# Specification Manual

## SCADA Platform

Griffin I'Net, Inc.

# System Hardware Specifications

**General Specifications**

       -40 to 75 degC ambient temperature range

       NEMA 4 enclosure

       (See section *Power Requirements* for power usage tables)

**CPU Module**

       454MHz ARM-based CPU

       128MB DDR2 SDRAM

       512MB Internal FLASH storage

       MicroSD slot for additional storage space

       10/100 Ethernet port

       USB host port

       USB OTG port (host or device)

       2 RS232/RS485 (jumper selectable) serial ports

       3 auxiliary RS232 serial ports

       RTC module with wide temperature coin-cell battery backup

       System temperature sensor

       System expansion bus port

**SCADA System Backplane**

       Wide 24VDC input (9-32VDC)

       High efficiency 24V to 5V 1A DC/DC converter

       4 expansion card connectors, 1 optional display connector

       TEC line voltage input, up to 56V

**Gauge TEC Line Driver Expansion Card**

       Up to 56V 675mA

       Software configurable voltage and current limit

       Voltage and current waveform readback

       FPGA-accelerated communications

**28V/48V Power Modules**

       Wide 24VDC input (9-32V, significantly reduced power when under 18V)

       Supplies 48V or 56V (dual 28V) power for TEC lines

       Two power modules can be wired in series for 56V

**Access Bracket**

       Main system 24V input

       On/off slide switch

       System protection fuse

       Common point of routing for TEC lines

# System Software Specifications

**Linux Operating System**
>Kernel version is currently 2.6.35

**SCADA Platform**
>Software version is currently 1.6x
>Ethernet interface for configuration, control, and data transfer
>Operates and logs data from gauges as configured by SCADA Client
>Modbus over RS485, Ethernet
>>Configurable register map

**SCADA Client**
>Windows, Linux, & Mac versions are available
>Connects to a SCADA unit over Ethernet
>Configures gauges for each TEC line
>Controls TEC line voltage and current limit
>Monitors TEC line voltage and current
>Views live gauge data (realtime or historical)
>Downloads gauge data to the PC for processing
>Exports downloaded gauge data to CSV files
>Support for custom software branding/logos

# Data Logging Storage Times

The SCADA Platform has internal storage of about 200MB available to store readings.  The system continuously logs several health statistics (system ambient and die temperatures, memory available, CPU load, etc) which currently consumes about 697KB/day.  After this, each active gauge will consume about 40 bytes per pressure and temperature reading.  Various errors are also logged, and can consume a significantly higher amount of space if the errors continue. (2MB/gauge/day)

Gauge data files are stored per gauge, on a one-file-per-day basis.  Once the storage location (external or internal) reaches 90% capacity, the system will begin to recycle the storage space used by the OLDEST data first.

Storage usage matrix (approximate)

| System health data | 1 day | 1 week | 1 month | 1 year |
|---|---|---|---|---|
| Storage used | 697KB | 4.9MB | 21MB | 254MB |

20 second updates

| Duration | 1 gauge | 2 gauges | 4 gauges | 8 gauges |
|---|---|---|---|---|
| 1 day | 173KB | 346KB | 691KB | 1.4MB |
| 1 week | 1.2MB | 2.4MB | 4.8MB | 9.7MB |
| 1 month | 5.2MB | 10.5MB | 21MB | 42MB |
| 1 year | 63MB | 126MB | 252MB | 505MB |

So, with 20 second updates the system can store data for 8 gauges approximately 3 months on the internal storage alone.  With a 4GB SD storage card in the SD media slot, there is room for over 5 years of data.

2.5 second updates

| Duration | 1 line | 2 lines | 3 lines |
|---|---|---|---|
| 1 day | 1.4MB | 2.8MB | 4.2MB |
| 1 week | 9.7MB | 19.5MB | 29MB |
| 1 month | 42MB | 84MB | 126MB |
| 1 year | 505MB | 1GB | 1.5GB |

With 2.5 second updates and no significant error conditions, a single TEC system will fill an 8GB SD memory card in 16 years.

# Power Requirements
### (as tested)

**Base system power (without TEC power modules)**

| | |
|---|---|
| Idle power | 0.75W |
| Idle power, Ethernet enabled | 1.25W |
| Full CPU power | 1.25W |
| Full CPU power, Ethernet enabled | 1.75W |

**One TEC Line (2x 30V Power Modules)**

| System Voltage | 8 gauges @ 16mA | 8 gauges @ 25mA (HT) |
|---|---|---|
| 12V | 14W | 18W |
| 18V | 14W | 19W |
| 24V | 14W | 21W |
| 31V | 17W | 21W |

**Two TEC Lines (2x 30V Power Modules)**

| System Voltage | 8 gauges @ 16mA | 8 gauges @ 25mA (HT) |
|---|---|---|
| 18V | 25W | 35W |
| 24V | 26W | 35W |
| 31V | 27W | 37W |

**Three TEC Lines (2x 30V Power Modules)**

| System Voltage | 8 gauges @ 16mA | 8 gauges @ 25mA (HT) |
|---|---|---|
| 18V | 35W | 52W |
| 24V | 35W | 52W |
| 31V | 37W | *TBD* |

# TEC Line Shorting Performance

(as tested)

All specifications are at 24VDC system power, 60V TEC line voltage.  Be sure to add the base system power to these numbers.

**One TEC Line (2x 30V Power Modules)**

| Conditions | Power |
|---|---|
| 320mA short | 23W |
| 400mA short | 28W |
| 450mA short | 30W |
| 682mA short | 45W |

**Two TEC Lines (2x 30V Power Modules)**

| Conditions | Power |
|---|---|
| 320mA short, other line at 130mA | 40W |
| 400mA short, other line at 130mA | 45W |
| 450mA short, other line at 130mA | 50W |
| 600mA short, other line at 130mA | 59W |
| 682mA short, other line at 130mA | 69W |
| 320mA short, other line at 200mA (HT) | 45W |
| 400mA short, other line at 200mA (HT) | 50W |
| 450mA short, other line at 200mA (HT) | 54W |
| 682mA short, other line at 200mA (HT) | 74W |
| Both lines shorting at 320mA each | 54W |
| Both lines shorting at 430mA each | 71W |

**Three TEC Lines (2x 30V Power Modules)**

| Conditions | Power |
|---|---|
| 320mA short, other two lines at 130mA | 49W |
| 450mA short, other two lines at 130mA | 59W |
| 550mA short, other two lines at 130mA | 66W |
| 600mA short, other two lines at 130mA | 71W |
| 400mA short, other two lines at 200mA (HT) | 66W |
| 450mA short, other two lines at 200mA (HT) | 71W |
| TWO 320mA shorts, other line at 200mA (HT) | 71W |