

GCM4 - Controller Module

Remote and Real-Time Monitoring.

General Description

The GCM4 controller module is a high-speed field computer with communication hardware capable of acquiring data from multiple digital transducer modules and transmitting this information wirelessly via the Internet or to computers via Ethernet. The GCM4 has significant data storage capacity including 4 GB of non-volatile solid state memory and over 500 MB of dynamic SDRAM memory. The GCM4 module provides all necessary communication hardware and software needed to acquire readings from our GST and inclinometer modules (models INC500 and i6). Thousands of sensors readings can be acquired over a single cable using the CAN network. In addition, the GCM4 provides four high-accuracy zero-drift differential input channels for monitoring low signal sensors like strain gages and load cells. The GCM4 also provides four single-ended inputs for larger voltage signals. A precision 5 volt source is included to provide very low drift and temperature stable excitation for external sensors like strain gauges, load cells, accelerometers and piezometers.



Features

- ✓ Easily network thousands of sensors over a single cable
- ✓ Four differential inputs with programmable gain
- ✓ Four single-ended inputs with programmable gain
- ✓ Precision low drift 5V excitation source for sensors
- ✓ On board humidity and current monitoring sensors
- ✓ One event source input with debounce circuitry
- ✓ 4 GB of solid state memory
- ✓ Three voltage sources to power external components
- ✓ Trigger input for sampling synchronization

Technical Features

- 1 GHz ARM Processor
- Over 500 MB SDRAM Dynamic Memory
- 4 GB Non-Volatile Solid State Memory
- Connects with 4G Internet Modems
- CAN Version 2.0B Compliant
- 10/100 Base-T Ethernet Port
- Built-In Humidity, Current and Temperature Sensors
- Very Compact Size (4.3" x 3.6" x 2.0")
- Standard Operating Temperature Range (-40 to 85 C)

Applications

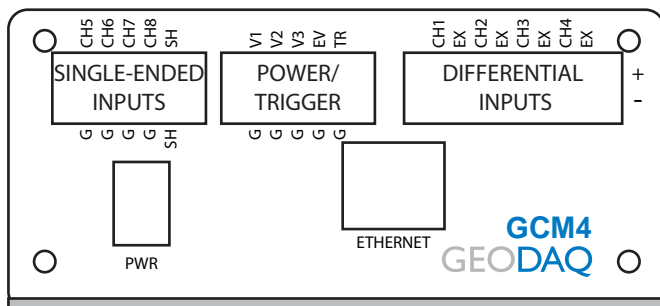
- Web-Based Monitoring
- Dams and Pipelines
- Bridge and Structural Health Monitoring
- Early Warning Systems
- Landslide and Slope Monitoring
- Remote Monitoring
- Static and Dynamic Pile Testing

Power

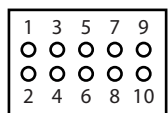
The GCM4 operates from any regulated or unregulated 12 volt DC power supply including batteries and solar powered systems. The GCM4 applies power to sensor networks only during sampling events and turns power off when complete, thus saving battery capacity when not in use. Between sample events the GCM4 places itself into a low power mode drawing very little current. The GCM4 provides two 1-amp voltage sources (8 and 11 volts) for powering external components like modems, cameras or other instrumentation devices. One "always on" 5 volt source provides power to instrumentation for monitoring sensors during sleep intervals.

Sensor Inputs

The GCM4 has a total of 8 input channels with 24-bit resolution for monitoring external sensors like strain gauges, load cells, piezometers, and displacement transducers. The GCM4 includes four differential inputs for low signal sensors and four single-ended inputs for 0 to 5 volt output type sensors. A high precision 5 volt excitation source exhibiting very low drift is provided to power ratiometric type sensors for incredibly stable readings over long monitoring periods.

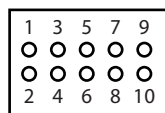


SINGLE-ENDED INPUTS



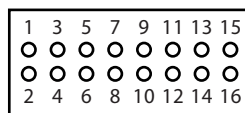
1. CH5 Input (+)
2. CH5 Ground
3. CH6 Input (+)
4. CH6 Ground
5. CH7 Input (+)
6. CH7 Ground
7. CH8 Input (+)
8. CH8 Ground
9. Shield
10. Shield

POWER/TRIGGER



1. 8V Output
2. Ground
3. 11V Output
4. Ground
5. 5V Output
6. Ground
7. Event Input
8. Ground
9. Trigger IN 3.3V
10. Ground

DIFFERENTIAL INPUTS



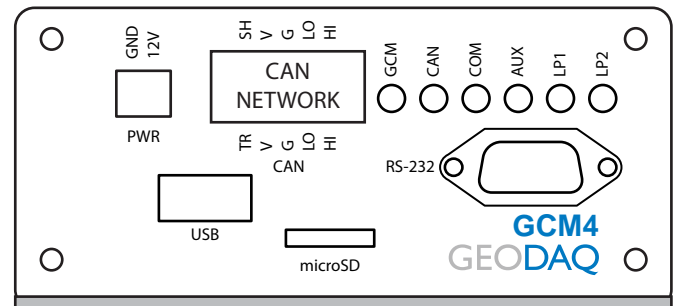
1. CH1 Input (+)
2. CH1 Input (-)
3. 5V Excitation
4. Excitation Ground
5. CH2 Input (+)
6. CH2 Input (-)
7. 5V Excitation
8. Excitation Ground
9. CH3 Input (+)
10. CH3 Input (-)
11. 5V Excitation
12. Excitation Ground
13. CH4 Input (+)
14. CH4 Input (-)
15. 5V Excitation
16. Excitation Ground

CAN Network

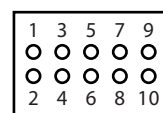
Geotechnical and structural instrumentation like strain gauges, piezometers, accelerometers, and displacement transducers can be added to a GCM4 controller by simply adding a new GST module to the network. This distributed monitoring approach moves measurements close to the sensors eliminating the need to add long instrumentation cables, perform field wiring to a central data logger enclosure, and reprogramming field data collection equipment. Each GST node can capture static or dynamic time histories. The GCM4 provides a voltage source to the CAN network, so power is distributed to the entire data collection system.

Communication

The GCM4 can communicate directly with a PC computer using Ethernet or RS-232 for real-time field applications like pile testing or on-site diagnostics. The GCM4 communicates with wireless internet modems using the Ethernet port for remote monitoring applications. The USB port can be used to modify IP and port settings by inserting a flash drive during power-up.

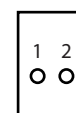


CAN NETWORK



1. Shield
2. Trigger 3.3V
3. CAN V Output
4. CAN V Output
5. Ground
6. Ground
7. CAN Data LO
8. CAN Data LO
9. CAN Data HI
10. CAN Data HI

PWR



1. Power Ground
2. 12V Input