of the radio into the unlock position.
3. With the battery latch engaged, slide the battery away from the top of the radio.



Attaching the Antenna

Removing the Antenna

Attaching the Belt Clip

1. Using your thumb, press the clip's spring latch towards the top of the clip. Slide the latch down into the groves of the radio and release your thumb.
2. Place the screw on top of the phillips screwdriver and keep it in place while passing the screwdriver through the opening of the clip.
3. Tighten the screw to the battery.

Removing the Belt Clip

1. Using a phillips screwdriver, loosen the screw positioned through the opening in the clip and remove it.
2. Using your forefinger, press the clip toward the battery and slide the clip up and off.

3: RADIO OPERATION

The HH7700 operates with most of its features already programmed into the radio. Request a list of the functions that are assigned to the buttons and switches on your radio.

Quick Start

Before proceeding, the radio must be set up using the HH7700 software Programmer.

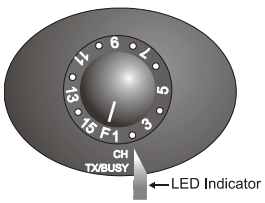
1.	**Battery**	Install a charged battery.
2.	**Antenna**	Install the antenna. Do not operate the radio without an antenna.
3.	**Power-up**	Turn the power/volume knob clockwise about halfway around. The radio beeps if programmed to do so. Set the volume to a comfortable level. If necessary, press **MONITOR** to mute the speaker.
4.	**Select channel**	Turn the channel knob until the desired channel is shown on the display.
5.	**Receive**	Listen using the built-in speaker.
6.	**Transmit**	Press **PTT** and speak about 4 inches from microphone. Release **PTT** when finished speaking. Do not press **PTT** longer than necessary after talking.

Selecting Channels

The radio can be programmed to hold up to 100 channels. Fifteen of the most frequently used channels can be programmed to coincide with the 15 positions on the channel knob. These are Preset channels.

To access Preset channels, turn the channel knob to display the channel assigned to each of the 15 positions. Use the LED indicator as a reference when positioning the **1** to **15** and **F**.

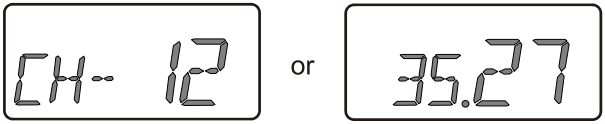
In the illustration to the right, the knob is in the channel **2** position.



If a channel has not been assigned to a position, **NO-CH** is displayed.

To access the channels that are not preset:

1. Turn the channel knob to **F**.
2. Press ▲ or ▼ to scroll through the channels.
3. Press **SHIFT** to display the channel's frequency.



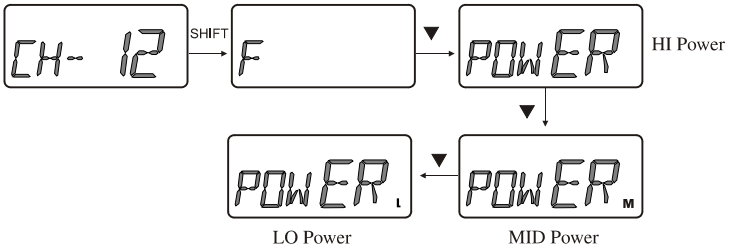
Note: *The radio is programmed to display either channel numbers or channel frequencies. It is not possible to display both.*

Setting Output Power

The power level can be set for each channel (high, medium or low).

To set the power level:

1. Navigate to the channel to set and press **SHIFT**.
2. Press ▼ to scroll through the power levels of high (no icon is displayed) medium (**M**) or low (**L**).



3. Press **SHIFT** to release.

Note: *If a button is not pressed during the power change, this mode terminates automatically after 5 seconds.*

Receiving a Call

1. Turn the radio on.
2. Adjust the volume.
3. Select the desired channel.
4. Listen for voice activity. The LED indicator flashes green while the radio is receiving.
5. To respond, hold the radio 1 to 2 inches from your mouth. Press PTT to talk. The LED turns red.

Note: *The radio can be programmed to enable a timeout from 0.5 seconds to 4 minutes. The call may terminate if the call time is exceeded.*

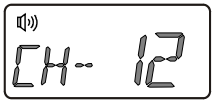
Sending a Call

1. Turn on the radio.
2. Select the desired channel.
3. Press **PTT** to talk. Pause a second before speaking to avoid voice cutoff.

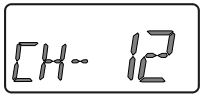
Note: *The* **MONITOR** *button can be pressed for tracking frequency usage. However, if* **LOCKOUT TYPE** *is programmed to monitor busy channels or tones, pressing* **MONITOR** *is not necessary.*

Monitoring the Radio

Press **MONITOR** to listen for activity on the channel/frequency. The monitor function works in standby or receiving mode. When the feature is on, the LED is green and the monitor icon is displayed.



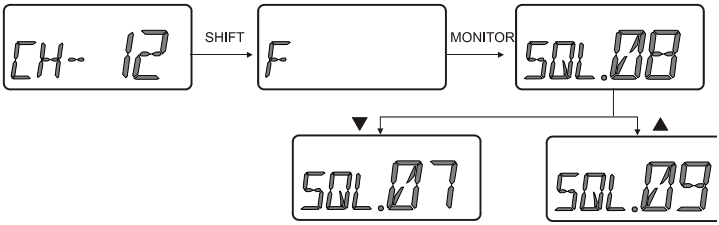
Press **MONITOR** again to disable the function.



Setting Squelch Level

To set the squelch level:

1. Navigate to the channel to set.
2. Press **SHIFT** and **MONITOR**.
3. Press ▲ to scroll up through the 16 squelch levels and press ▼ to scroll down through the 16 squelch levels.



4. Press **SHIFT** to release the squelch level function.

Note: *If a button is not pressed during squelch level changes, this mode terminates automatically after 5 seconds.*

Scanning

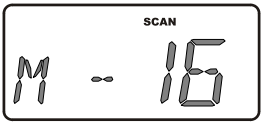
There are two types of scanning: Memory and Dual Watch.

Conditions

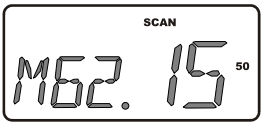
The following conditions apply to scanning:

- Scan lists, range and speed are defined using the Programmer.
- There has to be more than one channel on the memory scan list for scanning to proceed.
- A **SCAN** button and **DUAL WATCH** button must designated using the Programmer.
- Memory (**M**) and Dual Watch (**D**) scanning takes place in channel mode or frequency mode as illustrated on the next page.

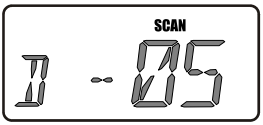
Channel Memory Scan



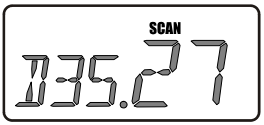
Frequency Memory Scan



Channel Dual Watch Scan



Frequency Dual Watch Scan

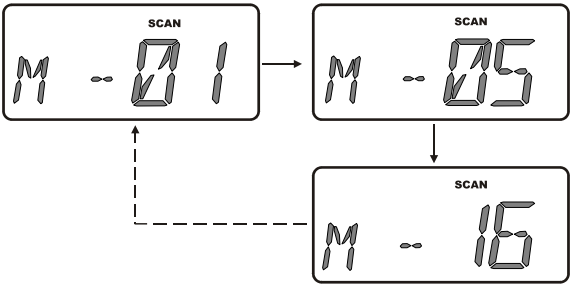


Memory Scan

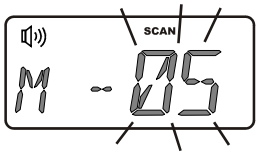
More than 1 channel must be assigned to the memory scan list for scanning to take place. Scanning can be viewed in channel mode or frequency mode.

1. Turn the Channel knob to the **F** position.
2. Press **SCAN**.

   The radio scans the memory list in a continuous loop at a speed set in the Programmer (from 50 ms to 120 ms). The example below shows an uninterrupted Memory scan (no activity detected).



When a signal is detected on a channel, the monitor icon is displayed, the channel or frequency flashes and activity on the channel is heard. Scanning pauses for 5 seconds unless tone decoding is enabled on some or all channels causing the scan rate to slow down as the radio decides whether or not there is something worth listening to.



When the signal ends or 5.0 seconds is up, scanning resumes.

3. Press **SCAN** again to stop scanning.

Dual Watch Scan

Dual watch has two functions and is dependent on how the channel knob is positioned. It is setup as follows:

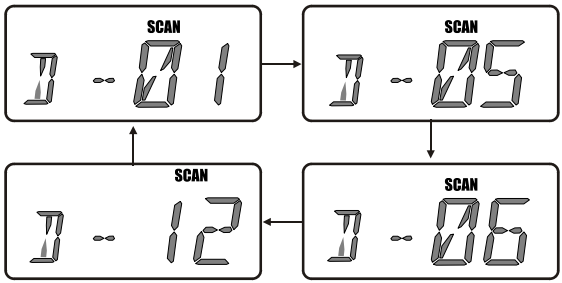
Channel Position	Description
F	Scanning alternates between all channels that are assigned to a frequency and a programmed priority channel. This function does not work if the assigned Priority channel is also a Preset channel.
1 to **15**	Scanning alternates between the chosen Preset channel and the programmed Priority channel. This function does not work if the chosen Preset channel is also a Priority channel.

To scan all assigned channel frequencies with a priority channel:

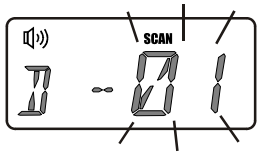
1. Turn the channel knob to the **F** position.
2. Press **DUAL WATCH**.

   The radio begins to scan all of the channels that have assigned frequencies at a speed set in the Programmer (from 50 ms to 120 ms). In the example below, channels 1, 5 and 6 are the only

programmed frequencies and channel 12 is the priority channel. After scanning the priority channel, the scan cycle continues with channel 1.



When a signal is detected on a channel, the monitor icon is displayed, the channel or frequency flashes and activity on the channel is heard.



Scanning pauses for 5 seconds unless tone decoding is enabled on some or all channels in which case the scan rate slows down as the radio decides whether or not there is something worth listening to.

When the signal ends or 5.0 seconds is up, scanning resumes.

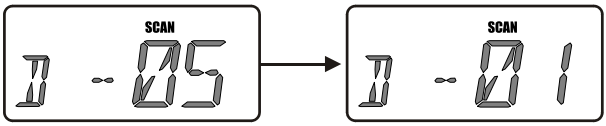
3. Press **DUAL WATCH** again to stop scanning.

Note: *If the radio finds something of interest on a non-priority channel, it continues to monitor the priority channel. If the radio finds something of interest on a priority channel, it stays there. If something of interest is found on both a non-priority and priority channel, the radio stays on the priority channel.*

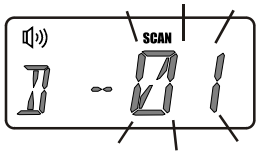
To scan a Preset channel with a Priority channel:

1. Turn the channel knob to one of the Preset channels (**1** to **15**).
2. Press **DUAL WATCH**.

   The radio begins to scan the radio looking for the Preset channel and the Priority channel (setup using the Programmer) to monitor. In the example below, the Preset channel is 5 and the priority channel is 1.



   When a signal is detected on a channel, the monitor icon is displayed, the channel or frequency flashes and activity on the channel is heard.



   Scanning pauses for 5 seconds unless tone decoding is enabled on some or all channels in which case the scan rate slows as the radio decides whether or not there is something worth listening to.

   When the signal ends, or 5.0 seconds is up, scanning resumes.

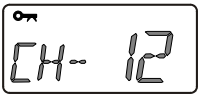
3. Press **DUAL WATCH** again to stop the scanning process.

Key Lock Feature

The key lock feature prevents the accidental pressing of radio buttons with the exception of **PTT** and **MONITOR**.

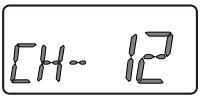
To activate this feature:

1. Press **MONITOR** for more than 2 seconds. Doing so displays the key icon .



   The key lock status is retained when the radio is turned off.

2. Release the key lock by pressing **MONITOR** again for more than 2 seconds. The key icon is no longer displayed.



Power Save Feature

If no transmission or reception has occurred for 5 seconds, the receiver switches from continuously on to periodically turning on and off based on whether and how the radio is programmed. By reducing the amount of time the receiver is on, battery life is extended.

The power save feature is set by the Programmer as follows.

- Battery Save On Timer:

  Set to Disable or 200 ms to 1000 ms, at 50 ms increments

- Battery Save Off Timer:

  Set to 100 ms to 500 ms, at 50 ms increments.

With this feature enabled, up to 500 ms of an incoming message can be missed so in some cases the sender may have to repeat the call. However, the resulting increase in battery life is usually worth this inconvenience.

Back Light Feature

The back light is enabled using the Programmer and can affect the display area and buttons on the radio in various ways:

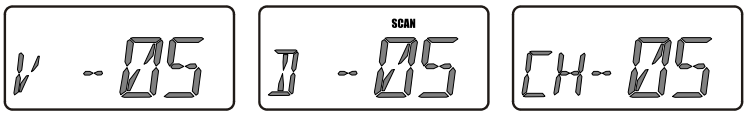
- On After Key. The light goes on after any key is pressed (default). It lights up for 1 second when the radio is turned on and for 5 seconds when the channel knob is turned or any other button is pressed (pressing any key within this 5 seconds extends the light 5 seconds longer).
- Always on. The light is always on.
- Disable. No light (useful in combat situations).

Scramble Feature

The scrambler is a hopping type of rolling code encryption that must be installed in your radio. A **SCRAMBLE** button must also be assigned by the Programmer for this feature to work. For details about using this feature, refer to the TVS-2-DT1 manual.

VOX Feature

VOX allows hands-free operation for voice detection and transmission. A **VOX** button must be assigned by the Programmer for this feature to work. When VOX is enabled, **V** is displayed. When scan is activated, VOX is overridden.



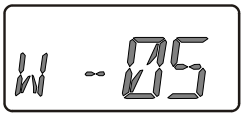
VOX on | At scanning | VOX off

The VOX status is retained when the radio is turned off.

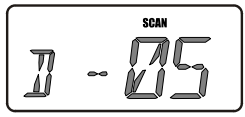
CAUTION: Not to be used with the Whisper feature.

Whisper Feature

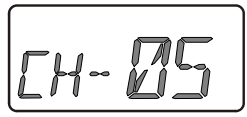
Whisper increases the sensitivity of voice transmission. The validity of its use must be taken into consideration before being programmed into the radio. A **WHISPER** button must be assigned by the Programmer for this feature to work. When Whisper is enabled, **W** is displayed. When scan is activated, Whisper is overridden.



Whisper on



At scanning



Whisper off

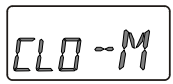
The Whisper status is retained when the radio is turned off.

CAUTION: Not to be used with the VOX feature.

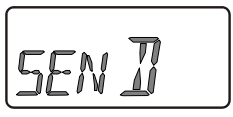
Cloning a Radio

Programmed data can be copied between 2 radios.

1. Connect the cloning cable to the radios.
2. Place both radios into cloning mode by pressing **MONITOR** and ▲ simultaneously while turning the radio on. The following screen is displayed on both radios.



3. Press **P1** on the transmitting (master) radio.



Transmitting Radio

Receiving Radio

A beep sounds when the transfer of data is finished. **END** is displayed on the sending radio for 2 seconds followed by **CLO-M**. After the receiving radio gets the data, **CLO-M** is displayed.

Note: *If cloning fails, the radio beeps and* **ERR** *is displayed for 2 seconds followed by* **CLO-M**.

Programmed Settings

The following settings are programmed using the Programmer. For details, refer to the HH7700-PROG-MSOP Programmer guide.

Common Parameters

Feature	Available Settings	Default
Power on beep	Enable: Radio beeps when turned on. Disable: Radio does not beep when turned on.	Enable
Key button beep	Enable: Radio beeps when a key is pressed. Disable: Radio does not beep when a key is pressed.	Enable
Rotary beep	Enable: Radio beeps when the channel select knob is turned. Disable: Radio does not beep when turning channel select knob.	Enable
Low battery beep	Enable: Radio beeps when battery is low. Disable: Radio does not beep when batter is low.	Enable
Battery save on timer	Disable: No powersave feature. To enable, set from 200 ms to 1000 ms in increments of 50 ms.	Disable
Battery save off timer	100 ms to 500 ms in increments of 50 ms.	250 ms
Timeout timer	0.5 minutes to 4 minutes in increments of 0.5 minutes.	3 min
TX/Busy lamp	Enable: On transmission, radio lamp is lit. Disable: Lamp does not light up during transmission.	Enable
LCD/keypad lamp	Disable: LCD/buttons don't light up. On after key: Light turns on after any button is pressed. Always on: Light is always on.	On after key
Frequency display	Enable: Frequency is displayed instead of channel number. Disable: Channel number is displayed.	Disable

Feature	Available Settings	Default
Scan speed	From 50 ms to 120 ms in increments of 10 ms.	80 ms
CTCSS timer	From 100 ms to 300 ms increments of 10 ms.	200 ms

Programmable Buttons

P1, P2, P1+Shift, P2+ Shift	Description
None	No function.
Scan	On or off: If on, **SCAN** icon and **M**(emory) or **D**(ual Watch) are displayed.
Dual watch	On or off: If on, **SCAN** icon and **D**(ual Watch) are displayed.
Scramble	Security system if installed in radio.
VOX	Hands-free operation.
Whisper	Increased sensitivity of voice transmission.

Channel Parameters

Function	Available Settings	Default
Channel number	1 to 100	
Scan	None, Scan, Priority	None
Channel spacing	Wide, Narrow	Wide
Receive frequency	30.0000 MHz to 87.9875 MHz	None
Transmit frequency	30.0000 MHz to 87.9875 MHz	None
RX Sub-Audio	CTCSS, 150Hz, None	None
TX Sub-Audio	CTCSS, 150Hz, None	None

Function	Available Settings	Default
Decode	CTCSS tone. If RX Sub-Audio is set to CTCSS, choose from Decode/Encode CTCSS Frequencies table below. If RX Sub-Audio is set to none or 150 Hz, CTCSS frequencies cannot be set.	Off
Encode	CTCSS tone. Set TX Sub-Audio tone with CTCSS frequencies. Cannot be programmed if set to 150 Hz.	Off
Lockout type	Busy channel: If set to on while receiving, cannot transmit. Busy tone: Can transmit if receive with CTCSS tone frequency is matched. None: Can transmit regardless, and receiving condition is set to none.	None
Timeout timer	Enable, Disable	Enable

Preset Channel Parameter

Function	Available Settings
Preset 15 channels to channel knob positions	Channels 1 to 100 can be set to work with the channel knob.

Decode/Encode (CTCSS) Frequencies

No.	Freq. (Hz)	No.	Freq. (Hz)	No.	Freq. (Hz)	No.	Freq. (Hz)
1	67.0	11	94.8	21	131.8	31	186.2
2	69.3	12	97.4	22	136.5	32	192.8
3	71.9	13	100.0	23	141.3	33	203.5
4	74.4	14	103.5	24	146.2	34	210.7
5	77.0	15	107.2	25	151.4	35	218.1
6	79.7	16	110.9	26	156.7	36	225.7
7	82.5	17	114.8	27	162.2	37	233.6
8	85.4	18	118.8	28	167.9	38	241.8
9	88.5	19	123.0	29	173.8	39	250.3
10	91.5	20	127.3	30	179.9		