



**dataTaker®**

## DT85M Series 3 Data Logger

*Designed especially for remote monitoring*

### Applications include:

Weather Stations  
Agricultural Research  
Environmental Monitoring  
Research & Development  
Total Energy Monitoring  
Aquaculture

Structural Monitoring  
Strain Guages  
Fault Identification  
Machine Down Time  
Load Cells

Vehicle Testing  
GPS  
Flow  
Thermistor Arrays  
Pressure

**\*FREE Software & Technical Support**



- » Ultra low-power design
- » Integrated cellular modem
- » Automatic data transfer to email or FTP
- » 1 serial 'smart sensor' port
- » Up to 48 Analog ( $\pm 30V$ ) sensor inputs
- » Expandable to 960 analog points
- » 12 flexible digital channels
- » Modbus for SCADA connection
- » SDI-12 (multiple networks)

**Warranty:** All dataTaker Data Loggers are covered by a 3 year warranty on workmanship and parts. For further information on the dataTaker range, or for useful downloads, visit the dataTaker web site at [www.datataker.com](http://www.datataker.com) or contact your nearest dataTaker office or distributor.

**Quality Statement:** dataTaker operates a Quality Management System complying with ISO9001:2008. It is dataTaker's policy to supply customers with products which are fit for their intended purpose, safe in use, perform reliably to published specification and are backed by a fast and efficient customer support service.

**Trademarks:** dataTaker is a registered trademark.

**Specifications:** dataTaker reserves the right to change product specifications at any time without notice. **Designed and Manufactured in Australia.**

\*Our ability to provide free software and support is dependent on applicable export control laws (including those of the United States) and the export policy from time to time of Thermo Fisher Scientific Inc.

### Designed For Remote Applications

The dataTaker DT85M intelligent data logger is a fully featured low-powered logging platform with an integrated cellular modem, making it perfect for remote applications. The rugged design and wide operating temperature range of the DT85M provides reliable operation in virtually any environment. The DT85M's perfect balance of performance with low-power also allows you to use a smaller solar panel without compromising on functionality.

### Automatic Data Delivery

Forget travelling long distances to get your data. Utilise the DT85M's automatic data delivery features to schedule your data to be automatically emailed to your inbox every day, week, month or other time interval. More sophisticated systems can make use of the automatic data delivery features to send logged data to an FTP server. Alarm conditions can also trigger data delivery in addition to sending alarm messages to multiple email addresses or mobile phones.

### Easy To Configure

The DT85M is configured directly in your web browser using dataTaker's *dEX* graphical interface. *dEX* takes you through the configuration of your logger, showing you wiring diagrams and allowing you to decide – in as much or as little detail – how you want the system to work, suiting both novice or advanced users. Using the internal modem you can even re-configure your system remotely over the internet if required.



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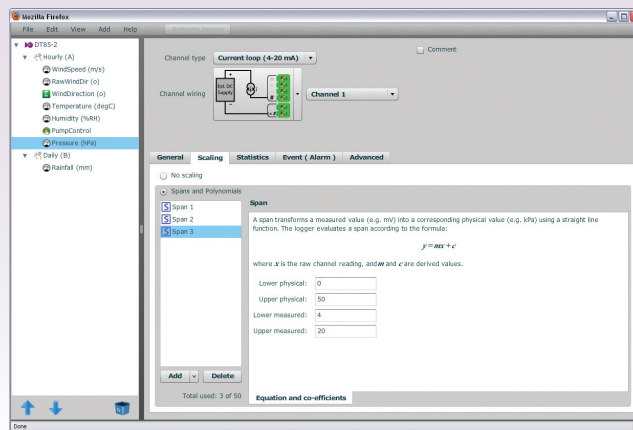


# dEX Logger Software

- » Built-in software - no application to install
- » Runs directly from your web browser
- » Accessible by Ethernet, USB connection or integrated modem
- » Intuitive graphical interface
- » Easy-to-use configuration editor
- » Access live and historical data

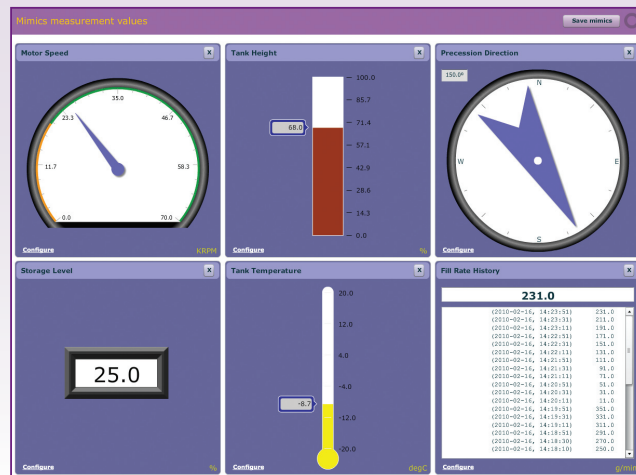
## Easy configuration

The dEX configuration editor allows you to view, edit and save logger configurations in an easy-to-use Windows Explorer style user interface.



## Real-time monitoring

dEX displays real-time sensor measurements, calculations and diagnostic information using mimics, tables and trend charts.



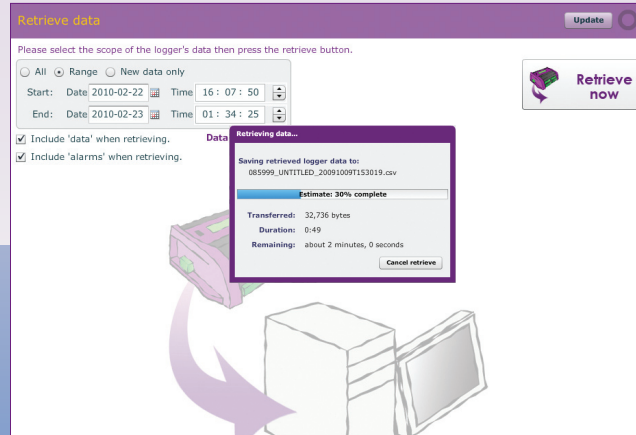
## What is dEX?

dEX is an intuitive graphical interface that allows you to configure your data logger, view real-time data in mimics, trend charts or tables and retrieve your historical data for analysis.

dEX runs directly from your web browser and can be accessed either locally or remotely, anywhere that a TCP/IP connection is available including worldwide over the Internet. You can use any of the logger's built-in communications ports to view dEX including Ethernet and USB.

## Data retrieval

dEX allows you to retrieve your data at the click of a mouse button. Just select either All, Range or New Data Only.





## Browser-based solution

dEX comes pre-installed on every logger in the DT80 range. The software loads in your web browser so there is no need to install cumbersome applications on your computer. Being browser-based, dEX is cross-platform and will work on all major operating systems including Windows, Mac and Linux.

## Data that is compatible with your applications

Logged data is ready to import into common spreadsheet and data processing applications such as Excel for further analysis and reporting. Data can be saved to your computer in comma separated (.CSV) format or our proprietary binary (.DBD) format.

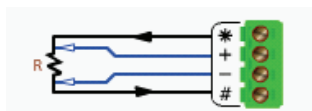
## Command window

The command window provides a terminal interface which allows the built-in command language of the logger to be used. Macro buttons allow common commands to be sent on a button press.

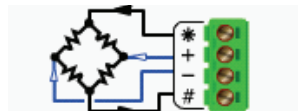
## Configuration editor

The configuration editor allows you to view, edit and save logger configurations in an easy-to-use Windows Explorer style user interface. Tree view of configuration allows definition of measurement schedules and measurements.

Wiring diagrams show available wiring configurations for each sensor type. Configuration can be stored and retrieved on either the logger or a local computer.



Platinum RTD (4 wire)



Voltage bridge (+ / #)

## Channel list

Displays name, value, units, alarm state, time stamp and logging state for each measurement.

Run	Name	Value	Units	Alarm	Time stamp	Log
✓	1hr_Humidity	51	%RH		2010-02-02, 12:00:00	✓
✓	1hr_Mean Win	0	m/s		2010-02-02, 12:00:00	✓
✓	1hr_Mean Win	7			2010-02-02, 12:00:00	✓
✓	1hr_Pressure	1006	hPa		2010-02-02, 12:00:00	✓
✓	1hr_Temperature	23.6	Deg C		2010-02-02, 12:00:00	✓
✓	1min_Humidit	48	%RH		2010-02-02, 12:32:00	✓
✓	1min_Mean Wi	0	m/s		2010-02-02, 12:32:00	✓

## Customisation of the application

The menu options, mimics panels and mimics can be added or removed to suit novice or advanced users. The color and brand name images within dEX can be customised to match corporate requirements or for personal preference.

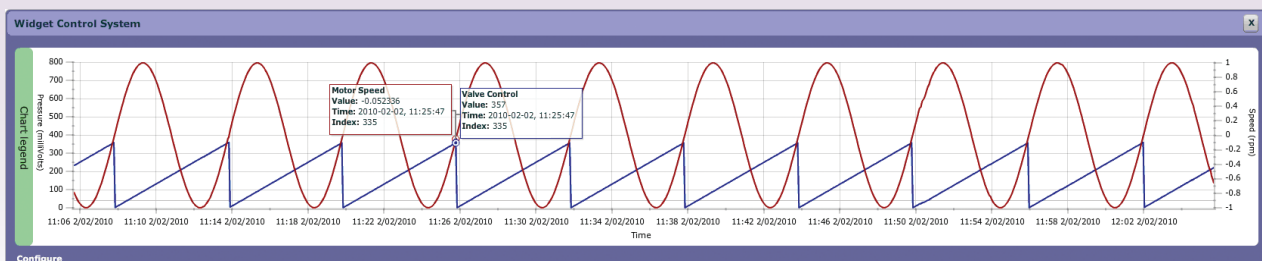
Mimics are organised into panels which can be modified to highlight custom alarm conditions or data grouping. Mimics include dials, bar graphs, thermometers etc. Real-time chart recorder mimic allows you to view trends and historical data over a custom time/date range. Up to 16 mimics can be displayed on up to 5 mimic pages (default is 1 page of 6 mimics).

## Minimum system requirements

- Web Browser (tested with): Internet Explorer, Firefox, Safari & Google Chrome
- TCP/IP connection
- Adobe flash player 10 or higher
- Screen resolution of 1024 x 768

## Chart recorder mimic

Real-time trending for sensors, calculations or other data. Supports up-to 5 traces per chart and up-to 2 Y-axes. Backfills with historical data stored in logger.



*The difference is dEX!*

## Analog Channels

16 analog input channels (expandable to 320\*)  
Each channel is independent and supports: one isolated 3-wire or 4-wire input, or two isolated 2-wire inputs, or three common referenced 2-wire inputs.  
The following maximums apply:  
Two wire with common reference terminal: 48 (expandable to 960)\*  
Two wire isolated: 32 (expandable to 640)\*  
Three and four wire isolated: 16 (expandable to 320)\*  
\*Expansion requires optional CEM20.

### Fundamental Input Ranges

The fundamental inputs that the DT85M can measure are voltage, current, resistance and frequency. All other measurements are derived from these.

Full Scale	Resolution	Full Scale	Resolution
±30 mVdc	0.25 µV	100 Ω	1.5 mΩ
±300 mVdc	2.5 µV	1000 Ω	15 mΩ
±3 Vdc	25 µV	10,000 Ω	150.00 mΩ
±30 Vdc	250 µV	100 Hz	0.0002 %
±0.3 mA	2.5 nA	10 kHz	0.0002 %
±3 mA	25 nA		
±30 mA	250 nA		

Auto-ranging is supported over 3 ranges.

### Accuracy

Measurement at ...	5°C to 40°C	-45°C to 70°C
DC Voltage	0.1%	0.35%
DC Current	0.15%	0.45%
DC Resistance	0.1%	0.35%
Frequency	0.1%	0.25%

Accuracy table above is % of reading ±0.01% of full scale.

### Sampling

Integrates over 50/60Hz line period for accuracy and noise rejection  
Maximum sample speed: 25Hz  
Effective resolution: 18 bits  
Linearity: 0.01%  
Common mode rejection: >90dB  
Line series mode rejection: >35dB

### Inputs

Inter-Channel Isolation: 100V (relay switching)  
Analog Section Isolation: 100V (opto-isolated)  
Input impedance: >100MΩ, 100KΩ (30V range)  
Common mode range: ±3.5V or ±30V on 30V range

### Sensor Excitation (Supply)

Analog channels: selectable 250µA or 2.5mA precision current source, 4.5V voltage source, or switched external supply.  
General Purpose: Switchable 12V regulated supply for powering sensors & accessories (max 150mA).  
Switchable 5V regulated supply for powering analog sensors (max 25mA).

## Analog Sensors

Supports a wide range of sensors including, but not limited to, those listed below. A wide range of sensor scaling and linearising facilities including polynomials, expressions and functions.

### Thermocouples

Types: B, C, D, E, G, J, K, N, R, S, T  
Calibration standard: ITS-90

### RTDs

Materials supported: Pt, Ni, Cu  
Resistance range: 10Ω to 10KΩ

### Thermistors

Types: YSI 400xx Series, other types\*\*  
Resistance range: <10kΩ\*\*

\* Other thermistor types are supported by thermistor scaling and calculated channels.

\*\*Resistance range can be increased with the use of a parallel resistor.

### Monolithic Temperature Sensors

Types supported: LM34 - 60, AD590, 592, TMPxx, LM135, 235, 335

### Strain Gauge and Bridge Sensors

Configurations: ¼, ½ & full bridge  
Excitation: voltage or current

### 4-20mA Current Loop

Internal 100Ω shunt or external shunt resistor

## Digital Channels

### Digital Input/Outputs

8 bi-directional channels  
Input Type: 8 logic level (max 20/30V)  
Output Type: 4 with open drain FET(max: 30V, 100mA), 4 with logic output.

### Relay Output

1 latching relay, contacts (max: 30Vdc, 1A)

## Counter Channels

### Low Speed Counters

8 counters shared with digital inputs.  
Low speed counters do not function in sleep mode.  
Size: 32 bit  
Max count rate: 10 Hz

### Dedicated Counter Inputs

7 high speed inputs or 3 phase encoder (quadrature) inputs  
Size: 32 bit  
Max count rate: 100 kHz  
Input type: 5 logic level inputs (max ±30V), and 2 programmable inputs as either logic level inputs or sensitive inputs (10mV) for magnetic pick-ups (max ±10V)

## Serial Channels

### SDI-12

4 SDI-12 inputs shared with digital channels. Each input can support up to 10 SDI-12 sensors.

## Calculated Channels

Combine values from analog, digital and serial sensors using expressions involving variables and functions.  
Functions: An extensive range of Arithmetic, Trigonometric, Relational, Logical and Statistical functions are available.

## Alarms

Condition: high, low, within range and outside range  
Delay: optional time period for alarm response  
Actions: set digital outputs, transmit message via SMS or email, execute any dataTaker command.

## Scheduling of Data Acquisition

Number of schedules: 11  
Schedule rates: 10ms to days

## Data Storage

### Internal Store

Capacity: 128MB = approx 10,000,000 data points  
**Removable USB store device(optional accessory)**  
Types: compatible with USB 1.1 or USB 2.0 drives, e.g. Flash drive.  
Capacity: approx. 90,000 data points per megabyte

## Communication Interfaces

### Ethernet Port

Interface: 10BaseT (10Mbps)  
Protocol: TCP/IP

### USB Port

Interface: USB 1.1  
Protocol: TCP/IP or ASCII Command

### Serial Sensor Port

Interface: RS232, RS422m, RS485  
Speed: 300 to 115,200 baud  
Flow Control: Hardware (RTS/CTS), Software (XON/XOFF), None  
Protocols: Modbus, Serial Sensor

## Network (TCP/IP) Services

Uses Ethernet port or integrated modem

### Command Interface

Access the ASCII command interface via TCP/IP

### Web Server

Access dEX to view data or configure the logger.  
Define custom dynamic web pages.  
Download data in CSV or DBD format.  
Command interface window.  
Define mimic displays.

### FTP Server

Access logged data from any FTP client or web browser.

### FTP Client

Automatically upload logged data direct to an FTP server.

## Modbus Server (Slave)

Access current data and status from any Modbus client

## Modbus Client (Master)

Read/write data from Modbus sensors and devices including PLCs, dataTaker dataloggers, modbus displays.

### Email Client

Email data or alarms directly from the logger.

### DDNS Client

Browse to the logger over the Internet using Dynamic DNS.

## System

### Display and Keypad

Type: LCD, 2 line by 16 characters, backlight.  
Display Functions: channel data, alarms, system status.  
Keypad: 6 keys for scrolling and function execution.  
Status LEDs: 4 for sample, disk, attention and power.

### Firmware Upgrade

Via: Ethernet, USB or USB disk

### Real Time Clock

Normal resolution: 200µs  
Accuracy: ±1 min/year (0°C to 40°C), ±4 min/year (-40°C to 70°C)

### Power Supply

External voltage range: 10 to 30Vdc  
Peak Power: 12W

### Average Power Consumption (typical)

Using 12Vdc external power source

Values within brackets represent the additional power required by the modem to push data daily to an FTP server.

Schedule Rate	1 analog sample Average Power (mW)	6 analog samples Average Power (mW)
1 sec	540 (9)	840 (27)
5 sec	250 (3)	330 (7)
30 sec	50 (2)	65 (2)
1 min	30 (2)	40 (2)
5 min	15 (2)	15 (2)
30 min	10 (2)	10 (2)
1 hrs	10 (2)	10 (2)

## Inbuilt Modem

### Features

Alarms: Send email or SMS messages  
Data: Send data to an email address or FTP server  
Remote access: Connect to dEX or Command interface  
SIM interface: SIM Socket (1.8V/3V)

### Networks and Frequencies

#### USA Only:

Interfaces: EDGE, GPRS, GSM, CSD

#### All other places:

Interfaces: EDGE, GPRS, GSM, WCDMA, HSPA, HSDPA

#### Frequencies:

EDGE/GPRS/GSM: 850/900/1800/1900 MHz  
WCDMA/HSPA/HSDPA: 850/1900/2100 MHz

## Physical and Environment

Construction: Powder coated steel and anodized aluminum.  
Dimensions: 300 x 137 x 65mm  
Weight: 2.5kg (5kg shipping)  
Temperature range: -30°C to 70°C \*  
Humidity: 85% RH, non-condensing  
\*reduced LCD operation outside range -15°C to 50°C

## Accessories Included

Resource CD: includes software and user manual.  
Comms cable: USB cable  
Line adaptor: 110/240Vac to 15Vdc, 800mA  
Antenna with 2m cable

## Optional Accessories

A range of accessories are available.

For full technical specifications download the user's manual from our website [www.datataker.com](http://www.datataker.com).



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