

The DAQ518 is a complete 18-channel multiplexed signal conditioning system with a 16-bit resolution ADC and 10BaseT Ethernet connectivity to a PC or laptop for setup, data display and processing.

The ultra-compact fully enclosed chassis weighs only 1.13kg (2.5lbs), making it suitable for in-vehicle applications.

**FREE VersaDAQ  
Demo Software**

## APPLICATIONS

In-vehicle testing

- Automotive testing
- Motorcycle/ATV testing
- Boat/Marine engine testing

Tests using low-level sensors (thermocouples, etc.)

Tests using high-level sensors (battery voltage, steering/throttle position, shock travel, etc.)

Tests using bridge-type sensors

## DAQ518 Series

### 18 Channel Signal Conditioning System with 16-Bit ADC, Network Connectivity and Bridge Sensor Support



The DAQ518 is a complete 18-channel data acquisition system in an ultra-compact chassis.

## FEATURES

- 16 Differential input analog channels with fixed gain and filters
- 2 Bridge signal conditioning channels with programmable gain and filters accommodate 1, 2 or 4 active bridge arms
- 2 Additional Frequency Measurement channels
- 10BaseT Ethernet connectivity to your PC or laptop for setup, data display and processing
- Wireless Ethernet available
- 16-bit analog-to-digital converter resolution
- Aggregate sampling rate of up to 32k samples/second
- Simple user interface allows quick setup for data collection and storage
- Local data storage via CompactFlash™ module
- Auto-configuration on power-up for stand-alone applications
- External trigger input provided

**GENERAL DESCRIPTION**

The DAQ518 is a complete 18-channel multiplexed signal conditioning system with a 16-bit resolution ADC and 10 BaseT Ethernet connectivity to a PC or laptop for setup, data display and processing. The ultra-compact 67.7mm (2.64”) high, 112mm (4.41”) wide, 220 mm (8.66”) deep fully enclosed chassis weighs only 1.13kg (2.5lbs), making it suitable for in-vehicle applications. The DAQ518 chassis can be powered from DC voltage sources ranging from 10-18 volts. Power consumption is 18 watts for typical configurations. Local data storage is available via a CompactFlash™ module. Auto configuration on power-up provides stand-alone capability and along with the simple user interface makes data collection and storage a two-mouse click process.

The signal conditioning consists of 18 multiplexed differential input analog channels. There are 16 channels that can be configured with fixed 2-pole filters and fixed gains of 1/5 to 100. Filter options for these channels are available in a 1,2,5 progression from 10Hz to 1kHz. Filters and gain are configured in 8-channel groups. Input voltage ranges up to ±50 volts are supported. Channel inputs have over-voltage protection. End-to-end channel calibration is accomplished by configuring the input multiplexers via software to receive a reference voltage provided by an internal calibrator.

There are also 2 bridge signal conditioning channels that can accommodate 1, 2 or 4 active bridge arms. These channels provide programmable gain from 1 to 1000 with pre-filter gains of 1,10,100 and 1000 as well as post-filter gains of 1,2,5 and 10. Each channel also includes a programmable Butterworth filter with cutoff frequencies of 10, 50 and 500Hz. Each filter can also be bypassed.

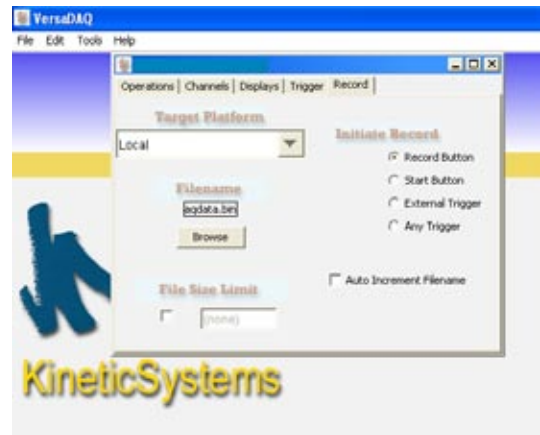
Two channels of frequency measurement are provided. An external trigger input is provided as well.

The 16 differential input analog channels are connected via a 44-contact “D” connector or through an available DAQ750 Termination Assembly. Each of the bridge signal conditioning channels are connected via a 15-contact “D” connector. Frequency measurement channels are also connected via a 15-contact “D” connector.

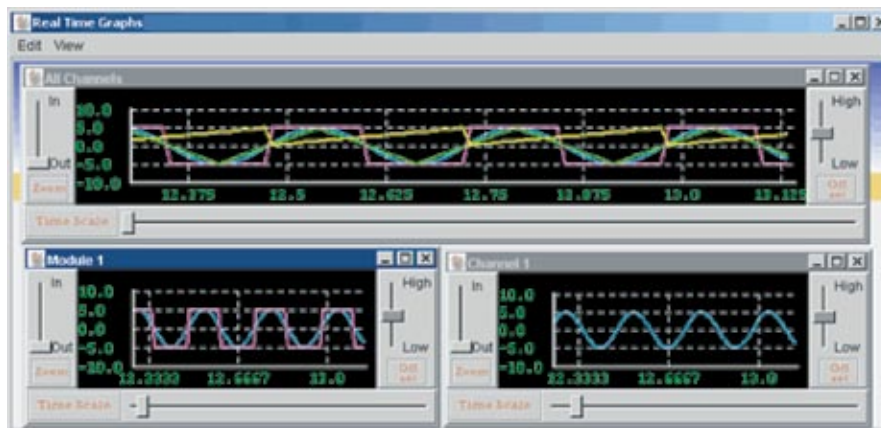
Included VersaDAQ software manages and controls DAQ518 operations including setup, data acquisition, and data recording. VersaDAQ runs on a PC/laptop and connects to a DAQ518 chassis via the 10BaseT Ethernet connection. VersaDAQ’s simple user interface configures channels, sample rate, record mode and calibration.



**Configuring DAQ518 Series Channels**



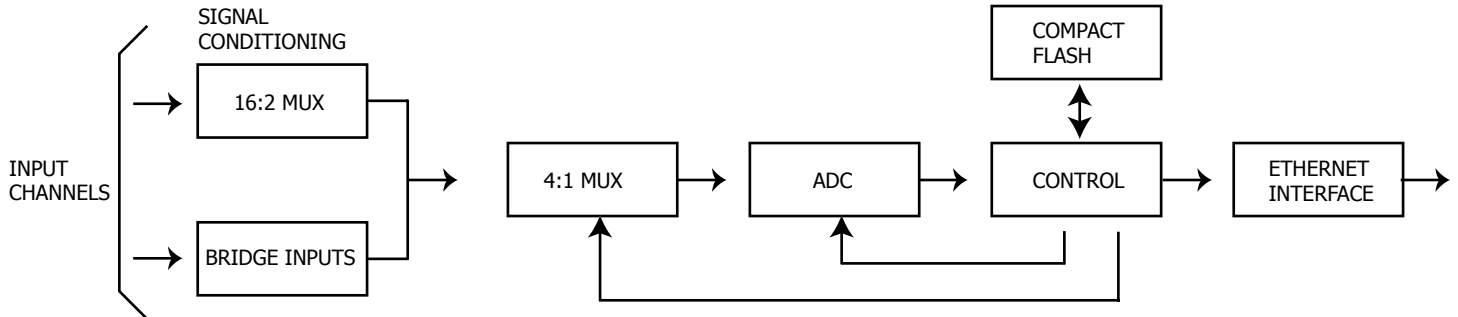
**Configure Data Record parameters**



**Monitoring Live Data Real-time Graphs**

| Items  | Specifications   |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
|--|--|------|-----------------------------|------|----------|---|------------------------------|-----|-----------------------------|---|------------------------------|-----|----------------------------|---|------------------------------|-----|----------------------------|---|------------------------------|------|----------------------------|----|-----------------------------|--|--|----|-----------------------------|--|--|
| Number of channels   | 16 differential input analog channels with fixed gain and filters, 2 bridge signal conditioning channels with programmable gain and filters, 2 frequency measurement channels<br><br>(The last differential input analog channel can be configured as an analog input channel or as an isothermal reference for temperature measurements.)   |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| 16 Fixed Analog Inputs<br>Input range<br>Common mode:<br>Differential:<br>Input protection<br>Input impedance<br><br>Available gain ranges<br>(fixed gain in groups of eight channels)<br>Available filter ranges<br>(fixed cutoff in groups of eight channels)<br><br>Accuracy, referred to input (RTI), after automatic calibration  | ±10V standard, ±30V, ±50V optional<br>±10V standard, ±30V, ±50V optional<br>±35V Standard<br>1MΩ<br><br>1/5, 1/3, 1, 2, 5, 10, 20, 50, 100<br><br>2-pole RC, 10Hz to 1kHz in a 1,2,5 progression<br>(Gain of 1/5 and gain of 1/3 options are available with 1-pole RC, 10 Hz Filter)<br><br>0.025% of reading ± 0.012% of full scale (for gains of 1 – 100)<br>0.025% of reading ± 1.00% of full scale (for gain of 1/5 and 1/3)   |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| 2 Bridge Signal Inputs<br>Input range<br>Common mode:<br>Differential:<br>Input protection<br>Input impedance<br><br>Gain Selection<br><br>Gain/Offset Accuracy<br>Referred to input (RTI)<br>-after automatic calibration<br><br>Filter -3dB Cutoff<br>Frequency Selection<br><br>Excitation<br><br>Line regulation<br>Load regulation<br>Temperature Coefficient<br>Bridge Completion<br><br>Shunt Calibration<br><br>Bridge Balance | ±10V standard<br>±10V standard<br>±40 V<br>1 MΩ<br><br>Pre-filter gain: 1, 10, 100, 1000; post-filter gain: 1, 2, 5, 10; Maximum overall gain: 1000<br><br><table border="0" data-bbox="446 1066 1209 1234"> <thead> <tr> <th>Gain</th> <th>Accuracy</th> <th>Gain</th> <th>Accuracy</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>±(1.2mV + 0.025% of reading)</td> <td>100</td> <td>±(13µV + 0.025% of reading)</td> </tr> <tr> <td>2</td> <td>±(600µV + 0.025% of reading)</td> <td>200</td> <td>±(8µV + 0.025% of reading)</td> </tr> <tr> <td>5</td> <td>±(250µV + 0.025% of reading)</td> <td>500</td> <td>±(5µV + 0.025% of reading)</td> </tr> <tr> <td>1</td> <td>±(120µV + 0.025% of reading)</td> <td>1000</td> <td>±(5µV + 0.025% of reading)</td> </tr> <tr> <td>20</td> <td>±(60µV + 0.025% of reading)</td> <td></td> <td></td> </tr> <tr> <td>50</td> <td>±(25µV + 0.025% of reading)</td> <td></td> <td></td> </tr> </tbody> </table><br>10, 50, 500Hz and filter bypass (5kHz bandwidth)<br><br>Independent excitation for each channel. Each channel provides +/- excitation and sense leads. Excitation voltages of 0V, 2.5V, 5V and 10V are available. Open sense lines or an over-current condition will shut down the supply automatically and signal the error condition. Excitation calibration is also provided.<br><br>0.003%<br>0.0025% V/mA<br>2ppm/°C<br>Two channels of bridge completion are provided; ¼, ½ and full-bridge configurations are supported ; options with 120, 350 and 1000Ω completion resistors are available.<br>+/- shunt calibration can be performed on each channel. Switching is performed under software control. Shunt calibration resistors are mounted externally.<br>A 12-bit DAC provides the ability to remove bridge offsets of up to ±70mV with a 350Ω bridge | Gain | Accuracy                    | Gain | Accuracy | 1 | ±(1.2mV + 0.025% of reading) | 100 | ±(13µV + 0.025% of reading) | 2 | ±(600µV + 0.025% of reading) | 200 | ±(8µV + 0.025% of reading) | 5 | ±(250µV + 0.025% of reading) | 500 | ±(5µV + 0.025% of reading) | 1 | ±(120µV + 0.025% of reading) | 1000 | ±(5µV + 0.025% of reading) | 20 | ±(60µV + 0.025% of reading) |  |  | 50 | ±(25µV + 0.025% of reading) |  |  |
| Gain   | Accuracy   | Gain | Accuracy                    |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| 1  | ±(1.2mV + 0.025% of reading)   | 100  | ±(13µV + 0.025% of reading) |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| 2  | ±(600µV + 0.025% of reading)   | 200  | ±(8µV + 0.025% of reading)  |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| 5  | ±(250µV + 0.025% of reading)   | 500  | ±(5µV + 0.025% of reading)  |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| 1  | ±(120µV + 0.025% of reading)   | 1000 | ±(5µV + 0.025% of reading)  |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| 20   | ±(60µV + 0.025% of reading)  |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| 50   | ±(25µV + 0.025% of reading)  |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| Frequency Measurement Inputs<br><br>Counter frequency measurement range:<br>External Trigger:  | 2 single-ended TTL-level inputs that can be used as counters. Digital input 0 can also be used as an external trigger to start a scan<br><br>0.8 Hz to 50kHz<br>TTL-level low true pulse (1 second minimum pulse width)  |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| Aggregate Sampling Rate  | 32k sample/second , the internal sample clock can be programmed via software for sample rates from 0.0625Hz to 32kHz   |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| Resolution   | 16-bit, monotonic over operating range   |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| DC Power Requirements  | 10-18VDC (12VDC nominal), 18 watts for typical configurations, 30 watts maximum  |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| Chassis Dimensions   | 67.7mm (2.64") high, 112mm (4.41") wide, 220mm (8.66") deep  |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |
| Weight   | 1.13kg (2.5lbs)  |      |                             |      |          |   |                              |     |                             |   |                              |     |                            |   |                              |     |                            |   |                              |      |                            |    |                             |  |  |    |                             |  |  |

## DAQ518 Block Diagram



### ORDERING INFORMATION

The DAQ518 has 16 differential analog input channels with fixed gain/filter parameters and 2 bridge signal conditioning channels with programmable gain/filter. The 16 fixed gain/filter channels can be configured in 8 channel groups with any gain/filter combination listed in the table below. A screw terminal termination panel with isothermal reference for temperature measurements and interconnect cables are also available.

DAQ518-AA11 18-Channel Signal Conditioning Chassis with 16-Bit ADC

DAQ518-AB11 with 120Ω Bridge Completion

DAQ518-AC11 with 350Ω Bridge Completion

DAQ518-AD11 with 1 kΩ Bridge Completion

| Filter/Gain combinations for the DAQ 518 chassis analog input channels |                      |                   |                      |                  |
|--|----------------------|-------------------|----------------------|------------------|
| Card Slot Location   | Group A (8 Channels) |                   | Group B (8 Channels) |                  |
|  | Filter (Hz)          | Gain              |                      |                  |
| x  | Fxx                  | Gxx               | Fxx                  | Gxx              |
|  |                      | Gain of 1/5 = .2  |                      |                  |
| 2  | 10Hz = 11            | Gain of 1/35 = .3 | 10Hz = 11            | Gain of 1/3 = .3 |
|  | 20Hz = 21            | Gain of 1 = 01    | 20Hz = 21            | Gain of 1 = 01   |
|  | 50Hz = 51            | Gain of 2 = 02    | 50Hz = 51            | Gain of 2 = 02   |
|  | 100Hz = 12           | Gain of 5 = 05    | 100Hz = 12           | Gain of 5 = 05   |
|  | 200Hz = 22           | Gain of 10 = 11   | 200Hz = 22           | Gain of 10 = 11  |
|  | 500Hz = 52           | Gain of 20 = 21   | 500Hz = 52           | Gain of 20 = 21  |
|  | 1000Hz = 13          | Gain of 50 = 51   | 1000Hz = 13          | Gain of 50 = 51  |
|  | No Filter = 00       | Gain of 100 = 12  | No Filter = 00       | Gain of 100 = 12 |

(Gains of 1/3 and 1/5 are only available with 1-pole RC, 10 Hz Filter)

The table below shows the corresponding full-scale input voltage range for each gain factor.

| Gain | Full-scale Input Range |
|------|------------------------|
| 1/5  | ±50 volts              |
| 1/3  | ±30 volts              |
| 1    | ±10 volts              |
| 2    | ±5 volts               |
| 5    | ±2 volts               |
| 10   | ±1 volts               |
| 20   | ±0.5 volts             |
| 50   | ±0.2 volts             |
| 100  | ±0.1 volts             |

Part Number Examples for selecting the gain/filter parameters for the 16 fixed signal conditioning channels:

2F11G12F00G01 = Group A (8 channels) configured for 10Hz filter, gain of 100

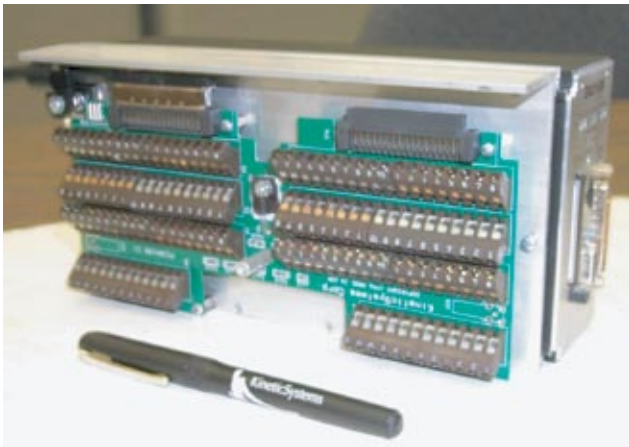
Group B (8 channels) configured for no filter, gain of 1

2F12G.3F21G02 = Group A (8 channels) configured for 100Hz filter, gain of 1/3

Group B (8 channels) configured for 20Hz filter, gain of 2

**RELATED PRODUCTS**

- DAQ750-518 Isothermal Termination Assembly for the DAQ518
- DAQ500-TRIG Push Button Cable Assembly for External Trigger



DAQ750 shown with cover removed



Specifications contained within this data sheet are subject to change without notice

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**KineticSystems Company, LLC**

900 N. State St.  
Lockport, IL 60441-2200

**Toll-Free (US and Canada):**

phone 1-800-DATA NOW  
1-800-328-2669

**Direct:**

phone +1-815-838-0005  
fax +1-815-838-4424

**Email:**

mkt-info@kscorp.com

To find your local sales representative or distributor or to learn more about KineticSystems' products visit:

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