Squirrel 2040 series

High performance data loggers for demanding applications

Overview

The Squirrel 2040 series combines a higher channel count with the same high performance, comprehensive features and universal inputs as the 2020 in a neat compact and portable instrument.

Using multiple 24-bit analogue to digital convertors, twin processors and removable memory options the 2040 series provides great flexibility to handle a wide range of complex and demanding multi-channel applications.

The Squirrel 2040 series are the ideal data loggers for industrial, scientific research and quality assurance applications and more!

The 2040 provides standalone data acquisition, advanced networked solutions and data analysis straight out-of-the box.
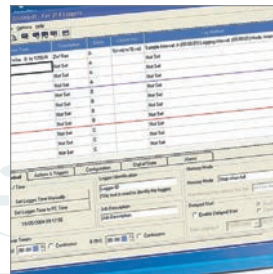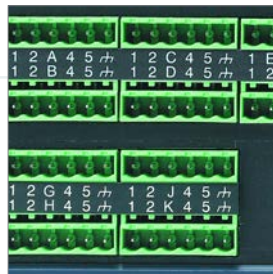
Key features

» Fully configurable via the integrated keypad
» 16 true differential or 32 single ended universal analogue inputs for voltage, current or resistance measurements plus 2 high voltage, 4 pulse and 8 digital event/state inputs
» Analogue inputs can be used with thermistors, thermocouples, 2, 3 or 4 wire RTD temperature (4F16 only) sensors and 4-20mA signals
» Logging rates of up to 100Hz on up to 4 channels
» Ethernet, USB and RS232 communication ports
» Internal memory storage for up to 14 million readings
» Download of internal data to removable MMC / SD card

» Sensor power and FET outputs for use with external devices
» Calculated channels derived from real channels using advanced mathematical functions e.g. $\log(x)$; $\ln(x)$; $\operatorname{sqrt}(x)$

Analogue inputs supported

» Thermistors
» Thermocouples
» Pt100 / Pt1000 (maximum of eight 3- or 4-wire, on 4F16 only)
» Voltage
» Current
» Resistance

The Squirrel 2040 series comprises two models:

» **Squirrel 2040–2F16**
– Up to 100 readings per second on 2 channels
– Two 24-bit analogue to digital converters

» **Squirrel 2040–4F16 (high speed model)**
– Up to 100 readings per second on 4 channels
– Four 24-bit analogue to digital converters
– 4 pulse rate / counter inputs (4 at up to 64kHz, 2 at up to 100Hz)
– Eight 3- or 4-wire Pt100 / Pt1000

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» **Up to 32 universal inputs**
» **High precision (0.05% of reading + 0.025% of range)**
» **Advanced data management, to MMC / SD or PC**
» **Flexible communications (USB, Ethernet, RS232)**
» **High speed option (100Hz on 4 channels)**
» **Various remote connection options e.g. via Ethernet, dial up modem or wireless**

Power output for sensor excitation / external devices

16 to 32 universal analogue inputs for recording temperature, current, voltage and resistance

Easy to use, removable connector system

2 high voltage channels (20, 40 or 60V) for automotive applications

Power supply – internal alkaline batteries or external DC power supply

USB, Ethernet and RS232 connectivity for quick and easy PC and remote communication and networking

Range of trigger functions via 8 digital inputs; 4 pulse rate / counter inputs

4 alarm outputs for triggering external devices

Large, clear 128 * 64 dot graphical LCD display

To operate the logger simply use the four integral push buttons and display, or use the convenient SquirrelView set-up, download and export software – free with every Squirrel logger

Robust, ergonomically designed case with easy access to all user facilities

Store up to 14 million readings in the Squirrel's on board memory

Store up to 6 logger configurations. Load from a removable MMC / SD card for speed and convenience, or download data files to the card

Communications

Ethernet, USB and RS232 serial ports are inbuilt. This allows simple connection to either a PC based TCP/IP network, a wireless to PC connection or to a GSM modem for remote data downloading. This flexibility enables global data access and retrieval as well as complete system integration of the SQ2040 series into complex and critical applications

Multiple configurations stored in the logger:

Up to six logger configurations (channel type, names, logging speeds, triggers etc.) together with the current configuration can be held in the logger`s internal memory. Additional configuration settings can also be loaded from the external MMC/SD memory card. This allows the operator to quickly and easily switch between logger configurations without the need for a PC.

Software configuration via SquirrelView:

The SquirrelView software (supplied with the SQ2040 series data logger) allows logger configuration, data download and export whilst giving the user full control over SQ2040. The optional SquirrelView Plus gives the user access to many advanced data analyses and archiving/transfer features. Refer to SquirrelView data sheet for specifications.

Concurrent sampling:

The SQ2040 series uses multiple analogue and digital converters that enables true concurrent sampling and logging. It allows the user to configure a channel to log at a rate of 100Hz whilst retaining different sample speeds on the other channels. Ideal for measuring dynamic parameters that change at different rates such as temperature and pressure.

Capabilities

» **Create complex schedules of logging rates, triggers and alarm outputs**
» **Scale and view readings in real time on the integral display or on a PC running SquirrelView**
» **Select logging rates up to 100 readings per second on up to 4 channels (2 channels on Squirrel model 2040-2F16) or a combination of different logging rates**
» **Derive up to 16 calculated (virtual) channels from real input channels using mathematical functions**

Applications

Automotive development

Engineering

Agricultural research

Squirrel SQ2040 Technical Specifications

	SQ2040-2F16	SQ2040-4F16
Analogue Input Channel Options	**Analogue to digital converters:** 2 **Differential:** 16 **Single Ended*:** 32 **3 or 4 wire:** 0	**Analogue to digital converters:** 4 **Differential:** 16 **Single Ended*:** 32 **3 or 4 wire:** 8
Logging Speed	Up to 100 readings per second on 2 channels	Up to 100 readings on 4 channels
Additional Channels	**Pulse:** (2 x fast - 64kHz)& (2 x slow - 100Hz) **Event/digital:** 8 state inputs or 1 x 8 bit binary **Single Ended*:** 2	**Pulse:** (2 x fast - 64kHz)& (2 x slow - 100Hz) **Event/digital:** 8 state inputs or 1 x 8 bit binary **Single Ended*:** 2
Analogue Inputs	Accuracy: (at 25°C) voltage and resistance (± 0.05% readings + 0.025% range) Common mode rejection: 100dB Linearity: 0.015% Input impedance: > 1MΩ Series mode line rejection: 50/60Hz 100dB	
Analogue - Digital Conversion	Type: Sigma - Delta Resolution: 24bit Sampling rate: up to 10, 20* or 100* readings per sec. per ADC. No 100Hz on 1F8 (* with mains rejection off)	
Thermistor Ranges	**Y & U-type:** - 50 to 150°C **Pt100/ Pt1000:** - 200 to - 850°C (2 wire only on 2F16, 3 or 4 wire on 4F16) **Customer specific thermistor range**	
Thermocouple Ranges; Differential and Single Ended	**K-type:** - 200 to 1372°C **R-type:** - 50 to 1768°C **B-type:** 250 to 1820°C **T-type:** - 200 to 400°C **S-type:** - 50 to 1768°C **C-type:** 0 to 2320°C **N-type:** - 200 to 1300°C **J-type:** -200 to 1200°C **D-type:** 0 to 2320°C	
Working Environment	- 30 to 65°C, RH up to 95% (non-condensing)	
Voltage Ranges; Differential and Single Ended	- 0.075V to 0.075V, - 0.15V to 0.15V, - 0.3V to 0.3V, - 0.6V to 0.6V, 0.6V to 1.2V, 0.6V to 2.4V, - 3V to 3V, - 6V to 6V, -6V to 12V, - 6 to 25V	
High Voltage Input Range	4V to 20V, 4V to 40V, 4V to 60V (max 2 may be selected)	
Current Ranges, Differential (Requires external 10Ω shunt)	-30 to 30mA, 4 to 20mA	
Resistance Ranges, all 2 wire	0 to 1250Ω, 0 to 5000Ω, 0 to 20000Ω, 0 to 300000Ω	
Resistance Range 3 and 4 wire (4F16)	0 to 500Ω, 0 to 4000Ω	
Digital/Alarm Outputs	4 open drain FET (18V 0.1A)	
Memory	Internal: up tp 128Mb (up to 14 million readings) External: Up to 1Gb - removable MMC/ SD (for transferring internal memory and storing setups only)	
Internal Memory Modes	Stop when full or overwrite	
Calculated Channels	Up to 16 virtual channels derived from physical input channels	
Resolution	Up to 6 significant digits	
Display/Keypad	128*64 dot graphical display,4 button keypad	
Power Supply	Internal: 6 x AA alkaline batteries External: 10-18VDC. Reverse and polarity and over-voltage protected	
Power Consumption @ 9V	Sleep mode: 600µA Logging: 40 - 80mA	
Power Output for External Device	Regulated 5VDC at 50mA or logger supply voltage at 100mA	
Time and Date	In-built clock in 3 formats	
Communication	Standard: RS232 (Auto bauding to 115200 baud) USB 1.1 & 2.0 compatible Ethernet 10/100 base TCP/IP. Requires external power supply. External options: GSM, Wi-Fi and PSTN Modems	
Programming / logger setup	SquirrelView or SquirrelView Plus Software	
Dimensions (w x d x h), weight	235 mm x 175 mm x 95 mm, 1.2 kg, enclosure material ABS	

Note: SQ2040 is supplied with software, manual, USB cable, wall bracket, batteries and 4 current shunt resistors.