DigiTrak® iMFD®

Multi-Function Display

&

DigiTrak® FSD™

F Series Display

Operator's Manual

Digital Control Incorporated

dci@digital-control.com
www.DigiTrak.com

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All statements, technical information, and recommendations related to the products of DCI are based on information believed to be reliable, but the accuracy or completeness thereof is not warranted. Before utilizing any DCI product, the user should determine the suitability of the product for its intended use. All statements herein refer to DCI products as delivered by DCI and do not apply to any user customizations not authorized by DCI nor to any third-party products. Nothing herein shall constitute any warranty by DCI nor will anything herein be deemed to modify the terms of DCI's existing Limited Warranty applicable to all DCI products. The most recent version of this manual is available on DCI's website.

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This equipment complies with Part 15 of the Rules of the FCC and with Industry Canada license-exempt RSS standards and with Australia Class License 2000 for LIPD (low interference potential devices). Operation is subject to the following two conditions: (1) this equipment may not cause harmful interference, and (2) this equipment must accept any interference received, including interference that may cause undesired operation. DCI is responsible for FCC compliance in the United States: Digital Control Incorporated, 19625 62nd Ave S, Suite B103, Kent WA 98032; phone 425-251-0559 or 800-288-3610.

Changes or modifications to any DCI equipment not expressly approved and carried out by DCI will void the user's Limited Warranty and the FCC's authorization to operate the equipment.

CE Requirements

DigiTrak receivers are classified as Class 2 radio equipment per the R&TTE Directive and may not be legal to operate or require a user license to operate in some countries. The list of restrictions and the required declarations of conformity are available on DCI's website, www.digitrak.com, under the Service & Support tab. Click on DOWNLOADS and select from the CE Documents pull-down menu to download, view, or print the documents.

Contact Us

United States *DCI Headquarters*	19625 62nd Ave S, Suite B103 Kent, Washington 98032, USA +1.425.251.0559 / 1.800.288.3610 +1.425.251.0702 fax dci@digital-control.com
Australia	2/9 Frinton Street Southport QLD 4215 +61.7.5531.4283 +61.7.5531.2617 fax dci.australia@digital-control.com
China	368 Xingle Road Huacao Town Minhang District Shanghai 201107, P.R.C. +86.21.6432.5186 +86.21.6432.5187 fax dci.china@digital-control.com
Europe	Brueckenstraße 2 97828 Marktheidenfeld Germany +49.9391.810.6100 +49.9391.810.6109 fax dci.europe@digital-control.com
India	DTJ 1023, 10th Floor DLF Tower A, DA District Center Jasola, New Delhi 110044 +91.11.4507.0444 +91.11.4507.0440 fax dci.india@digital-control.com
Russia	Molodogvardeyskaya Street, 4 Building 1, Office 5 Moscow, Russia 121467 +7.499.281.8177 +7.499.281.8166 fax dci.russia@digital-control.com

Dear Customer,

Thank you for choosing a DigiTrak locating system. We are extremely proud of the equipment we have been designing and building in Washington State since 1990. We believe in providing a unique, high-quality product and standing behind it with superior customer service and training.

Please take the time to read this entire manual, especially the section on safety. Also, please fill in the product registration card provided with this equipment and either mail it to DCI headquarters, fax it to us at 253-395-2800, or complete and submit the form online at our website, www.digitrak.com. We will put you on the Digital Control mailing list and send you product upgrade information and our *FasTrak* newsletter.

Feel free to contact us if you have any problems or questions. Our Customer Service department is available 24 hours a day, 7 days a week. International contact information is available on our website.

As the horizontal directional drilling industry grows, we're keeping our eye on the future to develop equipment that will make your job faster and easier. Visit us online any time to see what we're up to.

We welcome your questions, comments, and ideas.

Digital Control Incorporated
Kent, Washington
2013

See our DigiTrak Training Videos on YouTube at www.youtube.com/dcikent.

Table of Contents

Safety Precautions and Warnings

Carefully review this manual and be sure you always operate your DigiTrak locating system properly to obtain accurate depth, pitch, roll, and locate points. If you have any questions about the operation of the system, please contact DCI Customer Service for assistance.

General

Warning All operators must read and understand the following safety precautions and warnings and must review this operator's manual before using the DigiTrak F5 Locating System.

Serious injury and death can result if underground drilling equipment makes contact with an underground utility such as a high-voltage electrical cable or a natural gas line.

Substantial property damage and liability can result if underground drilling equipment makes contact with an underground utility such as a telephone, cable TV, fiber-optic, water, or sewer line.

Work slowdowns and cost overruns can occur if drilling operators do not use the drilling or locating equipment correctly to obtain proper performance.

DCI equipment is not explosion-proof and should never be used near flammable or explosive substances.

In the event of electrostatic shock, the display screen may go blank. No data loss will occur. Click the trigger to reset the receiver, or toggle down to reset the remote display.

Hot surfaces can occur on cable transmitters if housing requirements are not met. Always ensure the transmitter is installed properly in the housing during use.

Directional drilling operators MUST at all times:

- Understand the safe and proper operation of drilling and locating equipment, including the use of ground mats and proper grounding procedures.
- Ensure that all underground utilities have been located, exposed, and accurately marked prior to drilling.
- Wear protective safety clothing such as dielectric boots, gloves, hard hats, high-visibility vests, and safety glasses.
- Locate and track the transmitter in the drill head accurately and correctly during drilling.
- Maintain a minimum distance of 8 in. (20 cm) from the front of the receiver to the user's torso to ensure compliance with FCC requirements.
- Comply with federal, state, and local governmental regulations (such as OSHA).

- Follow all other safety procedures.

DigiTrak locating systems cannot be used to locate utilities.

Continued exposure of the transmitter to heat due to frictional heating of the drill head can cause inaccurate information to be displayed and may permanently damage the transmitter.

Remove the batteries from all system components during shipping and prolonged storage; damage caused by leakage may occur.

Equipment and Battery Disposal

This symbol on equipment indicates that the equipment must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of such equipment at a designated collection point for the recycling of batteries or electrical and electronic equipment. If the equipment contains a banned substance, the label will show the pollutant (Cd = Cadmium; Hg = Mercury; Pb = Lead) near this symbol. Before recycling, ensure batteries are discharged or the terminals are covered with adhesive tape to prevent shorting. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service, or the shop where you purchased the equipment.

The battery charger provided with your DigiTrak locating system is designed with adequate safeguards to protect you from shock and other hazards when used as specified within this document. If you use the battery charger in a manner not specified by this document, the protection provided may be impaired. Do not attempt to disassemble the battery charger, it contains no user-serviceable parts. The battery charger shall not be installed into caravans, recreational vehicles, or similar vehicles.

Pre-Drilling Testing

Before each drilling run, test your DigiTrak locating system with the transmitter inside the drill head to confirm it is operating properly and providing accurate drill head location and heading information.

During drilling, the depth will not be accurate unless:

- The receiver has been properly calibrated and the calibration has been checked for accuracy so the receiver shows the correct depth.
- The transmitter has been located correctly and accurately and the receiver is directly above the transmitter in the drill head underground or at the front locate point.
- The receiver is placed on the ground or held at the correct height-above-ground distance, which has been set correctly.

Always test calibration after you have stopped drilling for any length of time.

Interference

Interference can cause inaccuracies in the measurement of depth and loss of the transmitter's pitch, roll, or heading. Always perform a background noise check prior to drilling.

- Sources of interference include, but are not limited to, traffic signal loops, invisible dog fences, cable TV, power lines, fiber-trace lines, metal structures, cathodic protection, telephone lines, cell phones, transmission towers, conductive earth, salt, salt water, rebar, and radio frequencies.
- Interference at the remote display may also occur from other sources operating nearby on the same frequency, such as car rental agencies using their remote check-in modules or other directional drilling locating equipment.
- Background noise must be minimal and signal strength must be at least 150 points above the background noise during all locating operations.
- Because this equipment may generate, use, and radiate radio frequency energy, there is no guarantee that interference will not occur at a particular location. If this equipment does interfere with radio or television reception, which can be determined by powering the equipment off and on, try to correct the interference using one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the receiver and affected equipment.
  - Consult the dealer, DCI, or an experienced radio/TV technician for help.
  - Connect the DCI equipment to an outlet on a different circuit.

Equipment Maintenance

Turn off all equipment when not in use.

Store the equipment in cases, away from heat, cold, and moisture. Test to confirm proper operation prior to use.

Clean the screens on the receiver and remote display using a damp soft cloth without chemicals or cleaning agents.

Clean the receiver, remote, and battery charger case using only a soft moist cloth and mild detergent.

Do not use chemicals to clean the transmitter.

Inspect the equipment daily and contact DCI if you see any damage or problems. Do not disassemble or attempt to repair the equipment.

Do not store or ship this equipment with batteries inside. Always remove the batteries from the equipment before shipping or periods of non-use.

Introduction

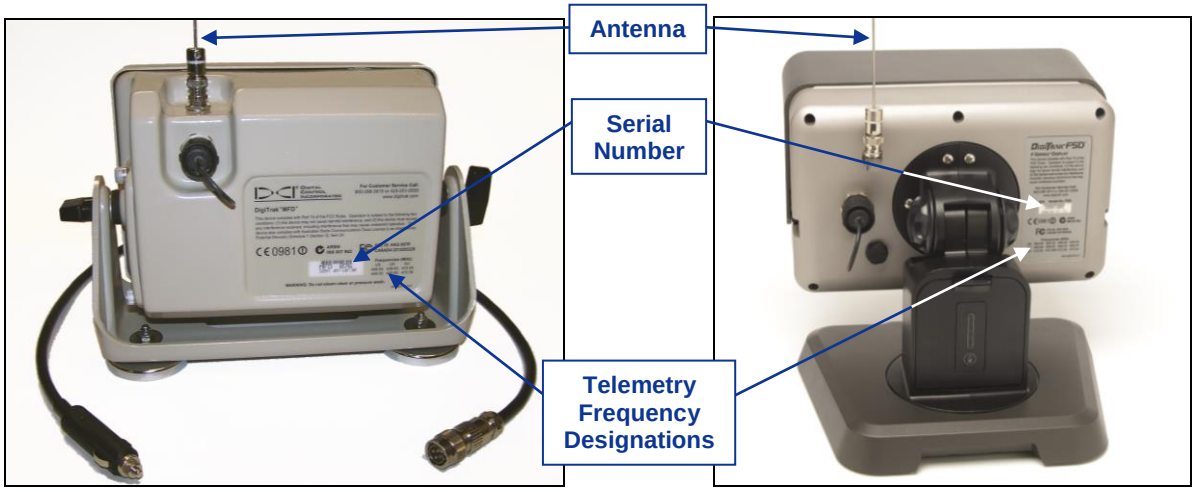
DigiTrak MFD and FSD Remotes Are Compatible with DigiTrak Mark III, Mark IV, Mark V, Eclipse, F2, F5, and SE Receivers

The DigiTrak Multi-Function Display (MFD) and the DigiTrak F Series Display (FSD) are remote displays that can accept telemetry signals from your DigiTrak Mark Series, Eclipse, F2, F5, or SE receiver. The MFD or FSD remote must be set up correctly to receive signals from your receiver. It can also receive signals from the F Series and Eclipse cable and F5 and Eclipse SST transmitters. Contact DCI for more information on the cable and SST transmitters, which require additional equipment and instructions.

This manual explains how to use the free-standing MFD and FSD remotes. It provides information on powering the remotes, navigating the menus, setting up the device to receive signals from your receiver, and understanding the display screens. The menus and display screens addressed in this manual also apply to the panel-mounted version of the DigiTrak Multi-Function Display. Specific information is presented for the different remotes: DigiTrak F2, F5, Eclipse, TensiTrak, SE, and Mark Series.

An internal speaker emits audible tones to warn of transmitter temperature increases and is tested every time the unit is powered on.

To meet global requirements and for proper communication with the receiver, one of the frequency designations shown on the remote display's serial number label must match that shown on the receiver's label.

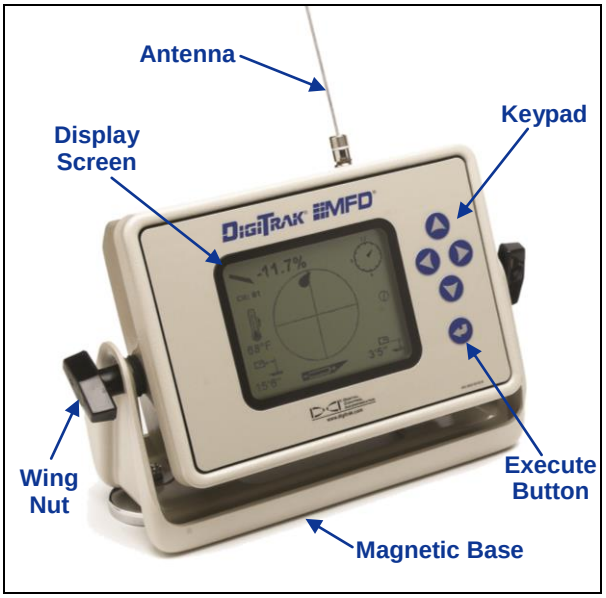


Serial Number Label on Back of MFD Remote

Serial Number Label on Back of FSD Remote

This manual does not give instructions on how to operate the locating systems. You must read the operator's manual for your locating system before trying to use it with the MFD or FSD remote. Call DCI if you have any questions.

Basic Instructions



MFD Remote

FSD Remote

Power Options

The MFD and FSD remotes can be powered with a battery pack or from another DC power source using the DC power cable. If using the DC power cable, power the displays with 12–28 VDC. If both a battery pack and the DC power cable are installed, the remote will draw power from the battery pack until the battery voltage is below the DC source voltage.

DC Power Cable

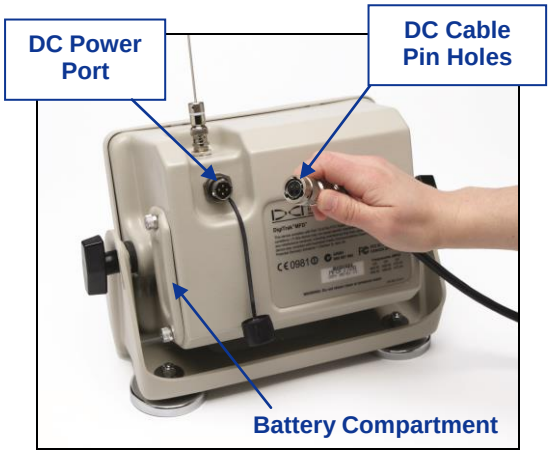
Battery Packs for MFD (not included)

The MFD remote requires a 14 VDC battery pack such as that shown to the left where the central terminal is negative. The FSD remote requires the DCI lithium-ion battery pack shown to the right.

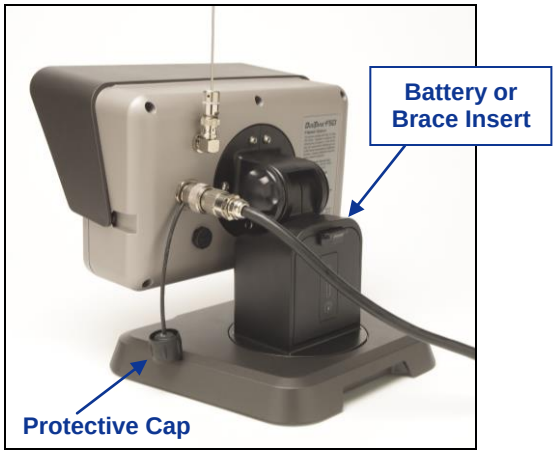
The battery status of the DCI lithium-ion battery pack can be checked by pressing the battery status button on the battery pack.

DCI Lithium-Ion Battery Pack

Connecting DC Power Cable



Connecting DC Power Cable to MFD Remote



DC Power Cable Installed in FSD Remote

To connect the DC power cable:

1. Remove the protective cap on the power port by rotating it counterclockwise.
2. The DC cable and power port are keyed to ensure proper alignment. Line up the keyed slots and DC cable's four pin holes with the four pins in the DC power port on the remote.
3. Push in and rotate the cable connector clockwise until the cable is secure.
4. Install the other end of the DC cable into the DC power source.

Note: If the FSD remote's power is supplied via the DC cable, the brace insert must be installed for structural integrity. The brace insert looks like and is installed like a DCI lithium-ion battery.

Installing Battery Pack into MFD Remote

To install the battery pack in the MFD remote:

1. Remove the battery compartment cover by rotating the thumb screws counterclockwise.
2. Insert the battery pack into the battery compartment, terminal end in first, as shown.
3. Reattach the battery compartment cover by holding it in place while pushing in and rotating the thumb screws clockwise.

Inserting Battery into MFD Remote

Installing FSD Battery Pack or Brace Insert

To install the DCI lithium-ion battery pack or brace insert in the FSD remote:

1. Hold the battery/brace insert with the tab up and facing away from the FSD remote.

2. Insert the battery/brace insert into the FSD remote's battery compartment, and push on the battery/brace insert until the tab latches in place.

Installing FSD Battery

Keypad

The keypad to the right of the display window is used to operate the MFD and FSD remotes.

Execute Button – The execute button (curved arrow) turns on the remote and selects a highlighted menu option. It is also used for adjusting the screen contrast as discussed below.

Direction Buttons – The direction buttons are used to navigate menu options. The down button is also used to access the main menu from the remote mode screen. (See "Main Menu" later in this section.)

Power On/Off

Once you have provided power to the remote, either using the battery pack or a DC power source, then you can operate the unit. The power on and off functions are as follows.

Power On – Press the execute button for a half-second or more to turn on the unit. You will hear a tone and the main display screen for the last mode used will appear. If you do not hear a tone, there may be a problem with the internal speaker; call DCI for customer support.

Power Off – To turn off the remote, you must access the main menu by pressing the down button and selecting the power off option. See the instructions for using the main menu later in this section.

Adjusting Screen Contrast

There are two ways to adjust the screen contrast. The easiest method is to hold in the execute button while pushing the right arrow (to lighten the display) or the left arrow (to darken the display). Each time the left or right arrow button is pressed, the contrast will change incrementally. The other way is by using the contrast adjustment option in the main menu. (See "Main Menu" later in this section.)

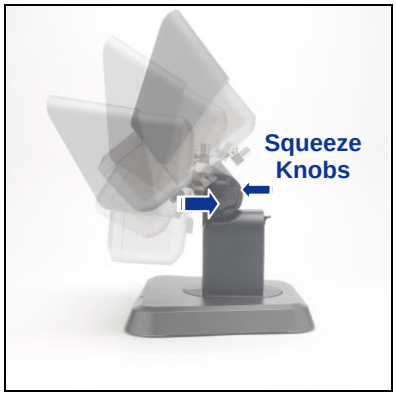
Adjusting Viewing Angle

The MFD remote allows you to adjust the viewing angle through a range of 180° up/down. The FSD remote allows you to adjust the viewing angle through a range of 180° left/right, 90° up/down, and 270° about the display's center.

Up/Down – To adjust the MFD remote's viewing angle, loosen the large black wing nuts on the sides of the remote, position the display as desired, and tighten the wing nuts. Do not overtighten to avoid damaging the housing.

To adjust the FSD remote's up/down viewing angle, loosen and squeeze the two knobs on the back of the FSD unit, adjust the screen as desired, and tighten the knobs. If the knobs are loose, the display will hold its vertical position only until the knobs are squeezed together or the display is vibrated. Thus, DCI recommends tightening the knobs before drilling.

Loosen Display Knobs

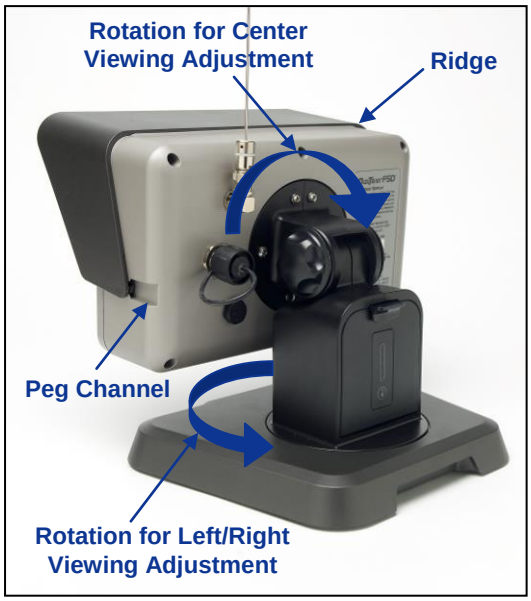


Adjust Viewing Angle

Tighten Display Knobs

Left/Right – When the FSD remote's magnetic base is secure, adjust the left/right viewing angle by rotating the display about the base.

Center – With the magnetic base secure, take hold of the display and rotate it to the desired orientation.



Attaching and Removing Visor

The removable visor on the FSD remote shields the screen from environmental conditions such as rain and sun. The visor is held in place by a ridge on the top of the display and channels on the sides of the display. The antenna must be removed when installing or removing the visor.

To install the visor, slide the visor's pegs along the peg channels on the sides of the display until the visor locks over the ridge.

To remove the visor, push the visor back over the ridge and along the channels.

Speaker and Audible Tones

The audible tones emitted by the MFD and FSD remotes to indicate an increase in the transmitter temperature are summarized in the table below.

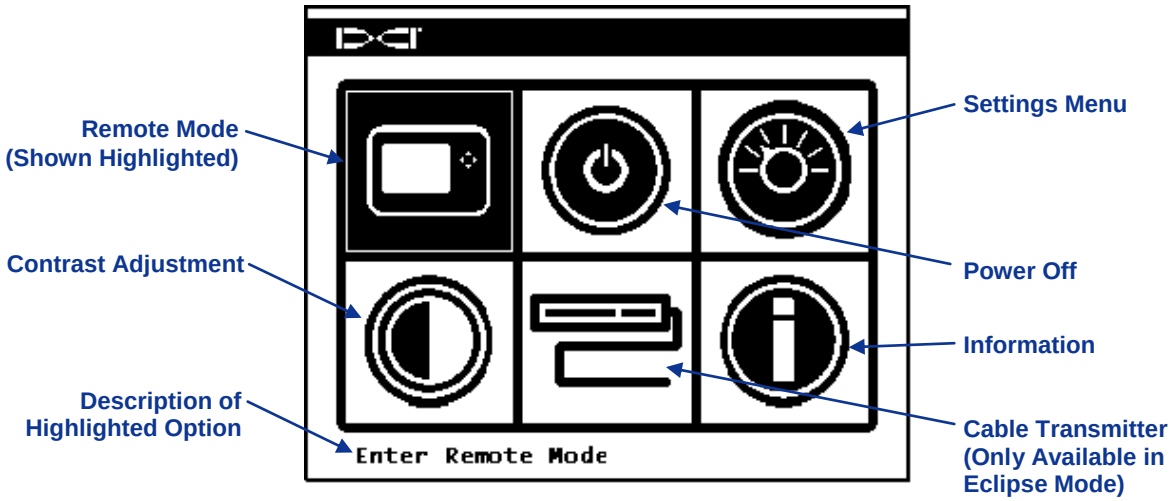
Transmitter Temperature Warning Tones

Temperature	Warning Tones
Below 61° F (16° C)	No tones for temperature increases.
61–97° F (16–36° C)	Double-beep sequence (beep-beep) for every 4° C increase in temperature.
104–111° F (40–44° C)	Two double-beep sequences (beep-beep, beep-beep) for every 4° C increase in temperature. **NOTE**: Action is required to cool the transmitter.
118–133° F (48–56° C)	Three double-beep sequences (beep-beep, beep-beep, beep-beep) for every 4° C increase in temperature. **NOTE**: Cooling is critical to avoid irreversible damage.
Above 140° F (60° C)	Three double-beep sequences every 5 seconds on the remote display, and every 20 seconds on the receiver. **NOTE**: Warning signifies dangerous drilling conditions; irreversible damage may have already been done.
Above 176° F (80° C)	Transmitter shuts down.
180° F (82° C)	FS and FC transmitter overheat indicator (temp dot) turns black (see below).
220° F (104° C)	Long-range and extended long-range transmitter overheat indicator (temp dot) turns black (see below).

Normal drilling temperatures range from 64° F (16° C) to 104° F (40° C). Once the temperature reaches 104° F (40° C) the thermometer icon will appear as  .

Main Menu

The main menu is accessed by pushing the down direction button.



Main Menu Screen

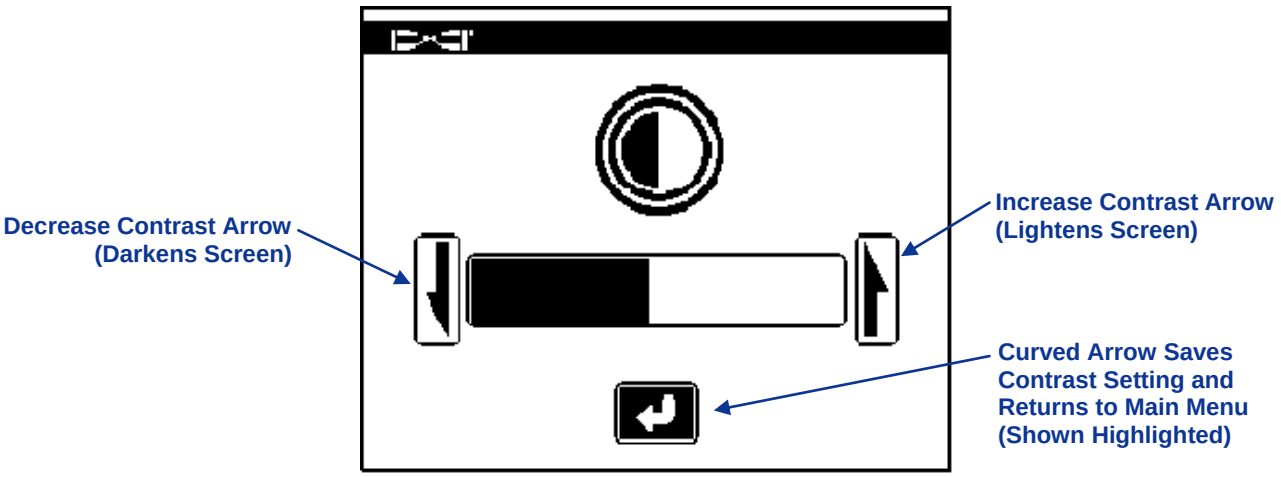
Use the direction buttons to highlight an option, and then press the execute button to select it. The table below lists the main menu options and the result for selecting each item.

Main Menu Options

	**Remote Mode** – Puts the MFD or FSD unit into remote radio mode. The unit will then display information including transmitter pitch, roll, temperature, battery status, depth, predicted depth, and *Target Steering* information sent from the receiver. The correct remote mode must be selected to communicate with your receiver. See the "Settings Menu" to change the remote mode.
	**Power Off** – Turns the unit off with no audible signal.
	**Settings Menu** – Opens the settings menu to select receiver model, telemetry channels, or pitch and depth units. See "Settings Menu" below.
	**Cable Transmitter** – Puts the MFD or FSD remote in cable mode for reading cable transmitters. Only accessible from F2, F5, and Eclipse mode; requires a cable box. Contact DCI for more information about the cable box.
	**Contrast Adjustment** – Allows you to adjust screen contrast. See below for instructions.
	**Information** – Displays system information such as the software version, the serial number, and the current display settings.

Contrast Adjustment

When the contrast adjustment option is selected from the main menu, the following screen appears.



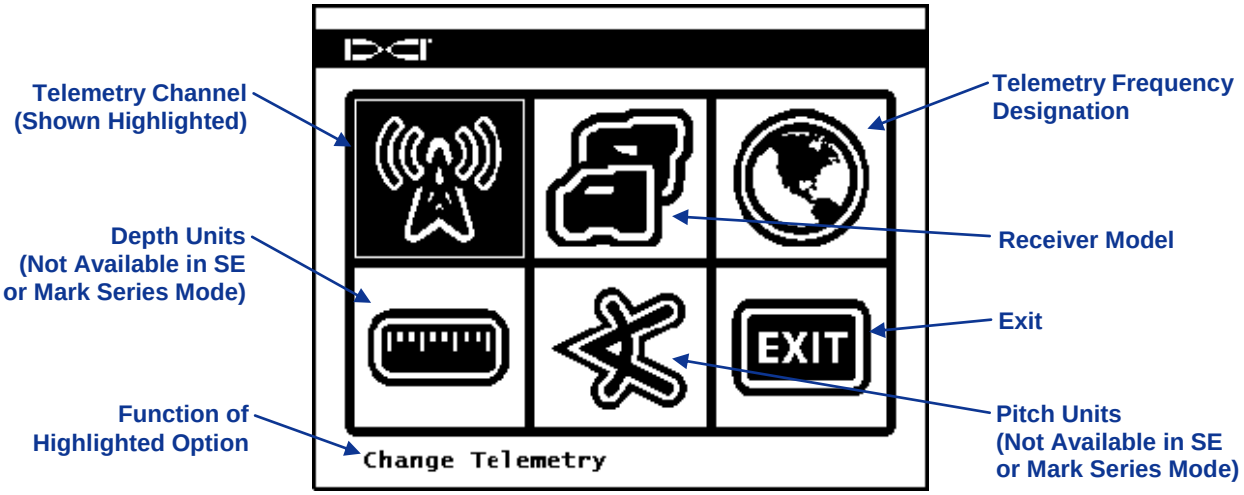
Adjust Screen Contrast

Using the left or right direction button on the remote, highlight the decrease contrast or increase contrast arrow as shown on the screen above. Then, adjust the contrast by pressing the execute button on the remote. Each time the execute button is pressed, the contrast will change incrementally. When the

contrast is adjusted, use the left/right direction buttons on the remote to highlight the curved arrow on the screen, as shown above, and press the execute button to return to the main menu.

Settings Menu

The settings menu is accessed by selecting the settings menu option at the main menu screen. If you are using a Mark Series locating system, the depth and pitch unit options will not be available; these units can only be changed at the receiver.



Settings Menu Screen

The table below shows the menu options as they appear on the display with descriptions of their uses. Any changes that are made to the settings will be saved when the remote is turned off. DCI recommends that you program the MFD or FSD settings to match the settings on your receiver.

Settings Menu Options

	**Telemetry Channel** – Opens the telemetry channel options. There are four channel options for the Mark Series, F5, F2, and SE modes: 1, 2, 3, 4. The Eclipse mode has eight channel options: A (1, 2, 3, 4) and B (B1, B2, B3, B4). Telemetry option B is recommended for the Eclipse System. The remote and receiver must have the same telemetry frequency designation and be set to the same telemetry channel.
	**Receiver Model** – Allows you to program the remote to work with an F5, F2, Eclipse, SE, or Mark Series receiver. Software updates may be required for older MFD and FSD remotes to display some mode options. Use Mark Series mode with an SE receiver if there is not an SE option.
	**Telemetry Frequency Designation** – Opens the telemetry region options. If you must change this setting, call DCI to determine which setting is required in your area and to verify that it matches the receiver frequency.
	**Depth Units** – Allows you to select distance units as either English or metric. When English units are selected, temperature will display in degrees Fahrenheit (° F). When metric units are selected, temperature will display in degrees Celsius (° C).
	**Pitch Units** – Allows you to select pitch angle units. The options are percent (%) or degree (°).

EXIT	**Exit Menu** – Exits the settings menu and returns to the main menu screen. After a setting is changed, the exit option is automatically highlighted for selection.

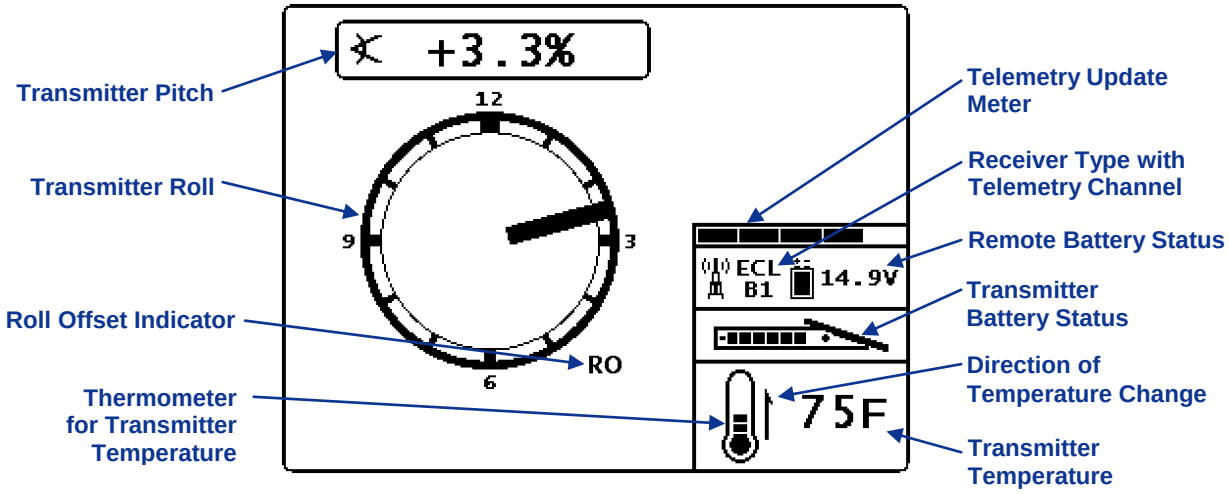
Remote Modes

The main display screen for the last remote mode setting is the default screen when you turn on the MFD or FSD remote display. It shows the transmitter pitch, roll, battery status, and temperature. The MFD or FSD battery status, receiver model, telemetry channel, telemetry update meter, and *Target Steering* data (if active) are also displayed on the main screen.

F5, F2, and Eclipse Modes

Main Display Screens

The F5, F2, and Eclipse modes have essentially the same screen display. The only significant difference between the F5, Eclipse and the F2 display modes is that the F5 and Eclipse modes will display roll at the ½ clock positions as well as the standard 12 clock positions. The number of clock positions that display is a function of the transmitter.



DigiTrak F5, F2, and Eclipse Main Display Screen

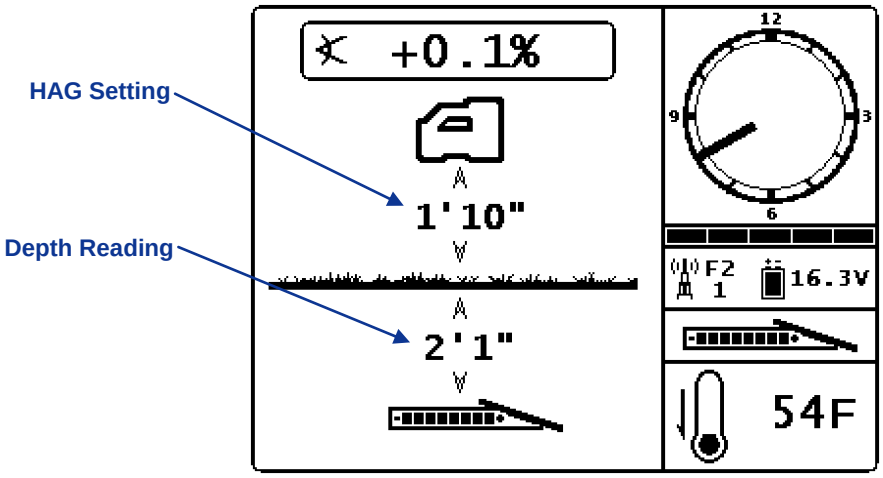
The telemetry update meter displays the amount of signal being received. If less data is being received, then fewer bars are shown on the meter. If the meter is decreasing or low, you should pause before making steering decisions to ensure you have correct data. When the meter is empty, telemetry data is not being received and the information will disappear.

The roll offset indicator displays when the receiver has been programmed to compensate for a difference between the transmitter's 12 o'clock and the drill head's 12 o'clock positions.

Depth Display Screens

The depth or predicted depth of the transmitter can be viewed on the remote display, but only when the receiver is positioned at the locate line (LL) or at the front locate point (FLP) with its trigger held in. See the operator's manual provided with your DCI locating system for information on correctly positioning the receiver.

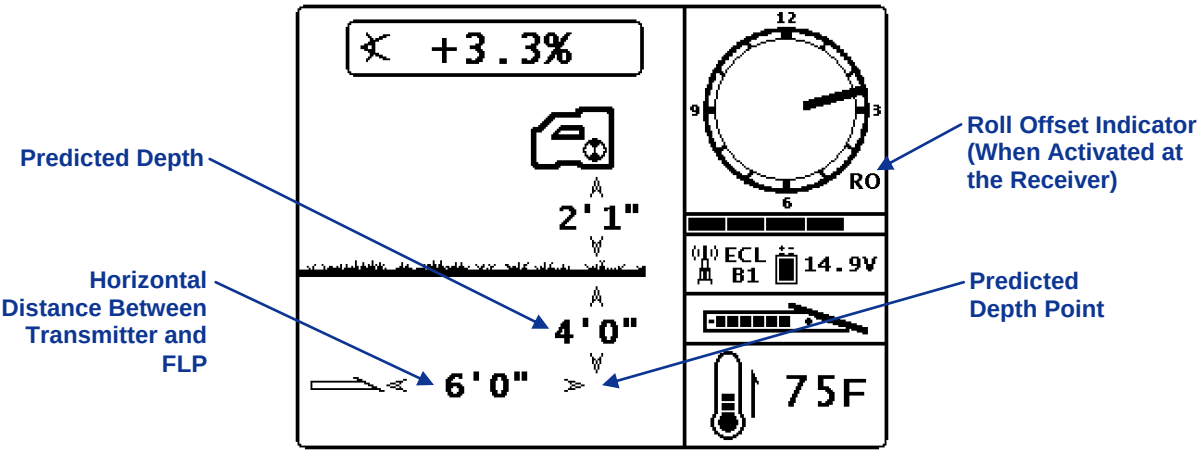
When the receiver is positioned at the LL with its trigger held in, the remote's display will change to show the depth reading with arrows pointing to the ground and the drill head. When the height-above-ground (HAG) function is turned on, the receiver is shown elevated with its HAG setting displayed. In the figure below you can see that the HAG setting is 1'10" to indicate that the receiver is being held that distance above the ground. See the operator's manual provided with your DCI locating system for information on using the HAG function.



Depth Display at the Locate Line with HAG On

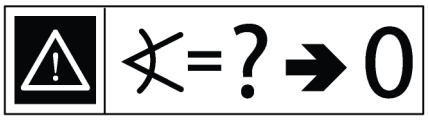
The depth data will display for 10 seconds after the trigger on the receiver is released, and then the display will return to the main display screen.

The predicted depth display screen appears when the receiver is positioned at the FLP or the RLP (rear locate point) and the trigger is held in. However, the predicted depth is only valid at the FLP. The predicted depth display will show arrows pointing to the receiver and the predicted depth point ahead of the transmitter.



Predicted Depth Display with HAG On

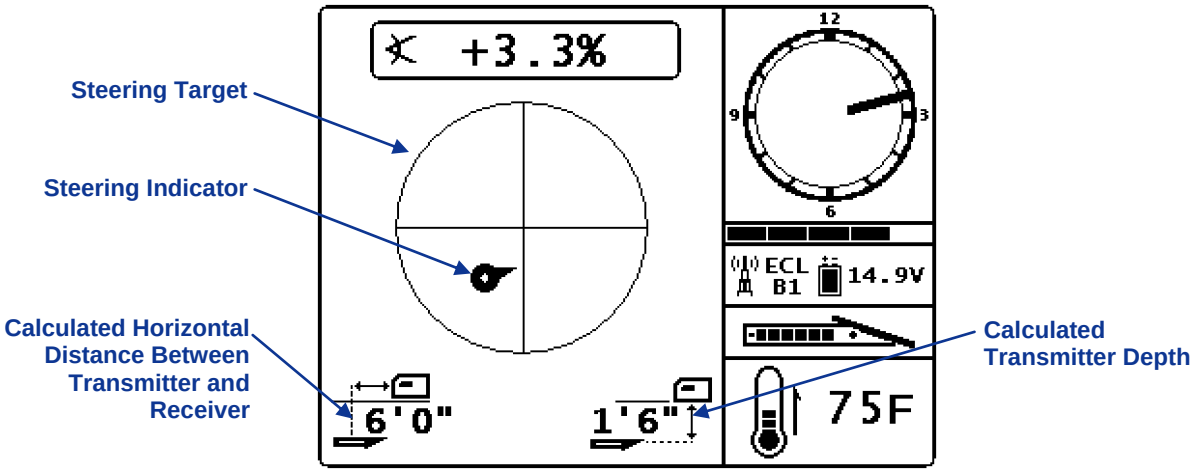
When the transmitter pitch information cannot be obtained at the receiver due to range restrictions or interference, the remote will assume the transmitter has a pitch of zero for depth and predicted depth readings. In this case, the following image will appear on the depth or predicted depth mode screen.



Pitch Assumed Zero

Target Steering *Display Screen*

The *Target Steering* display screen, shown below, will appear when the receiver has been programmed with a target depth value.

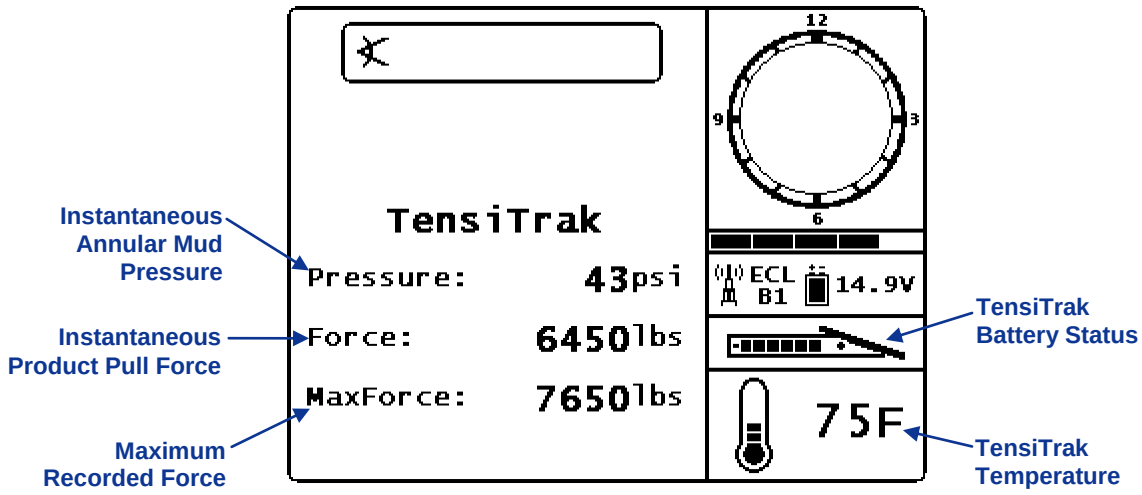


Target Steering *Display*

The calculated horizontal distance and depth shown on the *Target Steering* display are only correct when the receiver is properly positioned beyond the front locate point and within the range limits of the transmitter and remote. See the operator's manual provided with your DCI locating system for information on how to activate *Target Steering* and correctly position the receiver.

TensiTrak Mode (Eclipse and F5 Only)

When using the F5 or Eclipse TensiTrak Pullback and Pressure Monitoring System with the remote programmed to F5 or Eclipse mode, you will see the TensiTrak data screen shown below.



TensiTrak Data Screen

As the product's maximum recorded force (MaxForce) and instantaneous annular mud pressure (Pressure) increase, the remote will emit tones as shown in the following table.

TensiTrak Force and Pressure Warning Tones

Event	Warning Tones
MaxForce increases by 2000 lb (8.9 kN)	Single beep
Pressure increases by 5 psi (34 kPa) up to 40 psi (276 kPa)	Single beep
Pressure increases by 5 psi (34 kPa) from 40 to 50 psi (276–345 kPa)	Double beep
Pressure increases by 5 psi (34 kPa) from 50 to 60 psi (345–414 kPa)	Triple Beep

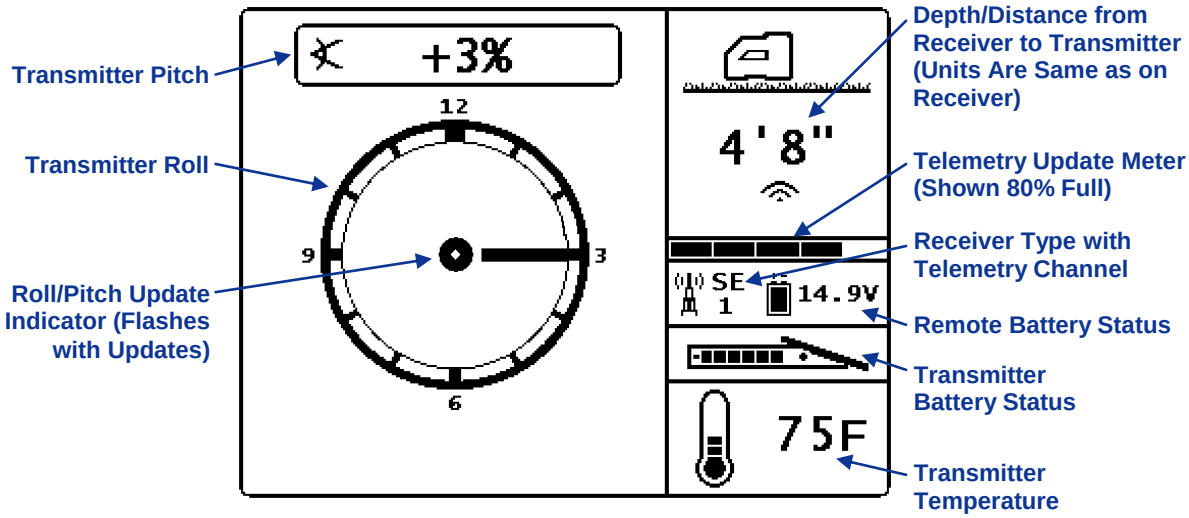
For additional information about the TensiTrak Pullback and Pressure Monitoring System, contact DCI.

SE Series Mode

The SE mode is used with an SE receiver. Software updates may be required for older MFD and FSD remotes to display the SE mode option. If you are using an older remote with an SE receiver and have not yet upgraded the remote to have the SE mode option, then use Mark Series mode; the Mark IV/V screens will display.

Main Display Screen

After entering the SE mode, confirm that the telemetry channel matches that of the receiver. The same depth and pitch measurement units as set on the receiver will display on the remote.



DigiTrak SE Main Display Screen

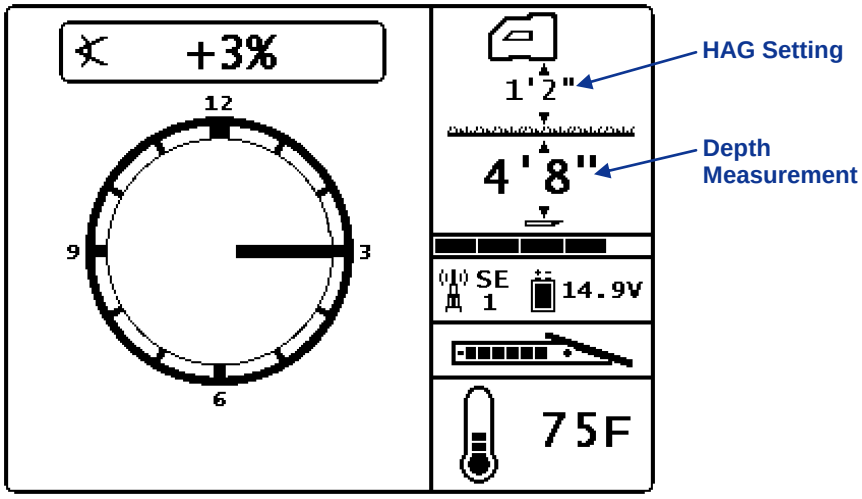
The telemetry update meter displays the amount of signal being received. If less data is being received, then fewer bars are shown on the meter. If the meter is decreasing or low, you should pause before making steering decisions to ensure you have correct data. When the meter is empty, all data will disappear.

A roll offset indicator (RO) will display next to the clock, as shown on the DigiTrak F2 and Eclipse main display screens, when the receiver has been programmed to compensate for a difference between the transmitter's 12 o'clock and the drill head's 12 o'clock positions.

Depth Display Screens

The depth or predicted depth of the transmitter can be viewed on the remote display when the SE receiver is positioned at the locate line (LL). See the operator's manual provided with your SE locating system for information on correctly positioning the receiver.

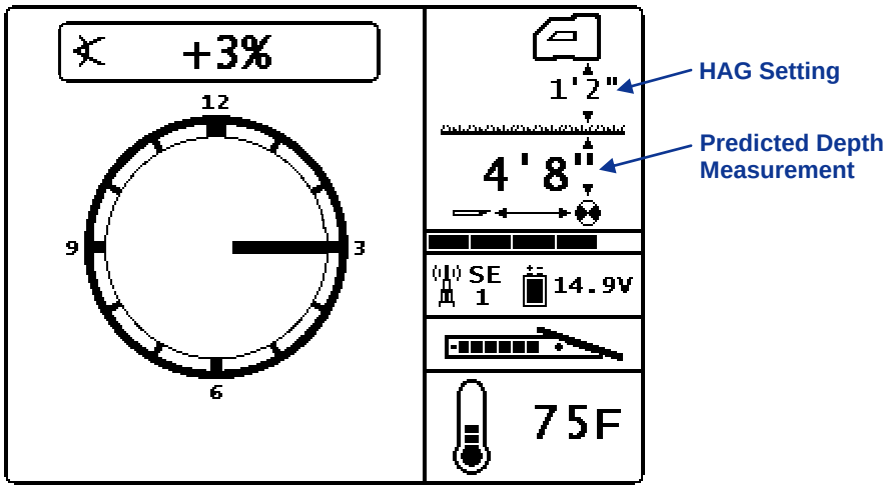
When the receiver is positioned at the LL and its trigger is held in, the remote display screen will change to show the depth measurement with arrows pointing to the ground and the drill head. When the height-above-ground (HAG) function is turned on, the receiver icon is shown elevated with its HAG setting displayed. In the figure below you can see that the HAG setting is 1’ 2” to indicate that the receiver is being held that distance above the ground. See your SE system operator’s manual for information on using the HAG function.



DigiTrak SE Depth Display Screen with HAG On

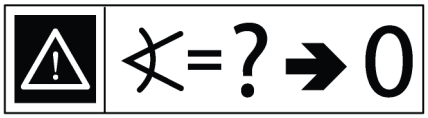
The depth data will display for 10 seconds after the trigger on the receiver is released, and it will then return to the main screen display.

The predicted depth display screen appears when the receiver is positioned at the FLP or the RLP (rear locate point) and the trigger is held in. However, the predicted depth is only valid at the FLP. The predicted depth display will show arrows pointing to the receiver and the predicted depth point ahead of the transmitter.



DigiTrak SE Predicted Depth Display with HAG On

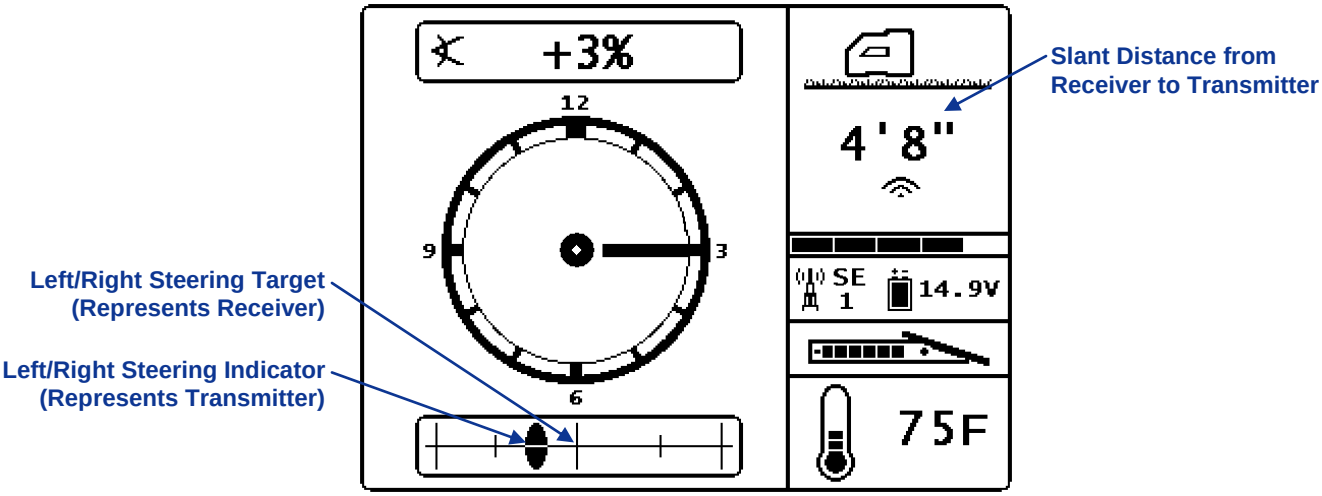
When the transmitter pitch information cannot be obtained at the receiver due to range restrictions or interference, the remote will assume the transmitter has a pitch of zero for depth and predicted depth readings. In this case, the following image will appear on the depth or predicted depth mode screen.



Pitch Assumed Zero

Remote Steering Display Screen

The remote steering display screen, shown below, will appear when remote steering has been turned on at the receiver. See the SE system operator's manual for more information.



DigiTrak SE Remote Steering Display

The remote steering information is only correct when the receiver is properly positioned beyond the front locate point and within the range limits of the transmitter and remote. See your SE system operator's manual for information on how to activate remote steering and correctly position the receiver.

Mark Series Mode

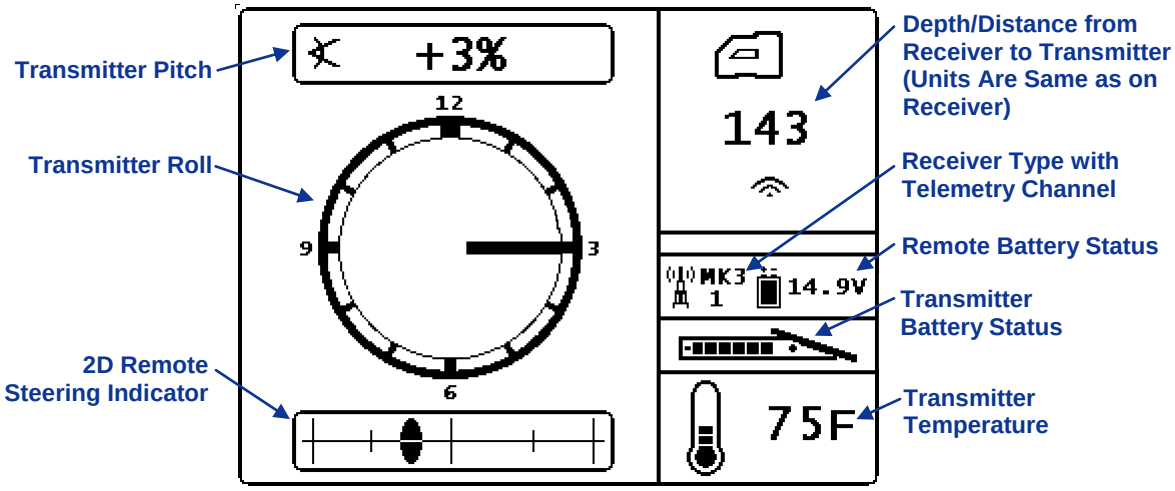
The Mark Series mode is used with a DigiTrak Mark II, Mark III, Mark IV, or Mark V receiver. The remote will automatically detect which receiver is being used and show the appropriate screen.

After entering the Mark Series mode, you should confirm that the telemetry channel on the remote matches that on the receiver. The same depth and pitch measurement units set on the receiver will display on the remote.

NOTE: The SE receiver is used with the MFD/FSD remote in Mark Series mode if the remote does not have updated software with the SE receiver mode option. The Mark IV/V screens will display.

Main Display Screens (Mark II, III, IV, and V)

When a Mark II or Mark III receiver is used, the data screen shown below will display. The depth/distance shown for either system may not be the actual depth; it could be the slant distance. For the most accurate depth reading, the receiver must be positioned over the drill head or at the front locate point (see the operator's manual provided with your DCI locating system).

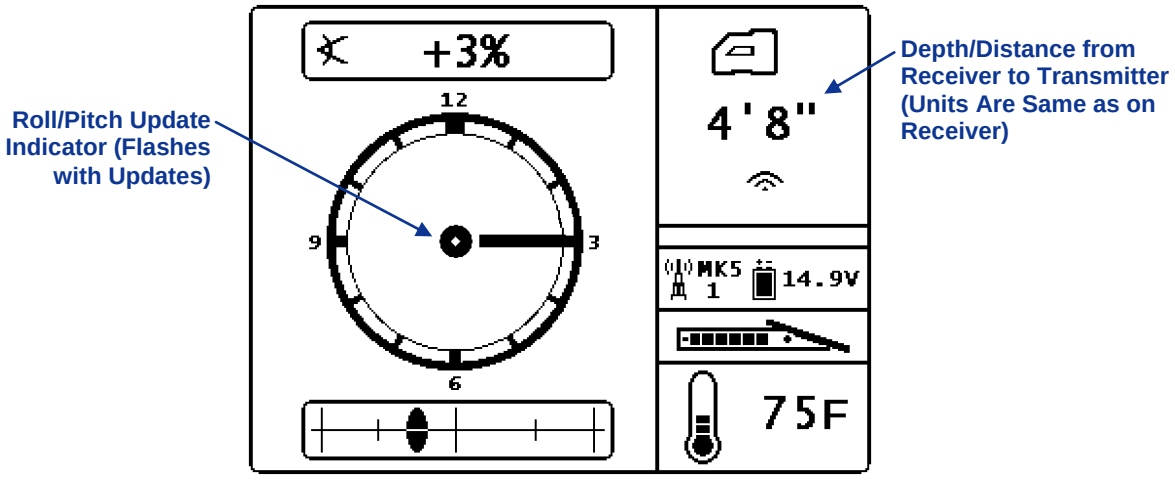


DigiTrak Mark II/III Main Display Screen

NOTE: If you are using a Mark II receiver, you will still see MK3 as the receiver type.

The telemetry update meter is not active when the remote is in Mark Series mode. Updates from the transmitter are indicated by the flashing dot in the center of the clock, as illustrated in the Mark IV/V main display screen shown below. The dot flashes at about 2-second intervals. When telemetry data is not available, the dot will not appear and no transmitter data will display.

The Mark IV/V main display screen will appear when a Mark IV or Mark V receiver is used. All symbols have the same representation as described for the Mark II/III screen shown above.

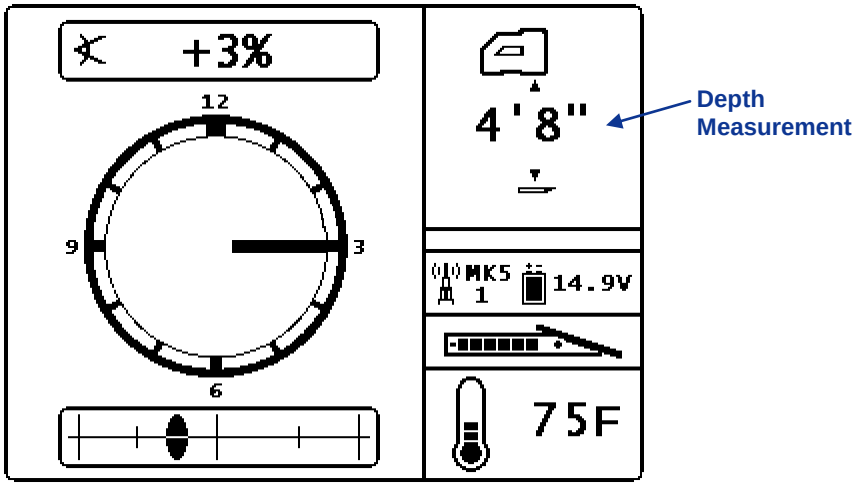


DigiTrak Mark IV/V Main Display Screen

The main display screen is the only screen that will display when using a Mark II or Mark III receiver. When using a Mark IV or Mark V receiver, depth and predicted depth screens will display as described below.

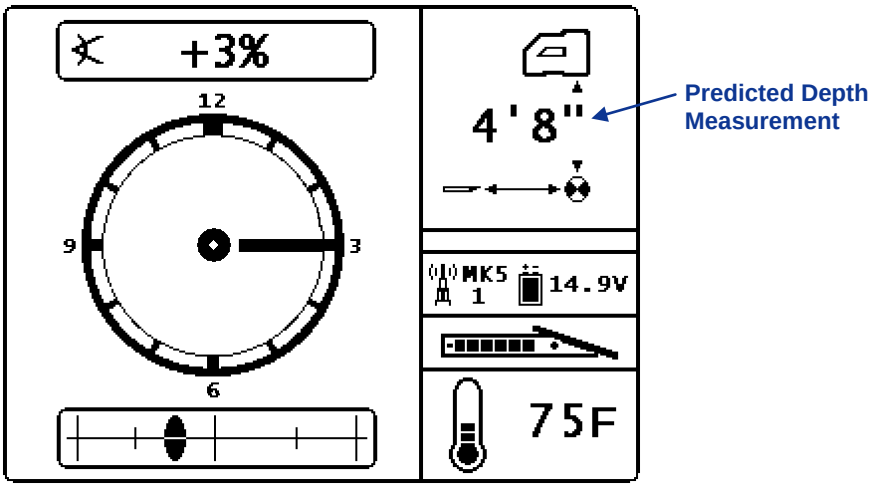
Depth Display Screens (Mark IV/V)

Once the Mark IV or Mark V receiver is positioned at the locate line and the trigger is held in, the depth information will be displayed as shown in the figure below. The vertical arrows pointing to the drill head and the receiver indicate that the reading is a depth measurement and not the slant distance to the head.



DigiTrak Mark IV/V Depth Screen

If the DigiTrak Mark IV or Mark V receiver is positioned at the front locate point (FLP) and the trigger is held in, you will see the predicted depth screen shown below.



DigiTrak Mark IV/V Predicted Depth Screen

Notice that there are vertical arrows pointing to the target and the receiver in front of the drill head. These arrows indicate that the depth measurement displayed is the predicted depth of the drill head when it reaches the point below the receiver at the FLP.

Appendix: Specifications

The power requirements and environmental requirements for the DigiTrak MFD, MFDF and FSD remotes are listed below.

Power Requirements

Device (Model Number)	Operational Voltage	Operational Current
DigiTrak F Series Display (FSD) and DigiTrak Multifunction Display Panel-Mounted (MFD)	12–28 V ⎓	3.2 W max
DigiTrak Multifunction Display Free-standing (MFDF)	12–28 V ⎓	3.2 W max
DigiTrak F Series Lithium-Ion Battery Pack (FBP)	14.4 V ⎓	4.5 Ah, 65 Wh max

Environmental Requirements

Device	Relative Humidity	Operating Temperature	System Working Altitude
DigiTrak F Series Display (FSD) and Multifunction Displays (MFD and MFDF)	<90%	-4 to 140° F (-20 to 60° C)	Up to 6561 ft. (2000 m)
DigiTrak F Series Lithium-Ion Battery Pack	<99% for <10° C <95% for 10-35° C <75% for 35-60° C	-4 to 140° F (-20 to 60° C)	

DIGITAL CONTROL INCORPORATED

19625 62nd Ave S, Suite B103
Kent Washington 98032, USA
425.251.0559 / 800.288.3610
dci@digital-control.com, www.DigiTrak.com

LIMITED WARRANTY

Digital Control Incorporated ("DCI") warrants that when shipped from DCI each DCI Product will conform to DCI's current published specifications in existence at the time of shipment and will be free, for the warranty period ("Warranty Period") described below, from defects in materials and workmanship. The limited warranty described herein ("Limited Warranty") is not transferable, shall extend only to the first end-user ("User") purchasing the DCI Product from either DCI or a dealer expressly authorized by DCI to sell DCI Products ("Authorized DCI Dealer"), and is subject to the following terms, conditions and limitations:

1. A Warranty Period of twelve (12) months shall apply to the following new DCI Products: receivers/locators, remote displays, battery chargers and rechargeable batteries, and DataLog® modules and interfaces. A Warranty Period of ninety (90) days shall apply to all other new DCI Products, including transmitters, accessories, and software programs and modules. Unless otherwise stated by DCI, a Warranty Period of ninety (90) days shall apply to: (a) a used DCI Product sold either by DCI or by an Authorized DCI Dealer who has been expressly authorized by DCI to sell such used DCI Product; and (b) services provided by DCI, including testing, servicing, and repairing an out-of-warranty DCI Product. The Warranty Period shall begin from the later of: (i) the date of shipment of the DCI Product from DCI, or (ii) the date of shipment (or other delivery) of the DCI Product from an Authorized DCI Dealer to User.
2. DCI's sole obligation under this Limited Warranty shall be limited to either repairing, replacing, or adjusting, at DCI's option, a covered DCI Product that has been determined by DCI, after reasonable inspection, to be defective during the foregoing Warranty Period. All warranty inspections, repairs and adjustments must be performed either by DCI or by a warranty claim service authorized in writing by DCI. All warranty claims must include proof of purchase, including proof of purchase date, identifying the DCI Product by serial number.
3. The Limited Warranty shall only be effective if: (i) within fourteen (14) days of receipt of the DCI Product, User mails a fully completed Product Registration Card to DCI; (ii) User makes a reasonable inspection upon first receipt of the DCI Product and immediately notifies DCI of any apparent defect; and (iii) User complies with all of the Warranty Claim Procedures described below.

WHAT IS NOT COVERED

This Limited Warranty excludes all damage, including damage to any DCI Product, due to: failure to follow DCI's operator's manual and other DCI instructions; abuse; misuse; neglect; accident; fire; flood; Acts of God; improper applications; connection to incorrect line voltages and improper power sources; use of incorrect fuses; overheating; contact with high voltages or injurious substances; use of batteries or other products or components not manufactured or supplied by DCI; or other events beyond the control of DCI. This Limited Warranty does not apply to any equipment not manufactured or supplied by DCI nor, if applicable, to any damage or loss resulting from use of any DCI Product outside the designated country of use. By accepting a DCI Product and not returning it for a refund within thirty (30) days of purchase, User agrees to the terms of this Limited Warranty, including without limitation the Limitation of Remedies and Liability described below, and agrees to carefully evaluate the suitability of the DCI Product for User's intended use and to thoroughly read and strictly follow all instructions supplied by DCI (including any updated DCI Product information which may be obtained at the above DCI website). In no event shall this Limited Warranty cover any damage arising during shipment of the DCI Product to or from DCI.

User agrees that the following will render the above Limited Warranty void: (i) alteration, removal or tampering with any serial number, identification, instructional, or sealing labels on the DCI Product, or (ii) any unauthorized disassembly, repair or modification of the DCI Product. In no event shall DCI be responsible for the cost of or any damage resulting from any changes, modifications, or repairs to the DCI Product not expressly authorized in writing by DCI, and DCI shall not be responsible for the loss of or damage to the DCI Product or any other equipment while in the possession of any service agency not authorized by DCI.

DCI reserves the right to make changes in design and improvements upon DCI Products from time to time, and User understands that DCI shall have no obligation to upgrade any previously manufactured DCI Product to include any such changes.

THE FOREGOING LIMITED WARRANTY IS DCI'S SOLE WARRANTY AND IS MADE IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IMPLIED WARRANTY OF NON-INFRINGEMENT, AND ANY IMPLIED WARRANTY ARISING FROM COURSE OF PERFORMANCE, COURSE OF DEALING, OR USAGE OF TRADE, ALL OF WHICH ARE HEREBY DISCLAIMED AND EXCLUDED. If DCI has substantially complied with the warranty claim procedures described below, such procedures shall constitute User's sole and exclusive remedy for breach of the Limited Warranty.

LIMITATION OF REMEDIES AND LIABILITY

In no event shall DCI or anyone else involved in the creation, production, or delivery of the DCI Product be liable for any damages arising out of the use or inability to use the DCI Product, including but not limited to indirect, special, incidental, or consequential damages, or for any cover, loss of information, profit, revenue or use, based upon any claim by User for breach of warranty, breach of contract, negligence, strict liability, or any other legal theory, even if DCI has been advised of the possibility of such damages. In no event shall DCI's liability exceed the amount User has paid for the DCI Product. To the extent that any applicable law does not allow the exclusion or limitation of incidental, consequential or similar damages, the foregoing limitations regarding such damages shall not apply.

This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from state to state. This Limited Warranty shall be governed by the laws of the State of Washington.

WARRANTY CLAIM PROCEDURES

1. If you are having problems with your DCI Product, you must first contact the Authorized DCI Dealer where it was purchased. If you are unable to resolve the problem through your Authorized DCI Dealer, contact DCI's Customer Service Department in Kent, Washington, USA at the above telephone number between 6:00 a.m. and 6:00 p.m. Pacific Time and ask to speak with a customer service representative. (The above "800" number is available for use only in the USA and Canada.) Prior to returning any DCI Product to DCI for service, you must obtain a Return Merchandise Authorization (RMA) number. Failure to obtain an RMA may result in delays or return to you of the DCI Product without repair.
2. After contacting a DCI customer service representative by telephone, the representative will attempt to assist you in troubleshooting while you are using the DCI Product during actual field operations. Please have all related equipment available together with a list of all DCI Product serial numbers. It is important that field troubleshooting be conducted because many problems do not result from a defective DCI Product, but instead are due to either operational errors or adverse conditions occurring in the User's drilling environment.
3. If a DCI Product problem is confirmed as a result of field troubleshooting discussions with a DCI customer service representative, the representative will issue an RMA number authorizing the return of the DCI Product and will provide shipping directions. You will be responsible for all shipping costs, including any insurance. If, after receiving the DCI Product and performing diagnostic testing, DCI determines the problem is covered by the Limited Warranty, required repairs and/or adjustments will be made, and a properly functioning DCI Product will be promptly shipped to you. If the problem is not covered by the Limited Warranty, you will be informed of the reason and be provided an estimate of repair costs. If you authorize DCI to service or repair the DCI Product, the work will be promptly performed and the DCI Product will be shipped to you. You will be billed for any costs for testing, repairs and adjustments not covered by the Limited Warranty and for shipping costs. In most cases, repairs are accomplished within 1 to 2 weeks.
4. DCI has a limited supply of loaner equipment available. If loaner equipment is required by you and is available, DCI will attempt to ship loaner equipment to you by overnight delivery for your use while your equipment is being serviced by DCI. DCI will make reasonable efforts to minimize your downtime on warranty claims, limited by circumstances not within DCI's control. If DCI provides you loaner equipment, your equipment must be received by DCI no later than the second business day after your receipt of loaner equipment. You must return the loaner equipment by overnight delivery for receipt by DCI no later than the second business day after your receipt of the repaired DCI Product. Any failure to meet these deadlines will result in a rental charge for use of the loaner equipment for each extra day the return of the loaner equipment to DCI is delayed.