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

3M

Contents

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 equipmen⚠t 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.

Pb.

Non-spillable
BATTERY MUST BE RECYCLED

Pb.

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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.
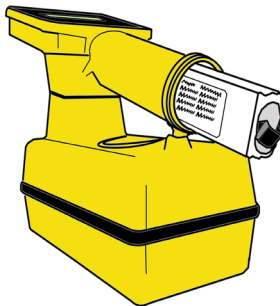
D. Transmitter Battery Installation

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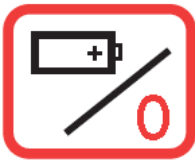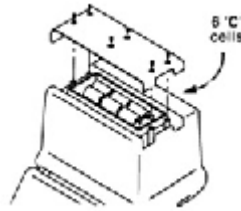
Press and hold OFF to manually test the batteries. The display and audio will indicate one of the following levels: (OK w/solid tone = good; LO w/beeping tone = low; "--" w/ no tone = replace)

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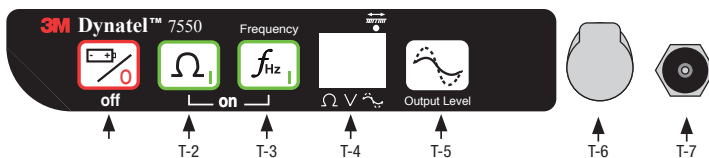
[T-1] off: Turns unit off and performs battery test.

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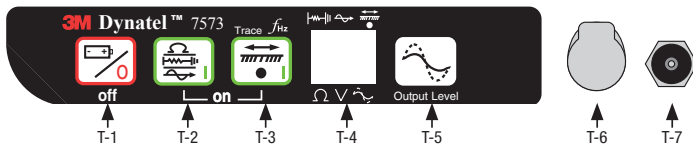
[T-1] off: Turns unit off and performs battery test.

[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.

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).
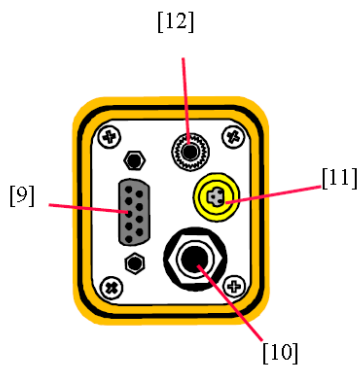
L. Receiver Locate Screen Definitions
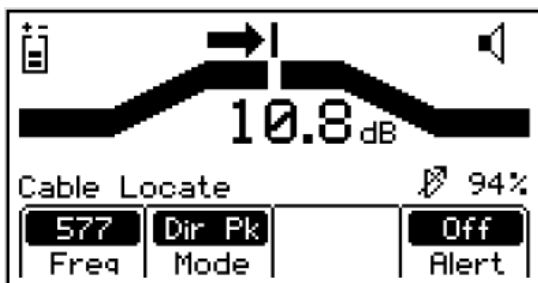
[13] **Battery Icon:** Indicates battery level.

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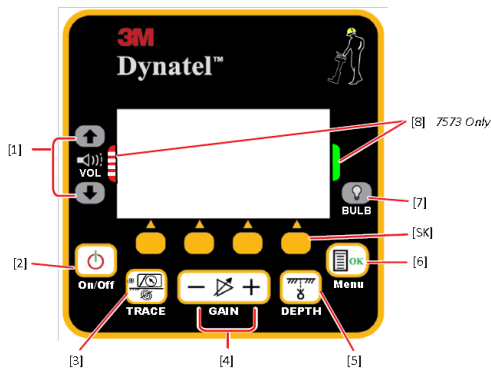
[1] **Speaker Volume Control:** Adjusts the volume of the receiver (off, low, med, high, and xpnd).

[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

```
MAIN MENU
Select Menu Item or

Press Menu again
┌──────┬──────┬──────┬──────┐
│Write │Data/ │ COM  │  >>  │
│Mode  │Templt│      │ More │
└──────┴──────┴──────┴──────┘
  ▲       ▲      ▲      ▲
 [1]     [2]    [3]    [4]
```
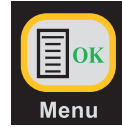
LOCATE MENU Screen

```
LOCATE MENU


Select a Locate Mode
┌──────┬──────┬──────┬──────┐
│Marker│Cable/│Fault │Tone/ │
│      │Pipe  │      │Ext   │
└──────┴──────┴──────┴──────┘
```
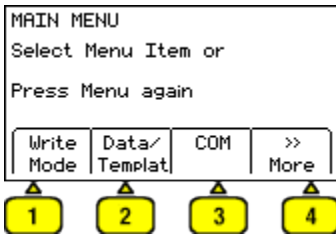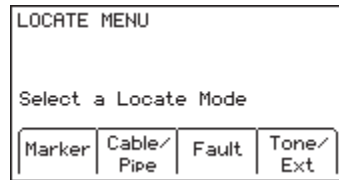
1. **Write Mode:** System used to write information to 3M™ iD Markers.

2. **Data/Template:** Displays marker history and template creation/selection displays:

```
┌──────┬──────┬──────┬──────┐
│Read  │Write │User  │Trace │
│Histry│Histry│Templt│Templt│
└──────┴──────┴──────┴──────┘
  ▲       ▲      ▲      ▲
 [2a]    [2b]   [2c]   [2d]
```

   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.
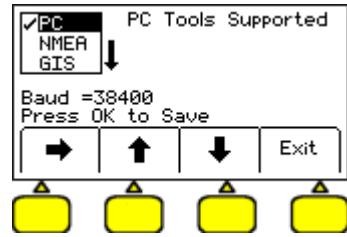
4. **>>More:** Advances to next Main Menu display.
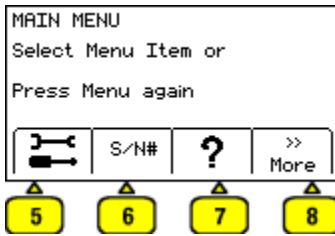
MAIN MENU Display 2   **LOCATE MENU Screen**
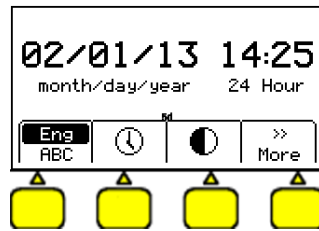
5. **Setup Tools** ⚙: Displays second and third level displays for receiver configuration.

   a. **Language** [Eng ABC] – 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.

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] + [inch] [SKToggle:i]

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

| inch | Marker | Tone/ | >> |
| | Type | Freq | More |
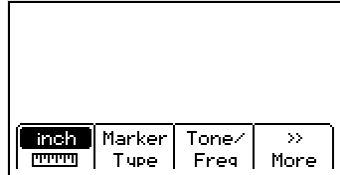
B. Setting the Receiver Clock

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.

02/15/13 14:12
month/day/year   24 Hour
Press OK to Save

| ← | − | + | → |
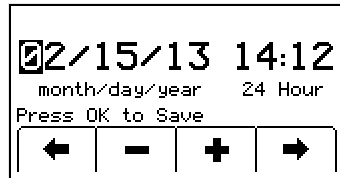
C. Selecting a Language

Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] + ⊟ [SK:5] + [Eng ABC] [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.
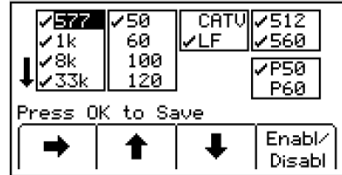
E. Selecting Locate Modes (Antenna Modes)

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.
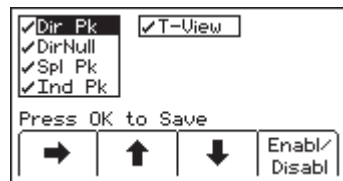
F. Selecting External Jack Frequencies (Tone Frequencies)

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.
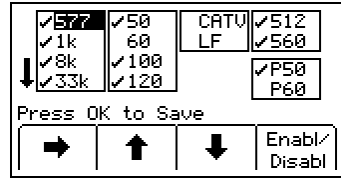
G. Creating User Defined Frequencies

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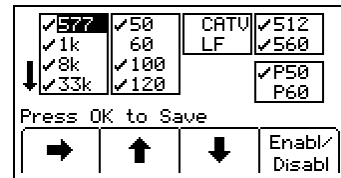
Press the left/right arrows [SK] to move the square cursor to a digit. Press *Select* [SK] to enter the number in the frequency field.

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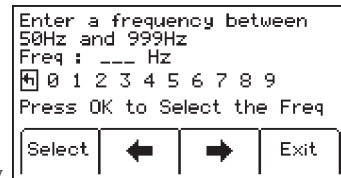
Note: To redefine a previously programmed user frequency, highlight the frequency, press enabl/disabl, select the back arrow with the cursor, and press select to delete the previous entry.

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.
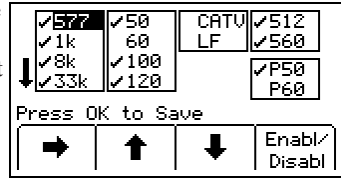
I. Selecting Locating Audio

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.
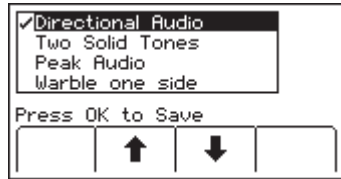
J. Adjusting Display Contrast

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.
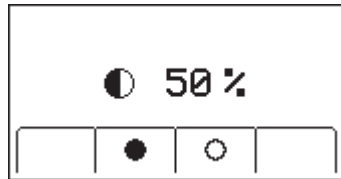
6. Locating Buried Cables And Pipes

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).
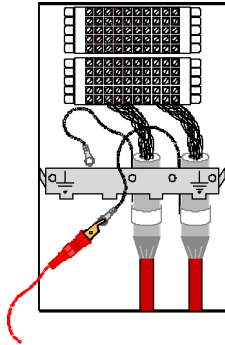
- Remove the ground bonding and attach the red clip to the shield of the cable, pipe, or target conductor. (If locating power cables, the red clip can be attached to the transformer cabinet, or the meter box).

- 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 lOK 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 lOK 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

<table>
<tr><td>

⚠ 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.

</td></tr>
</table>
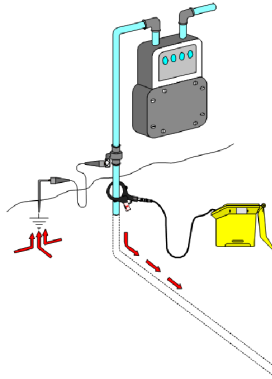
- Connect the Dyna-Coupler to the transmitter *Output Jack* [T-6] using the coupler cable (9011).

- 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.

3. Induction Method
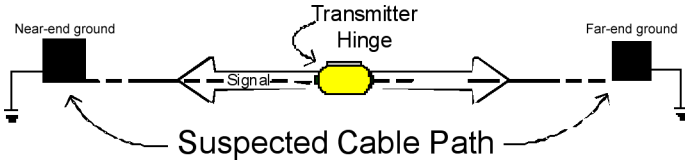
If you cannot make a direct connection, or use the 3M™ Dyna-Coupler clamp to apply a locating signal on the target, use the induction method. When nothing is plugged into the *Output Jack* [T-6] of the transmitter the unit will be placed into induction mode when it is turned on. This method uses the internal coil of the transmitter to generate a magnetic field. This is the least preferred method of applying a signal on a target conductor because it can easily be picked up by other non-target conductors in the area. However, it is the preferred method of applying a signal to multiple cables/pipes in the same trench and for the "two-person sweeping" application.

3M Dynatel™ Transmitters provide a choice of induction frequencies and output power levels. Higher induction output power levels are needed for detecting deeper depths and longer ranges. The 7500 Series transmitters provide four induction frequencies:

7550/7573	8 kHz, 33 kHz, 82 kHz, 200 kHz
7550E/7573E (International)	8 kHz, 33 kHz, 82 kHz, 133 kHz

The induction frequencies have three output power settings up to 12W. The 82 kHz and higher frequencies are commonly used for deeper cables/pipes and the lower frequencies are used to give longer locate distances. The 8 kHz (low frequency) induction helps in locating shallow facilities, such as risers.

The following sections review Non-sweeping and Sweeping (Area) methods used with the Induction Mode. The Non-Sweeping method is utilized when a specific target requires path tracing. The transmitter remains stationary in-line over the target and the path is traced. The Sweeping method is utilized when a designated area needs to be swept for non-specific targets, for example, all the buried pipes or conductors in the designated area. Several sweeping methods will be reviewed.

A. Non-Sweeping Induction Mode Locating

• Position the transmitter over the target facility, with the hinge of the transmitter over and in line with the cable/pipe path. Remove any cables from the *Output Jack*.

  – Align the Induction Direction arrows on the transmitter with the target conductor.

• Turn on the transmitter, select the frequency and select high output or maximum output power level for best signal-to-noise ratio.

• Trace the signal path with the receiver using the Induction Peak (Ind Pk) mode.

The Induction Peak mode of the receiver is a mode in which the upper antenna of the receiver is tuned to minimize distortion from the magnetic field of the transmitter.

Use Induction Peak (Ind Pk) mode when sweeping distance between the transmitter and receiver is 7.6–20 m (25–60 feet). Beyond 20 m (60 feet) you can also use the Special (single) Peak (Spl Pk) or Directional Peak (Dir Pk) modes. Special (single) Peak (Spl Pk) can be used for maximum detection depth and range (needed for deep conductors and metal pipes), but would require increased sweep distance separation between the transmitter and receiver.

Note: If nothing is plugged into the Output Jack of the transmitter, the transmitter will automatically turn on the internal antenna, and the last frequency used (8 kHz, or higher) will broadcast in induction mode.

The induction frequency can be changed by pressing the Trace Frequency button on the transmitter. For best results, the receiver should be at least 7.6 m (25 feet) away from the transmitter to begin tracing the target path, have the gain set between 78-84% and have the receiver in Induction Peak (Ind Pk) mode when starting the sweep. Attempting to trace the target close to the transmitter may lead to false indications due to the receiver detecting the large magnetic field radiating from the transmitter.

B. Sweeping (Area) Induction Mode Locating

Sweeping an area with the 3M™ Dynatel™ Locator 7500 Series allows the location of multiple metallic cables and pipes buried in an area without direct connect or coupler access to the cable or pipe. This approach is effective before any excavation takes place. Note that when specific buried objects need to be identified, it's important to use the direct connect or coupler method for applying the signal. This will help limit the applied locate signal to a specific facility that provides more position and depth accuracy along with an effective identification. There are two main types of "no access" or "blind" Induction Sweeps;

Passive Sweeps: These require only the use of the Receiver with passive frequency detection capability. This method uses existing external signal sources, such as 50 Hz/60 Hz for electric power, 15 kHz to approximately 30 kHz for low frequency radio signals, 100 Hz / 120 Hz CPS for impressed current Cathodic Protection signals and the less commonly occurring CATV signal of 31.25 kHz NTSC with CRT TV turned on.

Active Sweeps: These require both the Receiver and Transmitter with Induction capability. This method refers to using a 3M Dynatel transmitter as the signal source through induction, instead of relying on passive frequencies that may exist on the buried conductor or metal pipe. Active Induction allows for detecting buried cables and metal pipes in the absence of passive signals and at deep depths and short sections. 3M Dynatel transmitters provide a choice of induction frequencies and output power levels. Higher induction output power levels are needed for detecting deeper depths and longer ranges. The 7500E Series transmitters provide four induction frequencies: 8 kHz, 33 kHz, 82 kHz and higher and three output power settings up to 12W. The 82 kHz and higher frequencies are commonly used for deeper cables/pipes and the lower frequencies are used to give longer locate distances.

C. Passive Sweeps

Select Special (single) Peak (Spl Pk) mode on the receiver and then select the frequency (source; for example, power, LF, etc.) to be traced. Passive sweeps at power frequency will detect buried power cables and conductors carrying 50 Hz/60 Hz power signal in the ground. Other passive sources exist, such as Cathodic Protection, LF and CATV cable (with NTSC TV CRT turned on).

Walk in a grid pattern over the sweep area holding the receiver as shown in the following illustration. Stop when there is a response increase, locate the position of the maximum signal, follow the conductor path all the way out of the sweep area while putting location marks on the ground. Resume the sweep until another cable or pipe is detected, or the whole area is completely swept. Switch to another available passive frequency in the receiver and sweep again.
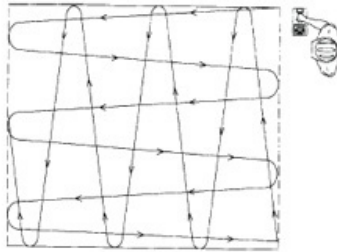
D. One-person Active Induction Mode Sweeps

One-person active induction mode sweeps require that the transmitter be set on the ground over the suspected path of the buried infrastructure. The receiver is used to detect signals induced by the transmitter on buried long conductors. Proper placement and orientation is key to maximize the induced signal in the buried cable or metallic pipe enough to be detectable by the receiver along each path in the swept area. (Note that no signal is induced onto a conductor whose path is perpendicular to the Induction Direction indication.)

• Place the transmitter in the upright (bottom on ground) position for directional optimization when aligned with the Induction Direction shown on the label on the transmitter.

• Tip the transmitter over towards the front, and lay it on it's front surface, for multi-directional wide area induction. (Note that no signal is induced onto a conductor whose path is directly under the transmitter).

• Remove anything plugged into the *Output Jack* (this will place unit in Induction Mode), select highest available frequency (133 kHz or 200 kHz) and highest output power level.

• Select the Induction Peak (Ind Pk) mode and (133 kHz or 200 kHz) frequency on the receiver. When in close proximity to the transmitter in induction mode, there is a direct signal from the induction antenna in the transmitter to the receiver through the air. Induction Peak (Ind Pk) mode is a newly added locate mode for use in closer proximity to a transmitter in Induction mode (< 60 ft, 20 m typ.). Special (single) Peak (Spl Pk) would give the highest sensitivity, but is affected by the air signal more than Induction Peak (Ind Pk) mode.

E. Two-person Active Induction Mode Sweeps

In two-person active induction mode sweeps, one person holds the transmitter and the other holds the receiver while walking together in a sweep pattern detecting long conductors in the ground when crossed by transmitter and receiver positions and orientation, as shown below:
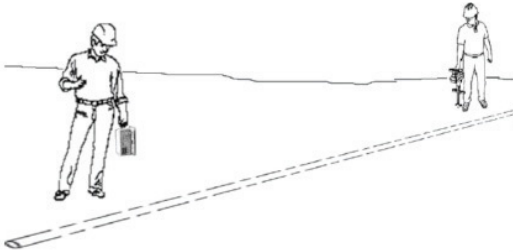
Transmitter Set-up

- Remove anything plugged into the *Output Jack* (this will place unit in Induction Mode), select high frequency (133 kHz or 200 kHz)), or medium frequency (33 kHz or 82 kHz), and highest output power level.

- Hold the transmitter with the lid facing up and align it with the Induction Direction arrow label, as shown on the transmitter, with the receiver.

Receiver Set-up

- Set the receiver to the same frequency as the transmitter.

- Select the Induction Peak (Ind Pk) mode, and press the *Gain* (+ or -) until the *Bar Graph* is just visible.

Sweeping

- Sweeping can be done at close distances between the transmitter and receiver.

- For best results, the receiver should be at least 25 feet (7.6 m) away from the transmitter to begin tracing the target path and have the gain set between 78–84% when starting the sweep. Attempting to trace the target close to the transmitter may lead to false indications due to the receiver detecting the large magnetic field radiating from the transmitter.

- Induction Peak (Ind Pk) mode cancels the air signal coming directly from the transmitter induction antenna to the receiver. Increasing the sweep distance between the transmitter and receiver reduces the direct air signal and allows for sensing deeper conductors and sections of metal pipes. Use Induction Peak (Ind Pk) mode when sweeping distance between the transmitter and receiver is 25–60 feet (7.6–20 m). Beyond 60 feet (20 m) you can also use the Trace View (T-View), Special (single) Peak (Spl Pk) or Directional Peak (Dir Pk) modes.

- Special (single) Peak (Spl Pk) can be used for maximum detection depth and range (needed for deep conductors and metal pipes), but would require increased sweep distance separation between the transmitter and receiver.

7. Receiver Locating Trace Modes

A. Trace View (T-View)

TRACE [3]

Trace View mode, or T-View, provides an intuitive mapping display showing the utility path utilizing dynamic directional arrows and a path indication line. This combination provides an excellent visual representation of the utility path and directional assistance to assist in pinpointing the target.

Several displays may be seen when using Trace View:

Display 1. When the receiver is outside of the detectable locating signal range, the display will show a solid circle inside of a dotted circle. At times it may show the dynamic directional arrow shown in Display 2 and/or the image in Display 4 below. The images may flash alternately indicating that the receiver is out of detectable locating signal range. See following example;
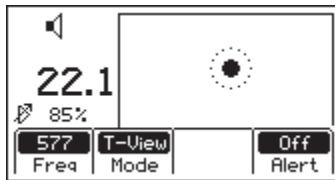
Display 2. When the receiver is within the detectable locating signal on the target, a steady target line will appear on the receiver display representing the target. The dynamic directional display arrows will guide the operator towards the target. The receiver volume and the signal strength increase as the target is approached. See following examples;
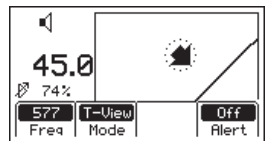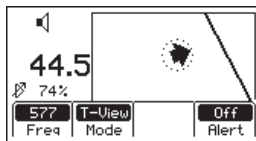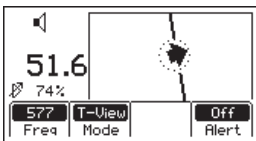
Left of Target Path
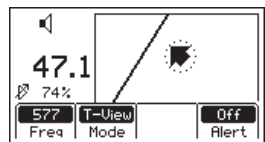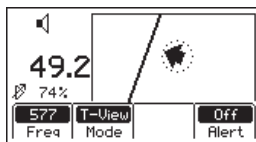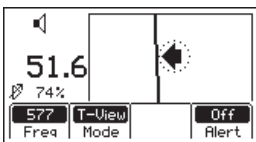
Right of Target Path

Display 3. As the receiver antenna crosses the target, the receiver volume increases to a maximum, the signal strength will be at its maximum and the directional arrow will become a straight line that is closely lined up with the target line on the display. See following examples;
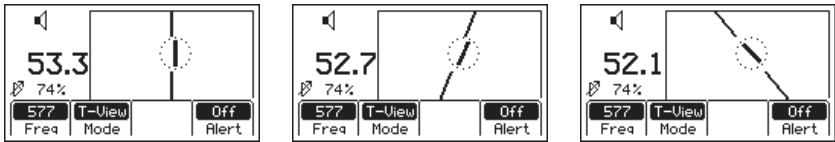
On Target Path

Display 4. A circle consisting of two arrows appears when the orientation of the receiver is not at the optimum position in relation to the target. The arrows indicate that the receiver should be twisted to obtain the optimum position. See following examples;
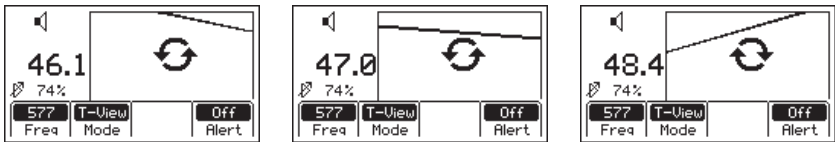
Twist Receiver

B. Special Peak (Spl Pk)

TRACE [3] + Mode [SK] + Spl Pk [SK Toggle] or
Menu/OK [6] + Cable/Pipe [SK] + Mode [SK] + Spl Pk [SK Toggle]

Special Peak Mode turns on only the peak antenna closest to the ground. Special Peak Mode is used in applications such as very deep cables or pipes, or when the signal is too weak for Directional Peak (Dir Pk).
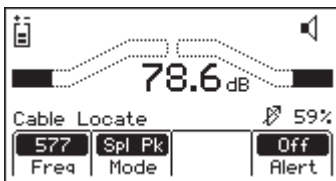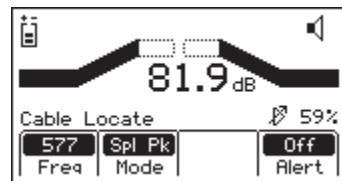
Left or Right of Target Path   Directly Over Target Path

C. Induction Peak (Ind Pk)

TRACE [3] + Mode [SK] + Ind Pk [SK Toggle]
or Menu/OK [6] + Cable/Pipe [SK] + Mode [SK] + Ind Pk [SK Toggle]

If you cannot make a direct connection, or use the 3M™ Dyna-Coupler clamp to apply a locating signal on the target, use the induction method. This method uses the internal coil of the transmitter to generate a magnetic field.

The Induction Peak mode of the receiver is a mode in which the upper antenna of the receiver is tuned to minimize distortion from the magnetic field of the transmitter.
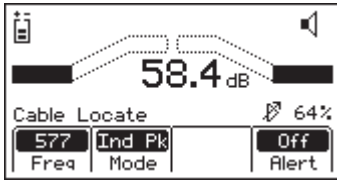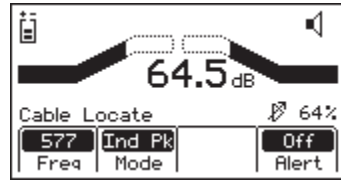
Left or Right of Target Path   Directly Over Target Path

D. Directional Peak (Dir Pk)

TRACE [3] + Mode [SK] + Dir Pk [SK Toggle]
or Menu/OK [6] + Cable/Pipe [SK] + Mode [SK] + Dir Pk [SK Toggle]

In Dir Pk mode, four peak antennas are used to analyze the magnetic field pattern. The bar graph indicates signal strength and the directional arrows sense the edges of the magnetic field. The left/right arrows will indicate the direction to the nearest cable/pipe that is in-line with the receiver handle.

As the antenna crosses the cable or pipe, the receiver speaker volume increases to a maximum, the *Bar Graph* [11] fills from both sides toward the middle, and the numeric *Signal Strength* [15] increases. As the antenna moves off the target path, the speaker volume decreases and the *Bar Graph* opens. Use the bar graph and the numeric *Signal Strength* to locate the exact target path.
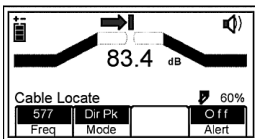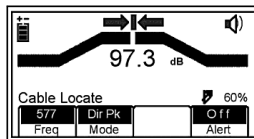
Left of Target Path   Directly Over Target Path   Right of Target Path
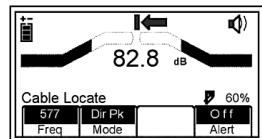
Once the target path has been located, the arrows at the top of the display will indicate the location of the target path in relationship to the receiver handle.

Note: When field distortion (due to congestion) is affecting the receiver, the left/right arrows may not coincide with the bar graph. Use the maximum numerical Signal Strength to target the cable or pipe.

E. Directional Null (DirNull)

TRACE [3] + Mode [SK] + DirNull [SK Toggle]
or Menu/OK [6] + Cable/Pipe [SK] + Mode [SK] + DirNull [SK Toggle]

In Directional Null mode, as the operator approaches the cable or pipe, the numerical *Signal Strength* will increase then fall sharply as the receiver crosses the target cable or pipe. The *Bar Graph* fills from both sides toward the middle and the receiver speaker volume decreases. As the antenna moves off the target path, the *Bar Graph* opens, the *Signal Strength* increases, and the speaker volume increases. Gain adjust is automatic in Directional Null mode.

The center of the DirNull display provides a 'compass view' of the target path. An arrow will point toward the location of the cable/pipe in 45-degree steps. A solid line will appear over the cable/pipe, indicating its orientation to the receiver handle.

For example:

Figure 1: If the target path is to the right of the receiver, and running parallel to the receiver handle, the right arrow will display.
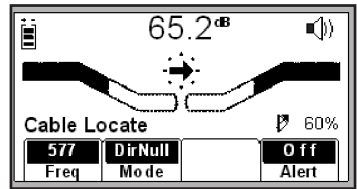
Figure 2: If the target path is to the left and in front of the operator (not running parallel to the receiver handle) the arrow will point toward the top left side of the display.
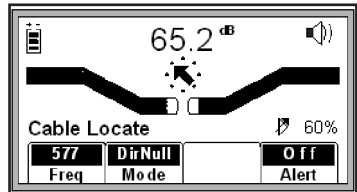
Figure 3: When the receiver crosses the target path, a solid line will appear, instead of arrows, indicating the target path and its orientation to the receiver handle.

Before marking target path, always use Directional Peak or, Special Peak mode to verify location.

F. Expanded Mode

When the third ring of the speaker icon is dotted or broken and 'xpnd' appears below the speaker icon as shown, the receiver is in "Expanded" mode. This mode is used for pinpointing a target cable or pipe. The area of response of the receiver narrows, allowing the locator to detect very small signal changes.
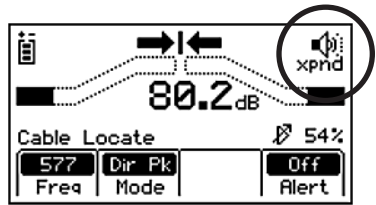
8. Depth and Current Estimate

Verifying the target path, depth and current can be helpful tools.

• Pinpoint the cable or pipe being located.

• Lower the tip of the receiver to the ground and press *DEPTH* [5].

   − The depth to the target cable or pipe is displayed in the units specified in the receiver set up menu. The bold current reading is a relative current measurement. This reading can be compared to the relative current reading that alternately flashes with the frequency on the transmitter. The milliamp reading is an actual current measurement.
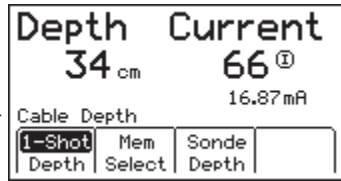
   − There are two options for measuring depth. Live depth is a continuous measurement. 1-Shot Depth is an averaging of the depth reading. When in 1-Shot mode, the unit will average the depth reading for three seconds, and then display the result on the screen. Press Depth [5] to alternate between the two modes.
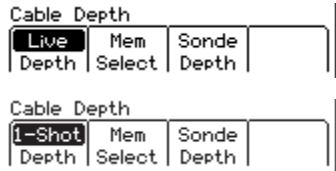
   − Five depth readings can be saved with the time, date and relative current measurements.

• Pressing *Mem Select* [SK] and then *Save* [SK] will place each entry in sequential order in memory (M1–M5) until five readings have been stored. The unit will overwrite saved entries in excess of five, beginning with M1.

• Optional step: Press *Clear All* [SK] to delete all stored depth information.
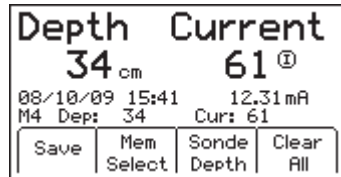
   − The operator may select a specific memory location to store the depth readings by pressing Mem Select [SK]. When the preferred location appears on the display, press Save [SK]. The display and memory location will populate with the current information.

   − Each memory location can be reviewed by pressing Mem Select [SK].

• Press *TRACE* [3] or DEPTH [5] to return to Locate mode, or wait until receiver automatically returns to the Locate mode.

9. Locating Frequencies

A. Active Frequencies

Active frequencies are trace signals supplied by a 3M™ Dynatel™ Transmitter 7500 Series (577 Hz, 1 kHz, 8 kHz, 33 kHz, 82 kHz or 133 kHz /200 kHz).

- Select the same frequency that the transmitter is generating.
- Press *Menu/*OK [6] (you may have to press *Menu* twice to toggle to the LOCATE MENU display).
- Press *Cable/Pipe* [SK]
- Press *Freq* [SK]
- Press *Active* [SK Toggle] until the desired frequency is displayed: ("Active" 577, 1k, 8k, 33k, 82k or 133k/200 kHz)
- Press *Menu/*OK [6] to return to Locate mode.

B. Power Frequencies

7550/7573 Locator

Power frequencies refer to 50 or 60 Hz signals, and their harmonics, that can be traced without the use of a transmitter.

60: Best for general locating of passive power.

60H (high harmonic): If the 60 choice appears to be responding slowly, or poorly, then 60H is the second choice for locating passive power.

60L (low harmonic): Third choice for passive power locating. May be used when 60 or 50H is weak or erratic.

7550E/7573E Locator

50: Best for general locating of passive power.

50H (high harmonic): If the 50 choice appears to be responding slowly, or poorly, then 50H is the second choice for locating passive power.

50L (low harmonic): Third choice for passive power locating. May be used when 60 or 60H is weak or erratic.

100 Hz: Used for locating rectified AC power signals, often found on pipelines using impressed current cathodic protection.

120 Hz: Used for locating rectified AC power signals, often found on pipelines using impressed current cathodic protection.

- Press *Menu/*OK [6] (you may have to press *Menu* twice to toggle to the LOCATE MENU screen).
- Press *Cable/Pipe* [SK].
- Press *Freq* [SK].
- Press *Power* [SK Toggle] until the desired frequency is displayed: ("Power" 60, 60L, 60H, or 120).
- Press *Menu/*OK [5] to return to Locate mode.

All U.S. receivers default to 60 Hz.

All International receivers default to 50 Hz. To set the receiver to detect 50 Hz signals refer to Enabling/Disabling Frequencies section of this manual.

C. Passive Frequencies

The receiver (without a 3M™ Dynatel™ Transmitter 7500 Series) can be used to detect some CATV cables (31.5 kHz). (A horizontal-scan television NTSC must be turned on to generate this frequency.)

- Press *Menu/*OK [6] (you may have to press *Menu/*OK [5] twice to toggle to the LOCATE MENU display).

- Press *Cable/Pipe* [SK].

- Press *Freq* [SK].

- Press *Pasv* [SK Toggle].

- Press *Menu/*OK [6] to return to Locate mode.

D. Auxiliary Frequencies

Auxiliary frequencies are signals generated from remote location transmitters, or frequency generating transmitters.

- Press *Menu/*OK [5] (you may have to press *Menu/*OK [5] twice to toggle to the LOCATE MENU display).

- Press *Cable/Pipe* [SK].

- Press *Freq* [SK].

- Press *Aux* [SK Toggle] until the desired frequency is displayed; ("Aux" 512, 560, 333 Hz, or user defined frequencies).

- Press *Menu/*OK [6] to return to Locate mode.

10. Locating in Directional Peak Mode

The following are instructions for locating a buried pipe or cable using the direct connect method and the Directional Peak (Dir Pk) mode. Other methods of connection and tracing modes/features are explained in previous sections.

Step 1. Insert the ground rod into the ground, perpendicular to the suspected target path.

Step 2. Remove the grounding from the near-end of the target cable/pipe.

Note: Never connect or disconnect the transmitter when the unit is on.

Step 3. Connect the red lead of the transmitter to the shield, neutral, or deenergized target conductor.

Step 4. Connect the black lead of the transmitter to the ground rod.

Step 5. Perform a battery check by pressing and holding *off* [T-1].

Step 6. Power on the transmitter by pressing *on* [T-2] once. This will place the transmitter in Ohm-meter mode. An Indicator Flag will be displayed above the ohm symbol, Ω, in the *Digital Display* [T-4].

    a. A solid tone from the transmitter indicates a complete circuit with a good ground.

    b. A beeping tone from the transmitter indicates a usable ground. An attempt should be made to improve the ground.

    c. No tone from the transmitter indicates a poor, or no ground. The transmitter will display 'OL' in this instance. An attempt should be made to improve the ground. Verify that the far end is grounded.

Step 7. Press *Trace (Frequency on 7500)* [T-3] to set the transmitter to Trace mode.

Step 8. Select a frequency on the transmitter by pressing *Trace (Frequency on 7500)* [T-3]. The unit will cycle through the available frequencies.

7550/7573	577 Hz, 1 kHz, 8 kHz, 33 kHz, 82 kHz, 200 kHz, All
7550E/7573E (International)	577 Hz, 1 kHz, 8 kHz, 33 kHz, 82 kHz, 133 kHz, All

Step 9. Press *On/Off* [2] to power on the receiver.

Step 10. Press *Menu/*OK [6] (you may have to press *Menu/*OK [5] twice to toggle to the LOCATE MENU display).

Step 11. Press *Cable/Pipe* [SK].

Step 12. Set the Frequency and Mode of the receiver.

Cable Locate			🔋 60%
577	**Dir Pk**		**Off**
Freq	Mode		Alert

    a. Press *Freq* [SK].

    b. Select the same frequency on the receiver that was selected on the transmitter by pressing *Active* [SK Toggle].

    c. Press *Menu/*OK [6] to save the setting and return to Locate mode.

    d. Press *Mode* [SK Toggle] until Dir Pk is displayed.

Step 13. Stand away from the suspected target path and adjust the *Gain* [4] down until the *Bar Graph* opens completely.

Step 14. Walk in a wide circle with your back toward the transmitter (about 10 to 15 feet (3 to 4.5 m) away).

    − Watch the receiver display and listen to the signal. Take note of where the receiver detects the strongest *Signal Strength* [9] ([8] for 2550E).

    − The *Bar Graph* will close when the unit detects a signal, and the arrows will reverse.

    − Adjust the *Gain* [4] down if the *Bar Graph* closes completely.
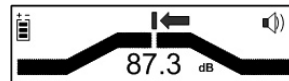
    − The numbers on the display will change with the signal strength (smaller, as you walk away from the target path; larger, as you approach the target path).

    − Make a complete circle around the transmitter. Return to each point in the circle that the receiver detected.

Step 15. Measure the Depth Current of each to identify the target path. The depth of the target path should be as expected and the relative current should compare to the Relative Current of the transmitter.

Note: The Relative Current reading will decrease steadily as the receiver moves away from the transmitter. When using higher frequencies, this decline is more evident.

Step 16. Adjust the gain so that the *Bar Graph* responds to the target path (open when off path, almost completely closed when directly over target).

Step 17. Trace the cable/pipe at a slow walk while moving the receiver in a side-to-side motion, keeping the receiver perpendicular to the ground.

Step 18. Measure the Depth and Current occasionally to verify target path.

Note: In order to measure the Depth and Relative Current accurately, the operator must pinpoint the target pipe or cable, and the receiver handle should be in-line with the target path.

– While in Dir Pk mode, find the highest *Signal Strength* [15].

– Lower the tip of the receiver to the ground. Twist the receiver left and right while watching the *Signal Strength*.

– When the highest reading is displayed, the handle of the unit is in line with the target pipe or cable.

Occasionally a signal will appear on adjacent cables or pipes. Compare the relative and actual current readings over each path to help determine the target path. Current readings will be significantly less on the adjacent cable/pipe compared to the target path.

Step 19. As tracing proceeds, remember that the most powerful signal is near the transmitter. As the receiver gets farther away from the transmitter the *Signal Strength* [15] decreases. It may be necessary to readjust the gain as needed; to be sure there is adequate signal for the receiver to operate. Press the *Gain* [4] up or down when the bar graph is no longer visible (too little signal) or when the bar graph is closed (too much signal).

Step 20. Trace the path until you reach a logical termination point (i.e.: terminal, meter, cabinet, etc).

11. Locating Active Duct Probes (Sondes)

Step 1. Press *On/Off* [2] on the receiver.

Step 2. Press *Menu/*OK [6] (you may have to press *Menu* twice to toggle to the LOCATE MENU display).

Step 3. Press *Cable/Pipe* [SK].

Step 4. Press *Mode* [SK Toggle] to select Special Peak (Spl Pk).

Step 5. Press *Freq* [SK].

Step 6. Press *Active* [SK Toggle] to select the 33kHz frequency (for a 33 kHz Sonde or ADP (Active Duct Probe)).

```
Cable Locate          ⟋ 87%
 ┌────┐┌──────┐   ┌──────┐
 │ 33k ││ Spl Pk │   │  Off  │
 └────┘└──────┘   └──────┘
  Freq   Mode        Alert
```
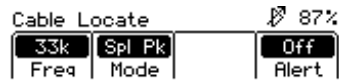
Step 7. Press *Menu/*OK [6].

Step 8. With the receiver handle perpendicular to the conduit path, locate the ADP position by moving along the path until the strongest signal is found. Adjust *Gain* [4] up or down when the *Bar Graph* remains either fully open or fully closed.

Step 9. Refer to the ADP operating instructions for further information.

A. Determining Active Duct Probe Depth

Step 1.   Place the tip of the receiver on the ground directly above the located ADP position.

Step 2.   Maintain the handle orientation perpendicular to the target path.

Step 3.   Press *DEPTH* [5].

Step 4.   Press *Sonde Depth* [5] to read ADP Depth

```
Cable Depth
┌──────┬──────┬──────┬──────┐
│1-Shot│ Mem  │Sonde │      │
│Depth │Select│Depth │      │
└──────┴──────┴──────┴──────┘
```

- − The depth to the ADP is displayed in units as specified in the receiver set up menu.

- − Five Sonde depth readings can be saved with the time, and date measured. Press *Mem Select* [SK] after the Sonde depth displays.

- − Press *Mem Select* [SK] to select a specific memory location (M1–M5) or select *Save* [SK]. *Save* will place each entry in sequential order in memory (M1–M5) until five readings have been stored. The unit will overwrite saved entries in excess of five, beginning with M1.

```
┌────────────────────────────┐
│      Sonde  depth          │
│           28 in            │
│ M5 Snd: 28 03/18/09 12:25  │
│ ┌──────┬──────┬──────┬────┐│
│ │ Save │ Mem  │Cable │Clear││
│ │      │Select│Depth │ All ││
│ └──────┴──────┴──────┴────┘│
└────────────────────────────┘
```

Step 5.   Optional step: Press *Clear All* [SK] to delete all saved depth readings.

Step 6.   Press *Mem Select* [SK] to select a specific memory location (M1-M5) to store the depth readings.

Step 7.   When the preferred location appears on the display, press *Save* [SK]. The display and memory location will populate with the current information.

Step 8.   Each memory location can be reviewed by pressing *Mem Select* [SK].

Step 9.   Press *Cable Depth* [5] to switch to the cable depth display, or *Menu/OK* [6] to return to Locate Mode.

Note: During a depth measurement, the display will exhibit '- -' when the received signal is too low, too high or erratic.

12. Locating Buried Sheath Faults and Earth Return Faults (3M™ Dynatel™ Locator Models 7573 only)

Note: Remove both the near-end and far-end grounding from the test section.

A. Transmitter Setup

Note: Do not make any connections while the transmitter is on.

Step 1.   Attach the red clip to the earth-faulted conductor of the cable or conductor under test.

Step 2.   Place the ground rod behind the transmitter and in parallel with the target path..

Step 3.   Connect the black clip to the ground rod behind the transmitter.

Step 4.   Press and hold *On/Off* [T-1] to perform a battery test.

Step 5.   Press *on* [T-2] once to power on the transmitter. This will place the transmitter in Ohm-meter mode. An Indicator Flag will be displayed above the ohm symbol, Ω, in the *Digital Display* [T-4].

   − The resistance of the fault will be displayed in ohms on the transmitter *Digital Display* [T-4].

Step 6.   Press *on* [T-2] again, to select Fault mode.

   − An Indicator Flag will be displayed above the fault locating symbol in the *Digital Display* [T-4].
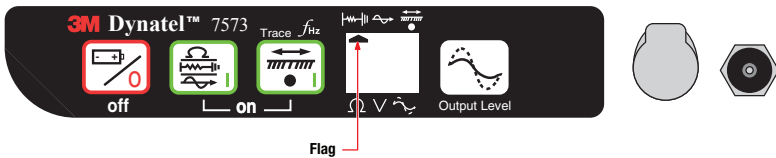
B. Pinpointing the Buried Fault

Step 1.   Connect the 3M™ Earth Contact Frame to the *External Jack* [10] of the receiver using the Earth Contact Frame cable.

Step 2.   Press *On/Off* [2] to power on the receiver.

Step 3.   Press *Menu/OK [6]*.

Step 4.   Press *Fault* [SK] to select Fault mode. The receiver display screen will display "*Fault Calibrating*" for about 5 seconds.

Step 5.   Hold the receiver in one hand and the Earth Contact Frame in the other with the solid green-banded leg of the frame toward the test section. Near the location of the ground rod (about one Earth Contact Frame width away), insert the Earth Contact Frame probes fully into the ground in line with the target path.

Step 6.   Press *REF* [SK] to record the fault *Signal Strength* level reference. The signal level will be recorded in the box above *REF* [SK] on the display. This reference indicates the *Signal Strength* [15] level at the ground rod. When the operator reaches the major fault location, the *Signal Strength* [15] indicated on the receiver will be very close (within 12dB) to this reference signal strength level.

Step 7. Continue along the cable path, re-inserting the 3M™ Earth Contact Frame probes every few steps while watching the receiver bar graph. The bar graph on the receiver will fill toward the right side of the screen (green), indicating that the fault is ahead of the operator (in the direction of the green-banded leg of the Earth Contact Frame).
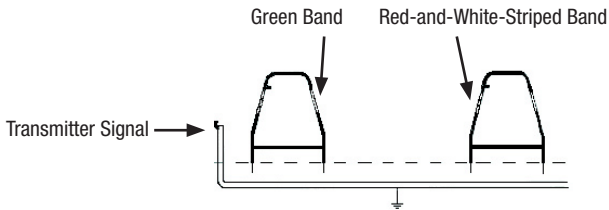
Step 8. When the bar graph fills toward the left (red-and-white-striped) side of the screen, the fault has been passed and is now behind the operator. Move back, inserting the Earth Contact Frame every few inches, until the arrows alternate back to green. Mark the point beneath the center of the Earth Contact Frame. Turn the Earth Contact Frame 90 degrees and insert into the ground over the previously marked point. Move the Earth Contact Frame to the left and right (following the directions of the green and red arrows). When the arrows reverse a third time, turn the Earth Contact Frame 90 degrees again. Pinpoint the fault by moving the Earth Contact Frame in the direction of the green and red arrows. The fault is located beneath the center of the Earth Contact Frame when the arrows change from one side to the other this time.

Step 9. To verify the fault location, insert the Earth Contact Frame's red-and-white-striped probe directly on the spot identified above. Pivot the Earth Contact Frame in a circle around the red-and-white-striped leg re-inserting the green-banded leg in the ground every few degrees of the circle. The arrow should always point toward the left (red) indicating that the fault is directly below the red-and-white-striped leg.
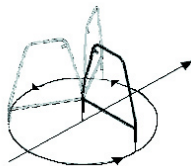
Step 10.   After a fault is found and pinpointed, move the 3M™ Earth Contact Frame about one frame width away from the fault and insert it in the ground with the green-banded leg towards the fault. Compare the numeric signal level with the fault signal strength level reference indicated in the lower left box labeled *REF*. If the reading is within 12 dB of the fault signal strength reference, the operator has found the major fault. If the fault reading does not fall within 12 db of the fault signal strength reference reading, multiple faults may exist. The signal level of this secondary fault can be saved by pressing *Fault 1* [SK] or *Fault 2* [SK]. The fault with the highest reading will be the primary fault.

13. Locating 3M™ Electronic Markers and 3M™ iD Markers

A. 3M™ Dynatel™ Locator 7500 Series E-Model Initial Configuration

Attention: All 7550E and 7573E-Model (Export) iD Locators must run the initial configuration setup found in the 3M™ Dynatel™ Locator PC Tools Software. The 3M™ Dynatel™ PC Tools Software is available free of charge at www.3M.com/dynatel under the Software section; 7573/7550/7420/2573/2250M/2273M/1420 Locator Software, dated Month Day, Year (EXE #.#MB)

Note: 7550 and 7573 Model Locators ship with all marker types enabled and can skip to Section C.

B. Activating the Marker Locate Feature

In order to enable the electronic marker location feature of this receiver, you must identify the country in which the locator will be used. This initial configuration is required for the 7550E and 7573E locator receiver models.

Some countries do not allow all marker operating frequencies. Therefore, 7550E and 7573E model locators are shipped with all the marker types/frequencies disabled.

ATTENTION
It is unlawful to operate this unit in any country with a configuration setting that is not specific to that country. In order to prevent the user from operating this unit with a configuration setting that is not specific to the country where it is operated, this unit is equipped with configuration software for installing country specific configurations.

Step 1.   Download the 3M™ Dynatel™ Locator PC Tools Software from www.3M.com/dynatel and install it on your computer. The 3M™ Dynatel™ PC Tools Software is available free of charge at www.3M.com/dynatel under the Software section; 7573/7550/7420/2573/2250M/2273M/1420 Locator Software, dated Month Day, Year (EXE #.#MB).

Step 2.   Close any programs that may be using the COM ports.

Step 3.   Start the software program; Dynatel PC Tool kit

Step 4.   Connect the locator to the PC via the provided RS232 serial cable or RS232-to-USB Adapter cable.

Step 5.   Power the locator on.

Step 6.   From the main screen, select the country in which the unit will be operating. (If the country is not listed, select 'All other countries'.)

Step 7.   A communication window will appear. (Baud rate 38400 / Com Port x; select PC COM Port that is connected to the locator.)

Step 8.   Click Menu/OK[6].

Step 9.   Press *Initial Configuration* .

Step 10. Press *Download* .

Step 11. The prompt line will display: Download Completed Successfully, when finished. The marker types legally allowed in the country selected in Step 6 above will be activated at this time.

Step 12. Multiple units may be configured at this point by simply connecting the next receiver, powering it on, and pressing download.

Step 13. Press *Exit* when all receivers have been updated.

C. Enabling/Disabling Marker Types

Markers can be enabled or disabled allowing a user to add or remove marker choices from the EMS/iD Marker and the Path Marker options.

Menu/OK [6:Toggle to MAIN MENU] + >>More [SK:4] + (⊟) [SK:5] + >>More [SK:d] + >>More [SK:h] + Marker Type [SK:j]

The unit will default with all markers enabled (✓).

Step 1.   Press the up/down arrows [SK] to highlight a utility to enable or disable.

Step 2.   Press *Enabl/Disabl* [SK].

– Only the markers that are enabled (√) will be available in the locate mode.

Step 3.   Press *Menu/*OK [6] to save settings or *Exit* [SK] to cancel.
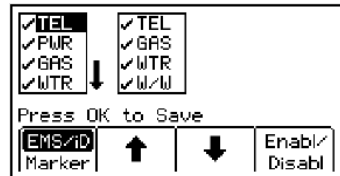
D. Alert Mode for Cable or Pipe Locating

While tracing a cable or pipe, it is possible to search for point markers with or without iD.

Step 1.   Press *Alert* [SK].

– If the unit is in Dir Pk, DirNull, Ind Pk or T-View modes, a prompt will notify the operator that alert mode only functions in Special Peak (Spl Pk) mode.

Step 2.   Press *Mode* [SK Toggle] for Spl Pk.

Step 3.   Press *Alert On* [SK Toggle].
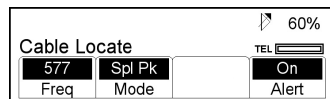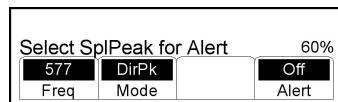
‒ The receiver display will add the Alert bar graph and the type of marker to the display with a prompt to adjust the marker gain.

Step 4.   Press the *Gain* [4] until only a small mark on the marker bar graph is visible.
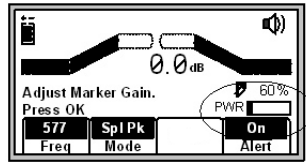
Step 5.   Press *Menu/*OK [6] to save the marker gain setting.

‒ The display will return to Special Peak (Spl Pk) Cable Locate / Alert On.

‒ If the selected type of utility marker is detected, a second audio tone will emit from the unit and the marker bar graph will fill. The marker utility will default to the last type of marker set in marker locate mode.
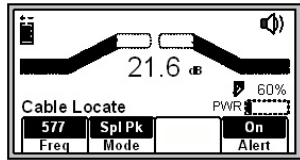
Step 6.   To change the type of marker that the unit will detect in alert mode:

‒ Press *Menu/OK* [6] + *Marker* [SK] + *Markr1* [SK Toggle].

‒ Press *Menu/OK* [6].

‒ Press *Cable/Pipe* [SK] to return to the locate mode with the newly selected marker type displayed.

‒ Adjust the *Gain* [4] again per step 4 above.

‒ Press *Menu/OK* [6].

E. Single Marker Locate

Use this option to select a marker to locate.

Step 1.   Press *Menu/*OK [6].

Step 2.   Step 2. Press Utility [SK Toggle] to select desired utility.

Step 3.   Marker should have EMS/iD selected.
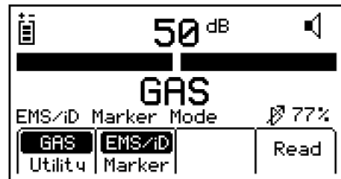
F. Alert Mode for Path Markers

While tracing path markers, it is possible to search for point markers with or without iD. The 3M™ Electronic Marking System (EMS) Marker frequency will be the same as the path marker frequency.

Step 1. Press Menu/OK [6:Toggle to LOCATE MENU screen].

Step 2. Press EMSiD/Path [SK].

Step 3. Press Utility [SK Toggle] to select desired Utility.

Step 4. Press Marker [SK Toggle] to select Alert.

Note: Only the marker types enabled in the setup menu will be shown.

Step 5. Adjust the Gain [4] down until the bar graphs open.

– The bar graph will close, the audio will increase, and the signal strength will be maximum when the receiver detects a marker of the specified utility.

– When an EMS/iD marker detected, select the EMS/iD in Marker [SK Toggle] for the detected utility marker.

– The unit will switch to Single Marker Locate in order to pinpoint the marker.

Step 6. Press Marker [SK Toggle] to return to Alert mode.
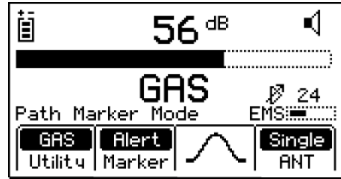
G. 3M iD Marker Depth and Passive Marker (Non-iD) Depth

Step 1. Lower the tip of the receiver to the ground over the pinpointed marker.

Step 2. Press *DEPTH* [5].

– The receiver will examine the marker *(Calculating, please wait...)*

– If the marker is a 3M™ iD Marker, the receiver will display the depth of the marker, and its identification number. A passive marker will display a depth reading and will not display a serial number.
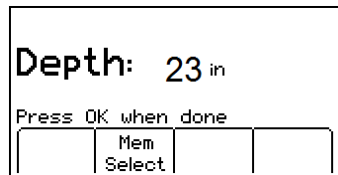
Step 3.   To save the depth reading, press *Mem Select* [SK].

- − Five depth readings can be saved with the time, date, and its identification number.
- − *Save* [SK] will place each entry in sequential order in memory (M1 - M5) until five readings have been stored. The unit will overwrite saved entries in excess of five, beginning with M1.

```
┌─────────────────────────────┐
│ Depth:  23 in               │
│                             │
│ M1:   0in 00/00/00 00:00    │
│ ┌──────┬──────┬──────┬────┐ │
│ │ Save │ Mem  │Clear │    │ │
│ │      │Select│ All  │    │ │
│ └──────┴──────┴──────┴────┘ │
└─────────────────────────────┘
```

Step 4.   Optional step: Press *Clear All* [SK] to delete all stored depth information.

Step 5.   Press *Mem Select* [SK] to select a specific memory location (M1-M5) to store the depth readings. When the preferred location appears on the display, press *Save* [SK]. The display and memory location will populate with the current information.

Step 6.   Each memory location can be reviewed by pressing *Mem Select* [SK].

Step 7.   Press *Menu/OK [7]* to return to Marker Locate Mode.

H. Path Marker Locate (3M™ Electronic Marking System (EMS) Caution Tape 7600 Series)

Step 1.   Press Menu/OK [6].

Step 2.   Press Marker [SK].

Step 3.   Press Utility [SK Toggle] to select desired utility.

Step 4.   Press Marker [SK Toggle] to select path.

```
┌─────────────────────────────┐
│ ▐ï       46 dB          ◀)  │
│ ███████████┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄  │
│           GAS               │
│ Path Marker Mode      ⚡82%  │
│ ┌────┬────┐  ╱╲  ┌──────┐   │
│ │GAS │Path│      │Single│   │
│ │Utility│Marker│         │ANT│ │
│ └────┴────┘      └──────┘   │
└─────────────────────────────┘
```

The Path Marker option is used to locate a path marker, such as 3M™ Electronic Marking System (EMS) Caution Tape of choice (TEL, GAS, WTR and W/W). This mode has three search methods -Peak, Null and a combined Peak/Null response.-which can be selected in the locate screen through [SK3].

Peak Mode - ⌒ On Mode entry, the Peak Mode will give thestrongest audio and bar graph response when the receiver is above the path marker.

Null Mode - ⌄ On Mode entry, the Null Mode will give the strongest audio and bar graph response when the receiver is to the front or back of the marker. Moving the receiver directly over the path marker will produce a quiet response.

Peak/Null Combination - ⌒⌄ On Mode entry, the combined Peak and Null Modes will respond with the Peak and the Null audio and bar graph response to allow for a larger pattern of signal over the marker.

• The bar graph will increase, the audio will increase, and the signal strength will be maximum when the locator detects a marker of the specified utility.

Single Antenna: Use this antenna arrangement for all normal locates. If there seems to be high noise then try the Dual Antenna to help filter out ambient noise.

Dual Antenna: This mode can help locate when ambient noise is 25 or higher on the signal strength display [10].

I. Sweeping and Locating the Tape/Pipe

Step 1.   Make wide locate sweeps across suspected pipe direction inside the suspected pipe corridor, every 2.5 ft (75 cm) until you detect the first marker.

Step 2.   When the first marker is detected, the pipe/tape direction can be determined by rotating the locator and finding the direction of the highest signal strength.

Step 3.   Walk straight in the direction of the handle, making smaller left/right sweeps to follow the path.

Step 4.   Press depth directly over a marker with maximized orientation, for the estimated depth to the tape.
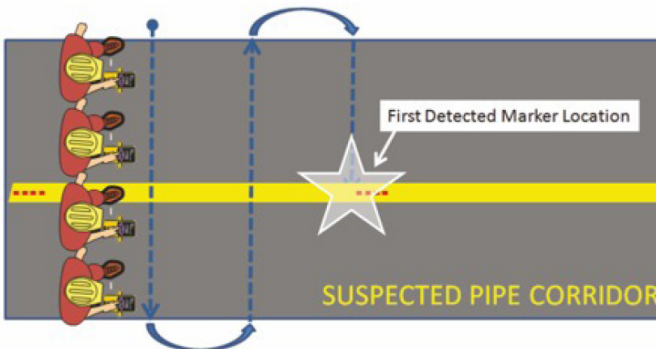
J. Estimating Depth

Step 1.   Lower the bottom of the locator to the ground over the targeted marker or caution tape.

Step 2.   Press Depth [5].

   − The locator will calculate the estimated depth to the marker or caution tape. (Calculating, please wait...)

Step 3.   To save the depth reading, press Mem Select [SK].

   − Five depth readings can be saved with the time and date.

   − Save [SK] will place each entry in sequential order in memory (M1 - M5) until five readings have been stored.

```
Depth:  23 in

M1:  0in 00/00/00 00:00
┌──────┬──────┬──────┬──────┐
│ Save │ Mem  │ Clear│      │
│      │Select│  All │      │
└──────┴──────┴──────┴──────┘
```

The unit will overwrite saved entries in excess of five, beginning with M1.

Optional: Press Clear All [SK] to delete all stored depth information.

Press Mem Select [SK] to select a specific memory location to store the depth readings.

When the preferred location appears on the screen, press Save [SK]. The display and memory location will populate with the current information.

Each memory location can be reviewed by pressing Mem Select [SK].

Press Menu/OK [6] to return to Marker Locate Mode.

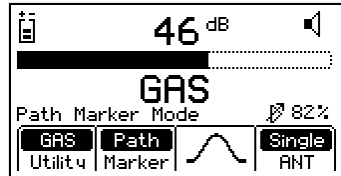# 14. Creating/Editing Templates for 3M™ iD Markers

In the User Template display, the operator can create and modify templates to be written to iD markers. Note that the easiest way to create user templates is by using the 3M™ Dynatel™ PC Tool Kit software on a PC and then downloading them to a receiver via the RS232 Serial Port [16] ([15] for 2550E) on the receiver and the provided RS232 cable or RS232-to-USB adapter cable. The 3M™ Dynatel™ PC Tool Kit software is available free of charge at www.3M.com/dynatel under the Software section; 7573/7550/7420/2573/2250M/2273M/1420 Locator Software, dated Month Day, Year (EXE #.#MB).

A. Creating New Templates

Menu/OK [6:Toggle to MAIN MENU] + Data/Templat [SK:2] + User Templat [SK:c]

Step 1.   Select *Create New* by pressing the up/down arrows [SK].

Step 2.   Press *View/Edit* [SK].

```
0.Create New
1.1420 EZW
2.DEPTH CHANGE
3.EF COUPLING

Select One. Press View/Edit ↓
┌──────┬──────┬──────┬──────┐
│View/ │  ↑   │  ↓   │ Exit │
│ Edit │      │      │      │
└──────┴──────┴──────┴──────┘
```

Step 3.   Name the template.

```
Template: New
UserList: All


Press OK to Save Template
Modify |  ←  |  →  | Exit
```
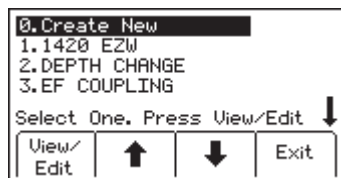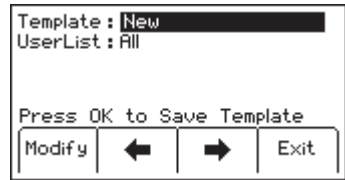
Step 4.   Select *UserEdit*.

Step 5.   Press *Menu*/OK [4]

Note: Older Gen 1 markers have less memory and the operator will see a message asking if you are creating an X-Type template. Only continue adding data if the marker is an X-Type marker.

```
Template: New
UserEdit


Select from list, Press OK
 ⬆  |  ↑  |  ↓  |  ⬇
```
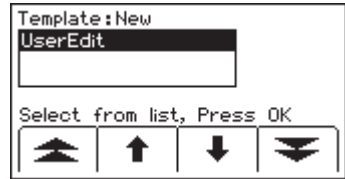
Step 6.   Move the boxed cursor by pressing the left/right arrows [SK], or up/down arrow [SK], to move the cursor up or down.

Step 7.   Press *Select* [SK] to enter the alphanumeric character.

Step 8.   Entry will appear at the top of the display.

Step 9.   Press Menu/OK [6] when the entries are complete and to save the entries, or press Exit [SK] to cancel entries. Pressing Menu/OK [6], or Exit [SK], will return to the template display.

```
Template: TEST TEMPLATE_
_ ⏎ 0 1 2 3 4 5 6 7 8 9 .
A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z
& - \ / * # @ ( ) % $ ' "
Press OK when done       ↓
 ⬍  |  ←  |  →  | Select
```

Note: To clear the previous field entry, select the 'back arrow' with the cursor and delete the previous entry.

Step 10.   Navigate through the fields by pressing the left/right arrows [SK].

Step 11.   Press *Modify* [SK] to populate the highlighted field.

```
Template: TEST TEMPLATE  87%
UserList: All
Company: 3M
█████████
Press OK to Save Template
Modify |  ←  |  →  | Exit
```

Step 12.   When modifying the Labels (left hand side of template information) there are three options for editing that are presented:

   a.   UserEdit.

   b.   Choosing one of the common (compressed) terms from the available list of terms.

   c.   Del Row (delete row).

```
:
UserEdit
#OfPairs
Address                  ↓
Select from list, Press OK
 ⬆  |  ↑  |  ↓  |  ⬇
```
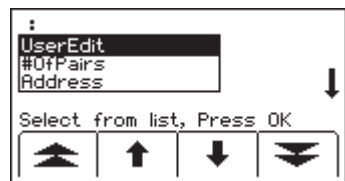
Step 13. When modifying the Descriptions (right hand side of template information) there are four options for editing that are presented:

    a. UserEdit.

    b. Delete Row.

    c. Last 10 UserEdits.

    d. Show All - lists common compressed terms.

```
Descrptn:Valve
UserEdit
Delete Row
Last 10 UserEdits        ↓
Select from list, Press OK
  ▲   |   ↑   |   ↓   |   ⤓
```

```
Descrptn:Valve
Delete Row               ↑
Last 10 UserEdits
Show All
Select from list, Press OK
  ▲   |   ↑   |   ↓   |   ⤓
```
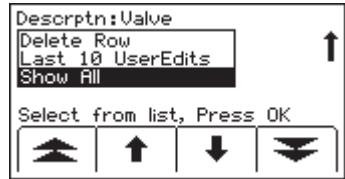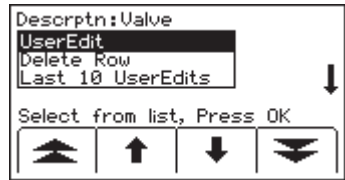
Step 14. Populate as many fields as possible from the drop-down list of common (compressed) terms available to conserve marker memory space, or choose *UserEdit* if a term is not found to meet the user's requirements. Select term by pressing the up/down arrows [SK] and press *Menu*/*OK* [5].

```
:
Date                     ↑
Depth
Descrptn                 ↓
Select from list, Press OK
  ▲   |   ↑   |   ↓   |   ⤓
```

Step 15. Navigate to the next field by pressing the left/right arrow [SK].

```
Template : TEST TEMPLATE  82%
UserList : All
Company : 3M
Descrptn:
Press OK to Save Template
 Modify |  ←  |  →  | Exit
```
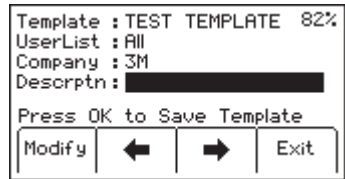
Step 16. Press *Modify* [SK] to populate the highlighted field.

Step 17. Populate additional fields, as needed, using the above procedure Steps 15 and 16. Templates are limited to six Label and six Description fields.

```
Template : TEST TEMPLATE  77%
UserList : All
Company : 3M
Descrptn: Valve
Press OK to Save Template
 Modify |  ←  |  →  | Exit
```
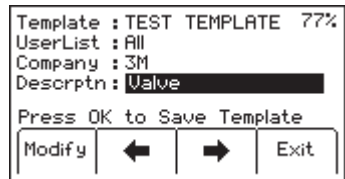
Step 18. When the template is complete, save the template by pressing *Menu*/*OK* [5].

```
Template : TEST TEMPLATE  82%
UserList : All
Company : 3M
Descrptn:
Press OK to Save Template
 Modify |  ←  |  →  | Exit
```

B. Editing Templates

The operator can select an existing template and make changes to it in the same manner described in *14. A. Creating New Templates*. The following save screen will appear.

```
Template Name already exists
Select one of the options
listed below

 Over  Rename  Save  Cancel
 Write          New
```

Over Write: Saves all modifications that have been made to the original template.

Rename: Overwrites the old template with the new name and all modifications. Display will return to the template name field. Modify the name of the template and press *Menu/OK* [6] to save.

Save New: Creates a new template containing all information. Original template remains unchanged. Display will return to the template name field. Modify the name of the template and press *Menu/OK* [6] to save.

Cancel: Clears all modifications made to any unsaved template.

15. Writing 3M™ iD Markers

The Write Mode enables the user to write information into 3M™ iD Markers. It is also possible to edit the information to be written into an iD Marker.

Menu [6] + Write Mode [SK:1]

Step 1. Select a template from the list on the display to be written into the marker by pressing the up/down arrows [SK] to highlight the preferred template. 'Last Written /Read' is the most recent data that was written to/read from a marker by the locator.

```
0.Last Written/Read
1.03-FIBER
2.04-STEEL
3.06-FIBERL

Select One. Press View/Edit ↓
 View/    ↑      ↓     Exit
 Edit
```

Step 2. Press *View/Edit* [SK].

‒ Four Write Mode options will be displayed at the bottom of the screen. [SK1] Overwrite: Will overwrite any data existing on an unlocked marker if 'Yes' is selected and 'No' will prevent overwrite. [SK2] X-Type: Choose 'Yes' if writing to a Gen 2 marker and 'No' if writing to a Gen 1 marker. Gen 2 markers will have an "X" following the serial number that is printed on the attached tag. SK3] Marker: Select type of marker to be written by repeatedly pressing Marker [SK Toggle]. [SK4] Lock/Unlocked: Press [SK4] to toggle between locking and unlocking the marker. The default setting is unlocked and note that a locked unit cannot be modified once locked.

```
Configure Write Mode and
Press OK when done

 Yes
 Over   Yes    TEL    🔒
 Write  X-Type Marker
```

```
Do you want to permanently
lock the marker data?

         No     Yes
```

Step 3. Press Menu/OK

The selected template will be displayed.
The arrow on the right side of the display
indicates there is more information than can
be displayed on the screen (scroll down by
pressing the down arrow [SK]).

```
Template :03-FIBER        88%
Company  :3M
Descrptn :Road Crossing
Depth    :48"

Press Locate to Cancel      ↓
 Start                        
 Write      ↑        ↓    Modify
```
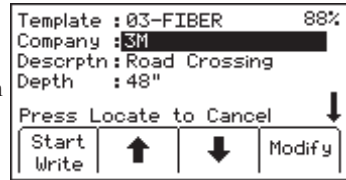
Step 4. Enter user information that will be written
to this marker. (See 6.A Modifying Marker
Data to be Written)

Step 5. Verify that all information is correct.

Step 6. Hold the locator directly over the top of the marker. The locator should be
within the following maximum writing ranges for each of the different 3M™ iD
Marker formats.
− Near Surface iD Marker = 6 in (15 cm) maximum.
− Ball iD Marker = 12 in (30 cm) maximum.
− Full Range iD Marker = 24 in (61 cm) maximum.

Step 7. Press *Start Write* [SK].

```
Looking for ID Marker(s)...




                            
```
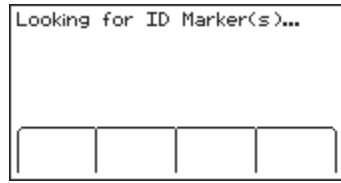
Step 8. After writing to the iD Marker is
completed, the following screen will be
displayed.

```
Looking for ID Marker(s)...
ID # : 000-103-5582
Writing Data...Done
Verifying...Done
UserData is not Locked

      Repeat        Write
      Write          Mode
```

Step 9.   The following messages may appear in the writing process:

Message 1. If the overwrite option was set to "No" And there was data present on the target market then the following screen will be displayed.

```
ID # : 000-103-5582
Writing...Failed
User Data already present.
Go back to Write Mode

|        | Retry  |        | Write  |
|        |        |        | Mode   |
```
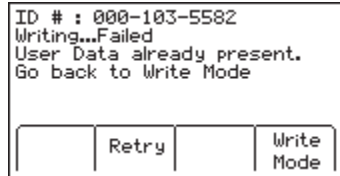
Message 2. When writing to a passive marker or the wrong frequency then the following will be displayed.

```
Looking for ID Marker(s)...

No ID Marker Found

Press Retry to try again

|        |        |        |        |
```
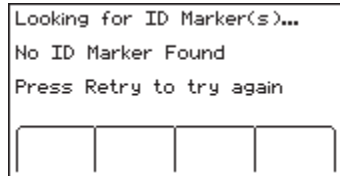
Message 3. This screen indicates that X-Type marker option was incorrectly set to "Yes" or "No". Verify the serial number that is displayed on the marker ends with an "X" to select "Yes" for X-Type, else select "No".

```
      Incompatible marker


|        | Retry  |        | Write  |
|        |        |        | Mode   |
```
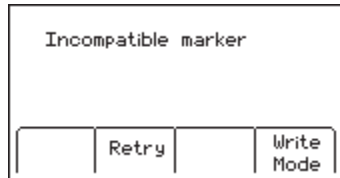
Note: Once the marker data has been locked, the information contained on the marker is PERMANENT. Choosing to permanently lock the marker data is irreversible. Once the data is locked it can not be overwritten. Assure that the data that is being written is correct before proceeding.

A. Modifying Marker Data to be Written

To alter the information to be written into the marker:

Step 1.   Press Menu [6] + Write Mode [SK].

Step 2.   Select a template from the list on the display to be written into the marker by pressing the up/down arrows [SK] to highlight the preferred template. 'Last Written/Read' is the most recent data that was written to/read from a marker by the receiver.

Step 3.   Press *View/Edit* [SK].

Step 4.   Press the up/down arrows [SK] to highlight the information to change.

```
Template : TEST TEMPLATE  65%
Company : 3M
Descrptn : Valve
Material : Steel

Press Locate to Cancel
| Write  |   ↑    |   ↓    | Modify |
| Marker |        |        |        |
```
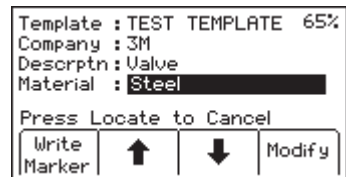
Step 5.   Press *Modify* [SK]. The percentage displayed in the upper right portion of the display indicates the remaining memory available on the marker.

Step 6. The operator may select *User Edit* in order to 'type' the modification, or *Delete Row* to remove the entire row from the template, or select *Show All* to display a list of common compressed terms.
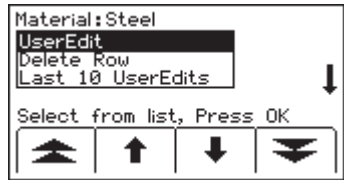
Note: Using a common compressed term requires less memory in the marker.

Step 7. Select an option from the list by pressing the up/down arrows [SK]. Press*/OK* [5].

Step 8. If *User Edit* is selected, the following display will appear.
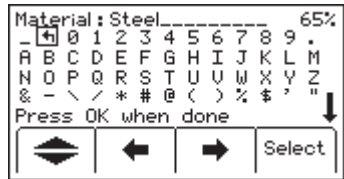
Step 9. Move the boxed cursor to the 'back arrow' and press *Select* [SK] to delete the entry to be modified.

Step 10. Move the boxed cursor by pressing the left/right arrows [SK] or the Up/ Down Arrow [SK] to move the cursor to the next row.

Step 11. Press *Select* [SK] to enter the alphanumeric character.

   − Entry will appear at the top of the display.

Step 12. Press*/OK* [5] when entry is complete.

Step 13. If *Show All* is selected, the following display will appear.
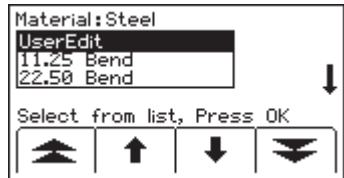
Step 14. Select a common compressed term from the list by pressing the up/down arrows [SK].

Step 15. Press*/OK* [5]. The modification will automatically populate the marker template.

16. Reading 3M™ iD Markers

The operator can retrieve the data from the 3M™ iD Marker by pressing *Read* [SK] on the Marker Locate display.

The receiver tip should be lowered to the ground to reach maximum read depth.

If more than one 3M™ iD Marker of the same utility is detected, the receiver will read the first marker and display the data from the marker.

The fourth yellow command key will be labeled *"Read Next"*. Press this key to extract the data from the other marker.
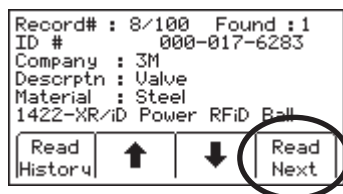
All the information retrieved from the marker, including the date and time read, is saved into the *'Read History'* file of the receiver. If a hand-held GPS device is used in conjunction with the receiver, coordinates will be saved into the "*Read History*" file also. (*See 17. Reviewing Marker Read/Write History*)

17. Reviewing Marker Read/Write History

A. Read History

The Read History mode is a historical file of all information that has been read from targeted markers (100 memory locations).

Menu [6] + Data/Templat [SK:2] + Read History [SK:2a]

The Read History screen displays the date and time that each marker was read, and its unique identification (serial) number.

```
mm.dd.yy  Time     ID #
02.16.09  13:53  000-034-0467
02.18.09  13:19  000-009-7665
02.18.09  13:21  000-034-0217
Record# : 2 LastRead : 10
┌──────┐ ┌───┐ ┌───┐ ┌──────┐
│Marker│ │ ↑ │ │ ↓ │ │ Exit │
│Details│
```

- Select the marker data to be viewed by pressing the up/down arrows [SK].

- Press *Marker Details* [SK] to view all data that was retrieved from the marker.

- Press *Read History* [SK] to return to list or press *Exit* [SK] to return to Data/Template review display.

```
Record# : 2/100   Found :0
ID #          000-009-7665
Company : 3M
Location : TX
Date     : 07/09/08 D/M/Y    ↓
Descrptn : Ball
┌──────┐ ┌───┐ ┌───┐ ┌──────┐
│ Read │ │ ↑ │ │ ↓ │ │ Exit │
│History│
```

B. Write History [SK]

Menu [6] + Data Templat [SK:2] + Write History [SK:2b]

- Select the marker data to be viewed by pressing the up/down arrows [SK].

- Press *Write Details* [SK] to view all data that was sent to the marker.

- Press *Write History* [SK] to return to the list of programmed data.

- Press *Exit* [SK] to return to Data/Template review display.

```
mm.dd.yy  Time     ID #
02.18.09  09:56  000-011-7600
02.18.09  13:23  000-034-0217
02.19.09  14:17  000-034-0012
Record# : 78
┌──────┐ ┌───┐ ┌───┐ ┌──────┐
│Write │ │ ↑ │ │ ↓ │ │ Exit │
│Details│
```

For additional information concerning writing to 3M™ iD Markers, refer to *www.3M.com/dynatel - Instruction Manual M-Series Locator PC Tools.*

18. GPS Compatibility Operation

A. Communicating with the GPS Unit

Menu [6] + COM Setup [SK:3]

The COM Setup [SK:3] key will toggle through several options to configure the Serial Port [14] of the locator (depending on the application, or capabilities of the GPS device). Select from the following options.

NMEA – The *Serial Port* is configured to receive NMEA signals from a GPS device (4800 Baud Rate). (Capture Mode/Mode 1)

GIS – The *Serial Port* is configured to send and receive data to a GPS device that has GIS mapping capabilities. (Capture/Transmit Mode/ Mode2)

PC – The *Serial Port* is configured to communicate with a computer for the Dynatel PC Tool Kit application.

PDA - The *Serial Port* is configured to only send information if the GPS device only has the ability to receive information.

B. Capturing the GPS Coordinates (Capture Mode / Mode 1)

Menu/OK [5:Toggle to MAIN MENU] + (COM) [SK:3] + NMEA

If the GPS device is not configured properly, there is an error communicating with the receiver, or the GPS device has not acquired enough satellites to pinpoint the location, the receiver will display the message *"Insert External Device"*.

When the receiver is communicating with a GPS device, the LAT and LONG coordinates received from the device will appear on the marker locate display.
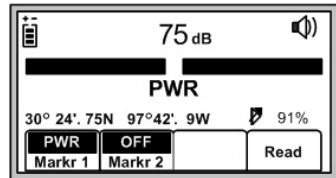
Step 1.   Locate a marker (See *4. D. Single Marker Locate.*)

Step 2.   Press *Read* [SK]

The information from the 3M™ iD Marker, as well as the GPS coordinates, will display on the receiver display. This information is saved automatically in the *Read Marker History.* (*See 17. Reviewing Marker Read/Write History*)

If the marker is a passive marker (rather than iD) the receiver will display *"No iD Marker Found"*. The GPS coordinates of the attempt to read the non-iD marker are stored in the *Read Marker History* as serial number # 0000-0000-0000. The marker details will indicate *"not an iD marker"*, but will display the GPS coordinates.

C. Sending 3M iD Marker Data to GPS (Capture-Transmit Mode / Mode 2)

Menu [6] + COM Setup [SK:3] + GIS

Locators that have marker locating capability (indicated by 'iD' in the model number or description) can be configured to send 3M™ iD Marker data directly to some GPS devices. When an iD marker is located and read, the information read from the iD marker, with feature and attribute data, is sent to the GPS device and is stamped with latitude, longitude and date/time data. The data acquired during this logging process can be uploaded to GIS mapping software. For more information and detailed instructions pertaining to specific GPS devices, refer to www.3M.com/dynatel for GPS instruction sheet.

D. Path Mapping with GPS

The 3M™ Dynatel™ Locator 7500 Series cable and pipe locators are compatible with hand-held GPS devices and now have the ability to map the path of underground target facilities. While measuring the depth to the target, the technician can automatically log the coordinates of the path on the GPS device. These logged points contain the Trace template that can have valuable information regarding the facility (owner, utility, size, etc.) and the method used to find the path (frequency, current, and measured depth).

In order to transmit the path information to a GPS device, the GPS device has to have the ability to accept information on one of its com ports at 4800 Baud. Using the manual supplied with the GPS device, configure the com port of the GPS to communicate with the receiver.

19. Help Mode

Menu[6] + >>More [SK:4] + **?** [SK:8]

The help screen contains basic information about the locator and its operation. It is designed to be a quick reference guide.

• Press the double up/down arrows [SK] to navigate between sections.

  – The single up/down arrows [SK] will scroll the display line by line.

20. 3M™ Dynatel™ PC Tool Kit and Locator Software Upgrades

Locator software upgrades are periodically released and can be downloaded, free of charge, at www.3M.com/dynatel. Located under the Software section, the software is titled 7573/7550/7420/2573/2250M/2273M/1420 Locator Software, dated Month Day, Year (EXE #.#MB). Once downloaded to your PC, double click the file and an autoinstaller will install the PC Tool desktop software. Double click the Dynatel PC Tool Kit icon on the desktop. Using the provided RS232 cable, or RS232-to-USB adapter cable, connect the Serial port [9] on the locator to the PC and power the locator on. Click the Upgrade Software button in PC Tools to begin upgrade. Do not disconnect or power off the locator while the upgrade is in progress. Wait until the software indicates that the installation was successful. This will take approximately seven minutes to complete.

The Dynatel PC Tool Kit provides the user an excellent interface between the locator and a PC. This software utility provides the tools for:

• Upgrading the locator to the latest software revision.

• Programming one or multiple locators to best suit specific user configurations.

• Loading an alternate language into the locator.

• Using the 3M™ iD Marker utility to:

  – Create templates for writing data to iD markers, or create Trace Templates for GPS path tracing when connected to a GPS device.

  – Download iD marker data that has been written or read by the locator for documentation databases.

Embedded in the desktop software is the most current software for the locator, which affords the user the option of upgrading the unit without returning the unit to the 3M Service and Repair Center.

Please refer to the operating instructions included with the software.

21. Memory Self Test

Menu [6] + >>More [SK:4] + S/N# SK:7]

This operation performs a self-test on the locator.

The locator will display current information about the unit (model number, serial number, software revision, and hardware revision).

1. Press Run [SK] to start the self test.

- A status bar will appear while the self test is running.

- Results will appear on the display when the test is complete.

- Press Exit [SK] to return to the Menu.

22. Additional Applications

A. Aerial Faults (Toning) (3M™ Dynatel™ Locator Models 7573 only)

Transmitter Setup

Step 1.   Connect the transmitter (based on type of fault) as described in Connection Diagrams in the following section.

Step 2.   Press and hold *off* [T-1] to perform a battery test.

Step 3.   Press *on: Ohm-meter/Fault Locate/Tone* [T-2] to power the Transmitter on and to verify the fault.

Step 4.   Press *on: Ohm-meter/Fault Locate/Tone* [T-2] twice more to select the Tone mode.

Step 5.   The *Digital Display* [T-4] will alternately flash between 577 and 133K.

Step 6.   Press *Output Level* [T-5] for high or maximum output level.

Receiver Setup

Step 1.   Press *On/Off* [1] to power the receiver on.

Step 2.   Press *Menu*/OK [6:Toggle to MAIN MENU]

Step 3.   Press *Tone/Ext* [SK] to select Tone mode.

Step 4.   Press *Freq* [SK Toggle] to select 577Hz.

Step 5.   Connect a toning coil to the receiver *External Jack* [10]

Step 6.   Move the toning coil along the cable and find a peak signal then press *Gain* [4] down to adjust the receiver gain.

Step 7.   Press VOL [1] to adjust the speaker volume as needed.

Step 8.   Follow the cable with the toning coil.

- When the receiver detects a short, cross, or ground fault (Connection Diagram Figures #1, #2, or #3), the audio and signal strength will stop or drop off sharply.

- When the receiver detects a split (Connection Diagram Figure #4) the audio and signal strength will increase significantly.

- When verifying a split (Connection Diagram Figure #5) the audio and signal strength will decrease after the toning coil has passed the split..

Connection Diagrams

Short:

Figure #1: Red clip to Tip; Black clip to ring.
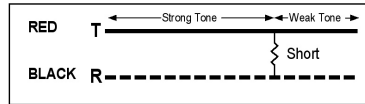
Cross:

Figure #2: Red clip to the crossed conductor of one pair; Black clip to the crossed conductor of the other pair.
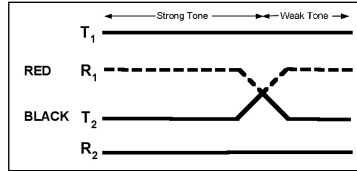
Ground:

Figure #3: Red clip to the faulted conductor; Black clip to ground.
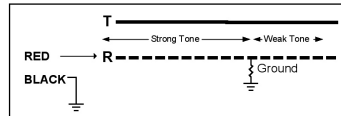
Split:

Figure #4: Red clip to Tip of Pair 1; Black clip to Ring of Pair 1.
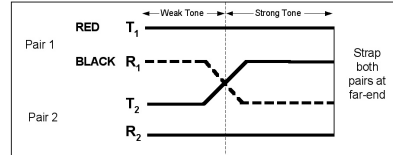
Verify Split:

Figure #5: Red clip to good conductor of Pair 1; Black clip to split conductor of Pair 2
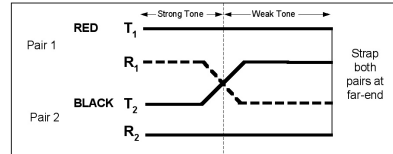
B. Cable Identification

1. Transmitter Setup

Step 1.   Connect the 3M™ Dyna-Coupler to the Transmitter *Output Jack* [T-6] using the coupler cable.

Note: Cable Identification requires two Dyna-Couplers: one at the Transmitter and one at the Receiver.

Step 2.   Clamp the Dyna-Coupler around the cable or both the tip and ring of a pair. Make sure the jaws fully close.

Step 3.   Press and hold *off* [T-1] to perform a battery check.

Step 4.   Press *on: Ohm-meter/Fault Locate/Tone* [T-2] three times to set the transmitter to *Tone* mode.

Step 5.   The *Indicator Flag* will light in the *Digital Display* [T-4] under the *Tone* icon.

Step 6.   Press *Output Level* [T-5] for high or maximum output level.

- The *Indicator Flag* will light in the *Digital Display* [T-4] above the *Output Level* icon when in high output level and flash when in maximum output level.

- The *Digital Display* [T-4] will alternately flash between 577 and 133K.

2. Receiver Setup

Step 1. Press *On/Off* [2] to power the receiver on.

Step 2. Press *Menu/*O*K [6]*.

Step 3. Press *Tone/Ext* [SK] to select *Tone* mode.

Step 4. Connect a second coupler to the Receiver's *External Jack* [10] using the Earth Contact Frame cable or another coupler cable.

Step 5. Press *Freq* [SK Toggle] to select the highest transmitter frequency (133K or 200 kHz).

Step 6. Check the first cable in the group by clamping the coupler around the cable.

Step 7. Press *Gain* [4] down and observe the numerical *Signal Strength* [15].

Step 8. Remember the *Signal Strength* [15] and continue by clamping the coupler around the next cable in the group.

- If the *Signal Strength* [15] is greater than the previous observation, press *Gain* [3] down.

- If the *Signal Strength* [15] is less than before, ignore it.

- After checking all the cables in the group, the cable with the highest *Signal Strength* [15] reading is the target cable.

23. Product Description And Optional Accessories

A. Product Description


```
7550
7573    [   ] — [  ]  /  [   ][   ]
                                    └── 3, 5 or 12-watt transmitter
                              └── C= Communication version;
                                   U=Utility version
                         └── iD=Locates electronic markers, including read/write iD Marker capability.
              └── E = Export version; no designation = U.S. version
        └── 3M™ Dynatel™ Pipe/Cable Locator 7550; 3M™ Dynatel™ Cable/Pipe/Fault Locator 7573
```
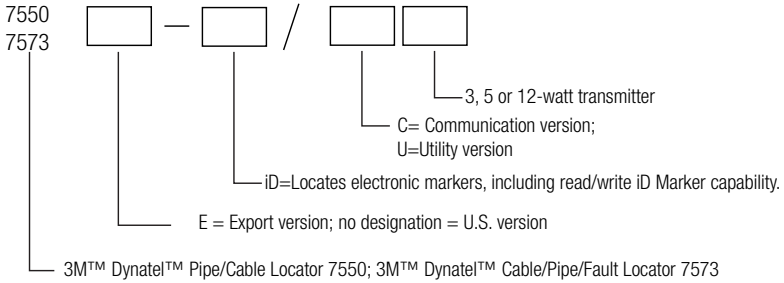
Example: 3M Dynatel Pipe/Cable Locator 7573-ID/U12

Description: 7573 Cable/Pipe/Fault/EMS Locator with marker locating capability (including reading and writing to iD Markers); U.S. version; Utility (large) Direct Connect Cable, 12-Watt Transmitter.

Several standard configurations are available. Please see the following chart, then contact your 3M Distributor or 3M Representative for assistance in product selection.

3M Customer Service can be reached at 1-800-200-0265.

B. Optional Accessories for 3M™ Dynatel™ Locators

Item	Part Number
Direct Connect Cables, Small Clip, Communications version, 10'(3 m)	2892
Direct Connect Cables, Large Clip, Utility version, 10' (3 m)	2876
Direct Connect Cables, Small Clip, Communications version, 5' (1.5 m)	9012
Ground Extension Cable	9043
3M Dyna-Coupler Clamp 3" (75 mm)	3001
3M Dyna-Coupler Clamp 4.5" (114 mm)	4001
3M Dyna-Coupler Clamp 6" (150 mm) w/ pouch	1196
Locator Coupler Accessory Kit, 3" (75 mm) (Includes 73" (75 mm) Dyna-Coupler, Coupler Cable and Coupler Pouch)	3019
Locator Coupler Accessory Kit, 4.5" (114 mm) (Includes 4" (114 mm) Dyna-Coupler, Coupler Cable and Coupler Pouch)	4519
Locator Coupler Accessory Kit, 6" (150 mm) (Includes 6" (150 mm) Dyna-Coupler, Coupler Cable and Coupler Pouch)	1196/C
Coupler Cable 12' (3.6 m)	9011
Rechargeable Battery (12-volt DC)	2200RB
Carrying Bag	7500
ADP 33 kHz Sonde	3229
Cigarette Lighter Adapter Cable (12-volt DC)	457-594-000
3M Earth Contact Frame (A-Fame)	3014
3M Earth Contact Frame (A-Fame) Cable6	9026
AC Charger for Rechargeable 7000RB Battery Pack	7000CH
AC charger for Rechargable 7000RB Battery Pack for ANZ	7000CH-ANZ
Rechargeable Battery Pack for Receiver	7000RB

24. Physical/Environmental Specifications

Physical Specifications:		
Locator Shipping Box	Size (L x W x H) IN (CM) 30" x 6.5" x 10.5" (76 x 17 x 27) Size (L x W x H) IN (CM) 33" x 17" x 12.5" (84 x 43 x 32)	Weight (including batteries) 6.4 lb. (2.90 kg) 39 lb. (17.7 kg)
Environmental Specifications:		
Operating environment	Outdoor; Indoor for charging and configuring with a PC	
Operating temperature Storage temperature Regulatory	-4° F to 122° F (-20° C to 50° C) -4° F to 158° F (-20° C to 70° C) 7550 (FCC Part 15), 7550E (CE) 7573 (FCC Part 15), 7573E (CE)	
Environmental Standard Maximum altitude	IP54 2000 m	

25. Receiver Specifications

Electrical Specifications:	
Power	Rechargeable Li Ion battery pack (7000RB)[1]
Battery Life	8 hours typical[2]
Charging Time	2.5 hours typical, with 90~240V AC adapter
Display	Large graphic high-contrast LCD with backlight
Speaker	0.25W
Headphone jack	Standard mini phone jack
Serial Port	Standard RS232 serial with DB9 connector (RS232 to USB adapter cable included)
Display	LCD
Gain Control	Manual and Automatic
Weight w/batteries	5.0 - 6.4 lbs. (2.3 - 2.9 kg) (model dependent)
Cable/Pipe Depth Accuracy	±2% ± 3 in. (7.6 cm) for 0–60 in. (1.5 m) ±6% ± 3 in. (7.6 cm) for 60–120 in. (1.5–3.0 m) ±10% ± 3 in. (7.6 cm) for 120–180 in. (3.0 m–4.5 m)
Cable/Pipe Depth Range	0–360 in. (0–914 cm)
Locate Modes:	
Trace View Directional Peak Directional Null Special Peak Induction Peak	
Frequency Response:	
Active 7550/7573	577 Hz 1 kHz 8 kHz 33 kHz 82 kHz 200 kHz
Active 7550E/7573E International	577 Hz 1 kHz 8 kHz 33 kHz 82 kHz 133 kHz
Passive	31.5 kHz (CATV) 15 – 30 kHz (LF)
Power	50 Hz, 5th and 9th harmonic of 50 Hz 60 Hz, 5th and 9th harmonic of 60 Hz (100 / 120 Hz) rectified power

Electrical Specifications:	
Auxiliary	512 Hz 560 Hz 640 Hz
User Defined Frequencies	Four
Marker Compatibility:	
3M™ Electronic Marking System (EMS)/ iD Markers	All 3M markers (telephone, gas, communication, power, water, wastewater and general purpose)
3M™ EMS CautionTape 7600 Series	All 3M path marking caution tape (telephone, gas, water, waste water)
Maximum Write Range 3M™ iD Markers:	(Telephone,Power, Gas, Water, Wastewater, Communications (CATV), General Purpose)
Near-Surface Ball Marker Full-Range	6 in (15 cm) 12 in (30 cm) 24 in (61 cm)
7550/7573 Locators Maximum Read Range 3M™ iD Markers (with ID):	(Telephone, Power, Gas, Water, Wastewater, Communications (CATV), General Purpose)*
Near-Surface Ball Marker Full-Range	3 ft (0.9 m) 5 ft (1.5 m) 8 ft (2.4 m)
7550E/7573E Locators Maximum Read Range 3M™ iD Markers (with ID):	(Telephone, Power CE, Water, Gas, Wastewater, Communications (CATV), General Purpose)*
Near-Surface Ball Marker Full-Range	90 cm (36 in) 1.5 m (60 in) 2.4 m (96 in)
* Some countries do not allow all marker operating frequencies. Refer to Configuration Section for 7550E/7573E Locators (Section 4A). ** Power CE is labeled at PWR2 when enabled.	
Maximum Detection Depth for Passive Markers (no ID):	
Near-Surface Ball Marker Mid-Range Full-Range	3 ft (0.9 m) 6 ft. (1.8 m) 7 ft. (2.1 m) 9 ft. (2.75 m)
Maximum Detection Depth	
7600 Series CT-3 Tape Depth measurement accuracy	2.5 ft (0.76 cm) +/- (10% + 5 cm) or +/- (10% + 2 in) up to specified depth of marker or caution tape (Depth accuracy susceptible to high ambient noise conditions)
iD Marker Memory Storage:	

Electrical Specifications:	
Memory storage with date/time stamp	Read marker records 100
Written marker records	100
User defined iD templates	32
Marker depth memory storage	Five with date/time stamp

Notes:

1. It's recommended to use the rechargeable battery pack. However, a battery holder and adapter are provided for using 8-AA size Alkaline batteries for backup, which would have reduced battery life.

2. The battery life is specified for the 7000RB rechargeable battery pack at 73°F / 23°C, with 10% usage of the backlight and audio volume at medium level.

26. U Version 12-Watt Transmitter Specifications

Item	Specification
Trace Mode	577 Hz 1 kHz 8 kHz 33 kHz 82 kHz 200 kHz
Fault Mode (7573 models only)	10/20 Hz -Fault signal 577 Hz / 33 kHz -Trace signal.
Tone Mode (7573 models only)	577 Hz and 200 kHz pulsing at 8 Hz
Induction Mode	8 kHz 33 kHz 82 kHz 200 kHz
Output Power (in Direct Connect mode)	Normal setting: 0.5 W High setting: 3 W @ 577 Hz, 1 kHz, 8 kHz, 33 kHz; 1 W @ 82 kHz, 200 kHz Maximum setting: 12 W @ 577 Hz, 1 kHz, 8 kHz; 10 W @ 33 kHz; 1 W @ 82 kHz, 200 kHz
Output Voltage (Maximum)	70 Vrms
Output Protection	240 Vrms
Weight w/batteries	w/ alkaline batteries only: 5.2 lbs (2.4 kg) w/ rechargeable battery and alkaline batteries: 9.2 lbs (4.2 kg)
Battery Qty. and size	For Normal and High Output Power: 6 "C" size, Alkaline (LR14) For Maximum Output Power: Rechargeable Battery, 12V-6AH, Sealed Maintenance-Free Lead (Pb)-Acid Battery (See Safety Section)

Item	Specification
Typical Battery Life	Normal Output Power level: 50 hours
	High Output Power level: 10 hours
	Typical transmitter specified battery life (listed above) is increased by 40% when using the 2200RB Rechargeable Battery (12 volt). Using the 2200RB bypasses the alkaline batteries.
	Maximum Output Power level: 4 hours (Maximum Output Power level achieved using 2200RB Rechargeable Battery.)
External DC Power	9-18V DC, 3A MAX
Standard	IP54
Regulatory	FCC compliant, FCC Part 15
Operating Temperature	4°F to 122°F (-20°C to 50°C)
Storage Temperature	-4°F to 158°F (-20°C to 70°C)
Rechargeable Battery Fuse	5 Amp / 32 Volt
	Littelfuse MINI® Blade # 0297005
Cigarette Lighter Adapter Cable Fuse	4 Amp/Fast Blow 250V

78-9000-5020-0 Rev C

27. E Version 12-Watt Transmitter Specifications

Item	Specification
Trace Mode	577 Hz 1 kHz 8 kHz 33 kHz 82 kHz 133 kHz
Fault Mode (7573 models only)	10/20 Hz -Fault signal 577 Hz / 33 kHz -Trace signal *Note: The fault locating limit is 2.0MΩ, although the transmitter's ohm-meter mode can display a fault resistance up to 10MΩ.*
Tone Mode (7573 models only)	577 Hz and 133 kHz pulsing at 8 Hz
Induction Mode	8 kHz 33 kHz 82 kHz 133 kHz
Output Power (in Direct Connect mode)	Normal setting: 0.5 W High setting: 3 W @ 577 Hz, 1 kHz, 8 kHz, 33 kHz; 1 W @ 82 kHz, 133 kHz Maximum setting: 12 W @ 577 Hz, 1 kHz, 8 kHz; 1 W @ 33 kHz; 1 W @ 82 kHz, 133 kHz (with external DC power source)
Output Voltage (Maximum)	70 Vrms
Output Protection	240 Vrms
Weight w/batteries	w/ alkaline batteries only: 5.2 lbs (2.4 kg) w/ rechargeable battery (2200RB) and alkaline batteries: 9.2 lbs (4.2 kg)
Battery Qty. and size	For Normal and High Output Power: 6 "C" size, Alkaline (LR14) For Maximum Output Power: Rechargeable Battery (2200RB), 12V-6AH, Sealed Maintenance-Free Lead (Pb)-Acid Battery (See safety information below.)
Typical Battery Life	Normal Output Power level: 50 hours High Output Power level: 10 hours Typical transmitter specified battery life (listed above) is increased by 40% when using the 3M™ Rechargeable 12V Battery 2200RB (12 volt). Using the 2200RB bypasses the alkaline batteries. Maximum Output Power level: 4 hours (Maximum Output Power level achieved using 2200RB Rechargeable Battery.)
External DC Power	9-18V DC, 3A MAX
Standard	IP54
Regulatory	FCC compliant, FCC Part 15CE
Operating Temperature	4°F to 122°F (-20°C to 50°C)
Storage Temperature	-4°F to 158° F (-20°C to 70°C)
Rechargeable Battery Fuse	5 Amp / 32 Volt Littelfuse MINI® Blade # 0297005
Cigarette Lighter Adapter Cable Fuse	4 Amp/Fast Blow 250V

$C\hspace{1pt}\epsilon\,①$ This product is in accordance with the requirements of the European directive 99/5/EC.

This is the EU symbol for equipment that is covered under the Waste from Electrical and Electronic Equipment (WEEE) directive per CENELEC Specification 5041. It indicates that certain products should not be discarded in the trash, but rather should be recycled. This applies to all electronic pluggable and battery powered products.

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Important Notice

All statements, technical information and recommendations related to 3M Products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using the 3M Product, you must evaluate it and determine if it is suitable for your intended application. Because conditions of Product use are outside of our control and vary widely you assume all risks and liability associated with such use. Any Product-related statements not contained in current 3M publications, or any contrary statements contained in your purchase order, shall have no force or effect unless expressly agreed to in writing by an authorized officer of 3M.

Limited Product Warranty

3M Locators (except accessories), will conform to 3M's published specifications and will be free from defects in material and manufacture for a period of twelve (12) months from the date of purchase. Dry cell batteries included in any of 3M's products are warranted only to the extent the battery manufacturer determines such batteries are covered by its warranty. Locating accessories are warranted for ninety (90) days after purchase. 3M's obligations and liability under this warranty are limited to repairing, replacing or refund of the purchase price, at 3M's option, any of 3M's products which, after normal and proper usage, are determined by 3M to be defective. This warranty does not extend to any of 3M's products which have been subjected to misuse, neglect, accident or improper applications, nor shall it extend to products which have been repaired or substantially altered outside 3M's manufacturing or repair facility, nor to any associated instruments, equipment or apparatus. Before utilizing any of 3M's products, BUYER should determine the suitability of the product for BUYER'S intended use. **3M MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** In no case shall 3M be liable for any special, incidental, or consequential damages based upon breach of warranty, breach of contract, negligence, strict liability or any other legal theory. This limitation does not apply to claims for personal injury.

Special Condition: Shipments into authorized distributor/supplier locations will have an additional ninety (90) day warranty period.

3M

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