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3M™ Dynatel™

Cable/Pipe/Fault/EMS Locator

7550/7573 Series

Operator's Manual

7550-iD Pipe/Cable/EMS Locator

7573-iD Pipe/Cable/EMS Locator

7550E-iD Pipe/Cable/EMS Locator

7573E-iD Pipe/Cable/EMS Locator

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Congratulations! You have just purchased one of the finest, most advanced locating devices available today!

The 3M™ Dynatel™ Pipe/Cable/EMS Locators 7550 and 3M™ Dynatel™ Cable/Pipe/Fault/EMS Locators 7573 Series are designed with all of the functionality of previous Dynatel locator models plus the ability to locate 3M EMS Caution Tape 7600 Series. All Dynatel 7550 and 7573 locators have the capability to read and write user information to 3M™ iD Markers. Information such as a pre-programmed identification number, facility data, application type, placement date and other details can all be read, stored and downloaded to your PC for enhanced resource management with this revolutionary equipment. The Dynatel 7550-iD Pipe/Cable/EMS Locators and Dynatel 7573-iD Cable/Pipe/ Fault Locators will also search for EMS markers while locating pipe/cable or path markers, simultaneously. When used in conjunction with a hand-held GPS, the ability to transmit path and marker coordinates multiplies the potential for mapping. This equipment provides a simple system for mapping utility information directly into CAD and GIS systems. The 7550/7573 Series transmitters are available in 3 watt, 5 watt and 12 watt versions.

Enhancements also include single push button depth for all markers and powering bluetooth dongles used for data retrieval and GPS data transmission. 3M is dedicated to bringing you premium equipment with outstanding reliability, backed by one of the best warranties in the business and outstanding service.

Visit our website at www.3M.com/dynatel for more application notes and product information.

Statement of Conformity

Hereby, 3M Company declares that this Underground Locating Product is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

www.3m.com/market/telecom/access/conformity/

1. Safety Information

Please read, understand and follow all safety information contained in these instructions prior to the use of the 3M™ Dynatel™ Pipe/Cable Locators 7500 Series and 3M™ Dynatel™ Cable/Pipe/Fault/EMS Locators 7573 Series. Retain these instructions for future reference.



Intended Use

The 3M™ Dynatel™ Cable/Pipe/Fault/EMS Series Locators 7550/7573 are used to identify the placement of underground utility lines. The system must be installed as specified in the 3M™ Dynatel™ Cable/Pipe/Fault/EMS Locator 7550/7573 Series Operator's Manual. It has not been evaluated for other uses or locations. If this equipment is used in a manner not specified by 3M, the protections provided by the equipment may be impaired.

WARNING

If this equipment is used in a manner not specified by 3M, the protections provided by the equipment may be impaired.

Explanation of Signal Word Consequences

 Warning:	Indicates hazardous situation which if not avoided, could result in death or serious injury.
 Caution:	Indicates hazardous situation which if not avoided, could result in minor or moderate injury.

Explanation of Product Safety Label Symbols



Do not throw away in normal trash.



Warning: Risk of electric shock



Consult accompanying documentation in all cases where this symbol is marked on the product.

A. Dyna-Coupler Information

WARNING

This WARNING applies to the following 3M Dyna-Couplers;

- 3" (75 mm) - Part number 3001
- 4.5" (114 mm) - Part number 4001
- 6" (150 mm) - Part number 1196
- All accessory kits containing any of the listed Dyna-Couplers - Part numbers 3019, 4519, 1196/C

A potential for electrical shock exists when using the Dyna-Coupler on cables energized with electrical power. Use appropriate safety procedures.

DO NOT USE ON CABLES CARRYING IN EXCESS OF 600 VOLTS RMS.

B. Direct Connect Information

WARNING

This WARNING applies to the use of the Direct Connect Cables and the Transmitter.

To avoid potential shock, or electrically damaging the Transmitter, when setting up the Transmitter to locate using the Direct Connect method, follow these basic steps;

- ALWAYS plug the Direct Connect Cable into the Transmitter Output Jack [T-6] BEFORE connecting the leads to the cable/pipe to be located and the ground rod.
 - Connect the red lead to the cable/pipe.
 - Connect the black lead to ground rod.

A POTENTIAL FOR ELECTRICAL SHOCK, AND/OR TRANSMITTER ELECTRICAL DAMAGE, EXISTS WHEN USING THE DIRECT CONNECT CABLE ON CABLES ENERGIZED WITH ELECTRICAL POWER IF THE ABOVE INSTRUCTIONS ARE NOT FOLLOWED. USE APPROPRIATE SAFETY PROCEDURES.

CHECK VOLTAGE BEFORE CONNECTING TRANSMITTER. VOLTAGE HIGHER THAN 240 VOLTS WILL DAMAGE EQUIPMENT. FOLLOW STANDARD PROCEDURES FOR REDUCING THE VOLTAGE.

C. Receiver Battery Information

WARNING

To reduce the risks associated with fire and explosion when using Lithium Ion batteries:

- Do not short, excessively heat, or dispose of batteries in fire;
- Do not pierce, modify or damage the battery, circuitry or packaging;
- Do not allow the battery to get wet;
- Only use the supplied charger or purchase a new charger from 3M;
- Do not operate batteries outside of -20° to 50° C (-4 ° to 122 °F).
- Only charge batteries in an indoor environment, with a temperature range of 0° to 45°C (32° to 113°F)
- DO NOT DOUSE A BURNING BATTERY! USE A FIRE EXTINGUISHER!

To reduce the risks associated with fire and explosion when using Alkaline batteries:

- Install batteries with proper polarity.
- Use only Alkaline “AA” (LR 6) with the included holder and adapter.
- Do not charge Alkaline batteries.
- Do not use leaking batteries.

CAUTION

To reduce the risks associated with environmental contamination:

Dispose of batteries and electronic components in accordance with all federal, state and local regulations.

ATTENTION

Shipping issues regarding batteries:

In many cases the outside of the packaging must have an appropriate warning label and the package may have weight restrictions;

Transportation regulations continuously change so please seek the advice of shipping agencies.

D. Transmitter Battery Information

CAUTION

To reduce the risks associated with fire and explosion:

- Do not short, excessively heat, or dispose of batteries in fire.
- Install batteries with proper polarity.
- Use only Alkaline "C" (LR14) sized batteries.
- Do not charge batteries.
- Do not use leaking batteries.

To reduce the risks associated with environmental contamination:

- Dispose of batteries and electronic components in accordance with all regulations.
- Ensure batteries are installed with correct polarity.
- Always remove batteries when storing the units for long periods of time.

UN2800 classification as “Batteries, wet, Non-Spillable, and electric storage” as a result of passing the Vibration and Pressure Differential Test described in DOT [49 CFR 173.159(d) and IATA/ICAO [Special Provision A67].

CAUTION

To reduce the risks associated with environmental contamination and possible injury:

The 12W transmitter utilizes the 3M™ Rechargeable 12V Battery 2200RB for the Maximim Output power level. This is a maintenance-free sealed lead (Pb)-acid battery.

- Replace the battery if the acid solution leaks.
- The batteries are not serviceable.
- Do not disassemble batteries.
- Do not remove vent caps.
- Do not rest tools or cables on batteries.
- Store lead-acid batteries with adequate ventilation.
- Do not heat batteries above 140°F (60°C)
- Never recharge batteries in an unventilated, enclosed space.
- Spent batteries must be treated as hazardous waste. Dispose of batteries and electronic components in accordance with all regulations.
- Do not incinerate batteries.
- Always remove/disconnect batteries when not in use or storing for long periods of time.



Non-spillable
BATTERY MUST BE RECYCLED

Pb.

2. About This Manual

There are two basic models included in the 3M™ Dynatel™ Locator 7500 Series. The 7550 locator is designed for pipe/cable/EMS locating. The 7573 locator is designed for cable/pipe/EMS and fault locating. The iD option (read/write capability to 3M™ iD Markers) is standard for both models. The 7550/7573 Series transmitters are available in 3 watt, 5 watt and 12 watt units. They provide .5 watts, 3 watts, 5 watts and 12 watts of output power. 5 and 12 watts is attained by utilizing the Cigarette Lighter Adapter or External Rechargeable Battery. This instruction manual will include all features. Instructions are applicable to all products, unless noted. The 12-watt transmitter offers additional power output levels for improved induction performance and 8 kHz (low frequency) induction for shallow facilities, such as risers. In order to demonstrate all available functions, some illustrations depict the 7573-iD receiver unit. The 7550 receivers and transmitters may vary from the illustrations shown.

3. Quick Start

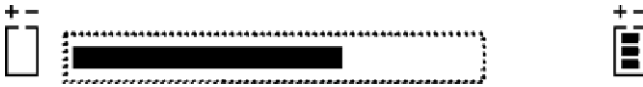
A. Locator Battery

1. Twist cap to open battery compartment.
2. Slide battery into handle ensuring the text is facing left or right of the handle.

B. Charging the Receiver Battery

1. Pull back on the rubber plug cover
2. Plug the AC charger into a power outlet.
3. Plug the charging cord into the yellow power port [page 13 - item 11].

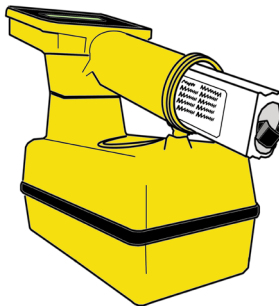
The receiver batteries are tested for two seconds every time the unit is turned on.



The bar graph on the screen will fill to the relative battery level. The Battery Icon [13] on the Locate Screen will continuously indicate the battery level.

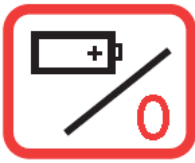
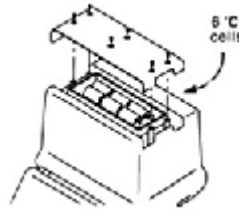
C. Using Alkaline batteries

1. Twist cap to open battery compartment.
2. Slide Lithium Ion battery pack out of handle.
3. Insert alkaline battery holder, with 8 AA Alkaline batteries, into battery compartment.
4. Cover and twist cap to close.



D. Transmitter Battery Installation

1. Loosen the six screws on the battery compartment cover on the bottom of the transmitter. Remove the cover.
2. Install six 'C' cell batteries (LR14) into the compartment as indicated by the polarity symbols (+ and -).
3. Replace the cover and tighten the screws.



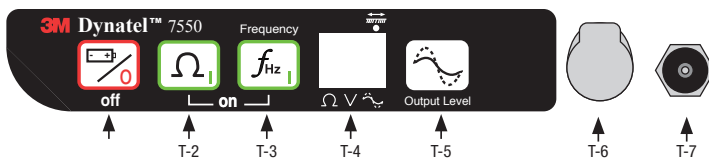
Press and hold OFF to manually test the batteries. The display and audio will indicate one of the following levels: (OK w/solid tone = good; LO w/beeping tone = low; "--" w/ no tone = replace)

E. 3M™ Rechargeable 12V Battery 2200RB Information

The maintenance-free sealed lead (Pb)-acid 3M™ Rechargeable 12V Battery 2200RB can be used as an auxiliary battery in 3M™ Dynatel™ Locator 7500 Series 12 Watt Transmitters. It plugs into the External Jack [T-7] and provides power for the transmitter. When the rechargeable battery is plugged in, normal output, high output, and maximum output are available. When the rechargeable battery is connected to the transmitter, the alkaline batteries are bypassed. The rechargeable battery is a lead acid battery rated at 5.4 amp-hours and is equipped with a user replaceable fuse (5A/32V).

Note: The internal batteries must be at least 5.4 volts. Do not remove the alkaline batteries from the transmitter when using the rechargeable battery. Rechargeable battery, or cigarette lighter adapter cable, is required for maximum output level. Rechargeable battery is installed in the well of the transmitter case.

F. 3M™ Dynatel™ Locator 7550 Transmitter Keypad and Connector Definitions



[T-1] **off**: Turns unit off and performs battery test.

[T-2] **on - Ohm-meter**: Turns the unit on and places the unit in Ohm-meter mode. This measures the continuity of the trace conductor/pipe and its far-end ground.

[T-3] **on - Frequency**: Turns the unit on and places the unit in Trace mode.

Select Frequency: Press *Frequency* [T-3] repeatedly to cycle through the transmitter's active frequencies. The selected frequency will be displayed [T-4].

Active Frequencies:

7550	577 Hz, 1 kHz, 8 kHz, 33 kHz, 82 kHz, 200 kHz
7550E (International)	577 Hz, 1 kHz, 8 kHz, 33 kHz, 82 kHz, 133 kHz

ALL indicates that the following active frequencies are transmitting simultaneously:

7550	577 Hz, 8 kHz, 33 kHz, 200 kHz
7550E (International)	577 Hz, 8 kHz, 33 kHz, 133 kHz

[T-4] Digital Display:

Indicator Flags: These flags coincide with the operational mode of the transmitter. Starting from bottom left to upper right; Ohm-meter [T-2], Voltage (at start up the transmitter checks for foreign voltage), Output Level (no flag = normal output; flag = high output; flashing flag = maximum output) and Trace mode [T-3].

Digital Display: Indicates frequency, relative current, resistance, battery level and voltage (if present on target).

[T-5] Output Level: Cycles output power level.

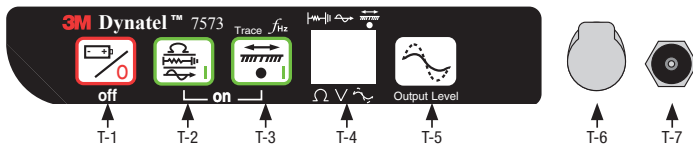
Normal=No Flag; High=Flag; Maximum=Flashing Flag (indicated in Digital Display [T-4])

NOTE: An external 12-volt power source is required to obtain Maximum Output level.

[T-6] Output Jack: Port for direct connect cables or Dyna-coupler cable.

[T-7] External Jack: Port to connect cigarette lighter adapter cable, or rechargeable battery (2200RB). Input voltage level: 9-18 VDC.

G. 3M™ Dynatel™ Locator 7573 Transmitter Keypad and Connector Definitions



[T-1] off: Turns unit off and performs battery test.

[T-2] on: Ohm-meter/Fault Locate/Tone: Turns the unit on and cycles through the following commands when pressed repeatedly.

Ohm-meter: Measures the continuity of the trace conductor/pipe and its far-end ground. It is also used to measure the fault resistance to earth.

Fault Locate: In this mode, the transmitter sends two alternating locating frequencies (577 Hz and 33 kHz) as well as fault signals 10 and 20 Hz.

Tone: In the tone mode, the transmitter generates two frequencies simultaneously:
7573 577 Hz and 200 kHz signals.
7573E (International) 577 Hz and 133 kHz signals.

[T-3] on: Trace (frequency): Turns the unit on and places the unit in Trace mode.

Select Frequency: Press *Trace* [T-3] repeatedly to cycle through the transmitter's active frequencies. The selected frequency will be displayed [T-4].

Active frequencies:

7573	577 Hz, 1 kHz, 8 kHz, 33 kHz, 82 kHz, 200 kHz
7573E (International)	577 Hz, 1 kHz, 8 kHz, 33 kHz, 82 kHz, 133 kHz

ALL indicates that the following active frequencies are transmitting simultaneously:

7573	577 Hz, 8 kHz, 33 kHz, 200 kHz
7573E (International)	577 Hz, 8 kHz, 33 kHz, 133 kHz

[T-4] Digital Display:

Indicator Flags: These flags coincide with the operational mode of the transmitter. (From top left to bottom right) Fault Locate mode [T-2], Tone mode [T-2], Trace mode [T-3], Ohm-meter [T-2], Voltage (at start up the transmitter checks for foreign voltage), and the Output Level (no flag = normal output; flag = high output; flashing flag = maximum output).

Digital Display: Indicates frequency, relative current, resistance, battery level and voltage (if present on target).

[T-5] Output Level: Cycles output power level;

Normal=No Flag; High=Flag; Maximum=Flashing Flag (indicated in Digital Display [T-4])

NOTE: *An external 12-volt power source is required to obtain Maximum Output level and the 12-watt output level varies by frequency. Output is limited to 10 watts at 33 kHz and 1 watt at 82 kHz and higher using the direct connection method.*

[T-6] Output Jack: Port for direct connect cables or Dyna-coupler cable.

[T-7] External Jack: Port to connect cigarette lighter adapter cable, or rechargeable battery (2200RB). Input voltage level: 9-18 VDC. (Only on 5-watt and 12-watt transmitters.)

H. Maximum Transmitter Output

An external 12V DC source is required for 12-Watt Output (Maximum setting) using a 12-watt transmitter. Connecting the rechargeable battery (2200RB) to the *External Jack* [T-7] will provide this external source, or the cigarette lighter adapter cable (included with high-powered units) can be used to connect the DC power from a vehicle’s battery source to the transmitter’s *External Jack* [T-7].

Press *Output* [T-5] twice for maximum output power mode.

The indicator flag (in [T-4]) will flash when the transmitter is in maximum output mode.

Note: *The external DC source does not charge the internal batteries.*

⚠ WARNING


To reduce the risk associated with hazardous voltage:

- Potential for electric shock exists when handling connection cables while the transmitter is ON. Make all connections prior to powering on the unit. Turn transmitter OFF before handling connection cables.
- Voltage greater than 240 volts will damage equipment and could cause personal injury or death. Make all connections before turning on the transmitter. Follow standard procedures for reducing the voltage.
- Do not change or modify this product in any way.

I. Cleaning Receiver and Transmitter Units

To clean the receiver and transmitter units, wipe with a damp cloth. Do not immerse any parts in water to clean.

J. Service and Accessories

Information regarding service, accessories, or replacement parts can be obtained by contacting 3M at 1-800-200-0265. 

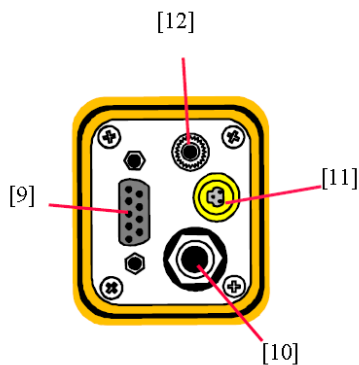
K. Receiver External Cable Ports Definitions

[9] **Serial Port:** RS232 port to connect the receiver to a PC via serial cable or USB-to-Serial Adapter cable.

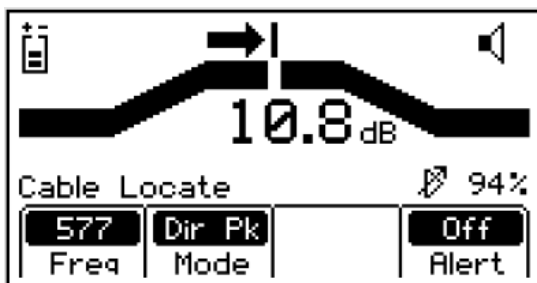
[10] **External Jack:** Port to connect cables from external devices such as the earth contact frame (A-Frame), a second Dyna-Coupler or a toning coil.

[11] **Charging Jack:** Port to connect AC charger for charging the Lithium Ion battery pack only.

[12] **Earphone Jack:** Will fit standard 1/8 inch minijack mono earphone plug (not included).



L. Receiver Locate Screen Definitions



[13] **Battery Icon:** Indicates battery level.

[14] **Bar Graph:** Graphical representation of the received signal.

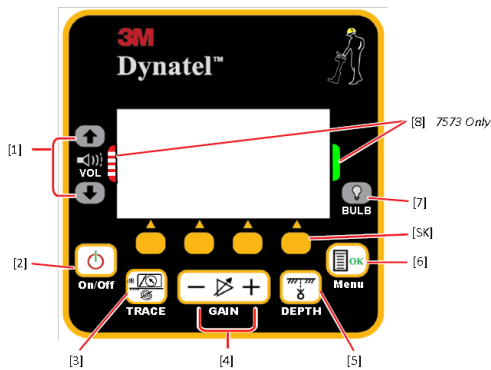
[15] **Signal Strength:** Digital reading of the signal strength that the receiver is detecting from the target.

[16] **Soft Key Commands:** Definitions for each of the four soft key functions.

[17] **Gain Level:** Displays relative gain level.

[18] **Speaker Volume Icon:** Indicates the relative volume level of the receiver. When the third ring is dotted and 'xpnd' appears below the speaker volume icon, the receiver is in "Expander" mode. This mode is used to pinpoint the target cable or pipe.

M. 3M™ Dynatel™ Receiver 7500 Keypad Definitions



[1] **Speaker Volume Control:** Adjusts the volume of the receiver (off, low, med, high, and xpnd).

[2] **On/Off (Power):** Turns unit on and off.

[3] **TRACE (Locate) MODE:** Toggles between Cable View locate mode and the four other locate modes (cycles through available modes via the Mode soft key when in the Cable/Pipe Locate screen.)

[4] **GAIN:** Adjusts the sensitivity of the receiver either up (+) or down (-) to maintain a satisfactory signal level.

[5] **DEPTH:** Measures depth of target.

[6] **Menu / OK:** Sets the receiver to trace mode for locating cable or pipe and displays Locate options, iD Marker templates and writing mode options, setup screens for configuration of the unit, i.e.: clock, language, depth units, marker data and frequencies, COM settings and Help files. Also acknowledges setup entries (OK).

[SK] **Soft Keys:** There are four soft keys (yellow keys) on the receiver. The function of each key is shown above the yellow key on the display screen. The functions will change, depending on the operation mode of the receiver. For instruction purposes in this manual, the display command is followed by [SK] to identify it as a soft key.

[7] **BULB:** Toggles the display backlight on and off.

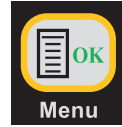
[8] **Fault Finding Direction Indicators:** Corresponds to the Earth Contact Frame (A-Frame) probe (leg) colors. These indicators only appear on the 7573 keypad.

4. Menu Screens

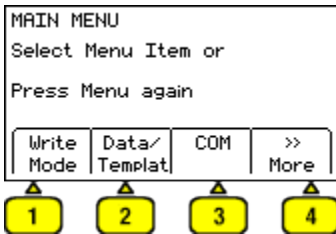
A. MAIN MENU/LOCATE MENU

When the *Menu/OK* [5] button is pressed, the display will toggle between the MAIN MENU display and LOCATE MENU display.

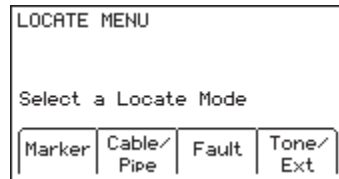
The function appears on the display above each soft key [SK].



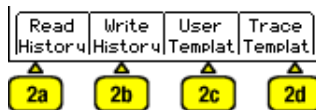
MAIN MENU Screen



LOCATE MENU Screen



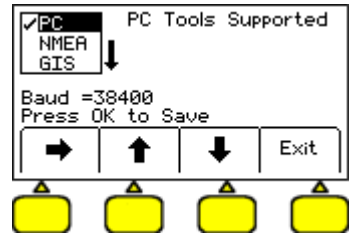
1. **Write Mode:** System used to write information to 3M™ iD Markers.
2. **Data/Template:** Displays marker history and template creation/selection displays:



- a. **Read History** – 100 memory locations for Read 3M™ iD Markers.
- b. **Write History** – 100 memory locations for written 3M™ iD Markers.
- c. **User Templates** – Create and edit iD templates for 3M™ iD Markers (max=32).
- d. **Trace Templates** – Create and edit templates used to identify path (max=5).

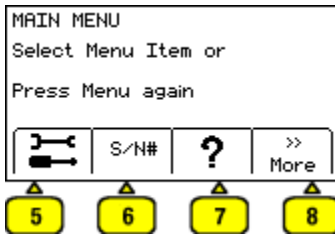
3. **COM Setup:** Displays second level COM Port setting display to configure RS232 port communication with different devices –

- a. **PC** – Locator will communicate to a computer.
- b. **NMEA** – Port is configured to accept coordinates from GPS device according to NMEA (National Marine Electronics Association).
- c. **GIS** – Port is configured to send iD marker information or path information to GPS device and receive coordinates from GPS device according to GIS (Geographic Information System).
- d. **PDA** – Locator will send iD marker and path information in ASCII string.



4. **>>More:** Advances to next Main Menu display.

MAIN MENU Display 2



LOCATE MENU Screen



5. **Setup Tools** (🔧): Displays second and third level displays for receiver configuration.

- a. **Language** (🇬🇧) – Toggles between English and alternate language.
- b. **Clock** (🕒) – Date and time stamped on marker information and depth readings.
- c. **Contrast** (🔆) – Adjusts contrast of LCD display.
- d. **>>More** - Advances to next menu display.

- e. **Locate Modes** – enable or disable locate modes.
- f. **Locate Frequencies** – enable and disable receiver frequencies in locate mode.
- g. **Audio Configuration** – Select audio response of unit in Directional Peak and Trace View modes.
- h. **>>More** - Advances to next menu display.



i. **Depth Units**  – Choose unit of measure; in, ft-in, or cm.

inch cm	Marker Type	Tone/ Freq	>> More
------------	----------------	---------------	------------

j. **Marker Type** – enable and disable marker utility types.

k. **Tone/Freq** - External Port or Tone Frequencies – enable and disable frequencies that are detectable through the external port of the receiver.

l. **>>More** - Returns to first SETUP MENU display.

6. **S/N#:** Displays information about unit and can perform a self check test.

Model : 7573-iD Locator			
Serial# : 00000005 Beta			
S/W : 11.63.02.00.01.02.09.10			
H/W : 18.00.00.00.00.01.06			
Self Test Mode			
Run			Exit

7. **Help** : Offers the user on-screen instructions.

8. **>>More:** Returns to first Main Menu screen.

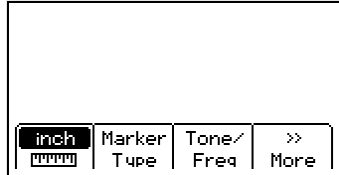
5. Configuring The Receiver

In the setup mode, the units of depth measurement, time, date, and date format can be set. The receiver can be configured to detect only certain frequencies and/or specific utility markers and activate certain locating modes. User defined frequencies can be programmed, language of the receiver can be selected, and tone frequencies set.

A. Selecting Depth Units


Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] +  [SK:5] + >>More [SK:d] + >>More [SK:h] +  [SKToggle:i]

- The soft key command will toggle between inches (in), centimeters (cm), and feet/inches (ft-in).

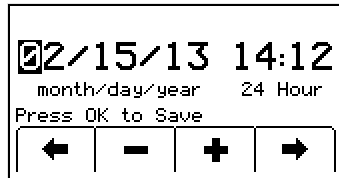


B. Setting the Receiver Clock

Set the time, date, and date format of the receiver. Depth and Current measurements are time and date stamped, as well as read and write marker information (iD units only).

Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] +  [SK:5] +  [SK:b]

- Press the left/right arrow [SK] to highlight the digit of the date or time to change.
- Press the + or - [SK] to increment or decrement.
- When the date format is highlighted, the format will toggle between mm/dd/yy and dd/mm/yy.
- Press *Menu/OK* [6] to save.



C. Selecting a Language

Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] +  [SK:5] +  [SKToggle:a]

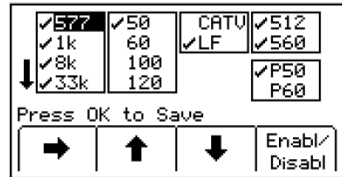
The soft key command will toggle between available languages. Alternate languages can be uploaded to the receiver using the 3M™ Dynatel™ PC Tools software. (Available for download at www.3M.com/dynatel.)

D. Enabling/Disabling Locating Frequencies


Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] +  [SK:5] + >>More [SK:d] + Locate Freq [SK:f]

The user can select the frequencies that the receiver will detect. All the available frequencies are listed in four groups (Left to Right: Active, Power, Passive, and Auxiliary). The Auxiliary group also contains the User Defined Frequencies. (See 5G. *Creating User Defined Frequencies*.) The box below the Auxiliary group allows the selection of filtering for 50 Hz or 60 Hz passive signals when User Defined frequencies have been chosen for locating.

- Press the right arrow [SK] to move the highlight bar to the section of frequencies to enable, or disable.
- Press the up/down arrows [SK] to highlight the specific frequency.
- Press *Enabl/Disabl* [SK]. (Enable denoted by ✓)
- Repeat steps 2 & 3 to enable/disable other frequencies.
- Press *Menu/OK* [6] to save.



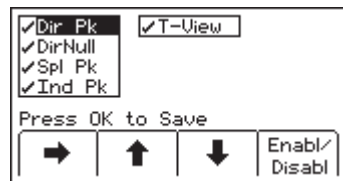
E. Selecting Locate Modes (Antenna Modes)

Menu/OK [5: Toggle to MAIN MENU] + >>More [SK:4] +  [SK:5] + >>More [SK:d] + Locate Modes [SK:e]

The user can select the locate modes (antenna modes) that the receiver utilizes. There are five locate modes that are available; Trace View (T-View), Directional Peak (Dir Pk), Directional Null (DirNull), Special Peak (Spl Pk) and Induction Peak (Ind Pk).

All five modes are activated when shipped. The user can deactivate any of the modes that will not be used.

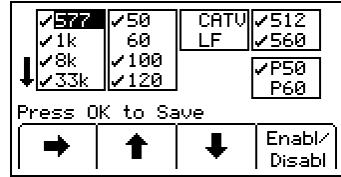
- Press the up/down arrows [SK] to highlight a specific locate mode in the first column.
- Press the right arrow [SK] to move the highlight bar to the second column, or back to the first column.
- Press *Enabl/Disabl* [SK]. (Enable denoted by ✓)
- Repeat steps 2 & 3 to enable/disable other locate modes.
- Press *Menu/OK* [6] to save.



F. Selecting External Jack Frequencies (Tone Frequencies)

Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] +  [SK:5] + >>More [SK:d] + >>More [SK:h] + Tone/Freq [SK:k]

A coupler can be plugged into the *External Jack* [15] of the receiver and used to identify 50 Hz or 60 Hz cables. (See *Other Applications: Cable Identification*.) The same procedure as above (Section 5D) is followed for selecting frequencies that can be detected by the *External Jack* found on the bottom of the receiver.

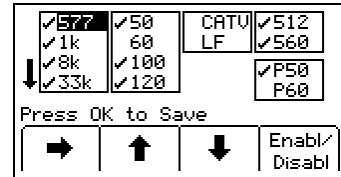


G. Creating User Defined Frequencies

Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] +  [SK:5] + >>More [SK:d] + Locate Freq [SK:f]

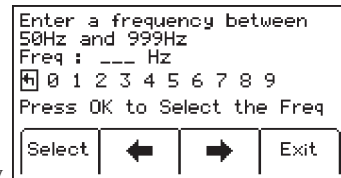
There are four user defined frequencies available on the receiver. (These frequencies must be between 50 Hz and 999 Hz.) These frequencies are found in the column on the far right of the Locate Freq display (Auxiliary frequencies). These frequencies, once programmed, will appear under the *Aux* [SK] frequency list when *Freq* [SK] is selected in the Locate mode.

To program the user defined frequencies press the right arrow [SK] to highlight the Auxiliary group of frequencies. Press the up/down arrows [SK] to highlight the user frequency to program. Press *Enabl/Disabl* [SK].



Press the left/right arrows [SK] to move the square cursor to a digit. Press *Select* [SK] to enter the number in the frequency field.

Press *Menu/OK* [6] to save the programmed frequency, or press *Exit* [SK] to cancel. The frequency will appear in the locate frequency display as U ###.

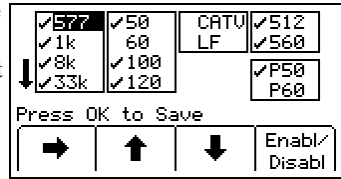


Note: To redefine a previously programmed user frequency, highlight the frequency, press *enabl/disabl*, select the back arrow with the cursor, and press *select* to delete the previous entry.

H. Filtering Power Frequency Interference (User Defined Frequencies Only)

Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] +  [SK:5] + >>More [SK:d] + Locate Freq [SK:f]

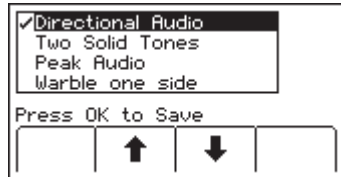
In order to filter out unwanted power influences while locating with user-defined frequencies, verify the correct frequency is selected for your location (default 60 Hz). Press *Menu/OK* [6] to save.



I. Selecting Locating Audio

Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] +  [SK:5] + >>More [SK:d] + Audio Config [SK:g]

The user can choose the audio response of the receiver when using the Directional Peak or Trace View modes for path locating. Highlight the audio selection and press *Menu/OK* [6] to save.

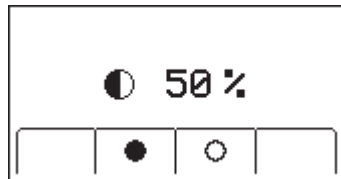


J. Adjusting Display Contrast

Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] +  [SK:5] +  [SK:c]

The display contrast can be adjusted higher or lower.

- Press the solid circle [SK] to darken the display.
- Press the open circle [SK] to lighten the display.
- Press *Menu/OK* [6] to save.



6. Locating Buried Cables And Pipes

A. Transmitter Connections

Perform a battery test. Use one of the following three methods to produce a trace signal on the target pipe or cable.

1. Direct Connect Method

⚠ WARNING

This WARNING applies to the use of the Direct Connect Cables and the Transmitter.

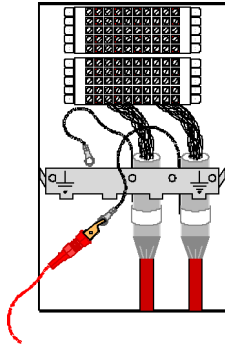
To avoid potential shock, or electrically damaging the Transmitter, when setting up the Transmitter to locate using the Direct Connect method, follow these basic steps;

- ALWAYS plug the Direct Connect Cable into the Transmitter Output Jack [T-6] BEFORE connecting the leads to the cable/pipe to be located and the ground rod.
 - Connect the red lead to the cable/pipe.
 - Connect the black lead to ground rod.

A POTENTIAL FOR ELECTRICAL SHOCK, AND/OR TRANSMITTER ELECTRICAL DAMAGE, EXISTS WHEN USING THE DIRECT CONNECT CABLE ON CABLES ENERGIZED WITH ELECTRICAL POWER IF THE ABOVE INSTRUCTIONS ARE NOT FOLLOWED. USE APPROPRIATE SAFETY PROCEDURES.

CHECK VOLTAGE BEFORE CONNECTING TRANSMITTER. VOLTAGE HIGHER THAN 240 VOLTS WILL DAMAGE EQUIPMENT. FOLLOW STANDARD PROCEDURES FOR REDUCING THE VOLTAGE.

- Plug the direct connect cable into the *Output Jack* [T-6] of the transmitter. Connect the black clip to the ground rod. Place the ground rod in the earth perpendicular to the suspected cable/pipe path. If necessary, extend the black lead with the Ground Extension Cable (#9043 available separately).



- Remove the ground bonding and attach the red clip to the shield of the cable, pipe, or target conductor. (If locating power cables, the red clip can be attached to the transformer cabinet, or the meter box).
- Turn the transmitter on by pressing *Ohms* [T-2]. The continuity of the circuit will be measured. The results are displayed on the *Digital Display* [T-4] in ohms and as an audible tone.

- If the continuity of the circuit is very good (the reading on the display is less than 3K Ω and a solid tone from the transmitter is heard) all frequencies can be used to locate. Always use the lowest frequency available. Lower frequencies are less likely to 'bleed over' to other cables in the same area, and are very good for tracing over long distances.
- If the circuit reads more than 3K Ω , but less than 10K Ω (indicated by a beeping tone from the transmitter) it will be necessary to use a higher frequency than 577 Hz in order to locate the cable/pipe.
- If the circuit reads more than 10K Ω , it will be necessary to use an RF signal such as 33 kHz, 82 kHz, 133 kHz or 200 kHz.
- If there is no tone and the transmitter indicates that there is an open circuit (OL in the display) this could be an indication of a poor ground, or an open-ended cable or pipe. Use one of the higher frequencies available, at high or maximum level. If it is an open-ended cable or pipe, the receiver's response will decrease suddenly at the site of the clear or severed end.

Note: In the ohms mode, the transmitter can detect voltage as well as ohms. If a low voltage is detected, the Digital Display [T-4] will alternate between displaying ohms and volts. When displaying ohms, the flag over the Ω symbol will be visible. When displaying volts, the flag over the 'V' will be visible. When the voltage magnitude is sufficient to impair the accuracy of the ohms measurement, only voltage will be displayed. If the voltage is AC, a sine wave will be visible on the Digital Display [T-4]. If a high AC voltage is detected, a rapid beeping tone will be heard.

- Press *Trace* [T-3] repeatedly until the desired frequency appears on the display. Note that the number that flashes alternately with the selected frequency is called the relative current. This number can be useful in identifying the target cable/pipe and is discussed more in 8. Depth and Current Estimate and 10. Locating in Directional Peak Mode.
- Press *Output Level* [T-5] to select high, or maximum, output level for longer tracing distances or deep pipe/cable.

2. 3M™ Dyna-Coupler Method

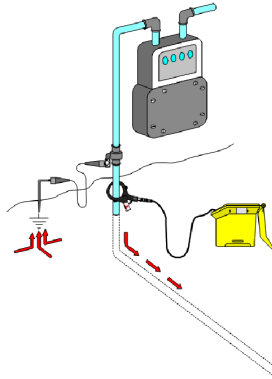
⚠ WARNING

This WARNING applies to the following 3M Dyna-Couplers;

- 3" (75 mm) - Part number 3001
- 4.5" (114 mm) - Part number 4001
- 6" (150 mm) - Part number 1196
- All accessory kits containing any of the listed Dyna-Couplers - Part numbers 3019, 4519, 1196/C

A potential for electrical shock exists when using the Dyna-Coupler on cables energized with electrical power. Use appropriate safety procedures.

DO NOT USE ON CABLES CARRYING IN EXCESS OF 600 VOLTS RMS.



- Connect the Dyna-Coupler to the transmitter *Output Jack* [T-6] using the coupler cable (9011).
- Clamp the Dyna-Coupler around the cable or pipe, below any bonds, just before it enters the earth. **The jaws of the coupler must fully close.**
- Press *Trace* [T-3] to turn on the transmitter. Press again to select 8 kHz, 33 kHz, 82 kHz, 133 kHz or 200 kHz.

Note: When using a Dyna-Coupler, always select high, or maximum, output power level by pressing the *Output Level* [T-5] key on the transmitter.

