dataTaker DT800 Series dataloggers
Frequently Asked Questions

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Introduction

Please note: The dataTaker DT800 range is obsolete. Information in this document may be outdated.

Mechanical

What mounting options are available?

The DT800 has internal mounting holes in the bottom of the case. See the DT800 user's manual for full details on size and position of mounting holes. A DIN rail mount is also available.

What is the vibration rating for a DT800?

The DT800 is not currently rated.

Drop tested to what?

This was drop tested only in packaging for shipping purposes.

What is the MTBF/MTTF for the DT800?

We do not provide a figure for this. Our products are designed to be robust and reliable, and we have no hesitation in offering a 3-year warranty to back up that claim.

Battery/power

What happens when the battery is exhausted?

The DT800 will shut down in a controlled fashion. No data will be lost as the data storage is in supported by the lithium backup battery. The logger will wake when external power is applied.

How often should I replace the Lithium battery?

This depends on the usage of the DT800. If it is always connected to a power supply, then the battery should be replaced every three to four years. If it spends a long time on the shelf and is only used occasionally, then once a year replacement would be required. If you are about to deploy the DT800 on a critical task, and you don't know the last time the batteries were changed, then it would be best practice to replace the batteries to ensure your data is safe.

How is the battery level displayed?

Battery and power supply conditions can be measured, logged, and alarmed as part of the DT800 program. The TEST command also returns battery and power supply operating details to a PC using DeLogger5 or DeTransfer.

What happens if the external supply fails?

The DT800 will continue to run as programmed from the internal 12 V battery until the external supply is restored.

NOTE: The logger may go into low power mode depending on the actual application requirements and logger programming.

Can I power from external Battery or solar panel?

Yes, use the 'Ext Bat terminals' to connect a nominal 12 VDC battery or other external low drain supply such as a solar panel.

NOTE: The DT800 will not charge an external battery. You must provide any charger required external to the DT800.

Can I use a non-standard external power supply (for example 24 VDC)?

Yes, 11–28 VDC via main power input terminals or coaxial connector with approximately 12 W minimum rating is required (i.e. a 15 VDC, 800mA plug pack).

Can I connect directly to a solar panel for power?

Yes, however for best performance and battery life, we suggest the use of a solar conditioner or regulator.

Host communications

Can I connect to the logger remotely?
Yes, via serial Modem or Ethernet.

NOTE: The standard version of DeLogger 5 doesn't include dial up modem support.

Can I connect over the web?
Yes, you can connect to the DT800 over a web connection in several ways.

• Full host access and control via a conventional host package such as DeLogger or DeTransfer

• FTP using a FTP client or Web browser allows access to data store files. Files can be moved to your PC then data viewed using DeView or DeLogger4

Can the logger connect to my Ethernet network?
Yes, using the standard Ethernet port you can connect to a LAN or WAN.

How do I connect with a USB cable?
Current version DT800 units are normally supplied with a USB to RS232 Serial Converter. Similar and tested units are available from FTDI. Use this with DataTaker DT500 and DT800 products when your PC does not have a RS232 serial port available. Not all USB converters have been found to work reliably, this unit has been tested by DataTaker.

Is the RS232 port Isolated?
Yes, the RS232 host port is electrically isolated from the rest of the system.

Can I print direct from the logger?
Yes, but only to a serial printer that will accept standard ASCII text and control characters. These units are commonly known as Line Printers. Other suitable printers may include the small docket printers used for POS (Point of Sale) transactions.

Modbus

Does the DT800 support Modbus?
No, the DT800 does not support the Modbus protocol. If you require a Modbus capable data logger, please see the DT80 model.

PC Card Slot–PCMCIA/Compact Flash Cards

What can I plug into the PC Card slot?

The PC card slot is only for use with PCMCIA and Compact flash memory cards with an adaptor. You cannot use other PC Card devices such as modems and network cards.

What PCMCIA/Compact Flash memory can I use?

The DataTaker DT800 data logger was designed to work with most ATA memory cards (PC Card and Compact Flash). However, not all cards are created equal so there can be compatibility issues.

Compatible cards

DataTaker recommends the use of cards from our standard products pricelist, as these have been tested with our products. The cards that we currently supply are Industrial Grade, more suited to use in industrial applications such as data logging and include a wider operating temperature range. The following cards have been tested without problems being encountered:

Brand Name	Type	Size
Simple Tech	Compact Flash	64 MByte
Iomega	Compact	Flash 32MByte
IBM	microdrive	340 MByte
Apacer Steno/Steno Pro	Compact Flash	64 MByte
SanDisk Industrial Grade	Compact Flash	64 MByte/128 MByte
Kingmax	Compact Flash	64 MByte
Verbatim	Compact Flash	64 MByte
Viking	Compact Flash	32 MByte

Problem cards

The following cards have exhibited some problems when used with the DT800 and should be avoided. These problems may have been encountered either during our testing or from customer experience.

Brand Name	Type	Size
Apacer / SST (consumer grade)	Compact Flash	48 MByte / 64 MByte
Pretec	Compact Flash	(unknown)
MemoryGold	Compact Flash	256 MByte
PQI	Compact Flash	1 GB
PQI (Hi-Speed)	Compact Flash	1 GB

Compact Flash memory cards

The DT800 has a single PCMCIA (also known as PC CARD) slot. It readily supports PCMCIA and Compact flash card (via an adaptor). Most cards currently used are compact flash cards. The card must be an ATA flash card. This is important for PCMCIA cards. All compact flash cards are ATA flash cards as this is part of the standard.

Supply Voltage

Most cards support 3 V and 5 V operation. The current DT800 firmware always uses 5 V operation. 3 V only cards are not supported.

Power Consumption

This can vary from card to card and must not exceed the maximum available current in the PCMCIA slot of the DT800 which is ~300 mA. It may also be of concern if using low power mode in which case a card with lower average consumption may be of interest. Typically, the mini hard drives such as the IBM microdrive cards consume close to 300 mA, whereas compact flash cards consume around 50 mA during write operations.

Access Speed

Similar to speed rating on memory chips, this is the minimum time that signals must be present when accessing the controller on the memory card. Normally quoted in the range 100 nS–350 nS. The DT800 firmware (V3.16 & V4.00) always uses worst case of 600 nS and does not check the access speed of the memory card. Some beta versions V3.99 used a fixed 250 nS, which is a problem for some cards such as Kingmax (access speed of 35 0nS). The time does not have a noticeable effect on overall performance.

Performance

The read and write performance of a card can vary from card to card. This is mostly to do with the performance of the on-board controller within the card. The present DT800 firmware does not take advantage of higher performing cards. In fact, higher performing cards may perform slightly slower depending on the controller inside the card.

Memory/IO Interface

Cards can be accessed in either memory mapped or I/O modes. The DT800 always uses memory-mapped mode.

Maximum Size

The maximum supported card size is 2 GByte. Larger cards will simply be formatted as 2 GB if used with the DT800.

Formatting of memory cards

The file type used by the DT800 is FAT16. Memory cards should be formatted by the DT800 for best performance.

WARNING: Memory cards 1GB and over must be formatted in Windows as FAT type and not formatted by the DT800. There is a known issue where card will not work correctly if the DT800 formats the memory card.

The card can be formatted with the command:

```
FORMAT"A:"
```

Environmental Specifications

Operating temperature range, shock rating, and humidity tolerance are specifications that can be important depending on the operating environment of the DT800. Industrial grade cards are usually better suited for use in the range of environments that the DT800 can operate in.

Erase Cycles

The number of times a sector on a card can be erased impacts on the useful life of the card. This is typically 10,000 to 1,000,000 times. See Wear Leveling for detailed discussion of card life.

Wear Leveling/Card Life

Most cards include a wear leveling system that is transparent to the user of the card to vastly improve the useable life of the card. By combining the erase cycles and the size of the card with a wear leveling system the life of the card should be many years if used continuously over that period. For typical DT800 applications the life should be longer than your lifetime.

A 64 Mbyte card has approximately 131,072 x 512 byte sectors. There will also be a number of spare sectors which can be used in case of failed sectors to ensure maximum capacity is always available. This could be as much as 10–50% spare sectors. This will be ignored for this calculation.

Assume we write at a rate of 30x 512 byte sectors per second (about the maximum rate the DT800 can sustain).

Assume worst case of 10,000 write per sector.

It takes 131,072/30 = 4,369.066666667 seconds = 72.817 minutes to write each sector once.

With perfect wear leveling you should be able to write each sector it's maximum amount of times. Therefore, it takes 72.817 * 10,000 = 728,177.7 minutes = 505 days = 1.3 years before the card will be no longer reliable.

By using a card with 100,000 erase cycles per sector, this increases to ~13.8 years.

In practice, the DT800 would rarely operate at a sustained rate of 30 sectors per second for any real world application so the life of the card should never really be an issue (unless the card does not provide for wear leveling).

Can I program the logger from the PC Card memory card?

Yes, either global or unit specific (using S/N for identification) oninsert.dxc files can be used to program a DT800 without needing a PC to be present.

Can I prevent the logger from being reprogrammed by the PC Card memory card?

Yes, the logger programming can be locked by using the command LOCKJOB "JobName".

Do I need to have a PC Card memory card in the slot to log data?

No, however the internal memory has 2 MB available, so should you require a greater amount of storage then you will need to use a PC Card memory card.

Can I open the file directly from the flash disk?

Yes, the data is stored in an ASCII CSV format and can be viewed with a spreadsheet or text viewer such as Windows notepad.

Internal data storage

How long will the memory last?

The internal 2 MB RAM drive provides storage for approximatly 120,000 readings. How long the memory will last in time is dependent upon the number of channels set per schedule and the sample rate used for that schedule. See section on 'USE OF MEMORY' for detailed information on memory allocation.

What happens when the memory is full?

The DT800 can be set to either overwrite old data or log only until the memory has been filled. If set to store until full (default), the logger will continue to run as programmed, however the DT800 will not store any further data. See section on 'USE OF MEMORY' for additional information on memory modes.

Schedules

What is a schedule?

A schedule is a group of tasks that will be performed using a common rate or trigger. Each schedule has a binary data store file for Data and Alarms related to that schedule. Each schedule has unique trigger settings for rate, file size, logging, etc. Each schedule can be started or halted separately. A total of 13 schedules are available–11 are for general purpose, one is for statistical data, and one is a polled (only) schedule. Refer to the User's Manual for detailed information on schedules.

How fast can I set the schedule trigger rate?

The DT800 will accept schedule triggers down to 10 mS (10 T), although actual logging may not be achieved at that rate. The fastest speed that can be obtained in practice will depend on the tasks contained within that schedule and the effect of tasks being performed by the logger, including writing to memory. For the most practical purposes, a setting of 100 mS (100 T) for analog channels would be considered maximum rate. It is possible to trigger continuously, which will run the schedule as fast as possible. Note that digital channels, system channels, channel variables (CVs), and Serial Sensor channels can be scanned at higher rates than analog inputs.

How can I capture events?

Schedules can be triggered by events such as change of state for a digital input, counter, channel variable, or Serial Sensor activity. In addition, alarms can be used to control when the DT800 saves data by stopping and starting logging or the running of schedules. Refer to the user manual for detailed command information.

Can I have different channels logging at different speeds?

Yes, use more than one schedule. Each schedule has unique trigger settings for rate. A total of 13 schedules are available–11 are general purpose, one is for statistical data, and one is a polled (only) schedule.

Sample speed

How do I increase the sample speed?

There are several parameters that can be changed to increase the sample speed.

```
P11=1000 Sets the mains frequency to 1000
P46=2 Set the number of samples to b averaged to 2
P60=100 Sets the AtoD converter speed to 100,000
```

The auto ranging can be turned off by setting an appropriate gain lock for the signal type.

Analog inputs

What does 'Universal' or 'Versatile' mean in regard to the DataTaker analog inputs?

A basic concept of the DataTaker data logger is that analog inputs can be used with more than one type of sensor without needing additional input modules. The DataTaker analog channel is a group of 4 terminals that can be used in many combinations.

On the DT800 we have 12, 4-wire (4-terminal) channels that allow sensors and signals based on voltage, current, resistance, and frequency to be measured. These are the fundamental signals output by most sensors. It is not necessary to use all four terminals on each channel. Each of these channels can be connected to between 1 and 3 sensors or signals, depending on the requirements of that sensor or signal type. Refer to the user manual for detailed connection information.

How many analog inputs can I use on the DT800?

DT800: From 12 to 42 depending on the input or sensor type.

The universal analog inputs used on the DT800 allow from 1 to 3 inputs per 4 wire 'channel' or up to 7 inputs across a channel pair. Refer to the user manual for detailed connection information.

How many voltage inputs can I use?

DT800: Up to 42 inputs can be used.

These will be arranged in 12 groups of three or 6 groups of 7. Each group of three must share a common 0V. Alternatively, unshared inputs can be used for a reduced number of inputs.

How many thermocouple inputs can I use?

DT800: Up to 42 thermocouple inputs can be used.

The connections used are the same as other voltage based inputs. Refer to the user manual for detailed connection information.

How many RTD inputs can I use?

DT800: Up to 12 RTD inputs can be used.

Connection is 1 RTD per 4 wire DataTaker universal channel. Refer to the user manual for detailed connection information.

How many 4–20 mA inputs can I use?

DT800: Up to 42 current loop or 4–20 mA inputs with external shunt resistors can be used.

Note: The DT800 does not have internal shunt resistors. Refer to the user manual for detailed connection information.

Can I use 2 wire 4–20 mA transducer inputs?

Yes, the DT800 includes support for current loop inputs external current shunts and an external power supply.

What is the input voltage range?

The overall range is ±13.5 Vdc or 9.5 Vac.

How does the auto ranging work?

The DT800 analog inputs can operate with 11 different levels of amplifier gain. By default, the most appropriate amplifier gain is selected automatically.

This allows small signals to be amplified for measurement, improving the effective resolution of that measurement. Autoranging can be disabled by using Gain Lock channel options.

Do I still need external attenuators?

If your voltage input is over 13.5 Vdc then you will need external attenuation.

Serial sensor channel

Does it support SDI-12?

Yes, this port can be configured for SDI-12.

How do I program this channel?

String commands and data parsing are programmed using either the DeLogger 4 expression builder or in native text code. This requires knowledge of the data formats and DataTaker command language. Refer to the DT800 User's Manual for additional information.

Use of memory

I need to capture infrequent events over longer time periods but don't want to log all the information between events.

Alarms can be used to control how the DataTaker handles data. For example, an alarm can turn logging on for a schedule when the temperature rises above a level, and another alarm can turn the logging off when it drops below another level. Refer to the user's manual for detailed command information.

Downloading data

Can I choose how much memory to download?

Yes, it is possible to download individual schedules only, or time to time periods of all or any individual schedule. In addition, it is also possible to download time to end or beginning to time.

Can I download while the logger is logging?

Yes, downloading or transfer of data from the DT800 via a host port or FTP doesn't stop data logging, but may limit the speed of faster schedules (1 second or faster) and will affect return of data to a PC in real time.

Can I download by time?

Yes, it is possible to download time to time, start of file to time, time to end of file, all schedules, or by individual schedule.

How long does it take to download a 1 MB data file?

Using default settings and a 1 MB data store file, standard UNLOAD time is:

- RS232: approximately 5 minutes (@ 57,600 baud)
- ETHERNET: approximately 3 minutes

The standard UNLOAD command unloads ASCII data (in a CSV format).

Replay files are also CSV files but include additional information.

What is the fastest way to unload my data logger?

Use an FTP (File Transfer Protocol) over Ethernet. A 1 MB data file will be transferred in less than 10 seconds, assuming typical LAN performance.

Can I use a PDA to download data?

Yes, DeMobile8 software (PDAs running the PocketPC2003 OS). Network connection is required, typically through WiFi. BlueTooth or RS232 interface is required for DeMobile (PDA) to DT800 communications.

Can I get my data over the internet?

Yes, either using direct connections within DeLogger, DeLoad, or DeTransfer, or with FTP using a browser or FTP client the data file can be copied from the DT800. Internet access requires the DT800 to be assigned a visible IP address. You may need to place it outside a firewall to be visible. A utility such as DeView can be to view or export the data file.

Can I FTP data files?

Yes, data store files can be moved using FTP via Ethernet or RS232/PPP. FTP folders can be viewed from IE and other browsers. This must be a remote request from FTP Client. This supports anonymous login for a read-only version.

Can I read my data using Notepad or Excel?

Standard UNLOAD and REPLAY files are text files using a CSV format. These can be viewed using text editors or spread sheets. Normal unload generates CSV text based files in either .csv or .dlr (REPLAY) file types.

Firmware

Is the firmware upgradeable?

Yes, via RS232 or PC Card memory card.

How can I get new firmware?

New firmware is available from thermofisher.com/datataker or from a current resource CD.

Note: The latest firmware is always on the web site.

Programming & commands

DeLogger not available for new DT800 products

Due to DeLogger being discontinued, we are no longer able to supply DeLogger with new DT800 products. You can use DeTransfer to program your new DT800.

Can I modify a program that is already in the DT800?

No, a new program must be loaded. The program can be read from the data logger in text form using the SHOWPROG command. It can then be modified before being loaded back to the DT800. This is only possible in text form, DeLogger 4 cannot reconstruct the program builder format from a text file.

Program constants held in CVs (channel variables) can be modified at any time.

Schedule rates can be changed at any time.

Any channel can be read at any time without reprogramming by sending the appropriate text commands to the data logger.

What debugging tools are available?

The DT800 has debugging support and error reporting capability. This includes reporting the position of an error in a program either as a text return or in the Error pane in DeLogger 4.

In addition, two log files are available:

• UERRLOG returns errors (exceptions/assertions)   • UEVTLOG returns contents of event log

Example:

DataTaker 800 E3

E3–Channel option error:

• Illegal channel option used   • Incompatible options used   • Option invalid for channel type

How do I comment my text program files?

Comments can be inserted by use of an apostrophe character (') followed by text comments, up to a carriage return.

Example:

```
' This line returns air temperature
1TK("Ambient")
```

Are commands case sensitive?

Yes, commands are only accepted in upper case.

Note: Switch settings are case sensitive.

How can I learn more about programming?

DataTaker conducts training workshops suitable for beginners or experienced users.

Troubleshooting errors

Error and Fault information from the logger

To assist with troubleshooting your application, the DT800 loggers include a number of error checking and event logging functions. It is useful to obtain the data from the logger to help identify the subtler problems that may occur. The two log files that are available:

- UERRLOG returns errors (exceptions/assertions)
- UEVTLOG returns contents of event log

These are best unloaded using the DeTransfer text interface, DeLogger can also be used but the data will be in Fixed Format and difficult for users to interpret.

Linearisation Errors

These errors will appear when a resistance measurement is outside an acceptable range. For example, when a PT385 measurement is outside the range 18.49-313.6 ohms (which equates to -200 to 600 degC) then a linearisation error will be returned. In this case, it is necessary to check the wiring to the measuring device and if necessary, verify this with a multimeter.

Alarms

Are Alarms logged to memory?

Yes, if Alarms are numbered they are logged.

What can be tested in Alarms?

All input and internal channel types can be tested in Alarms including analog and digital inputs as well as time, channel, and system variables. Refer to the User's Manual for detailed information on Alarms.

Can an Alarm be added to a channel being logged?

No, Alarms are treated as separate channels by the data logger. If a channel needs to be logged as data and be tested in an Alarm, two channels must be used. Refer to the User's Manual for detailed information on Alarms.

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