



**dataTaker**

# DT82EM Series 4 Data Logger

*Intelligent Data Logging Products*



- Dual Channel Isolation Technology
- Up to 6 Analog ( $\pm 50V$ ) sensor inputs
- 8 flexible digital terminals
- SDI-12 (multiple networks)
- Programmable Analog Output
- Integrated cellular modem
- Automatic data transfer via email or FTP
- Modbus for SCADA connection
- Web & FTP client / server
- USB memory for easy data and program transfer

**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.*

## Applications include:

Research & Development	Thermistor Arrays	Machine Down Time
Agricultural Research	Aquaculture	Pressure
Weather Stations	Structural Monitoring	Load Cells
Total Energy Monitoring	Strain Gauges	Flow
Environmental Monitoring	Process Monitoring	Vehicle Testing
Temperature Profiling	Fault Identification	GPS

**\*FREE Software & Technical Support**

## Versatile Measurement

Connect an array of sensors through the versatile analog and digital channels, high-speed counter inputs, phase encoder inputs and programmable serial sensor channels.

Temperature, voltage, current, 4-20mA loops, resistance, bridges, strain gauges, frequency, digital, serial and calculated measurements can all be scaled, logged and returned in engineering units or within statistical reporting.

Set up sampling, logging, alarm and control tasks to suit your own requirements while interfaces for smart sensors, GPS and other intelligent devices expand the DT82EM flexibility.

## Designed For Remote Applications

The dataTaker DT82EM 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 DT82EM provides reliable operation in virtually any environment.

The DT82EM'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 DT82EM'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 DT82EM 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.

- Built-in software – no application to install
- Runs directly from your web browser
- Accessible by Ethernet or USB<sup>1</sup> connection
- Intuitive graphical interface
- Easy-to-use configuration editor
- Access live and historical data
- View data as charts, mimics and tables

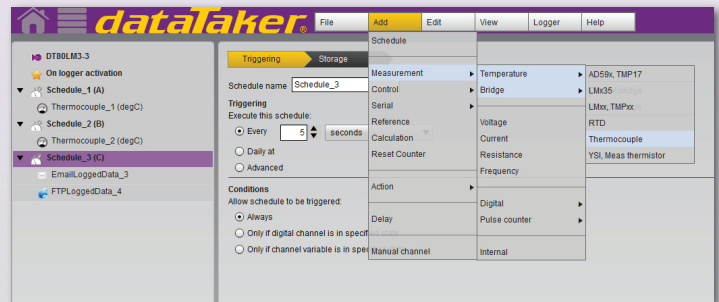
## What is dEX?

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, USB and RS-232.

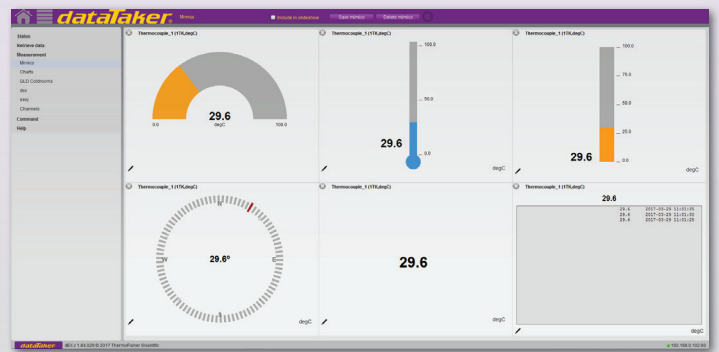
## Easy configuration

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.



## 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.

The screenshot shows the data retrieval interface with a table of historical data. The table has columns for 'Schedule', 'Min', 'Max', 'Units', 'Alarm', 'Created (local)', and 'Retrieved (local)'. There are three rows of data for 'Schedule\_1', 'Schedule\_2', and 'Schedule\_3'. A 'Refresh data' button is visible at the bottom.

Schedule	Min	Max	Units	Alarm	Created (local)	Retrieved (local)
Schedule_1	✓	✓	°C		2017-02-27 11:16:55	2017-02-27 11:20:00
Schedule_2	✓	✓	°C		2017-02-27 11:16:55	2017-02-27 11:20:00
Schedule_3	✓	✓	°C		2017-02-27 11:16:55	2017-02-27 11:20:00

<sup>1</sup> USB port equipped models only.

## Browser-based solution

dEX comes pre-installed on every logger in the DT80 range<sup>2</sup>. 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. To simplify it even further, dEX starts automatically in your default web browser when you connect to your logger using a USB cable<sup>1</sup>.

## 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.

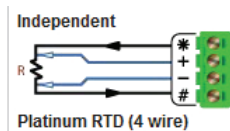
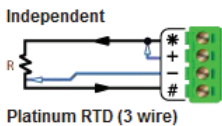
## Command window

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.



## Channel list

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

Name	Input	Run	Log	Alarm	Value	Units	Timestamp
Thermocouple_1	1TK	✔	✔		30.725632	degC	2017-03-29 12:14:10.203
Thermocouple_6	3TK	✔	✔	🔔	31.486366	degC	2017-03-29 12:14:10.241
Internal_7	REFT	✔	✔		33.993843	degC	2017-03-29 12:14:10.280
Thermocouple_2	3TK	✔	✔	🔔	31.493584	degC	2017-03-29 12:14:10.422
Thermocouple_5	3TK	✔	✔		31.49563	degC	2017-03-29 12:14:10.557

## 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.

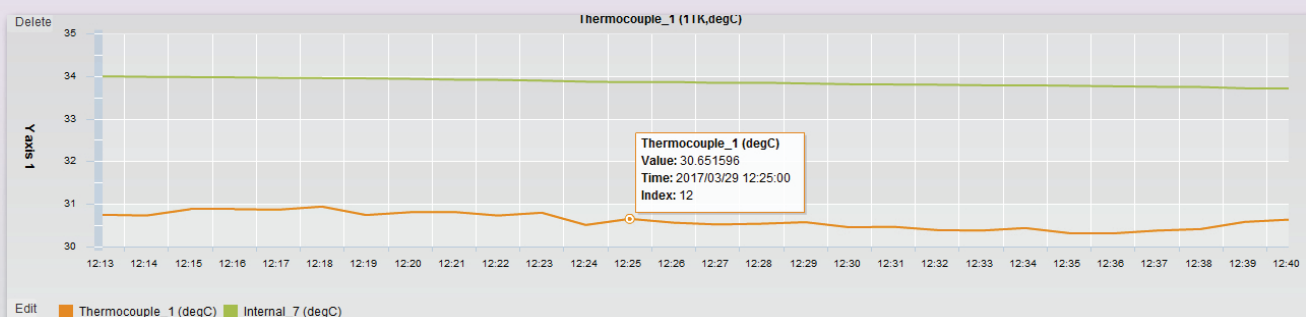
Mimics are organised into panels which can be modified to highlight custom alarm conditions or data grouping. Mimics include dials, bar graphs, thermometers etc. Real-time chart recorder mimic allows you to view trends and historical data over a custom time/date range. Up to 16 mimics can be displayed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

## Minimum system requirements

- Web Browser (tested with): Internet Explorer V7 and above, 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.



<sup>2</sup> dEX operates on all DT80 Series 2, Series 3 and Series 4 except Series 1.

# Technical Specifications

## Analog Channels

2 analog input channels

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.

- 2-wire with common reference terminal: 6
- 2-wire isolated: 4
- 3- and 4-wire isolated: 2

### Fundamental Input Ranges

The fundamental inputs that the DT82EM can measure are voltage, current, resistance and frequency. All other measurements are derived from these.

### Sampling

Integrates over 50/60Hz line period for accuracy and noise rejection

Maximum sample speed: 40Hz

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: 160K $\Omega$ , >100M $\Omega$

Common mode range:  $\pm 3.5V$  or  $\pm 55V$  (attenuator on/ off)

### Sensor Excitation (Supply)

Analog channels:

- selectable 2 $\mu A$ , 213 $\mu A$  or 2.5mA precision current source
- 4.5V voltage source
- switched external supply

General Purpose: Switchable 12V/5V regulated supply for powering sensors & accessories (max 150mA).

### Analog Output

Isolated programmable 16-bit DAC: voltage 0-10V or current 0-24mA

## 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: 10 $\Omega$  to 1M $\Omega$

### Thermistors

Types: YSI 400xx Series, other types\*

Resistance range: up to 1M $\Omega$

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

### Monolithic Temperature Sensors

Types supported: LM34 - 60, AD590, 592, TMPxx,

LM135, 235, 335

### Strain Gauge and Bridge Sensors

Configurations: 1/4, 1/2, & full bridge

Excitation: voltage or current

### 4-20mA Current Loop

Internal 100 $\Omega$  shunt or external shunt resistor

## Digital Channels

### Digital Input/Outputs

4 bi-directional channels

Input Type: 4 logic level (max 20/30V)

Output Type: 3 with open drain FET (max: 30V, 100mA)

1 with logic output

### Relay Output

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

## Counter Channels

### Low Speed Counters

4 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

4 high speed inputs

Size: 32 bit Max Count rate: 100 kHz

Input type:

- 2 logic level inputs (max  $\pm 30V$ ),
- 2 sensitive inputs (100mV) for magnetic pickups (max  $\pm 10V$ )

## Serial Channels

### SDI-12

1 SDI-12 inputs, shared with digital channels. Each input can support multiple SDI-12 sensors.

### Generic Serial Sensor

Flexible options to allow data to be logged from a wide range of smart sensors and data streams.

Available ports: Host RS232 Port\*

Baud rate: 300 to 115,200

\*If used as a Serial Sensor channel then the Host Port is not available for other communications.

### 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, 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)

Larger storage available refer to technical support.

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, Modbus Slave

### Network (TCP/IP) Services

Uses Ethernet and/or Host RS232 (PPP) ports

### Command Interface

Access the ASCII command interface of the DT82EM via TCP/IP

### Web Server

Access current data and status from any web browser.

Custom pages can be defined. Download data in CSV format. Command interface window. Define mimic displays.

### Modbus Server (slave)

Access current data and status from any Modbus client

(e.g. SCADA system)

### FTP Server

Access logged data from any FTP client or web browser

### FTP Client

Automatically upload logged data direct to an FTP server

## 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 or USB memory.

### Real Time Clock

Normal resolution: 200  $\mu s$

Accuracy:  $\pm 1$  min/year (0°C to 40°C),

$\pm 4$  min/year (-40°C to 70°C)

### Power Supply

External voltage range: 10 to 30Vdc

Peak Power: 12W (12Vdc 1A)

### Average power Consumption

Using 12Vdc external power source

Sampling Speed	Average Power
1 second	1350 mW
5 seconds	500 mW
30 seconds	135 mW
5 minutes	70 mW
1 hour	60 mW

## Integrated Cellular 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

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

EDGE/GPRS/GSM Freq: 850/900/1800/1900 MHz

WCDMA/HSUPA/HSDPA Freq: 850/1900/2100 MHz

## Physical and Environment

Construction: Powder coated zinc and anodized aluminum.

Dimensions: 180 x 137 x 65mm

Weight: 900g (3kg shipping)

Temperature range: -45°C to 70°C\*

Humidity: 85% RH, non-condensing

\*reduced battery life and LCD operation outside range -15°C to 50°C

## Accessories Included

Resource CD: includes software, video training and user manual.

Comms cable: USB cable

Line adaptor: 110/240Vac to 15Vdc, 800mA

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