



***Datalink Systems, Inc.***

TECHNICAL DOCUMENTATION

# **MDT Manual (3.56)**

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# 1.0 MDT-2000 Overview

The MDT-2000 is Datalink's mobile data terminal (MDT), with built-in display and keypad. It is designed for in-vehicle use, providing two-way messaging and automatic vehicle location (AVL) over multiple wireless communications networks. Standard features are as follows:

- LCD graphical display with backlight
- Keypad with backlight
- Internal speaker
- Two digital input/output (I/O) pins
- Three external serial ports
- Internal GPS receiver (optional)

Because of its power and flexibility, the MDT can connect to a wide variety of external devices, including:

- Cellular modems (GPRS/CDMA)
- Satellite modems (Inmarsat D+/Globalstar/MSat)
- Sentry 2-way pager system
- RF modem (point-to-point and trunked)
- External keyboard
- Magnetic card reader
- Laptop
- Third-party devices
- J-1708 engine interface

Using these devices, the MDT can provide enhanced functionality, and connect to several networks. Other devices and networks are available with custom development. The MDT can operate with more than one network simultaneously, and performs least cost routing to determine which network to use.

## 2.0 Specifications

<b>Size:</b>	150 mm x 120 mm x 45 mm (W x H x D) Additional space required for connectors
<b>Supply Voltage:</b>	8-24 VDC
<b>Supply Current:</b>	>1 A (for start-up inrush)
<b>Power Requirements:</b>	5 W Add 0.5 W for optional internal GPS
<b>Temperature Range:</b>	-20°C to 70°C
<b>Serial Ports:</b>	RS-232 (300-115200 bps) 3 external ports (1 port includes hardware flow-control) 1 internal port for optional internal GPS
<b>Display:</b>	320 x 200 pixel monochrome dot matrix LCD with backlight
<b>Keypad:</b>	12-key with backlight
<b>Digital I/O Lines:</b>	Programmable as inputs or outputs (forced to inputs during reset) CMOS logic level (0-5 V max) 1 K $\Omega$ series resistance
<b>Optional Internal GPS:</b>	12-channel SMA connector on rear panel
<b>Clock:</b>	Built-in real time clock with battery backup
<b>Temperature:</b>	Built-in temperature sensor

## 3.0 Physical Layout

Figure 1 shows the MDT-2000. Each external feature is described below.



**Figure 1 – MDT-2000**

<b>PWR LED:</b>	Red LED is active when power is applied to the unit.
<b>TX LED:</b>	Active when data is being transmitted.
	Flashes when high priority data is queued for transmission.
<b>RX LED:</b>	Active when data is being received.
	Flashes when new messages are waiting to be read.
<b>GPS LED:</b>	Flashes quickly (twice/sec) if GPS receiver not found.
	Flashes slowly (once/sec) if GPS has poor signal.
	LED off when GPS has valid signal.
<b>Speaker:</b>	Beeps when new message is waiting to be read.
<b>Function Keys:</b>	F1-F4, used to select on-screen prompts.
<b>Menu Key:</b>	Not used in this version of firmware.
<b>Mode Key:</b>	Shortcut to Status screen.
<b>PWR Key:</b>	Not applicable to units with permanent power. Otherwise, hold down to turn unit on. To prevent accidental shutdowns, MDT can only be turned off through menu system, or by disconnecting power.
<b>Reset:</b>	Small switch can be pressed to restart the MDT without disconnecting power.
<b>Arrow Keys:</b>	Used to move through menu system, and to scroll through messages.
<b>Enter Key:</b>	Selects currently highlighted option

## 4.0 Connections

The MDT has two external data sockets, plus antenna connectors where applicable:

*Bottom RJ-45*

*Side RJ-45*

*Rear SMA connector for GPS*

*Rear SMA connector for GPRS*

Power

COM1/COM3 serial ports

IO1/IO2 digital input/output lines

COM2 serial port (with full handshaking lines)

Included with optional internal GPS receiver.

Included with optional internal GPRS modem.

### 4.1 Cables

The MDT is normally supplied with two cables, plus GPS antenna, modem antenna, and mounting hardware where applicable.

- 1) **RJ-45 to DB-9 (female)**. This cable connects to the side RJ-45 on MDT (COM2). Pin 1 is closest to the Enter key.

RJ-45	Direction	DB-9 (female)
1	→	6 (DSR)
2	←	4 (DTR)
3	←	3 (TX)
4	→	8 (CTS)
5	→	2 (RX)
6	←	7 (RTS)
7	→	1 (DCD)
8	—	5 (GND)
		9 (RI) not connected

- 2) **RJ-45 to multiple connectors**. Connects to bottom RJ-45 on MDT. Pin 1 is closest to the Menu key. This cable has the following connections:
  - a. Thick black wire. Connect to ground or negative supply.
  - b. Thick red wire. Connect to positive supply. 8-24V DC.
  - c. Two DB-9 (male) plugs. COM1 and COM3 serial ports (port numbers labelled on plugs).
  - d. White and black pair. IO1 digital input/output line (0-5V max).
  - e. Blue (red in old harness) and black pair. IO2 digital input/output line (0-5V max).

### 4.2 Input/Output lines used for RF modem

- I/O line 1 is used as Channel Acquired input when using RF network (polarity configurable).
- I/O line 2 is used as Push-to-Talk (PTT) output when using RF network (polarity configurable).

## 5.0 Installation

Connect the thick black and red wires to a 12V DC supply (8 to 24V accepted), being sure to observe correct polarity. Connect the RJ-45 plug attached to these power wires into the bottom connector on the MDT. When power is applied, the MDT should turn itself on and display a “System Initializing ...” message. After a few seconds, it will start loading the firmware, and then display the user interface (see section 6.0).

Press the Mode button to select the Status menu, where the COM port assignments are displayed. If you need to add or remove external devices, access the Advanced Options menu (see section 13.2.5).

Now connect the modems to the appropriate COM ports. The main MDT connector includes the COM 1 and COM 3 plugs. COM 2 requires a separate cable, which connects to the right-side RJ-45 connector on the MDT. Check that each modem has the appropriate antenna, and then apply power.

If you have received the MDT-2000G/GPRS version with internal GPRS modem, the unit will have a pre-activated SIM card and pre-programmed settings to connect to the assigned DataGate server. Connect the GPS and GPRS (GSM) antennas to the correct connectors on the rear panel. Re-check that they are correct and then apply power.

You can also configure the two I/O pins as either inputs or outputs (0-5V) (see section 13.2.6), unless you are using an RF modem, which uses these pins for external control.

The Status menu displays the current MDT status, including network connection, COM port assignment, and GPS signal status. Monitor this screen to check that each modem is communicating and can connect to the network. If a “no answer” response is received from any modem, it is possible that this modem has not been activated at the server. Contact your server provider to check this asset’s configuration.

## 6.0 User Interface

The MDT uses a backlit graphical LCD screen to display the user interface.

### 6.1 Interface Overview

Figure 3 shows a sample MDT screen.

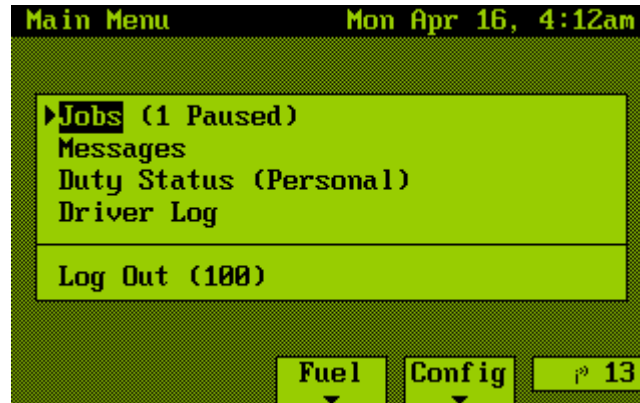





Figure 2 – MDT Screen

Each screen has a title, which includes the screen name and current date and time. The bottom line of the screen can contain prompts (depending on which screen is being shown), each of which is lined up with one of the four MDT function keys. Each prompt represents an action or shortcut that a user can perform by pressing the corresponding key. You can navigate the MDT menus by using the Up/Down arrow keys, and select options using Enter.

At any stage, the Status menu can be accessed by pressing the MDT's Mode button (see Section 9.0).

### 6.2 Status Icons

The bottom right corner of the screen shows a network status icon, including number of packets waiting to be sent. If all packets have been sent, this will show "OK". An envelope icon will also appear when new messages (or jobs) have been received. The following network icons are displayed:

-  No active network
-  Using a terrestrial network
-  Using a satellite network

## 6.3 Driver Log In

After showing the “System Initializing ...” message at boot up, the MDT displays the Driver Log In screen as shown in Figure 3.

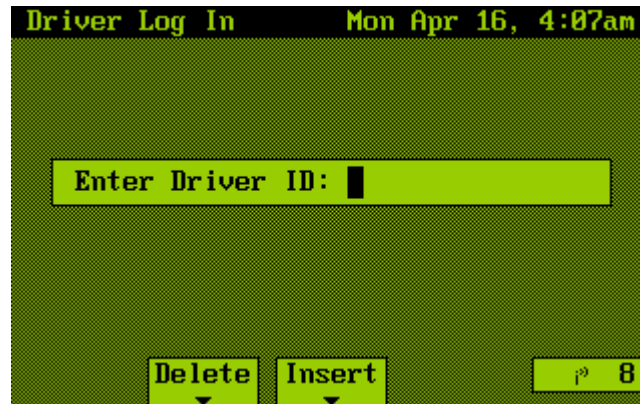


Figure 3 – Driver Log In

The Driver ID is used to track which driver is using each MDT, and can be a numeric or text field. Once the ID has been entered, the Main Menu will be displayed. Note that if an MDT is shut down without a driver logging out, the driver will automatically be logged in at the next restart, and the Main Menu will be the first screen displayed.

Enter the ID using the MDT arrow keys, or an external keyboard if available. The Up/Down arrow keys cycle through the alphabet, while the Left/Right keys move from one character to the next.

Delete and Insert shortcuts are provided using the F2 and F3 keys. To complete entry of the driver ID, use the Enter key.

## 6.4 Main Menu

The Main Menu screen will vary depending on which firmware version is being used. Figure 4 shows two options. The left hand screen is a simple application, with messaging and fuel/service options. The right hand screen shows a job dispatch version of the MDT, which includes Jobs, Duty Status, and Driver Log menu options.

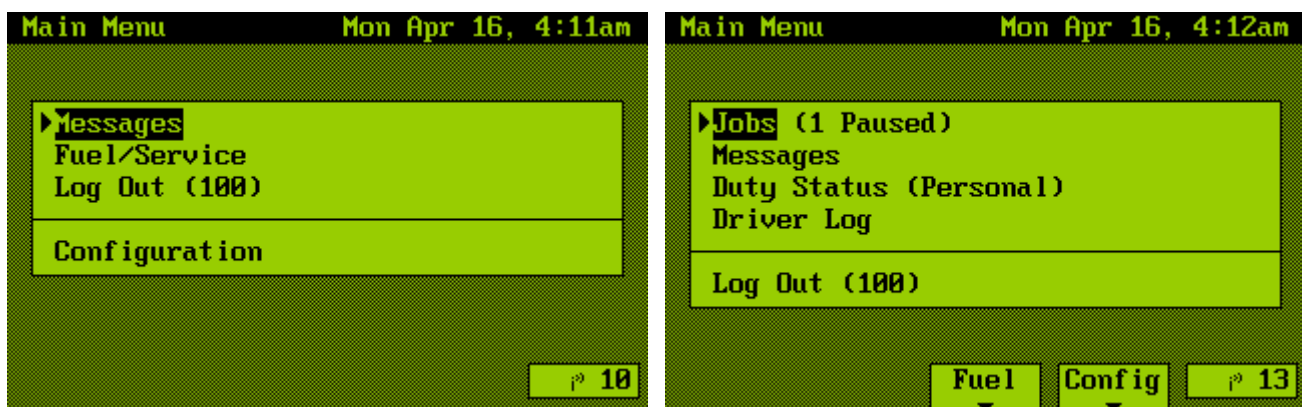


Figure 4 – Main Menu

Here is a list of common Main Menu options:

<b>Jobs</b>	List of jobs sent to this MDT from the dispatch desk.
<b>Messages</b>	List of text messages from dispatch.
<b>Duty Status</b>	Driver can enter his/her duty status.
<b>Driver Log</b>	Log of duty status changes, used to monitor past 14 days.
<b>Log Out</b>	Driver can log out of MDT, allowing another driver to log in.
<b>Fuel/Service</b>	Fuel/Service details can be entered by driver.
<b>Configuration</b>	Provides access to various MDT settings.

The currently selected option is shown highlighted, with a small prompt (>) on the left side of the option. Use the up and down arrow keys to select an option, and the Enter key to move to the next screen.

Note that some menu items display extra information next to the item text. For example, the Log Out option will show the currently logged in driver.

When a new job or message has been received, an envelope icon is displayed in the lower-right corner of the screen (see section 6.2). The Main Menu will also show an envelope icon next to the Jobs or Messages option, and lists how many new jobs/messages have been received.

## 6.5 Alerts

When the MDT needs to alert the driver for any reason, it will beep and show a message screen, such as that shown in Figure 5. The beeping will continue periodically until the screen is closed, to make sure the driver notices the alert.

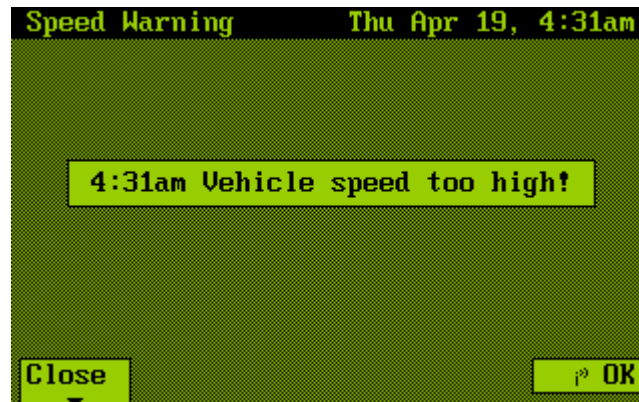


Figure 5 – Alert Screen

Alerts are displayed for the following reasons:

<b>Clock Battery Low</b>	The MDT uses a small battery to retain clock settings.
<b>Low Memory</b>	The MDT will check spare memory when it starts up.
<b>Low Disk Space</b>	Disk space is used to save messages, jobs, and buffered packets.
<b>Drive/Duty Time Limits</b>	If driver logging is enabled, driver is alerted when drive and/or duty time remaining is low.
<b>No Network Warning</b>	Optional warning alerts driver if no network is available

**Auto Duty Status**

Duty status will automatically change based on vehicle movement if current status is set to On Duty or Driving.

**Speed Warning**

Overspeed alert warns driver when vehicle speed is above limit.

**Job Cancelled**

A dispatcher has cancelled a job.

**Engine Warnings**

Optional engine interface has detected engine parameters exceeding preset limits.

## ***7.0 Network Operation***

The MDT monitors all connected modems for network signal, and chooses the lowest cost option when sending data. For example, an MDT can be configured with both a satellite and cellular modem. While in cell coverage, all data will be sent through the cellular modem, but if coverage is lost, the MDT will automatically switch to the satellite modem. When cell coverage is regained, the MDT will switch back immediately to the lower cost modem.

When no network is available, or the MDT has been configured to buffer reports, the outgoing packets will be stored in memory for transmission at a later time. Up to 400 events, or 6000 GPS positions can be buffered at once, assuming the MDT has enough spare memory.

High priority packets (events or messages) are stored in non-volatile memory, so they will be retained even if the MDT is turned off. This memory is relatively slow to write to, so the MDT displays a "Please Wait" warning while writing takes place. It is normal behaviour to see these warnings appear when the MDT is transferring event and/or message data.

## 8.0 Messages

The Messages screen is accessed through the Main Menu. When no messages are stored in the MDT, the screen displays “No Messages” (see Figure 6).



Figure 6 – No New Messages

When a message is sent to this MDT from a DataHost user, the MDT beeps to warn the driver, and an envelope icon is displayed in the lower-right corner of the screen. The Main Menu will also show an envelope icon next to the Messages option, and lists how many new messages have been received (see Figure 7).

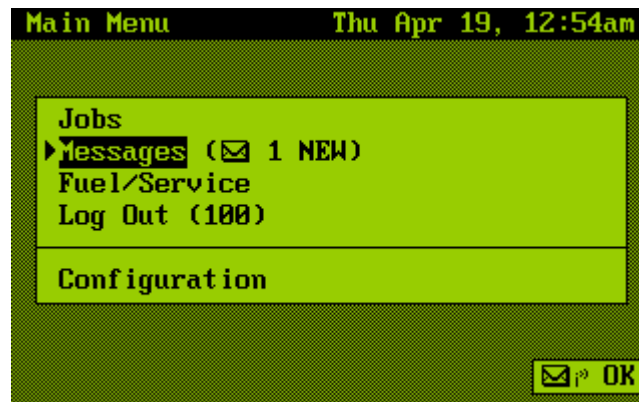


Figure 7 – Main Menu with New Messages

The Messages screen lists messages in chronological order (newest at bottom of list), and may be scrolled through using the up and down arrow keys. Both incoming and outgoing messages are displayed. Figure 8 shows the Messages screen with several messages, including one new. A scroll bar is displayed if there are more messages than can fit on one screen. In this case, the left and right arrow keys act as page up and page down keys.

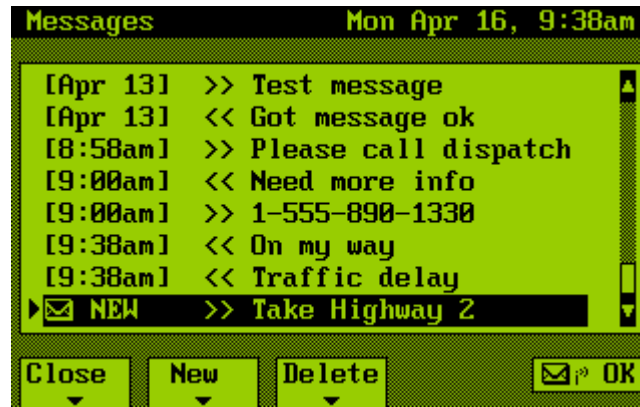


Figure 8 – Messages Screen

Each message is listed with the date or time of arrival, a direction of transmission, and the first line of the message text. Three dots are added to the end of the message if there is more text available. The message time, date and direction are displayed as follows:

- NEW** This message has not yet been read. MDT will beep periodically and RX LED will flash until message is read.
- [TIME]** If the message is less than 24 hours old, the time of arrival is displayed, e.g. [9:38am]
- [DATE]** The message date is displayed if the message is more than 24 hours old, e.g. [Apr 13].
- >>** Message received
- <<** Message transmitted

To view an entire message, select it using the arrow keys, and then press Enter to access the Message Detail screen (see section 8.2).

There are three prompts at the bottom of the screen: Close, New, and Delete. These prompts are selected by using the MDT function keys. Selecting Close (F1) will return to the Main Menu. Selecting New (F2) will display the New Message screen (see section 8.1). Selecting Delete (F3) (available only when messages are shown) will prompt for erasure of the selected message.

When messages are sent or received, they are stored in the MDT's non-volatile memory, and will be available even after power is removed from the unit. The MDT can store up to 50 messages, after which any new messages will overwrite the oldest message.

## 8.1 New Message

Figure 9 shows the New Message screen (accessed from the Messages screen). Use the arrow keys to select the desired response, and then press Enter to send. A prompt is displayed to confirm the message, which is then queued for transmission. The Cancel prompt may be selected to return to the Messages screen.

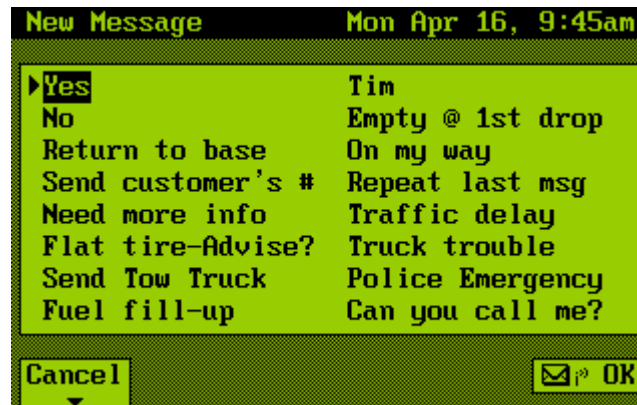


Figure 9 – New Message Screen

The messages on this screen are remotely programmable, and can therefore be modified to suit any particular application. Up to 16 messages may be stored at any time.

When using an external keyboard to access the New Message screen, a different screen is shown (see Figure 10). This screen shows a blank area with a cursor, in which a user can enter a freeform text message (up to 8 lines long) using the keyboard. Two prompts are provided, to either cancel or send the message. Note: the original response list can still be accessed by using the MDT function key to access the New Message screen (instead of the keyboard function key). If the Cancel prompt is selected after message text has been entered, a warning prompt will be displayed to confirm you want to cancel the message.

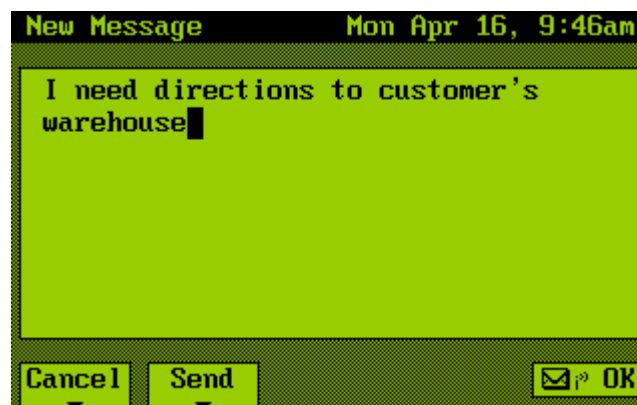


Figure 10 – Freeform Text Entry

During freeform text entry, the arrow keys can be used to navigate around the message to edit previously entered text. Note that the message is limited to 8 lines.

## 8.2 Message Detail

When a message is selected from the Messages screen by pressing the Enter key, it is displayed in detail as in Figure 11. The screen title states which message is being shown (out of the total number of messages), and the message date and time of arrival are listed at the top of the message. A scroll bar will be shown if the message is longer than the screen.

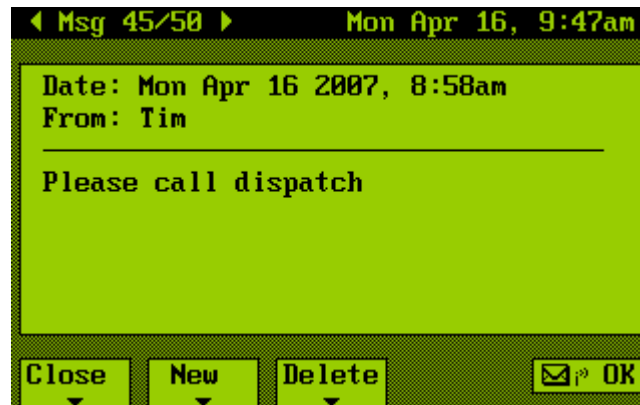


Figure 11 – Message Detail Screen

A “From:” field (for incoming messages) or “Sent To:” field is included to indicate the message direction. Received messages will show which DataHost user sent the message. Currently, sent messages are always sent to “All” DataHosts.

The arrow keys can be used to navigate through messages while in this screen. Up/down arrows scroll through the current message (if longer than the screen), and left/right arrows select the previous and next messages (if they exist).

Three prompts are available: the Close prompt may be selected to return to the Messages screen; the New prompt opens the New Message screen (section 8.1); and the Delete prompt will ask for confirmation to delete the message.

## 9.0 Dispatch Screens

Selecting the Jobs option on the Main Menu displays the Jobs screen. If no jobs have been received from the dispatch desk (or all completed jobs have been deleted), a “No Jobs” message is displayed.

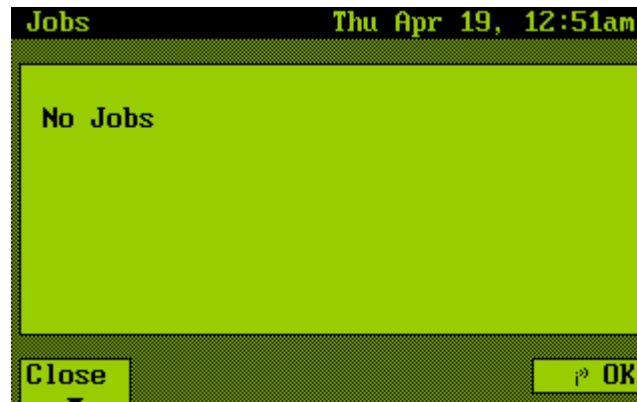


Figure 12 – No New Jobs

When a job is sent to this MDT from the dispatch desk, the MDT beeps to warn the driver, and an envelope icon is displayed in the lower-right corner of the screen. The Main Menu will also show an envelope icon next to the Jobs option, and lists how many new jobs have been received (see Figure 13).

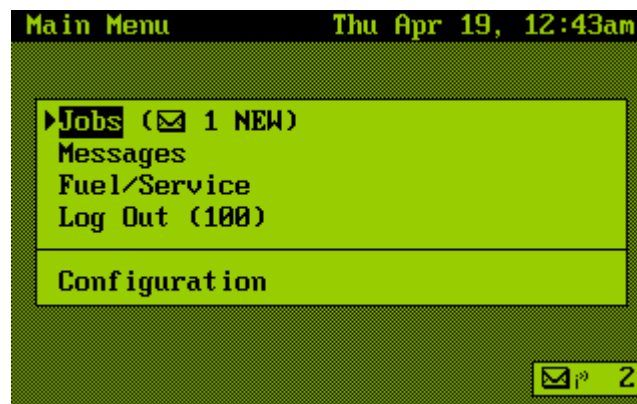


Figure 13 – Main Menu showing New Job

The Jobs screen lists jobs in chronological order (newest at bottom of list), and may be scrolled through using the up and down arrow keys. Figure 14 shows the Jobs screen with three jobs, including one new. A scroll bar is displayed if there are more jobs than can fit on one screen. In this case, the left and right arrow keys act as page up and page down keys.

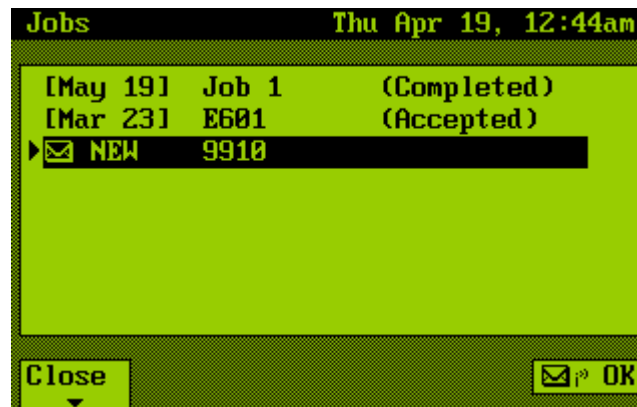


Figure 14 – New Job

Each job is listed with the date or time of scheduled start, a Job ID, and the job status (if available). The job time and date are displayed as follows:

<b>NEW</b>	This job has not yet been accepted or refused. MDT will beep periodically and RX LED will flash until response is made.
<b>[TIME]</b>	If the job's scheduled start is today, the start time is displayed, e.g. [9:38am]
<b>[DATE]</b>	If the scheduled start is not today, the start date is displayed, e.g. [Apr 13].

Job status can show:

<b>(Cancelled)</b>	A dispatcher has cancelled the job. The MDT will display a warning when this occurs.
<b>(Accepted)</b>	Job has been accepted by driver.
<b>(Active)</b>	Job is selected as current job.
<b>(Paused)</b>	Job has been paused by driver.
<b>(Completed)</b>	Job is complete. Driver can now delete the job if desired.

When jobs are received, they are stored in the MDTs non-volatile memory, and will be available even after power is removed from the unit. The MDT can store up to 50 jobs, after which any new jobs will overwrite the oldest completed job.

To view a job, select it and press Enter to access the Job Information screen (see Figure 16).



Figure 15 – Job Information

The Job Information screen shows some basic job info. For a simple dispatch application, we have included the customer name, location, scheduled start time, event type, problem descriptions, and job notes. Because the MDT screen is limited to 40 characters in width, we have tried to limit field sizes.

Note that the lower area of the screen shows four options. The driver can close this screen, accept or refuse the job, or show the job details by using the F1 through F4 keys on the MDT.

The Job Detail screen (Figure 16) shows more information about the Job. In this generic example, we have included the Dispatcher name (in case the driver needs to contact dispatch with a query about the job), received date/time (for reference), job contact details, and some basic billing information.

These fields can be modified to display any other application specific data required, and further detail screens can be added if more than 8 fields are necessary.

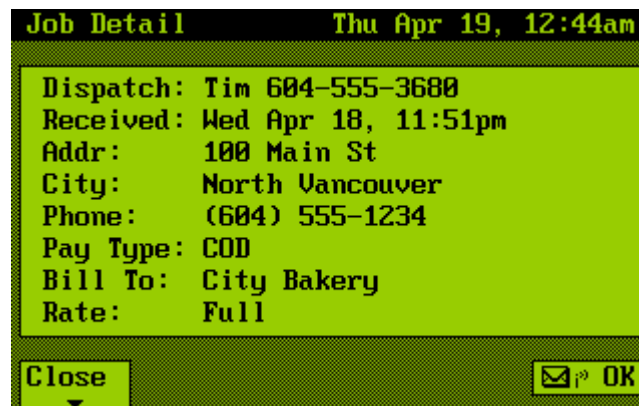


Figure 16 – Job Detail

The driver can accept the job by selecting the Accept option on the Jobs list screen. This sends a message back to the dispatch desk, telling the dispatcher that the driver is going to perform the requested job. A screen is shown to confirm this action (see Figure 17).

The driver also has the option to refuse the job. This sends a warning back to dispatch that this driver is not available, and they will need to find another driver to complete the job.

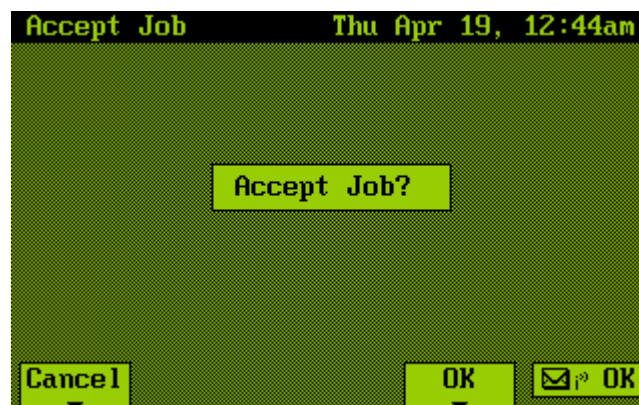


Figure 17 – Accept Job

Once accepted, the Job information and Jobs list screens show the job as Accepted (next to the Job ID field). The driver now has the option to select the job (see Figure 18). This would normally be done when the driver begins travelling to the job location.



Figure 18 – Job Accepted

When the driver selects a job, he/she is again prompted to confirm the decision (see Figure 19).



Figure 19 – Select Job

Once selected, the current job becomes the active job, and the driver is shown the first step in the job process (see Figure 20). Note that these job “steps” can be customized for various applications by changing displayed details and/or adding/removing steps from the process.

Each step shows some relevant information (for example, the Travel to Job screen shows the customer name and contact details). There are also prompts for the driver to select when this part of the job is complete. In this case, the driver would select the Arrive at Job option when he/she arrives at the customer’s location.

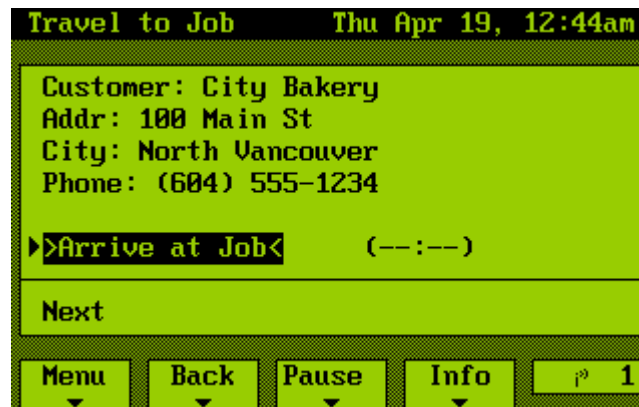


Figure 20 – Travel to Job

The Info option provides a quick link to display the Job information screen for the active job.

The Next option is used to move to the next step. A warning is displayed if the driver has not yet completed the current step, and he/she is prevented from moving to the next one. Every time the driver completes a step, the current job status is updated at the dispatch desk. This allows dispatchers to see what job the driver is currently completing, and what stage he/she is at.

The Back option moves back a step in the job process. This can be used to go back and check on any data entered, or to restart a step if required. For example, a driver might have selected the "Arrive at Job" option accidentally, and will need to reselect it when he/she actually arrives. When overwriting a previous entry, a warning is shown (see Figure 21).

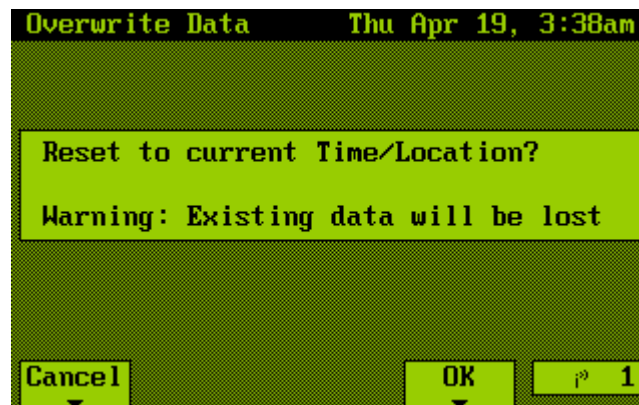


Figure 21 – Overwriting Job Data

If the driver presses the Back button while at the first step (Travel to Job), the job will be postponed. This means that any job data already entered (such as job arrival time) will be reset, and the driver will have to start the job from scratch at a later time. When postponing, a warning prompt is shown to confirm the decision (Figure 22).

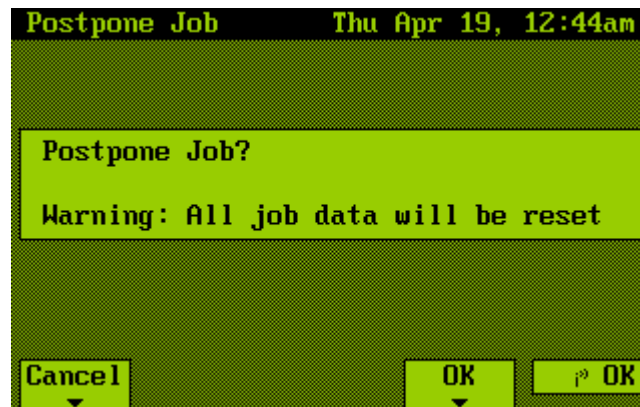


Figure 22 – Postpone Job

Selecting the Menu option while progressing through a job will bring up the Main Menu screen. There will now be a new option (Active Job) that takes the driver back to the current job step (see Figure 23). Accessing the menu allows the driver to send/receive messages, enter duty status changes, etc, without interrupting the active job.

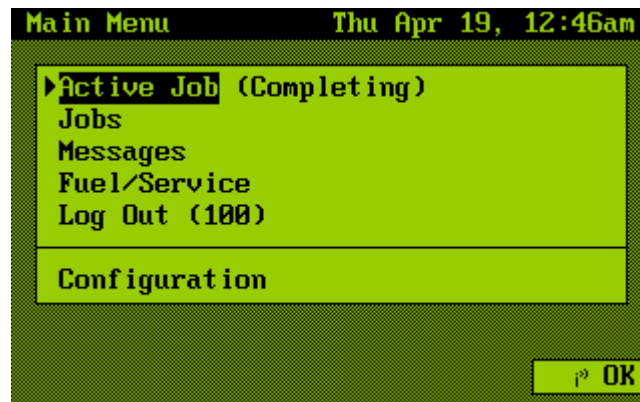


Figure 23 – Main Screen with Active Job

While a job is active, the Jobs list will show the job with an (Active) state (see Figure 24). When the active job is highlighted, a new prompt (Show) will appear, which returns you to the current job step (this is the same as selecting the Active Job option on the Main Menu).

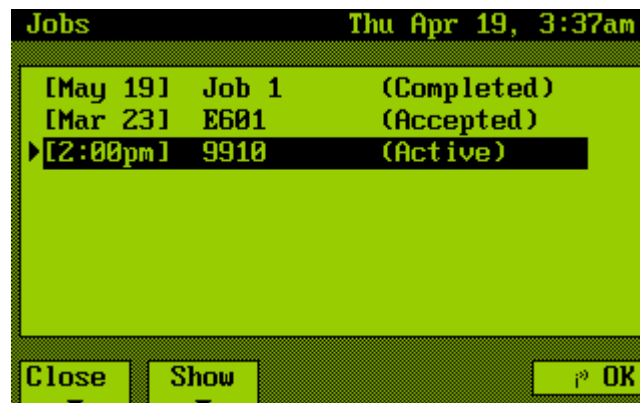


Figure 24 – Jobs List with Active Job

Returning to the active job, the driver selects the appropriate option when the job step is complete. In this case, the driver has arrived at the job site, and has selected the Arrive at Job option (Figure 25). Note that the option now displays the time at which the step was completed.

The Next option can now be used to progress to the next stage of the job.

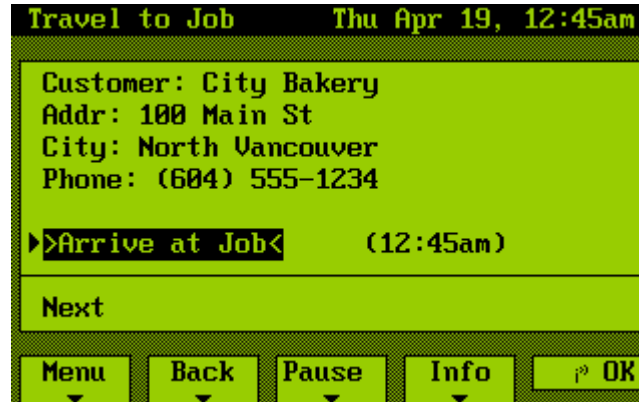


Figure 25 – Arrived at Job

In this example, the next stage is “At Job” (Figure 26). This screen displays the job details, and includes an option for the driver to enter when the job has been completed. Note that the job timer is displayed in real-time, to indicate how long this step has taken.

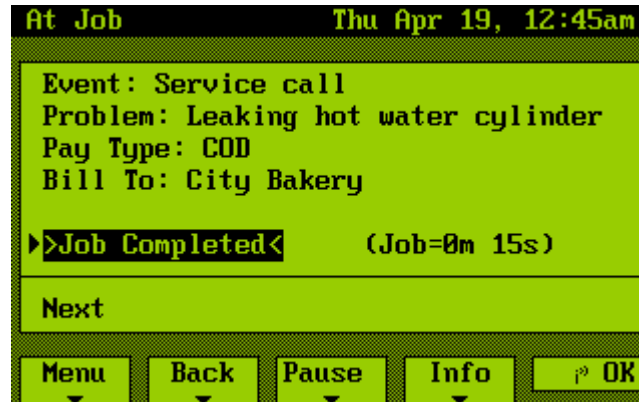


Figure 26 – At Job

The last step in this example is the Job Completion screen (Figure 27). This has two options: one for entering comments about the job, and another for closing the job.

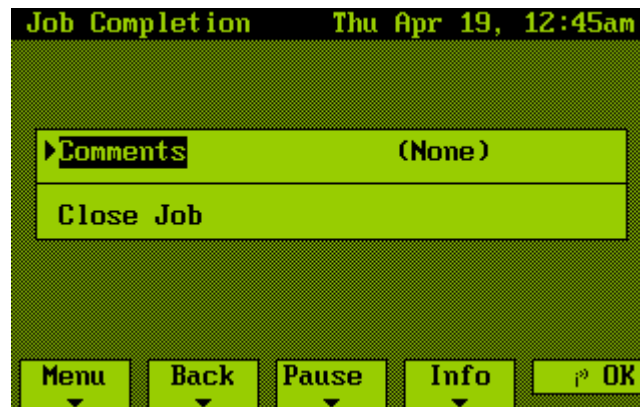


Figure 27 – Closing Job

Comments can be entered using a keyboard attached to the MDT, as shown in Figure 28. Note that the comments field can contain any information the driver wants to enter. If there are specific items that the driver should enter when progressing through a job, these can be placed on the appropriate job step screens, and checked before allowing the driver to continue. For example, one of our customers uses a field to indicate how many units of a product are actually delivered to a customer, which the driver must enter at the delivery step.

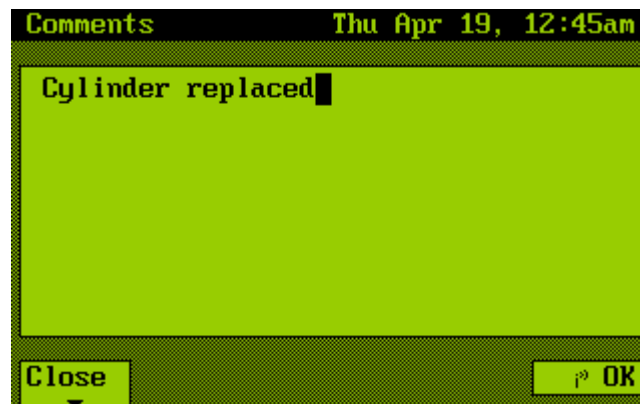


Figure 28 – Job Comments

The Job Completion screen shows (...) once comments have been entered (Figure 29). The driver can select the Comments option again to check or modify his/her entry.

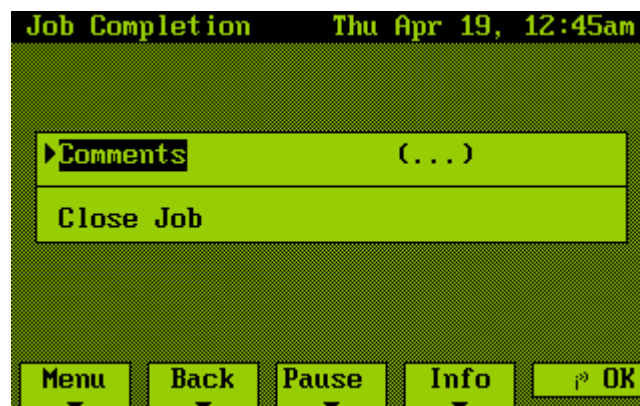


Figure 29 – Comments Added

Selecting “Close Job” once again prompts the driver to confirm the decision (Figure 30). If the OK option is selected, the job will be sent back to the dispatch desk.

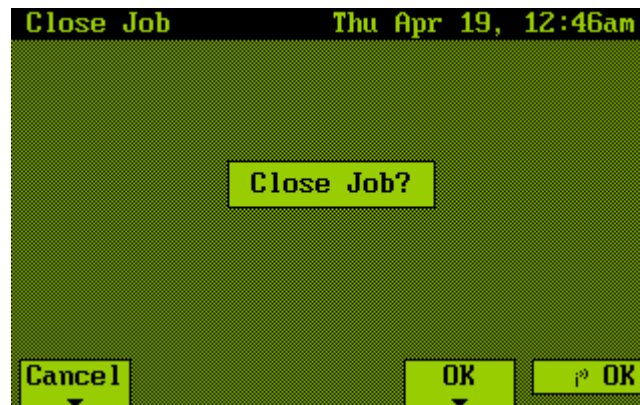


Figure 30 – Close Job

The data sent back will include the vehicle position and date/time that each job step was completed, as well as any application specific data (and comments).

Once a job has been completed, it will show as (Completed) in the Jobs list (see Figure 31). This allows a driver to check back on recent jobs.

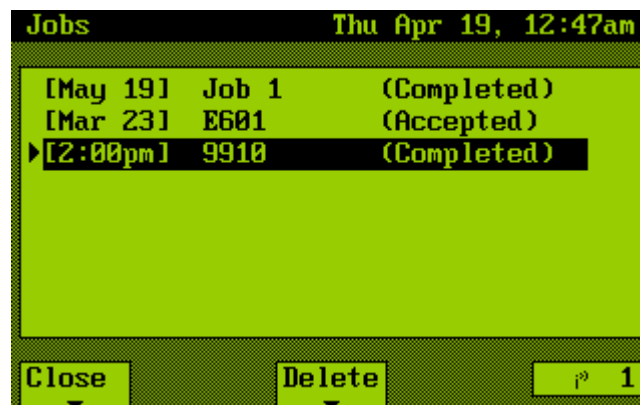


Figure 31 – Job Completed

When a completed job is selected in the Jobs list, a new option (Delete) will be shown, which deletes the job from the MDT’s memory. A prompt is shown to confirm the decision (see Figure 32).



Figure 32 – Delete Job

## 9.1 Pausing a Job

The active job can be paused at any step, by pressing the Pause button. A warning is displayed (Figure 33) to confirm the action.

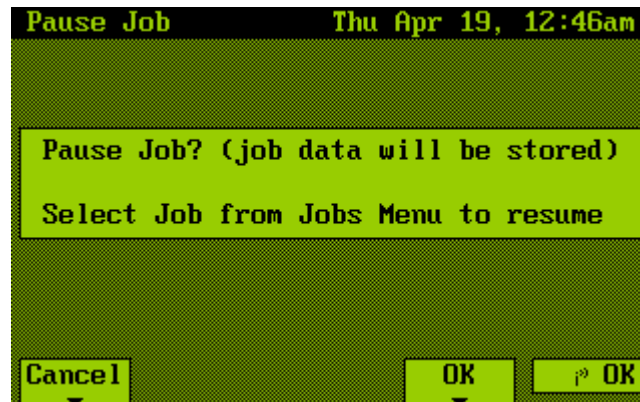


Figure 33 – Pause Job

Any number of jobs can be paused at one time, allowing a driver to work on higher priority jobs if desired. When a job is paused, it will show as (Paused) in the Duty list (see Figure 34). A new option (Resume) will be shown, which

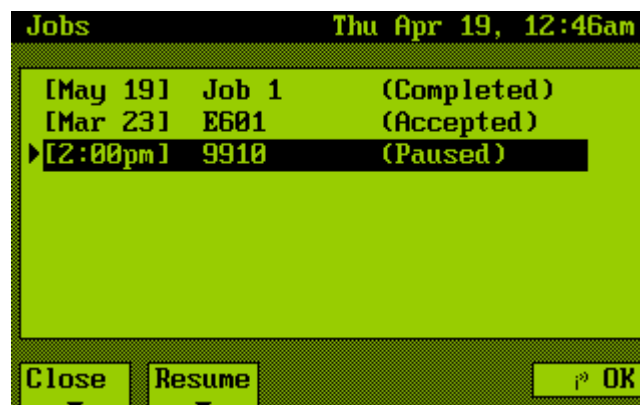


Figure 34 – Job Paused

The Main Menu will also indicate the total number of paused jobs (see Figure 35).

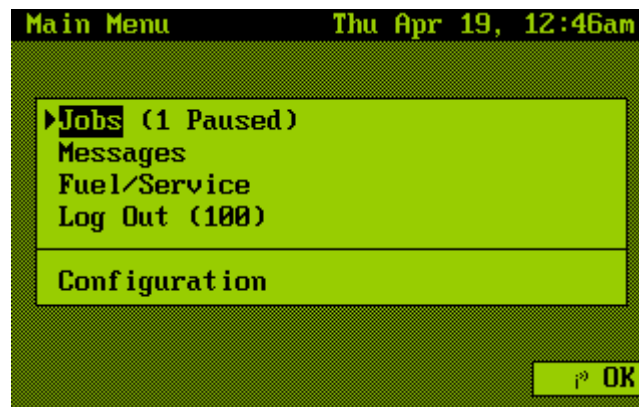


Figure 35 – Main Screen with Paused Job

## 9.2 Customizing Dispatch Screens

The dispatch example shown in this section is very basic, with only two job steps – “travel to job” and “at job”. The MDT can be customized to add more job steps, and each step can prompt the driver to enter required information. Other possible steps could include “picking up parts” or “completing paperwork”.

There may also be other events that need to be handled, such as recording when a driver takes breaks during a job. This would not be an actual step in a job, but could happen at any stage.

The “Refuse” option is provided to allow the driver to decline a job. This allows a driver to indicate that he/she would be unable to reach the job in time. Depending on the application, this may not be a necessary or desirable option, and can be removed from the screen.

Keep in mind that each field of information sent and received over the air will contribute towards monthly airtime bills, so it is important to reduce the number of fields (and field sizes) to a minimum.

## 10.0 Fuel/Service

The MDT provides a simple screen for entering fuel or service charges (see Figure 36). The driver can access this screen from the main menu, and simply enters the fuel and/or service values as required. If the Send option is selected, the MDT will calculate the total charge for the driver to confirm before it sends the data.

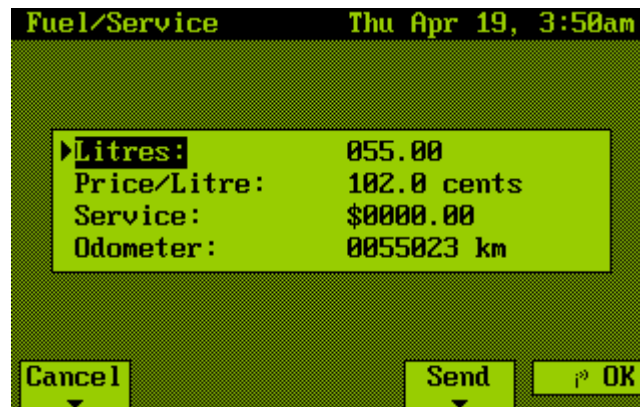


Figure 36 – Fuel/Service Screen

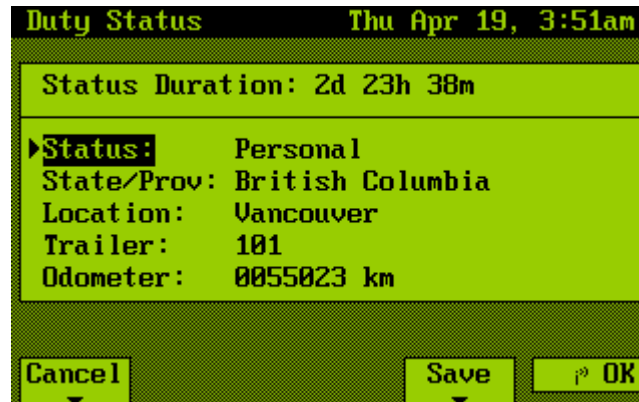
# 11.0 Duty Logging

Driver duty logging is an optional MDT feature. It allows a driver to keep track of his/her duty status, and calculates driving and duty hours remaining using the Canadian and U.S. hours of service log rules.

Figure 37 shows the Duty Status screen, where a driver enters changes to his/her status. The current status duration is shown at the top of the list. Status can be selected from the following list:

- Pre/Post Trip*
- On Duty*
- Roadside Inspection*
- Driving*
- Loading*
- Unloading*
- Waiting*
- Off Duty*
- Sleeper Berth*
- Personal*

The State/Province field can be modified at border crossings. An automatic log entry will be generated when this field changes, to help track hours spent in different regions. The location, trailer, and odometer fields can be used to track other vehicle details.



**Figure 37 – Duty Status Screen**

The Driver Log screen (Figure 38) provides access to historical duty status information. The top of the list shows the current duty/cycle and driving time available, based on the selected log rule.



Figure 38 – Driver Log Screen

Currently, the following log rules are supported:

*Alberta 13/15*  
*US 7/60*  
*US 8/70*  
*CDN 7/70*  
*CDN 14/120*  
*CDN N60 7/80*  
*CDN N70 14/120*

Note: some log rules place limits on whether other log rules can be selected without first taking extended off duty periods, so not all rules may be available at all times.

Selecting the Show Duty Timers option brings up the Duty Timers screen (Figure 39).



Figure 39 – Duty Timers

This screen shows the current timers used to calculate hours remaining.

The Cycle Hours screen (Figure 40) shows how many hours are remaining on the different log rules. Note that the CDN x/120 rules show two values. The first value defines how many hours are available without taking a 24-hour break. The second value is the total remaining time before the cycle needs to be reset.

Cycle Hours		Thu Apr 19, 3:51am
Alberta 13/15:	15h 0m	
US 7/60:	60h 0m	
US 8/70:	70h 0m	
CDN 7/70:	70h 0m	
CDN 14/120:	70h 0m	(120h 0m)
CDN N60 7/80:	80h 0m	
CDN N60 14/120:	80h 0m	(120h 0m)

Close OK

Figure 40 – Cycle Hours Remaining

The Log Listing screen (Figure 41) shows a list of all duty status changes over the last 14 days (the MDT can store up to 500 entries). Log rule changes are also listed. Pressing Enter on any item will bring up a detailed log screen.

Log Listing		Thu Apr 19, 3:51am
▶ Apr 16, 4:12am	*Rule Change	

Close OK

Figure 41 – Log Listing

The Daily Recap screen (Figure 42) shows the number of hours spent on duty and driving in the last 14 days. Use the Up/Down arrows to scroll through the list.

Duty (Drive) Time		Thu Apr 19, 3:52am
7 days ago	0h 0m	(0h 0m)
6 days ago	0h 0m	(0h 0m)
5 days ago	0h 0m	(0h 0m)
4 days ago	0h 0m	(0h 0m)
3 days ago	0h 0m	(0h 0m)
2 days ago	0h 0m	(0h 0m)
Yesterday	0h 0m	(0h 0m)
▶ Today	0h 0m	(0h 0m)

Close OK

Figure 42 – Duty and Drive Time Recap

## 12.0 Status

The MDT has a Status screen to monitor the current state of the MDT. This screen is accessed from the Configuration Menu, or by pressing the MODE button on the front of the MDT. Figure 43 shows a typical Status screen. Select the Close prompt to return to the Main Menu.

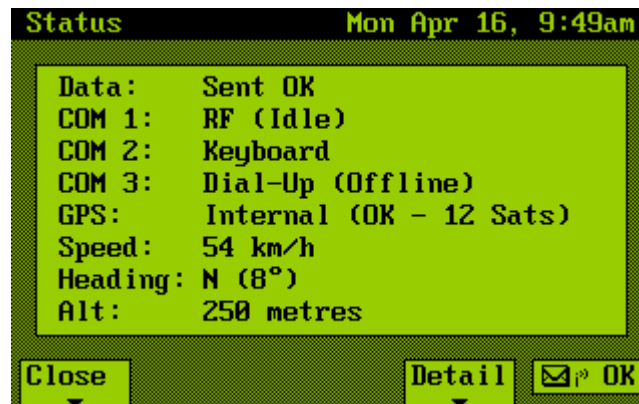


Figure 43 – Status Screen

The following MDT attributes are monitored.

- Data:** Current state of transmit queue, as follows:
  - x Packets Waiting* Data waiting to be sent.
  - Sent OK* Data sent, and nothing more to transmit.
- COM 1/2/3:** Shows how each of the external serial ports are assigned. Also shows the state of any network connections (see section 12.3)
- GPS:** Status of GPS receiver (see section 12.4)
- Speed:** Current vehicle speed.
- Heading:** Direction of vehicle movement. Eight-point compass heading and bearing are shown.
- Alt:** Altitude obtained from GPS signal.

Screen prompts are given to access the Detailed Status screen (see section 12.1), and Engine Monitoring screen (see section 12.2). This last screen is only available if Engine Monitoring hardware is connected to the MDT.

### 12.1 Detailed Status

The Detailed Status screen includes further status information about the MDT, including hardware, firmware and GPS details. The Firmware Version and Serial Number fields should be quoted in correspondence relating to this device.

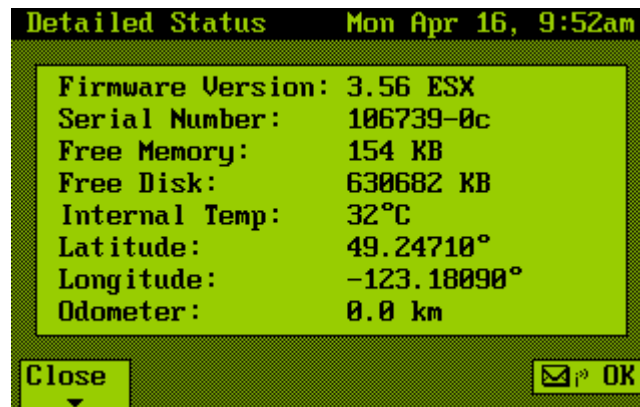


Figure 44 – Detailed Status Screen

## 12.2 Engine Status

If the optional J-1708 engine monitoring hardware has been installed, the MDT can monitor several engine parameters, as shown in Figure 45. Various alarms can be set in the advanced options to automatically warn the driver and dispatch desks when engine parameters go outside an allowable range.

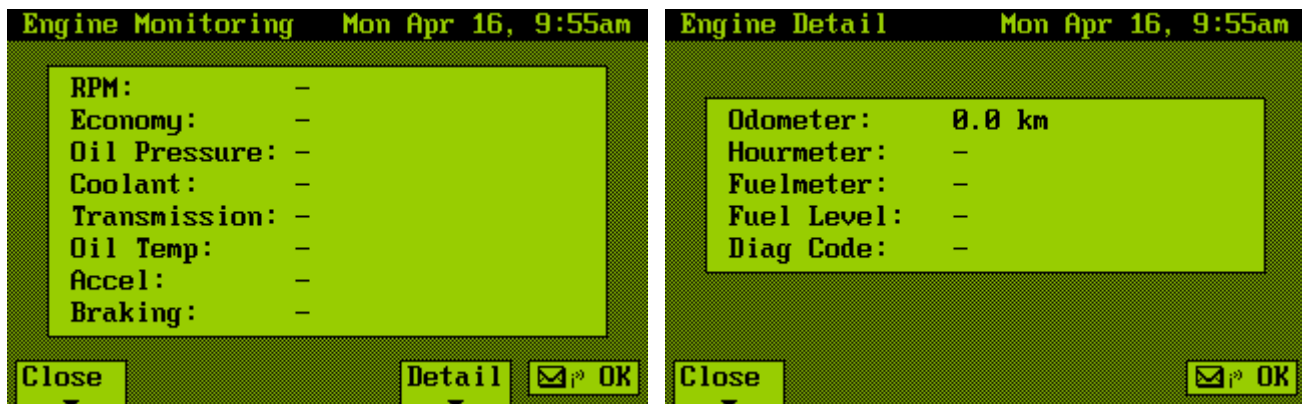


Figure 45 – Engine Status Screens

## 12.3 Network Status

Each network goes through several states as it is initialized and network conditions change. A list of these states for each network is shown below.

### Common States

<i>Looking for modem</i>	Modem not found. Sending serial commands to detect modem.
<i>Initializing</i>	Sending commands to configure modem.
<i>No Signal</i>	Modem is not receiving a signal. Will occur if modem is out of coverage, or signal is obstructed.
<i>Connected</i>	Network OK.
<i>No Answer</i>	Network signal is OK, but receiving no response from server. May occur if server is not configured, or communication with server is blocked. Check with server operator.

**Sat (PDT-100)**

<i>Reset</i>	Resetting modem. Occurs when PDT is first detected.
<i>Saving Setup</i>	Saving settings inside modem.
<i>Not Commissioned</i>	PDT-100 is not commissioned. Contact service provider with PDT ESN (serial number).
<i>Re-initializing</i>	Modem reconnecting with satellite.
<i>Commissioning</i>	Modem is being commissioned.
<i>TDM Change</i>	Modem signal change.
<i>Beam Crossover</i>	Modem is changing from one satellite beam to another.
<i>No Sync</i>	Cannot synchronize with satellite.
<i>No Status</i>	Waiting to receive status response from modem.

**GPRS/CDMA**

<i>Preparing Modem</i>	Checking modem IP address.
<i>Resetting</i>	Modem is trying to register itself on the network.
<i>Pin Required</i>	SIM requires pin code.
<i>PUK Required</i>	SIM is blocked.
<i>Phone Locked</i>	Modem is locked.
<i>Checking SIM</i>	MDT is checking SIM.
<i>SIM not ready</i>	Check SIM card.
<i>Checking Status</i>	Checking network.
<i>No Service</i>	No network signal.
<i>Registered</i>	Modem is registered.
<i>Scanning Network</i>	Looking for network.
<i>Access Denied</i>	Modem denied.
<i>Roaming</i>	Modem is roaming.
<i>Registering</i>	Registering.
<i>Emergency Only</i>	Emergency access only.
<i>Waiting</i>	Waiting for network.
<i>No GPRS Signal</i>	GPRS not available.
<i>GPRS OK</i>	GPRS signal OK.
<i>Scanning GPRS</i>	Looking for GPRS.
<i>GPRS Denied</i>	Access to GPRS denied.
<i>Checking GPRS</i>	Checking GPRS status.
<i>GPRS Roaming</i>	GPRS Roaming.
<i>Dialing</i>	Dialing packet data connection.
<i>Could Not Dial</i>	Dial failed.
<i>Connecting</i>	Connecting to network.
<i>Online</i>	Modem is online.
<i>Disconnecting</i>	Disconnecting from network.

**Globalstar**

<i>Checking Status</i>	Checking network status.
<i>No Service</i>	No satellite signal.
<i>Not Registered</i>	Not registered.

<i>Could Not Dial</i>	Dial failed.
<i>Waiting to Connect</i>	Dialling connection.
<i>Connecting</i>	Establishing link to packet data network.
<i>Online</i>	Modem online.
<i>Disconnecting</i>	Disconnecting from network.

**RF**

<i>Idle</i>	No data to send.
<i>Busy</i>	Radio channel is busy. Channel Acquired input must be inactive before MDT will attempt to transmit data. This prevents the modem transmitting over the top of a voice call.
<i>Acquiring Channel</i>	Waiting for channel. In trunked mode, MDT will activate the Push-to-Talk (PTT) output, and then wait for the Channel Acquired input to become active before sending data. The MDT will wait up to three seconds for a channel, after which it will release PTT and try again.
<i>Waiting</i>	Modem waits a programmable amount of time before and after sending data, to ensure the modems are synchronized. These delays are set under the RF Modem advanced configuration menu.
<i>Transmitting</i>	Sending data.

**DMR**

<i>Init x of 6</i>	Sending commands to set up modem.
<i>TX Barred</i>	Modem has been prevented from transmitting by the network.
<i>No Sync</i>	Cannot synchronize with satellite.

In the “Connected” and “No Answer” states, a network signal strength is also displayed (if available), giving an estimate of received signal quality.

**12.4 GPS Status**

The GPS states are shown below.

<i>No GPS source enabled</i>	GPS not available.
<i>Internal</i>	Internal GPS receiver.
<i>External</i>	External GPS receiver.
<i>Using DMR</i>	GPS data is being obtained from DMR modem.
<i>Using PDT</i>	GPS data is being obtained from PDT modem.
<i>Not Found</i>	GPS receiver not found.
<i>Scanning</i>	Looking for satellite signal.
<i>OK</i>	GPS signal is valid.

In the OK state, the GPS status may also list the number of visible satellites (depending on which GPS receiver is in use).

## 13.0 Configuration

A Configuration menu is provided to modify MDT settings, and is accessed through the Main Menu. Figure 46 shows the Configuration screen.

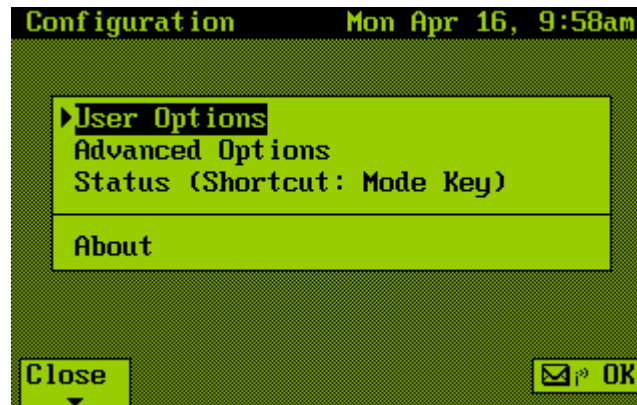


Figure 46 – Configuration Screen

Like the other MDT screens, the configuration menu is navigated using the arrow and Enter keys. Use the up/down arrows to select the desired option, and then Enter to activate it. The selected item is highlighted and has a prompt on the left side. Select the Close prompt to return to the Main Menu.

The User Options selection (described in section 13.1) contains settings a typical MDT user may wish to change, whereas the Advanced Options selection (section 13.2) provides access to detailed set-up information, and is therefore password protected. Also of interest is the About screen (see section 13.3).

### 13.1 User Options

Figure 47 shows the User Options screen. The available options are described below. To change an option, first select it with the up/down arrow keys, and then press Enter to modify it. The option will be highlighted. Now use the up/down keys to increase/decrease the value. Some options have multiple parts (such as an IP address), and the left/right arrow keys can be used to move between them. To discard a modification a user can select the Cancel prompt. To save, press Enter. Select the Close prompt to return to the Configuration menu. Note that the arrow keys can be held down to change the values more quickly.

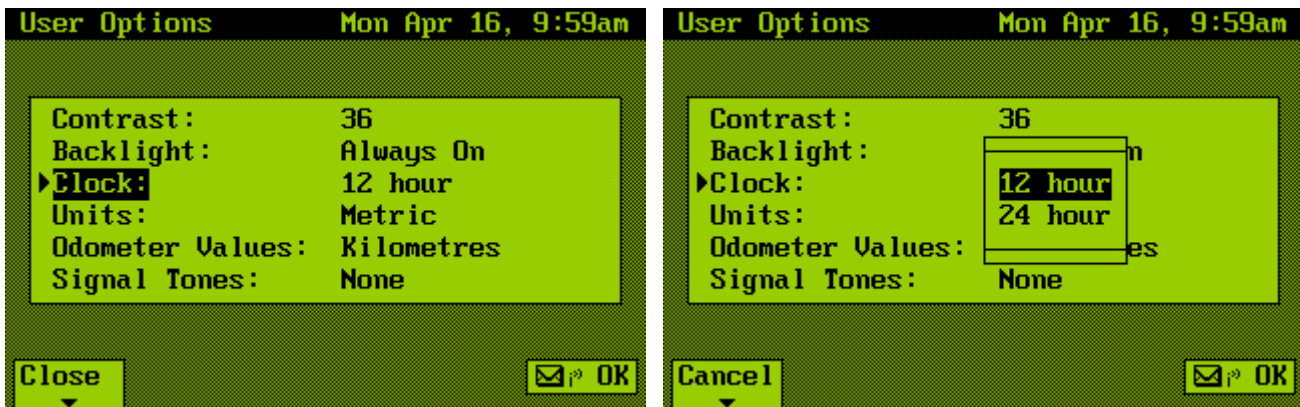


Figure 47 – User Options (right image shows editing a value)

- Contrast: Screen contrast setting. Adjust if screen text becomes too light or dark.
- Backlight: Turns screen backlight on or off. Normal position is on. There is also an option to turn off the backlight after a certain delay.
- Clock: Choose either 24 hour or 12 hour (am/pm) time format.
- Units: Controls how MDT displays speed, distance, and temperature measures.  
**Metric:** km, km/h, °C. **U.S:** miles, mph, °F.
- Odometer Values: Provides a separate adjustment for vehicle odometer values.
- Signal Tones: Select whether the MDT beeps when GPS and/or network signal is lost and found.

## 13.2 Advanced Options

To access the Advanced Options screen, a password must be entered. The password can be a combination of the Menu, Mode, F2-F4, and Arrow keys, with length from zero (blank password) to eight characters. Figure 48 shows the password entry screen. Pressing Enter submits the password, and, if correct, the Advanced Options are displayed. The default password is F2, F3, F4. This default may be changed under the General Options menu (see section 13.2.1).

If an incorrect password is entered three times in a row, a warning message will be sent to dispatch, and a timeout period of three minutes must elapse before another password attempt can be made.

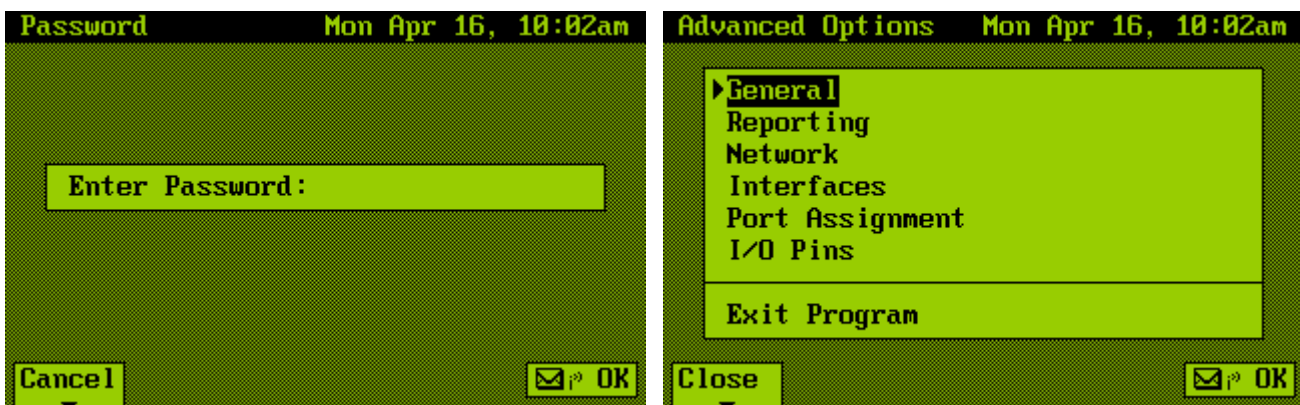


Figure 48 – Password Entry for Advanced Options

From the Advanced Options menu, the Exit Program option may be selected. This quits the MDT program, returning to console mode. Console mode allows a user to connect to COM2 and upgrade the MDT firmware (see section 0).

The Advanced Options screen provides access to many MDT settings. The primary options are described below.

### 13.2.1 General Options

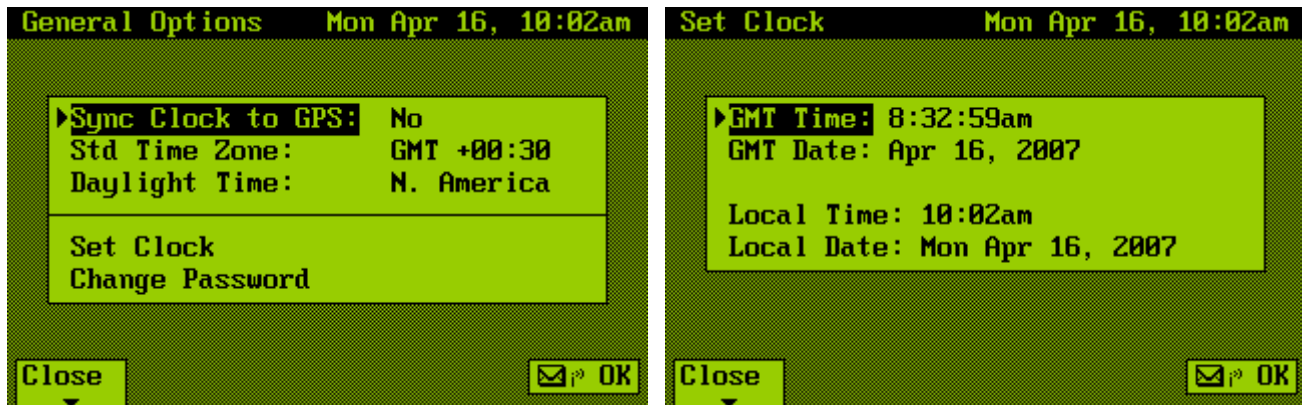


Figure 49 – General Options

- Sync Clock to GPS: Automatically sets MDT clock when a valid GPS time is available. Uses time zone and daylight time settings to convert GPS time to local time. Recommended.
- Std Time Zone: Enter time zone for displaying time. Note: if the Daylight Time option is enabled, this time zone must be the standard time zone.
- Daylight Time: Set for MDT to automatically adjust clock for daylight savings time. Currently only supports the standard North American daylight time settings.
- Set Clock: Set MDT time and data. Note that if “Use GPS Time” is enabled, the time and date will change automatically as soon as a valid GPS signal is available.
- Change Password: Change password used to access the Advanced Menu. Use Menu, Mode, F2-F4, and Arrow keys, from zero to eight characters.

### 13.2.2 Reporting Options

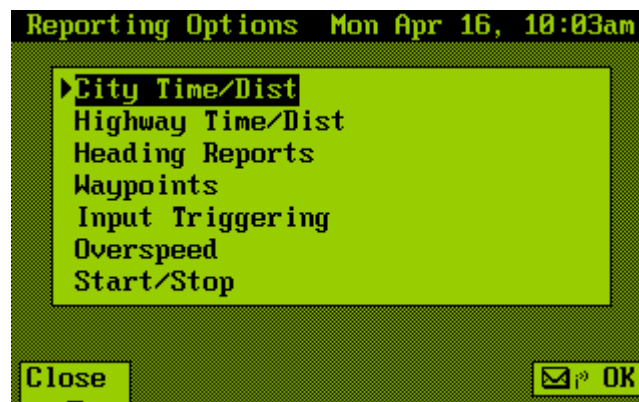
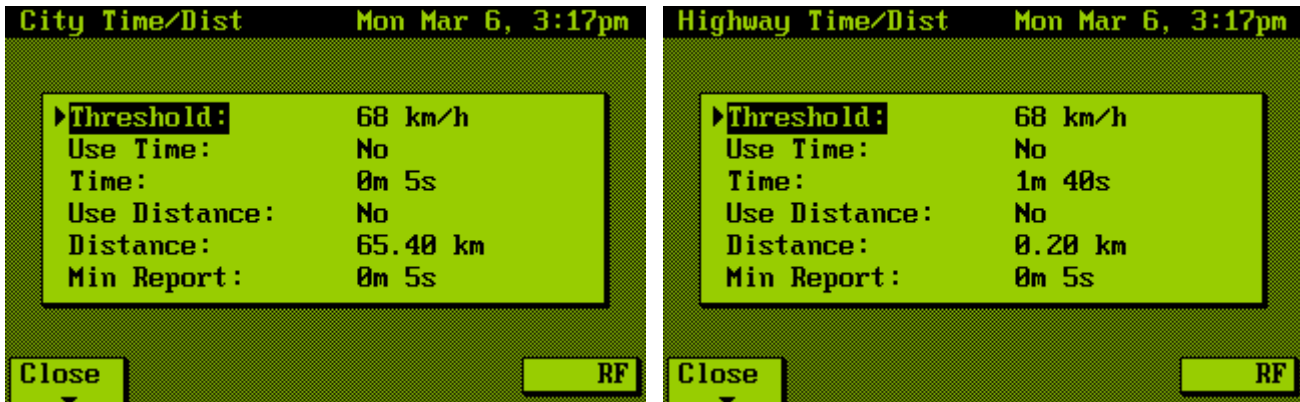


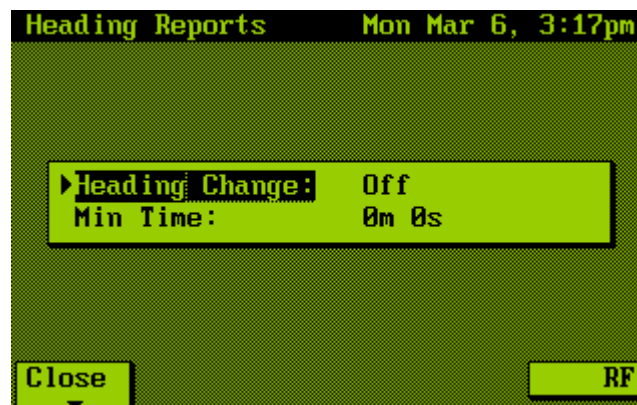
Figure 50 – Reporting Options

City Time/Dist:	Configure MDT position reporting frequency for slow speed zones.
Highway Time/Dist:	Configure MDT position reporting frequency for high speed zones.
Heading Reports:	Set the MDT to report based on vehicle heading changes.
Waypoints:	Select whether waypoints will be used to report position when MDT reaches predefined locations.
Input Triggering:	Select whether MDT will send an event report when any input changes.
Overspeed:	Select whether MDT will send event reports when vehicle speed exceeds a predefined level.
Start/Stop:	Select whether MDT will send event reports when the vehicle starts and stops.



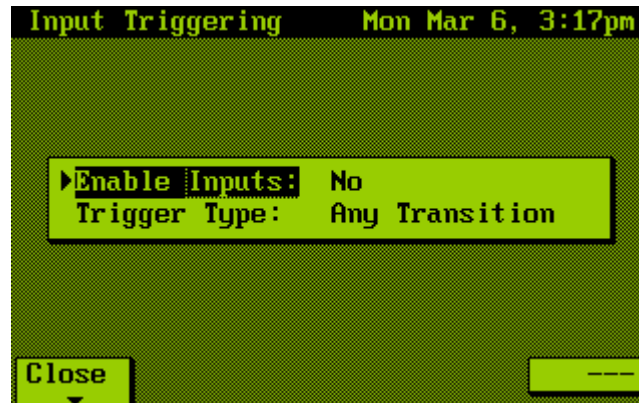
**Figure 51 – City/Highway Reporting Options**

Threshold:	Speed at which the reporting settings switch between “City” and “Highway” mode. If the vehicle speed goes lower than the City threshold, City reporting settings will become active. If the vehicle speed exceeds the Highway threshold, Highway settings will become active.
Use Time:	If active, MDT will send position report at a set time interval.
Time:	Time interval for time-based reporting.
Use Distance:	If active, MDT will send position report at a set distance interval.
Distance:	Distance interval for distance-based reporting.
Min Report:	Minimum time between reports. Used to limit maximum reporting rate from an MDT.



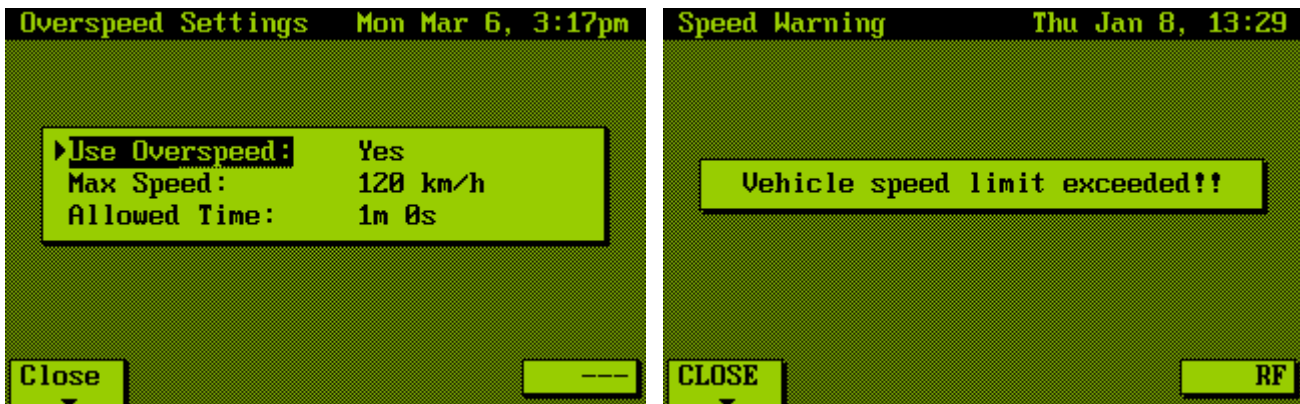
**Figure 52 – Heading Reports Options**

- Heading Change:** Position reports will be sent when vehicle heading changes by this amount. Set to zero to turn heading reports off.
- Min Time:** Time period for which heading must remain changed before report will be triggered.
- Waypoints:** Enable this option to trigger position reports when vehicle reaches preset locations. Waypoint locations can be modified remotely.



**Figure 53 – Input Triggering Options**

- Enable Inputs:** Input changes will cause position report to be sent.
- Trigger Type:** Type of transition required to trigger report.



**Figure 54 – Overspeed Settings (right image shows driver warning screen)**

- Use Overspeed:** If active, MDT will monitor vehicle speed to detect over-speed conditions.
- Max Speed:** If this speed is exceeded, the MDT speaker will start to beep to warn driver, and a warning screen will pop-up on the MDT display. After the Allowed Time period, if speed is still too high, an overspeed alert is sent to dispatch.
- Allowed Time:** Period vehicle speed is allowed to exceed limit without sending alert to dispatch.

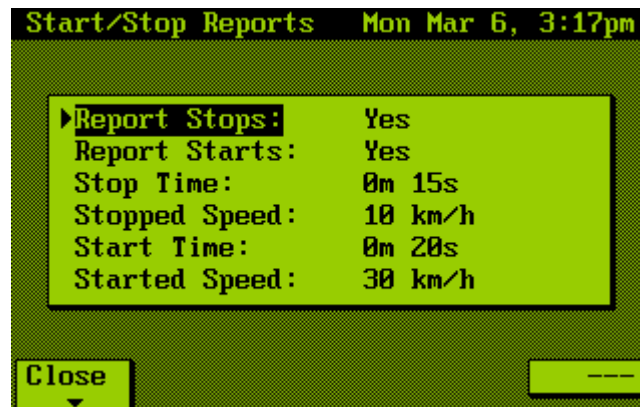


Figure 55 – Start/Stop Reports

Report Stops:	If active, MDT will report a “Stopped” event when stopped for a period of at least “Stopped Time”.
Report Starts:	If active, MDT will report a “Started” event when speed exceeds “Restart Speed” after a “Stopped” event.
Stop Time:	Time for which MDT must be stopped to trigger an event.
Stopped Speed:	Speed under which the MDT is considered stopped. This should take into account “drift” caused by weak GPS signals.
Start Time:	Time for which MDT must be moving to trigger an event.
Restart Speed:	Speed at which the MDT is considered to be moving.

### 13.2.3 Network Options

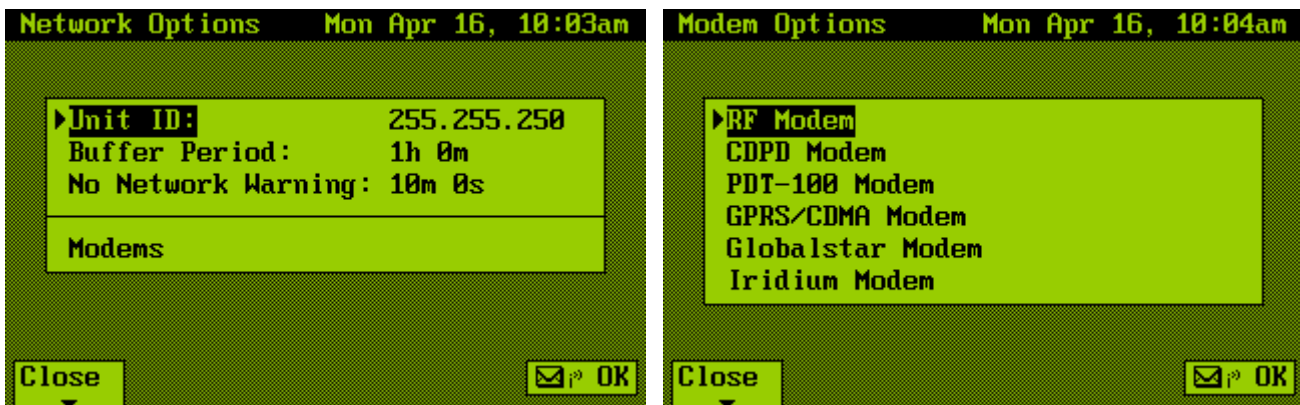


Figure 56 – Network and Modem Options

Unit ID:	ID used when communicating with server. Must match that configured in the DataGate software.
Buffer Period:	Period to buffer low priority packets before sending. Buffering can be enabled for each network separately
No Network Warning:	Alert user if network is unavailable for certain period.
Modems:	Modify communication speeds and other modem options.

## 13.2.4 Interface Options

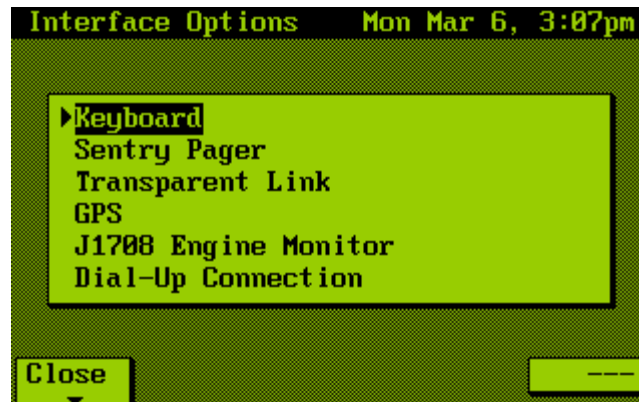


Figure 57 – Interface Options

Interfaces: Set options for various external interfaces.

## 13.2.5 Port Assignment

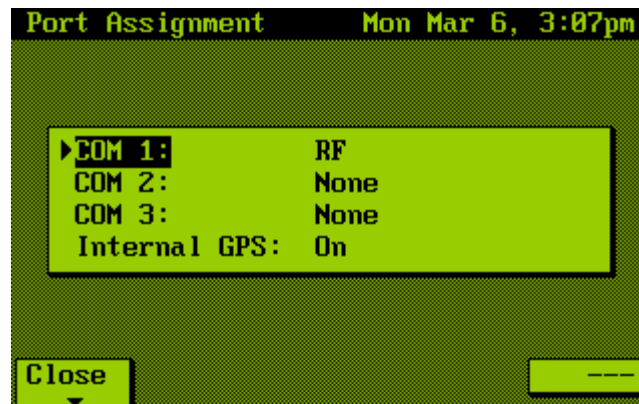
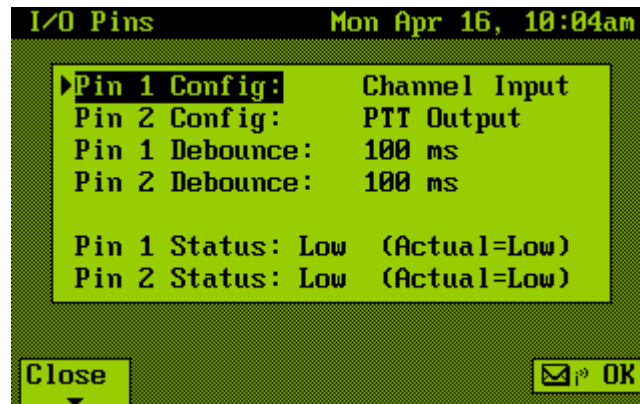


Figure 58 – Port Assignment

COM 1/2/3: Select which devices are attached to the three external COM ports. Only one of each device can be selected at one time. See section 14.0 for details.

Internal GPS: If enabled, the internal GPS will be used to obtain GPS signals. Only activate this if the MDT has the optional internal GPS board installed. If disabled, the MDT can use an external GPS or modems for GPS data.

## 13.2.6 I/O Pins



**Figure 59 – Port Assignment**

- Pin Config:** Select whether the two MDT I/O lines are used as inputs or outputs. When using an RF modem, the I/O lines are not available (see section 4.2). See below for a list of I/O functions.
- Debounce Time:** Time taken to trigger an input change when an I/O line is used as an input. This prevents false readings from line noise or switch “bouncing”.
- Pin Status:** This menu also shows the current status of both pins. This is useful for confirming correct operation when connecting the external lines. The “Actual” value shows the current pin state, ignoring debounce.

The I/O pins can be configured using the following functions:

- |                      |  |
|----------------------|--|
| <i>PTT Output</i>    | When using an RF modem, the PTT output triggers the radio transmitter.   |
| <i>Channel Input</i> | For RF modem, signal from radio to indicate if channel has been acquired.  |
| <i>Input</i>         | Pin is used as a standard input. Changes will be sent over the air, depending on how the Input Triggering options have been configured (see 13.2.2).           |
| <i>Output</i>        | Pin is an output, and can be set by a remote user.   |
| <i>Alert In</i>      | Input is used to trigger a high priority alert (see 14.0).   |
| <i>Alert Out</i>     | Output turns on when an alert occurs. This can be used to drive a horn.  |
| <i>Overspeed</i>     | Output will turn on when vehicle is travelling over the maximum allowed speed.   |
| <i>Engine On</i>     | Input will be used to count engine hours. When vehicle is moving, the drive time counter will increase - when stationary, the idle time counter will increase. |

Note that most functions can be set to “Low” or “High”. This defines the active state of the input or output. For example, if an input is pulled to ground when active, it should be configured as a “Low”.

## 13.3 About Screen

Figure 60 shows the About screen, which shows the MDT firmware version and copyright detail.

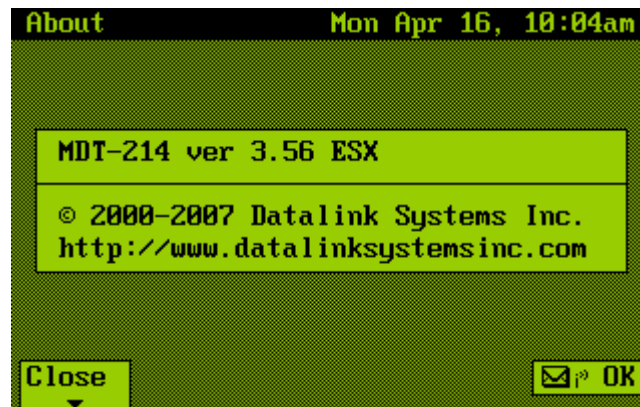


Figure 60 – About Screen

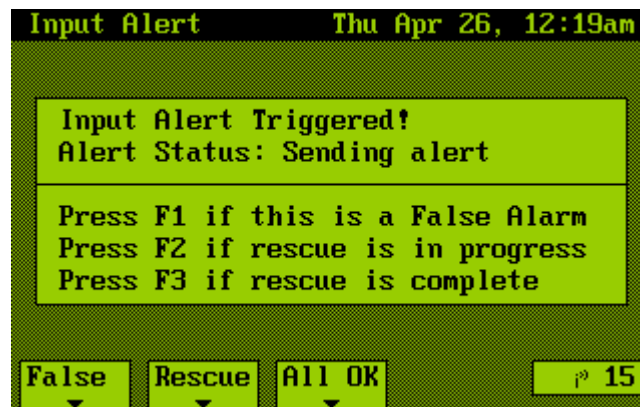
## 14.0 Input Alerts

An input can be configured with the “Alert In” function, which will cause the MDT to generate a high priority alert when this input goes active. This feature is ideal for monitoring lone workers, where emergency situations must be handled as quickly as possible. When an alert occurs, the MDT will start beeping, and a special screen is displayed (see Figure 61).

The alert status is shown as one of the following options:

<i>Sending alert</i>	MDT is sending alert over the air. Beeper will sound 5 sec on, 5 sec off (repeating).
<i>Alert sent OK</i>	Alert has been sent and acknowledged by server. Beeper will sound 1 sec on, 1 sec off (repeating).
<i>Could not send alert</i>	MDT could not create alert (no memory). Beeper off.
<i>Rescue in progress</i>	Indicates that “Rescue” option has been selected. Beeper will turn off.

Three options are provided to respond to the alert. The “False” option indicates that the alert was a false alarm. The “Rescue” option indicates that rescuers have arrived at the vehicle, and are in the process of dealing with the alarm. The “All OK” option indicates that the rescue is complete. When the alert status changes, the MDT will send another alert to the server to warn users of the change.



**Figure 61 – Alert Triggered**

If the other MDT I/O pin is configured with an “Alert Out” function, the pin will mimic the function of the MDT beeper. This allows it to be connected to the vehicle horn to warn the user of the alarm status (whether alert was triggered successfully, and sent OK), and also to alert rescuers to vehicle location.

## **15.0 External Devices**

The MDT supports a wide variety of external devices, which can be connected using the MDT's three external serial ports. This section lists each device, providing descriptions and operating instructions. Only one of each device can be selected at one time.

### **15.1 CDPD**

Discontinued.

### **15.2 PDT-100**

An EMS PDT-100 satellite modem can be used to provide network coverage across most of North America. The modem communicates with a geo-stationary satellite, and includes a built-in GPS receiver. If the MDT is configured to use a PDT-100, it will not require its own internal GPS receiver.

### **15.3 Sentry**

The Sentry is a limited range two-way paging device. It provides a link between the MDT and user at a distance of up to 1000 feet (range depends on surroundings). Its primary use is in man-down and lone-worker applications. The Sentry pager has three buttons for triggering emergency and general alerts. Because it is a two-way system, messages can also be sent to the user.

### **15.4 RF**

Using one serial port and both the digital I/O lines, an RF modem can be connected to the MDT. Digital I/O 1 is used as a Channel Acquired input. The MDT will monitor this line before transmitting, to prevent transmission over a voice call. Digital I/O 2 is used as a push-to-talk (PTT) output, which tells the radio to enter transmit mode. If the Trunked option is enabled, the channel acquired input is also used to detect when a trunked channel is available, and therefore when data transmission should begin. There are several configuration settings for an RF modem, which deal mostly with timing issues.

Note: if the Spread Spectrum setting is enabled, the MDT will send data directly to the modem without the need for the I/O lines.

### **15.5 DMR-200**

A special version of MDT firmware is available that talks to the DMR-200 Inmarsat modem. The Inmarsat network uses multiple geostationary satellites to provide global coverage. This firmware does not support multiple networks.

### **15.6 Keyboard**

An external keyboard can be connected to the MDT. A user can use the keyboard's F1-F4, arrows, and Enter keys to navigate the MDT menus. Also, free-form text entry is provided when sending messages.

## **15.7 Card Swipe**

The MDT supports a simple magnetic card reader. Custom firmware can be written for credit card processing or other card reading applications.

## **15.8 Palm Pilot**

A Palm Pilot provides a low-cost mobile data-entry platform. The MDT has routines to interface with a Palm Pilot, which receive and send messages and other data. The MDT can buffer received data whenever the Palm is not connected, and handles all network dependent protocols for transmitted data.

## **15.9 Dial-Up**

If the MDT is using an IP modem, it makes sense to be able to connect another mobile computing device (such as a laptop) to the modem. This allows the laptop to access the Internet for email, file transfer, etc. The dial-up port acts as a modem emulator. Any external device can send AT commands to the modem to establish a SLIP connection to the Internet. Meanwhile, the MDT maintains control of the actual modem, ensuring vehicle location and messaging features remain active. See 16.0 for more information on setting up the dial-up link.

## **15.10 Transparent**

One MDT port may be configured as a “transparent” link. Any serial device can connect to this port and send data over the network. The network server then forwards that data to a specific IP address. Likewise, data can be sent from the destination IP address to the network server, which then forwards that data to the MDT. The MDT will then send the data out the transparent COM port to the serial device.

When an external device sends data to the MDT’s “transparent” serial port, the data is forwarded on either the receipt of a programmable data termination character (normally carriage return), or by a data timeout (default 200ms).

## **15.11 Ext. GPS**

If an external GPS receiver is available, the MDT can be configured to use it as a source for its location. The MDT requires a standard NMEA serial string, and supports both RMC and GGA messages.

## **15.12 Engine Monitor**

An external J-1708 box is available to interface the MDT with the vehicle engine. This allows the MDT to monitor various engine parameters, and send alerts when values exceed a predefined range.

## **15.13 Grace Pager**

A one-way intrinsically safe pager, which can be used to provide worker protection in hazardous environments.

## **15.14 GPRS/CDMA**

The MDT supports internal and external GPRS modems, as well as Cypress and Airlink CDMA modems. These modems are similar to CDPD, but operate over newer cellular networks.

## **15.15 Globalstar**

The Globalstar network uses a large group of low orbit satellites to provide coverage around many parts of the world. Billing is time-based, so the MDT limits online time to the minimum required. It is recommended to enable buffering on this network to reduce the number of connections to the server.

## **15.16 Accelerometer**

This external box measures acceleration in three directions, allowing hard acceleration and heavy braking to be detected.

## **15.17 Iridium**

The Iridium network uses a large group of low orbit satellites that talk to each other to create a worldwide data network. Latency is about 1 minute.

## 16.0 Dial-Up Interface

A PC or other hardware can connect to the MDT using a dial-up (SLIP) connection. This allows the hardware to send and receive IP data packets, which can be used to communicate with the MDT, or forwarded to a GPRS/CDMA modem for Internet access.

### 16.1 Configuring Windows XP to connect to the MDT

#### 16.1.1 Add a dial-up modem

- 1) Open the Phone and Modem Options window from the Windows Control Panel.
- 2) Click on the Modems tab, and then “Add...” to install a new modem.
- 3) Select the “Don’t detect my modem” option, and next to continue.
- 4) Choose “Standard 19200 bps Modem” under the Standard Modem Types group.
- 5) Select the COM port where the MDT will be connected. Note that if you are going to use a USB to serial converter, it must be plugged in at this point.
- 6) The new modem should now show in the Phone and Modem list.

#### 16.1.2 Add a dial-up connection

- 1) Open the Network Connections window from the Windows Control Panel.
- 2) Select “Create a new connection” to add a dial-up connection.
- 3) Under “Connection Type”, select “Connect to Internet”.
- 4) Select “Set up my connection manually”.
- 5) Choose “Connect using a dial-up modem”.
- 6) Select the modem created above, making sure to uncheck any other modems.
- 7) Type “MDT” in the ISP Name box.
- 8) The Phone number can be any numeric value, such as 1234.
- 9) Leave the User Name and Password fields blank.
- 10) Close the Wizard. The new connection should show in the Dial-Up section of the Network Connections window.
- 11) Right-click on the MDT connection icon, and select Properties.
- 12) Under the Options tab, uncheck the “Prompt for name and password” and “Prompt for phone number” options.
- 13) Under the Networking tab, select SLIP as the server type.
- 14) Select the Internet Protocol Properties, and enter 192.168.0.2 as IP address, and 192.168.0.1 for DNS server.
- 15) Click Advanced, and ensure the “Use default gateway” option is enabled.

#### 16.1.3 MDT to laptop cable

A full handshaking cable is required to connect the MDT to the computer. See section 4.1 for details on the required cable.

### 16.2 MDT Dial-up configuration

- 1) Start the MDT, and go to “Configuration/Advanced Options/Port Assignment”.
- 2) Assign “Dial-Up” to COM 2.
- 3) Go to the “Advanced Options/Interface/Dial-Up Connection” screen. Confirm that the COM Speed is 19200, and the “Use DTR/DSR Lines” option is enabled.

4) Press the MODE button on the MDT to view the Status screen. The Dial-Up state will show Offline or Online, depending on whether the computer has established a connection.

### ***16.3 Establishing Connection***

- 1) Connect the MDT to the computer using the RJ-45 port on the right side of the MDT (COM 2).
- 2) Double click on the MDT dial-up connection in the computer's Network Connections window.
- 3) The computer should establish the connection, at which time the MDT status screen will show Dial-Up (Online).

### ***16.4 Connection Details***

The MDT monitors the dial-up connection, and forwards data received from the computer to the wireless network. Likewise, any data received from the wireless network will be sent to the computer. Network address translation is used to isolate the computer from the wireless network, allowing the MDT to switch networks transparently if more than one wireless modem is available.

When using Globalstar service, the MDT will only establish a satellite connection when data is received from the computer, and will shut down the connection if no more data is received after the PPP timeout period (configured under the "Advanced Options/Network/Modems/Globalstar Modem" screen). This allows a computer to keep its dial-up connection active at all times. NOTE: the computer should be configured to reduce network traffic (preferably using a firewall), as satellite airtime will be used each time a packet is sent.

## 17.0 MDT Programmer

An MDT Programmer utility has been written to allow the MDT firmware to be updated from Windows. This programmer is available on our web page (<http://www.datalinksystemsinc.com/download.html>). Figure 62 shows the Programmer's main screen.

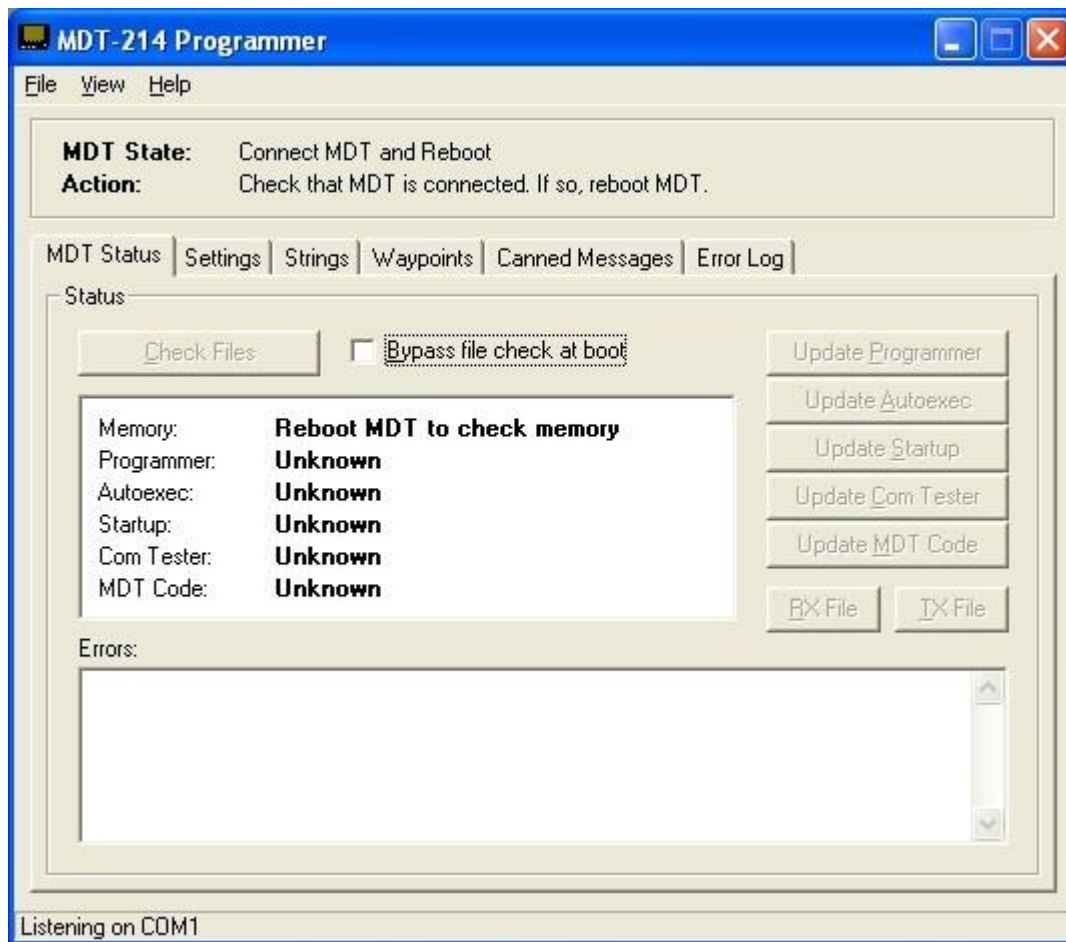


Figure 62 – MDT Programmer

Configure the programmer to use the appropriate COM port through the View/Options menu, then connect the MDT and turn on its power. The Programmer will detect the MDT reset, and go through the process of checking file versions. If any files are out of date, they can be updated using the buttons on the right side of the screen. The latest updates (except MDT firmware) are built in to the Programmer. Contact Datalink to obtain MDT firmware update files.

To update the firmware, first make sure you have copied the desired MDT firmware file to a directory on your PC. If the firmware is compressed, you must first decompress it. Then click on the Update MDT Code button, which will prompt you to enter the firmware file location. Select the appropriate file, and upload it to the MDT. An example of an MDT firmware file is "mdt\_3\_56k.exe". Once the upload is complete, restart the MDT to run the new firmware.

The Settings, Strings, Waypoints, Canned Messages and Error Log tabs are used to download and upload various files on the MDT.

## ***18.0 Contact Information***

For further support, email: [support@datalinksystemsinc.com](mailto:support@datalinksystemsinc.com)