

# Squirrel SQ2040

Powerful data loggers for all applications

**Grant**  
DATA ACQUISITION

## Overview

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

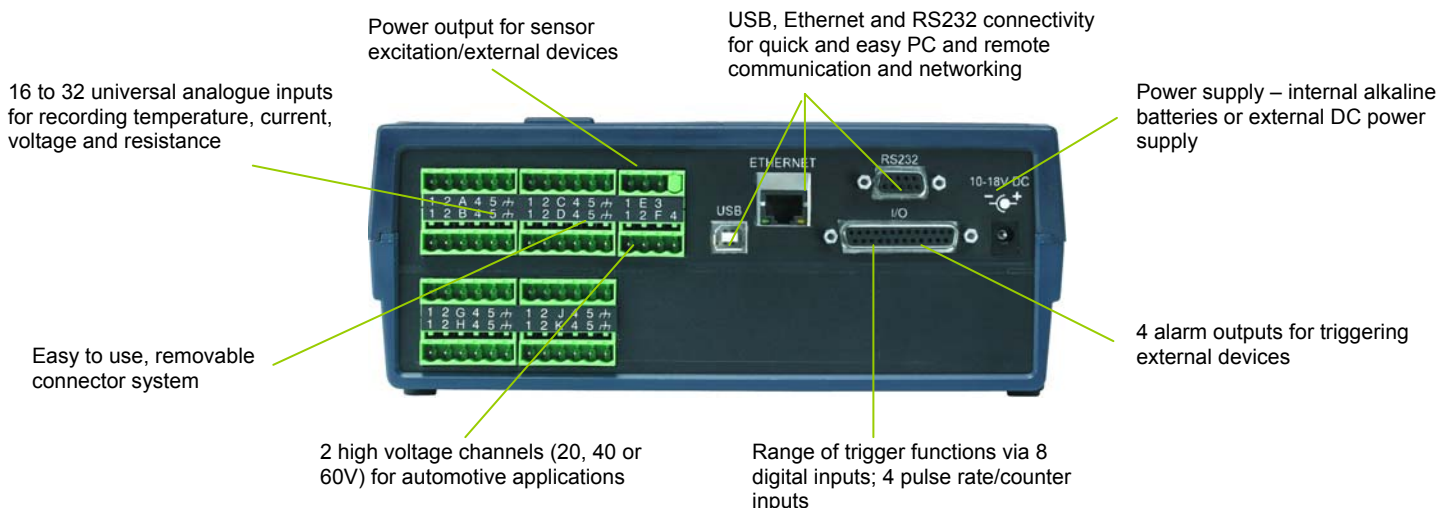
Using multiple 24-bit analogue to digital convertors, twin processors and removable memory options provides great flexibility to handle a wide range of complex and demanding multi-channel applications. The Squirrel 2040 series are the ideal data loggers for industrial, scientific research and quality assurance applications. The 2040 provides standalone data acquisition, advanced networked solutions and data analysis straight out-of-the-box.



**3 Year  
Warranty**

## Key features

- 16 true differential or 32 single ended universal analogue inputs for voltage, current or resistance measurements plus 2 high voltages, 4 pulse and 8 digital event/state inputs
- Analogue inputs can be used with thermistors, thermocouples, 2,3 or 4 wire RTD temperature sensors and 4 – 20mA signals
- User selectable logging rates of up to 100Hz on up to 4 channels
- Download of internal data to removable MMC/SD (Multi Media Card / Secure Digital) memory
- Large non-volatile internal memory – data retention is virtually indefinite
- Ethernet, USB and RS232 communication ports
- Sensor power and FET outputs for use with external devices
- Comprehensive access to information using the 2 line, 20 character LCD and button panel
- Calculated channels derived from real channels using advanced mathematical functions e.g.  $\log(x)$ ;  $\ln(x)$ ;  $\sqrt{x}$



## Communications:

Ethernet, USB and RS232 serial ports are inbuilt. This allows quick connection to either a PC based TCP/IP network, a wireless to PC connection or to a 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.

**Comprehensive software configuration via SquirrelView:**

The SquirrelView software (supplied with the SQ2040 series data loggers) allows logger configuration, data download and data export whilst giving the user full control over the SQ2040. The optional SquirrelView Plus gives the user access to many advanced data analysis and data archiving/transfer features. Please refer to our separate SquirrelView data sheet for all its advanced features.

**Concurrent sampling:**

The SQ2040 series uses multiple analogue to digital converters that enables true concurrent sampling and logging. This allows the user to configure up to 4 channels to log at a rate of 100Hz whilst retaining different sample speeds on other channels. This makes the SQ2040 series ideal for measuring dynamic parameters that change at different rates such as temperature and pressure.

**System specifications:**

**Input channels:**

		SQ2040 - 2F16	SQ2040 - 4F16
Analogue input channel options	Analogue to digital converters	2	4
	Differential	16	16
	Single ended*	32	32
	3 or 4 wire	0	8
Additional channels	Pulse	(2 x fast – 64kHz) & (2 x slow – 100Hz)	(2 x fast – 64kHz) & (2 x slow – 100Hz)
	Event/digital	8 state inputs or 1 x 8 bit binary	8 state inputs or 1 x 8 bit binary
	High voltage	2	2
	Internal channels	2 temperature	2 temperature
	Logging speeds*	1 sec to 1 day in 1 sec increments 2, 5, 10, 20 or 100Hz (20Hz or 100Hz only on 2 channels)	1 sec to 1 day in 1 sec increments 2, 5, 10, 20 or 100Hz (20Hz or 100 Hz only on 4 channels)

\*Please refer to our Technical Note for the configuration of these inputs

**Standard ranges for temperature channels:**

Each channel can be individually set to any of the ranges listed below. Pt100 to IEC751 and JIS1604 and Pt1000 to IEC751.

Input type	Ranges °C	Ranges °F
Y & U: Thermistor	-50 to 150	-58 to 302
Pt100/Pt1000*	-200 - 850	-328 to 1562

\*2 wire only on 2F16 - 3 or 4 wire on 4F16

Input type	Ranges °C	Ranges °F
K: Thermocouple	-200 to 1372	-328 to 2501
T: Thermocouple	-200 to 400	-328 to 752
J: Thermocouple	-200 to 1200	-328 to 2192
N: Thermocouple	-200 to 1300	-328 to 2372
R & S: Thermocouple	-50 to 1768	-58 to 3214

**Standard ranges for d.c. voltage:**

Each voltage channel can be any of the voltage ranges below. Mixed differential and single ended configurations are permitted. Please refer to our Technical Note for the permitted combinations of inputs

Voltage range	Voltage range	High voltage input ranges*
-0.075 to 0.075V	-3.0 to 3.0V	4.0 to 20.0V
-0.15 to 0.15V	-6.0 to 6.0V	4.0 to 40.0V
-0.3 to 0.3V	- 6.0 to 12.0V	4.0 to 60.0V
-0.6 to 0.6V	-6.0 to 25.0V	
-0.6 to 1.2V		
-0.6 to 2.4V		

\*Max of 2 may be selected

### Standard ranges for current and resistance channels:

Each current channel can be any of the current ranges below. Current ranges use differential input channels.

Current range (External 10Ω shunt)	Resistance range 2 wire	Resistance range 3 and 4 wire (4F16 version)
-30.0 to 30.0mA	0.0 to 1250.0Ω	0.0 to 500.0Ω
4 to 20mA	0.0 to 5000.0Ω	0.0 to 4000.0Ω
	0.0 to 20000.0Ω	
	0.0 to 300000.0Ω	

#### Analogue inputs

Accuracy: (at 25°C) voltage and resistance  
± (0.05% readings + 0.025% range)  
Common mode rejection: 100dB  
Input impedance: > 1M Ω  
Linearity: 0.015%  
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 second per ADC.

\* With mains rejection off

#### Alarm outputs

4 x open drain FET (18V 0.1A)

#### Power output for external device

Regulated 5 VDC at 50mA or  
logger supply voltage at 100mA

#### Time and date

In-built clock in 3 formats

#### Scaling data

Displays readings in preferred  
engineering units

#### Memory

Internal: 16Mb (Up to 1,800,000  
readings)  
External: Up to 1Gb - removable  
MMC/SD (For transferring internal  
memory and storing setups only)

#### Calculated channels

Up to 16 virtual channels derived  
from physical input channels

#### Resolution

Up to 6 significant digits

#### Programming/logger setup

SquirrelView or SquirrelView Plus  
software

#### Communication

Standard: RS232 (Auto bauding to  
115200 baud)  
Ethernet 10/100 base TCP/IP  
USB 1.1 and 2.0 compatible  
External options: GSM, WIFI and  
PSTN Modems

#### Power supply

Internal: 6 x AA Alkaline batteries  
External: 10-18VDC  
Reverse polarity and over-voltage  
protected

#### Power consumption @ 9V

Sleep mode: 600µA  
Logging: 40-130mA

#### Dimensions and weight

Dimensions: W235 x D175 x  
H95mm  
Weight: Approx 1.2kgs  
Enclosure material: ABS

#### Memory modes (internal only)

Stop when full or overwrite

#### Display and keypad

2 line x 20 character LCD display  
Battery state and external power  
indicator  
Keypad lock  
Navigate to:  
Arm/disarm/pause/continue  
Meter any channel or alarm  
Select from up to 6 x pre-stored  
setups  
Status/diagnostics/memory/time  
and date  
Download to MMC/SD

#### Operating environment

-30°C to +65°C  
Humidity: 90% at 40°C non-  
condensing

#### Accessories

MPU 12V: Universal (97-263V  
AC) power supply  
LC76: DC lead  
SQ20RB12-6: External  
rechargeable battery (12V, 6Ah)  
SB102: 25 way digital I/O  
connector  
CS202: Current shunt kit (4 x 10Ω  
0.125W)  
PEL4: Rugged weather proof  
enclosure  
CAL2040: Test and Calibration  
certificates  
SQ20A802: External GSM  
communications kit  
MMC64: Multi Media Card  
(Please see price list for additional  
accessories)

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

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Available from:-

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www.bis.fm

Grant data loggers and specialist technical support is available world-wide. Please visit [www.grant.co.uk](http://www.grant.co.uk) to locate our regional offices and to download technical support materials. You will also find your locally appointed distributor and support centre.

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