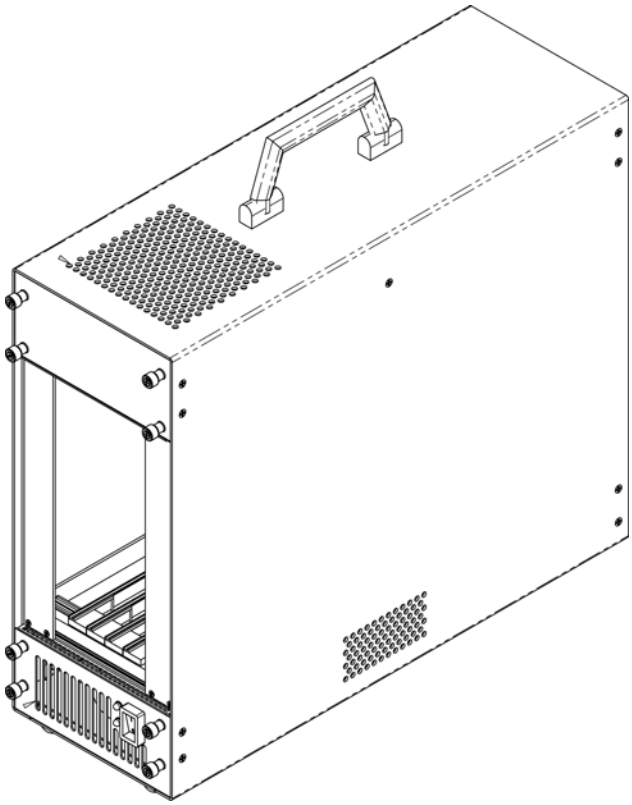
August 28, 2007 7004-0531-400

Model 7004
4U VXS FIVE SLOT MINI-TOWER CHASSIS

Operation and Maintenance Manual



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RECORD OF CHANGES

Date	Revision	Description of Change
070827	–	PRELIMINARY

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1. CONFIGURATION

1.1. Introduction

This chapter defines the configuration for the VXS MINI-TOWER CHASSIS. Information is provided concerning the following equipment elements:

- Table 1-1: System Configuration
- Table 1-2: Backplane Assignments 7004-0531-100
- Table 1-3: Field Replaceable Units

Table 1-1. System Configuration

Characteristic	Description
Standard	7004-0531-100
With Envirostat	7004-0531-101

Table 1-2. Backplane Assignments 7004-0531-100

Slot	Device Type	Device Installed
1	VXS Module	None
2	VXS Module	None
3	VXS Module	None
4	VME64X Module	None
5	VME64X Module	None

Table 1-3. Field Replaceable Units

VXS MINI-TOWER Part No. 7004-0531-100

Description	Part No.
Upper Fan Tray Assembly	141192-101
Lower Fan Tray Assembly	141193-101

VXS MINI-TOWER Part No. 7004-0531-101

Description	Part No.
Upper Fan Tray Assembly	141192-101
Lower Fan Tray Assembly	141193-100

2. GENERAL INFORMATION

2.1. Introduction

This manual provides information and instructions required for the operation and maintenance of the ruggedized VXS MINI-TOWER Chassis manufactured by DataMetrics Corporation (DMC).

2.2. Applicable Documents

Military Standards

MIL-STD-461E	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference

Commercial Standards

CE, CS, and RS	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference

ANSI/VITA 1.1-1997

ANSI/VITA 1-1994

IEEE P1014

2.3. Equipment Description

The VXS MINI-TOWER Chassis is a 4U ruggedized COTS VXS platform. The equipment is packaged using environmental management techniques that protect internal components from shock, vibration, temperature extremes, and electromagnetic interference/radio frequency interference (EMI/RFI). The chassis is provided in a tower configuration. The VXS MINI-TOWER Chassis includes the following primary functional elements:

- Backplane/cardcage
- Power subsystem
- Cooling system
- Input/output (I/O) interfaces

2.3.1. Backplane/Cardcage

The VXS MINI-TOWER Chassis incorporates a 5-slot card cage that supports three VXS modules and two legacy VME64X Modules. The VXS backplane conforms to VITA 41.0 VXS backplane specifications. It has a high-speed Multi-Gig RT-2 connector for up to 6.4Gbps signals over P0. There are power bugs for +5V, +5VSB, +3.3V, +12V, -12V. It has point to point connections which do not require use of switch cards.

2.3.2. Power Subsystem

The power subsystem includes a power switch, circuit breaker and a 750W primary power supply.

2.3.3. Cooling System

The VXS MINI-TOWER Chassis incorporates two, 150-cubic feet per minute, 12 Vdc, cooling fans that are mounted in field replaceable upper and lower fan trays. Cooling air enters the chassis at the lower front panel. Air is drawn through the cardcage and is exhausted at the top of the chassis.

2.3.4. Input/Output Interfaces

The back panel of the VXS MINI-TOWER Chassis includes an IEC 320 standard connection for prime power.

2.4. Specifications

VXS MINI-TOWER chassis specifications are defined in Tables 2-1 through 2-3.

Table 2-1. Physical Specifications

Characteristic	Description
Dimensions: Table Top Tower	7” Wide X 17.25 High X 20.31” deep.
Weight of 7004-0531-100	29 Lbs. (1)
Weight of 7004-0531-101	30 Lbs. (1)

(1) Excluding VXS & VME64W modules and peripherals

Table 2-2. Electrical Specifications

Characteristic	Description
Input Voltage: 115 Volts alternating current (Vac)	 85 to 264 Vac
Input Frequency: 115 Vac configuration	 47 to 440 Hertz (Hz)
Output Current: 115 Vac configuration	+5 V @ 60A +3.3 V @ 35A +/- 12V @ 17A

Table 2-3. Environmental Specifications

Characteristic	Description
Temperature: Operating [1] Non-operating	 -10 to +55 °C -20 to +85 °C
Relative humidity (non-condensing)	<95%
Altitude: Operating Non-operating	 Up to 10,000 feet Up to 40,000 feet
Vibration	Random: 0.5G 10 - 2000 Hz Sinusoidal: 0.5G 10 – 500 Hz
Shock: Operating Non-operating	 1 g, 11ms ½ sine 2 g, 11ms ½ sine
Inclination	Up to 90° off-level on any axis (configuration dependent)
EMI/electromagnetic compatibility (EMC)	MIL-STD-461E, CE102, CS101, CS114, CS116, RE102 and RS103.

[1] Fully functional without battle short enabled.

3. INSTALLATION

3.1. Introduction

This chapter provides information and instructions required for installation of the VXS MINI-TOWER Chassis and connection of external cabling.

3.2. Unpacking

Carefully remove the chassis from the shipping container. Inspect the unit for any evidence of damage. Retain packing materials for future use.

3.3. Chassis Installation

The VXS MINI-TOWER Chassis is provided in a table top or floor standing (Figure 3-1).

CAUTION
LIFTING AND MOVEMENT OF THE VXS MINI-TOWER CHASSIS MAY REQUIRE AT LEAST TWO MAINTENANCE PERSONNEL.

3.4. External Power Connection

A standard IEC 60320 power connection (C14 plug type) is provided on the rear of the chassis.

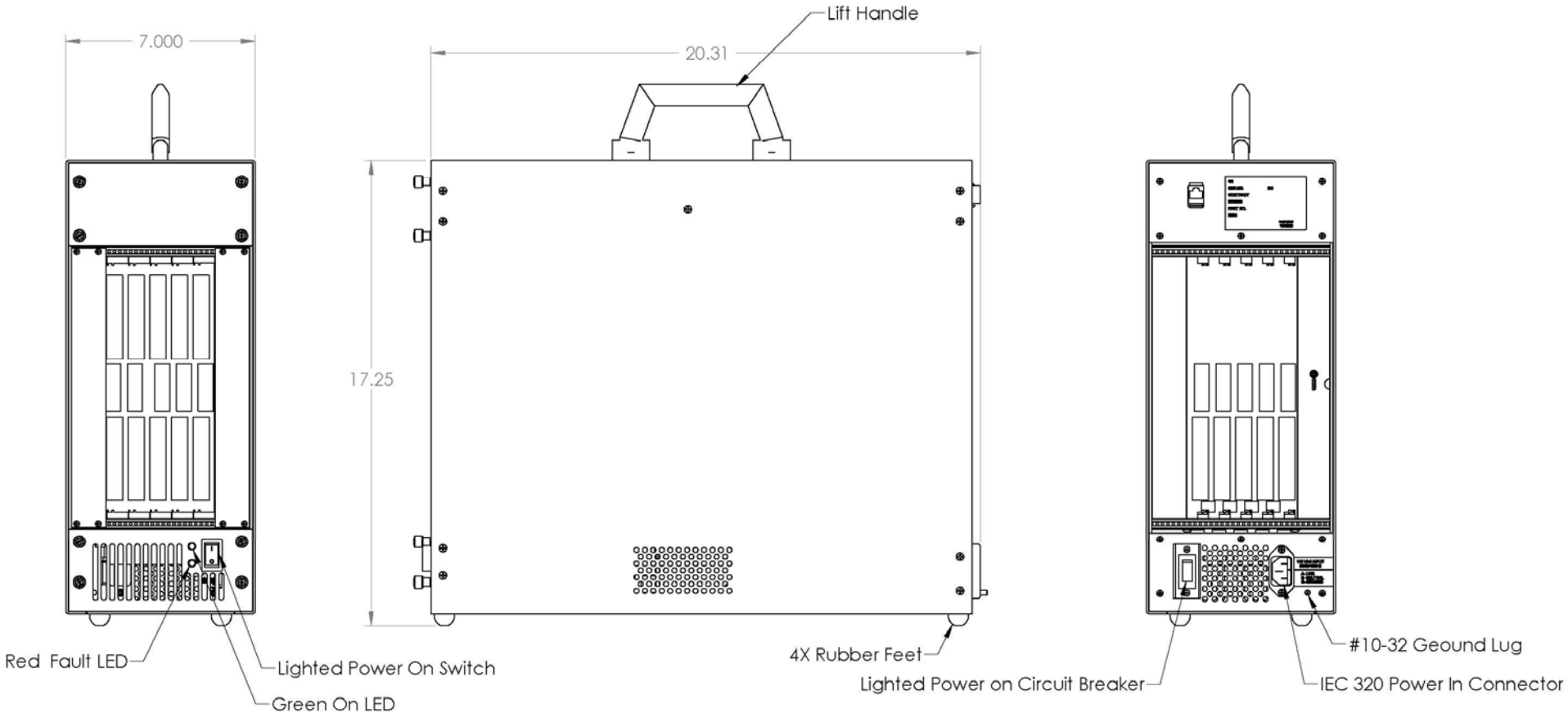

Figure 3-1. Outline Dimensions

4. OPERATION

4.1. Introduction

This chapter provides information concerning VXS MINI-TOWER Chassis controls and indicators, normal operation, software installation, error conditions, and shutdown. Before the unit is powered up for the first time, verify that the installation procedures defined in Chapter 3 have been performed.

4.2. Controls and Indicators

All controls and indicators required for operation of the VXS MINI-TOWER Chassis are located as shown in Figure 3-1.

4.3. Initial Operation

Follow the instructions defined below when operating the VXS MINI-TOWER Chassis for the first time.

a. Power up any external peripheral equipment that is to be used with the VME 64X chassis.

b. Push power switch to the “on” position.

- Button will illuminate when powered on.

4.4. Normal Operation

The basic startup sequence for regular operation is the same as that defined for initial operation. When the VXS MINI-TOWER is powered up under normal conditions, the unit will either boot the external operating system automatically or halt and display a console prompt. Refer to documentation for the applicable external peripheral equipment for a description of startup characteristics and options.

4.5. Shutdown

Follow the instructions defined below to power down the VXS MINI-TOWER Chassis:

a. Perform an orderly shutdown of the external user defined network and/or operating system using the procedure defined in the applicable software documentation.

b. Place the VXS MINI-TOWER Chassis POWER switch in the “off” position.

c. Place the VXS MINI-TOWER Chassis rear mounted Circuit Breaker in the “off” position.

5. FUNCTIONAL DESCRIPTION

5.1. Introduction

This chapter describes the major functional elements of the VXS MINI-TOWER Chassis. Information is provided concerning power distribution, the SEMB, VXS Backplane, peripheral subsystem, and cooling system. Chassis interconnections are identified in Figure 5-1 and 5-2. VXS MINI-TOWER Chassis subsystems are described in the following paragraphs.

5.1.1. Power Distribution

Prime power enters the chassis at the rear panel IEC 320 connector. The load side of the circuit breaker provides power to the primary power supply. The backplane provides dc outputs of +5 V, +3.3 V, +/-12 V, +/- V1, and +/- V2 for the VXS/VME 64X backplane. The fan is active whenever prime power is applied. The chassis is fully grounded internally and contains a #10-32 ground lug for external chassis ground.

5.1.2. VXS/VME 64X

The chassis incorporates a backplane/cardcage assembly that accommodates up to 3 VXS and 2 VME64X slots.

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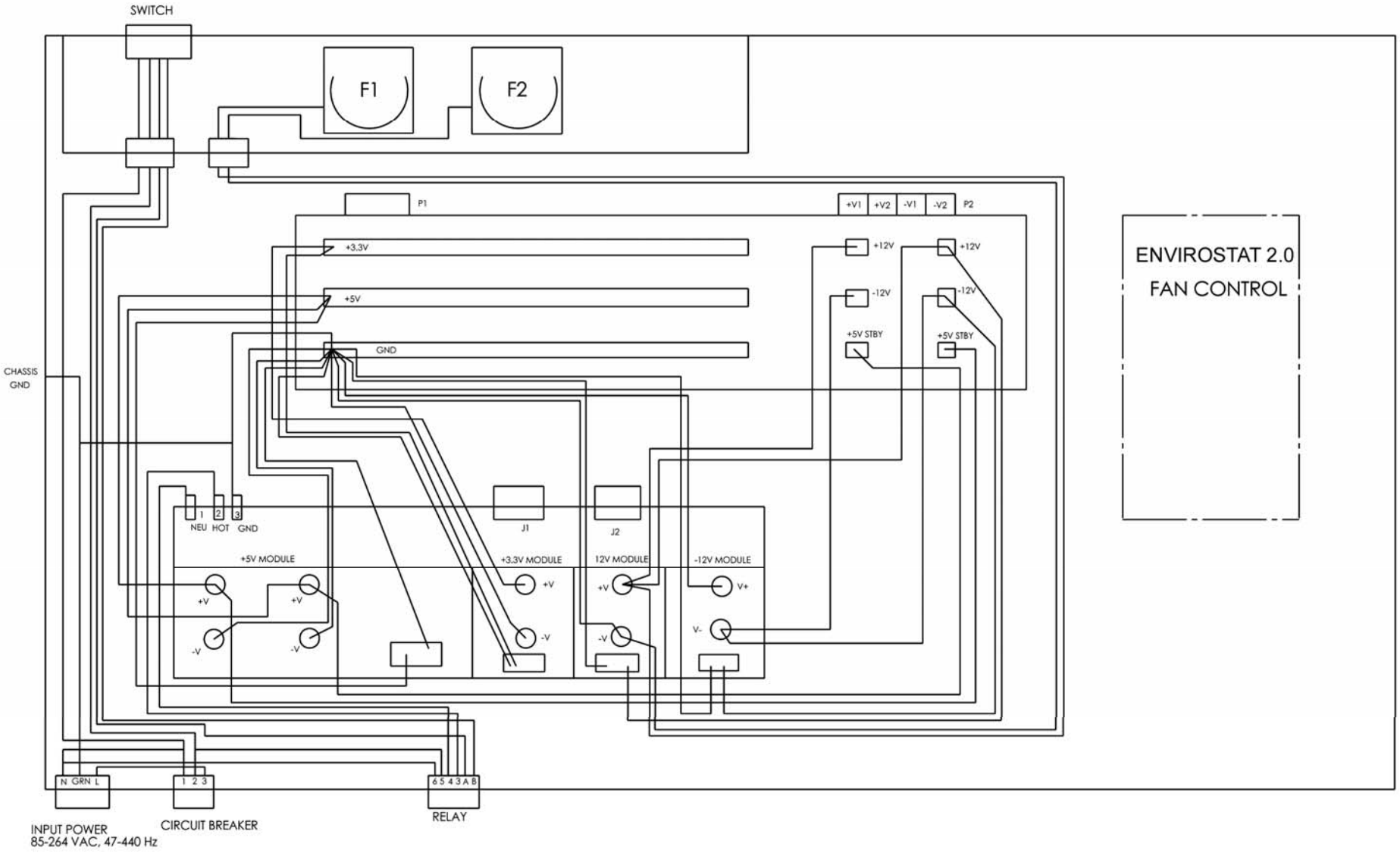

Figure 5-1. Chassis Interconnections

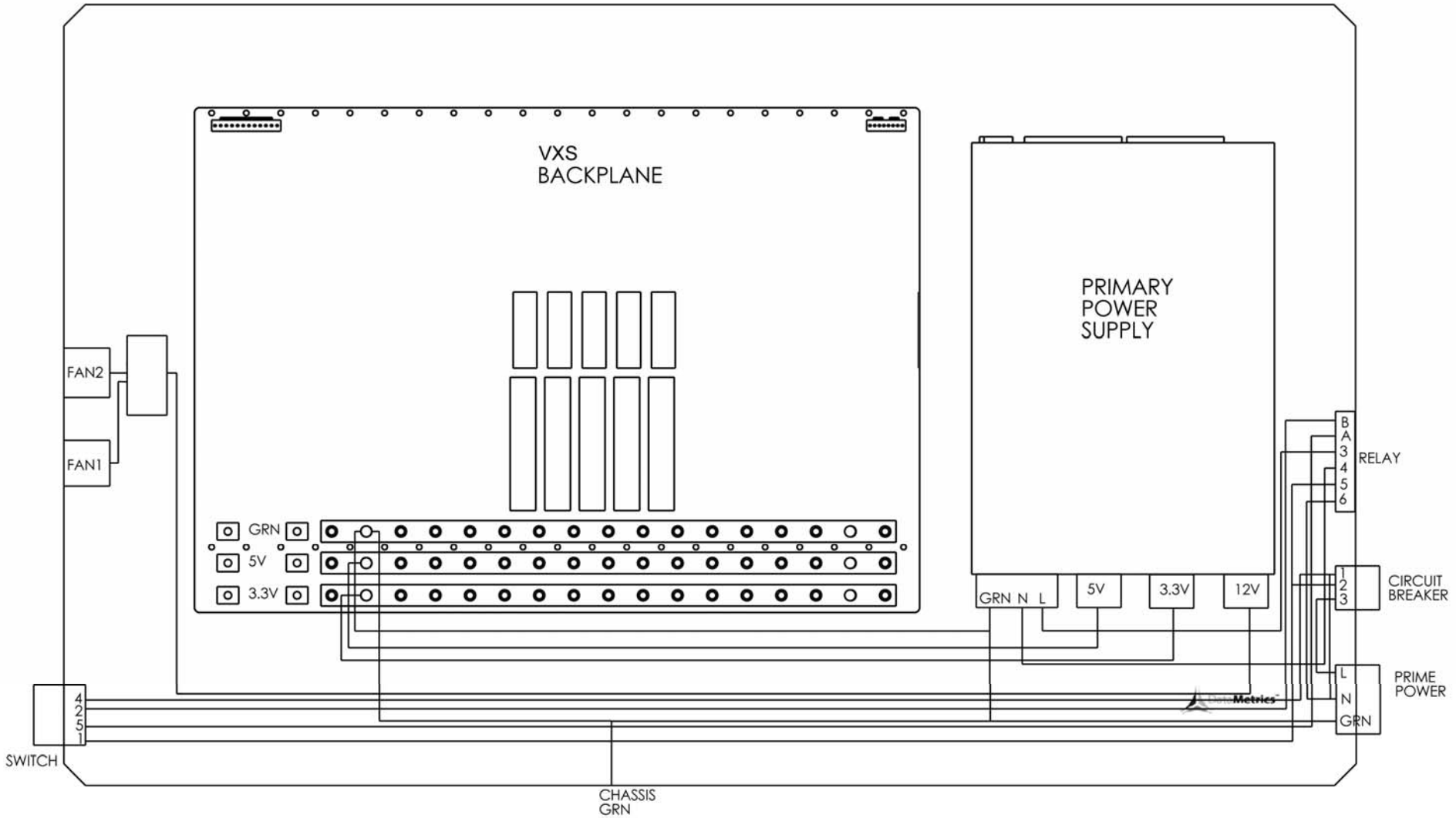

Figure 5-2. Interconnection Diagram

6. MAINTENANCE

6.1. Introduction

This chapter provides information and instructions concerning VXS MINI-TOWER Chassis tools and test equipment, periodic maintenance, firmware upgrades, fault isolation, removal and installation of replaceable components and subassemblies, and storage/transportation considerations.

6.2. Tools and Test Equipment

The following tools and test equipment are required to maintain the VME 64X chassis:

- Common hand tools
- Digital multimeter
- Monitor and keyboard that are compatible with the resident processor

6.3. Periodic Maintenance

The only periodic maintenance recommended for the VME 64X chassis is the cleaning of the lower fan tray filter. The recommended frequency for cleaning is dependent on the installation environment. In a typical operating environment, the fan should be cleaned bi-monthly to prevent dust build-up and lack of efficiency.

6.4. Replaceable Components and Subassemblies

The following paragraphs include information concerning removal and installation of the replaceable components and subassemblies identified in Chapter 1. Item locations are shown in Figure 6-1.

WARNING
POTENTIALLY LETHAL VOLTAGES EXIST WITHIN THE VME 64X CHASSIS. SERIOUS INJURY MAY RESULT IF SAFETY PRECAUTIONS ARE NOT OBSERVED. FAULT DIAGNOSIS PROCEDURES REQUIRE THAT INTERNAL COMPONENTS BE TESTED WHEN PRIME POWER IS APPLIED. THESE COMPONENTS MUST ONLY BE TOUCHED WITH THE APPROPRIATE TEST EQUIPMENT.

NOTE
FAULTY CABLES OR IMPROPER CABLE CONNECTIONS OFTEN CAUSE FAILURES. BEFORE REPLACING A COMPONENT OR SUBASSEMBLY, VERIFY THE CONTINUITY OF RELATED CABLING AND CONNECTORS.

WARNING
POTENTIALLY LETHAL VOLTAGES EXIST WITHIN THE VXS MINI-TOWER CHASSIS. SERIOUS INJURY MAY RESULT IF SAFETY PRECAUTIONS ARE NOT OBSERVED. DISCONNECT THE POWER SOURCE BEFORE INITIATING MAINTENANCE PROCEDURES.

NOTE
OBSERVE PRECAUTIONS RELATING TO ELECTROSTATIC DISCHARGE (ESD) WHEN HANDLING COMPONENTS THAT INCLUDE INTEGRATED CIRCUITRY.

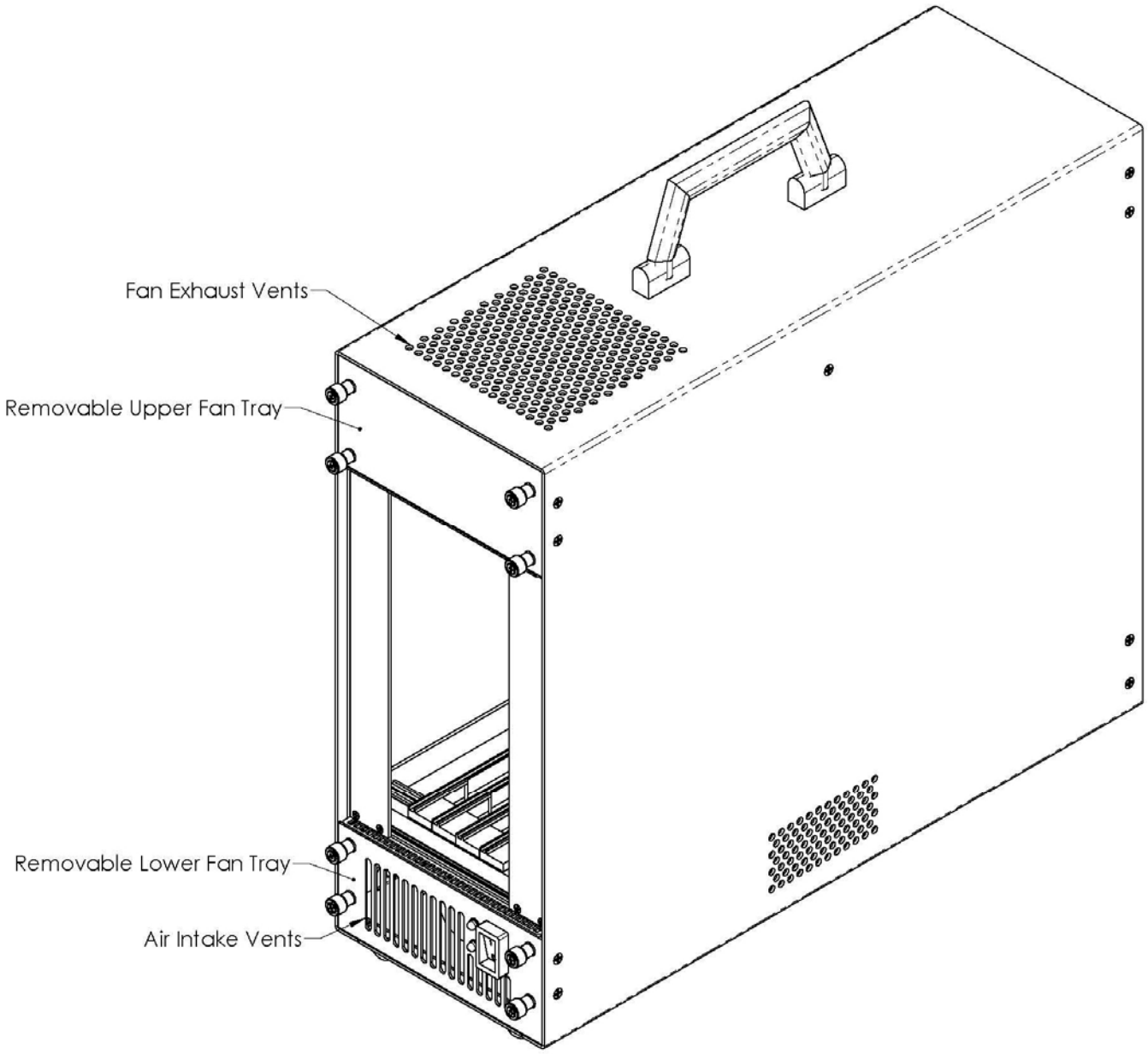

Figure 6-2. Field Replaceable Parts

6.4.1. VXS/VME 64X Modules

Removal:

a. Unseat the card by unlocking module ejector handles (top and bottom).
b. Gently pull module straight back and out of chassis.

Installation:

a. Position the card in the backplane and seat the board by pushing the card in.
b. Secure top and bottom ejector handles to chassis

6.4.2. Upper Cooling Fan

Removal:

a. Loosen (4) thumb screws from upper fan tray.
b. Slide out fan tray.
c. Disconnect cable from back of fan tray.

Installation:

a. Connect cable to rear of new fan tray.
b. Slide fan tray into chassis.
c. Tighten (4) screws on front of fan tray.

6.4.3. Lower Cooling Fan

Removal:

a. Loosen (4) thumb screws from upper fan tray.
b. Slide out fan tray.
c. Disconnect two cables from back of fan tray.

Installation:

a. Connect two cable to rear of new fan tray.
b. Slide fan tray into chassis.
c. Tighten (4) screws on front of fan tray.

6.5. Storage and Transportation

If the VXS MINI-TOWER Chassis is to be stored or transported, the unit should be packaged as originally shipped. The chassis can be stored or transported in any manner that is consistent with the environmental conditions identified in Table 2-3.

Appendix A.

1. Envirostat 2.0 System Monitor

1.1 Introduction

The objective for us was to produce a highly flexible but low cost and secure system to monitor and control integrated system parameters including power supplies, fans, and key components as well as providing substantially improved flexibility in both the access to the system at set up and in use as well as built in future proofing.

The Envirostat 2.0 is a web enabled product fully controlled via HTML web browser IE6, Firefox 2.0 etc and using password protection. The following information is an outline of the connectivity that can be utilized.

2. Connectors

2.1 Network Port

RJ1 provides a 10/100 network port. Connect this to your LAN for full control and monitoring.

Three LEDs are provided, the left hand integral green LED shows physical link state. The right hand integral green LED shows LAN activity. The separate orange LED is illuminated for 100BaseT connections. The unit will automatically switch from 100 to 10 connections.

The Envirostat 2.0 is designed to be fully controlled via the web interface using either Firefox 2.0, MicroSoft Internet Explorer 6, or Internet Explorer 7

The unit default IP address is 192.168.1.1 with a subnet mask of 255.255.255.0. Via the browser the IP address may be changed as may the address of a network NTP server (to set the time inside the unit) and an SMTP gateway for outgoing alarm emails.

Envirostat 2.0 connectors and pin outs are as below. Refer to “Figure 2-1: Pin-outs” for connector positions. Not all connections are made to the Envirostat board. Contact DataMetrics for details of the specific configuration and interface.

2.2 Power Input - PL5

This is used to power the Envirostat 2.0. It should be an independent dc supply from 7V to 40V.

- Pins 1 & 2 - 3.3V output from on board regulator (not currently used)
- Pins 3 & 4 - 0V
- Pin 5 - dc input 1
- Pin 6 - dc input 2
-

Note that these two inputs are Ored via diodes to allow dual supply feeds to be used. The range is +7 to +40V (typ. 12V)

Fan Power Input - PL21

This provides power to the fans. Regulated control to the fans is via fuse F2 (8A rating or as necessary)

All fan power is common.

- Pins 1, 2, 3, 4 - +12V Fan power supply.
- Pins 5, 6, 7, 8 - 0V
- Pin 9 - VFan (controlled fan output voltage - not used)

2.3 Fan Connectors (PL15, PL16, PL17, PL18, PL19)

Three fans are connected to each connector. Three wires are used, +12V, 0V and fan tachometer output. Fans must provide an open collector output providing two pulses per revolution.

PL15

- Pin 1 - Fan 1, Vfan
- Pin 2 - Fan 1, 0V
- Pin 3 - Fan 1, Tach
- Pin 4 - Fan 2, Vfan
- Pin 5 - Fan 2, 0V
- Pin 6 - Fan 2, Tach
- Pin 7 - Fan 3, Vfan
- Pin 8 - Fan 3, 0V
- Pin 9 - Fan 3, Tach
-

PL16

- Pin 1 - Fan 4, Vfan
- Pin 2 - Fan 4, 0V
- Pin 3 - Fan 4, Tach
- Pin 4 - Fan 5, Vfan
- Pin 5 - Fan 5, 0V
- Pin 6 - Fan 5, Tach
- Pin 7 - Fan 6, Vfan
- Pin 8 - Fan 6, 0V
- Pin 9 - Fan 6, Tach
-

PL17

- Pin 1 - Fan 7, Vfan
- Pin 2 - Fan 7, 0V
- Pin 3 - Fan 7, Tach
- Pin 4 - Fan 8, Vfan
- Pin 5 - Fan 8, 0V
- Pin 6 - Fan 8, Tach
- Pin 7 - Fan 9, Vfan
- Pin 8 - Fan 9, 0V
- Pin 9 - Fan 9, Tach
-

PL18

- Pin 1 - Fan 10, Vfan
- Pin 2 - Fan 10, 0V
- Pin 3 - Fan 10, Tach
- Pin 4 - Fan 11, Vfan
- Pin 5 - Fan 11, 0V
- Pin 6 - Fan 11, Tach
- Pin 7 - Fan 12, Vfan
- Pin 8 - Fan 12, 0V
- Pin 9 - Fan 12, Tach

PL19

- Pin 1 - Fan 13, Vfan
- Pin 2 - Fan 13, 0V
- Pin 3 - Fan 13, Tach
- Pin 4 - Fan 14, Vfan
- Pin 5 - Fan 14, 0V
- Pin 6 - Fan 14, Tach
- Pin 7 - Fan 15, Vfan
- Pin 8 - Fan 15, 0V
- Pin 9 - Fan 15, Tach

2.4 Analog Measurements

Eight channels of ADC are provided. Six are preconfigured to measure +5V, -5V, +12V, -12V, -48V and +3.3V.

The remaining two inputs may measure either positive or negative voltages up to +65 or -65V

Suitable resistors must be fitted for the relevant ranges. Whilst the first five voltages are fixed in the factor the last three inputs including the 3.3V maybe configured as either positive or negative.

Three links pairs are provided on the PCB to allow positive or negative voltages to be measured. The web configuration allows the resistor values and reference voltage to be entered to provide better accuracy.

PL1

- Pin 1 - +5V (max range is 6V)
- Pin 2 - 0V
- Pin 3 - -5V (max range is -6.8V)
- Pin 4 - 0V
- Pin 5 - +12V (max range 15.3V)
- Pin 6 - 0V

PL2

- Pin 1 - -12V (max range is -15V)
- Pin 2 - 0V
- Pin 3 - -48V (max range is -56V)
- Pin 4 - 0V
- Pin 5 - Unused
- Pin 6 - 0V (Unused)

PL3

- Pin 1 - +3.3V (max range 4.3V)
- Pin 2 - 0V
- Pin 3 - Channel 7 (R7/R15, LK2)
- Pin 4 - 0V
- Pin 5 - Channel 8 (R8/R16, LK3)
- Pin 6 - 0V

2.5 I2C Temperature Sensors

The board provides 5 connectors for I2C peripherals. Currently four digital temperature sensors are programmed. These are solid-state compact, highly accurate, remote units connected via four wire leads.

These are connected to any four connectors from PL10, PL11, PL12, PL13, PL14. The sensor boards contain and LED which will flash when the programmable (via the web interface) temperature settings are exceeded. Each sensors can be programmed for a maximum and minimum level. The flashing LED enables user to quickly locate the heat area.

PL10

- Pin 1 - +3V3 (to pin 1 on temperature sensor board)
- Pin 2 - SDA (serial data to pin 2 on temperature sensor board)
- Pin 3 - SCK (serial clock to pin 3 on temperature sensor board)
- Pin 4 - 0V (Ground to pin 4 on temperature sensor board)

The temperature sensor units use an I2C connection for each unit. The unit has a unique ID and there are up to 4 in the system – these are digital units and are very accurate across a wide temperature range. Please make sure these are connected the correct polarity as incorrect connection will destroy the device. The intention here was to produce sensors that are completely individual in the parameters set so that a standard part can used in just about any application.

2.6 PSU Shutdown

Two optically isolated outputs are available for PSU control. These may be independently set to normally on or off and switch as required. This is configured via the web interface.

PL20

- Pin 1 - PSU 1, Collector (+)
- Pin 2 - PSU 1, Emitter (-)
- Pin 3 - PSU 2, Collector (+)
- Pin 4 - PSU 2, Collector (-)

2.7 Relay Output

One DPCO relay is provided. This is fully controlled by the alarm cause and effects via the web interface. The relay may be set to be normally on or off at power up.

PL4

- Pin 1 - NC1 (Normally Closed)
- Pin 2 - COM1 (Common)
- Pin 3 - NO1 (Normally Open)
- Pin 4 - NC2 (Normally Closed)
- Pin 5 - COM2 (Common)
- Pin 6 - NO2 (Normally Open)

2.8 OLED Interface

An optional OLED display may be connected via PL8. This is not currently active.

- Pin 1 - C\S\ Chip select
- Pin 2 - DIN Data In
- Pin 3 - L\C\D\W\R\ Write line
- Pin 4 - LCLK Clock
- Pin 5 - L\R\S\T\ Reset
- Pin 6 - SD/C\ Register select
- Pin 7,9 - Power 3.3V
- Pin 8,10 - Ground 0V

2.9 Programming Port

This is used to load the software.

PL6

2.10 Printer/AUX Port

An optional parallel printer port is available. This may also be used for general I/O but is currently unused.

PL7

- Pin 1 - A\C\K Acknowledge
- Pin 2 - PD0 Data 0
- Pin 3 - BSY Busy
- Pin 4 - PD1 Data 1
- Pin 5 - S\T\B\ Strobe
- Pin 6 - PD2 Data 2
- Pin 7 - A\F\D Auto feed
- Pin 8 - PD3 Data 3
- Pin 9 - I\N\I\T\ Initialize
- Pin 10 - PD4 Data 4
- Pin 11 - PE Paper Error
- Pin 12 - PD5 Data 5
- Pin 13 - E\R\R\ Error
- Pin 14 - PD6 Data 6
- Pin 15 - +3V3 Power out (Unused)
- Pin 16 - PD7 Data 7
- Pin 17, 19 - 0V Ground
- Pin 18 - S\L\T\I\N\ Select In
- Pin 20 - SLCT Select

2.11 Auxiliary I/O

Nine I/O ports are available of which one is committed to reset the unit to default values.

PL9

- Pin 1, 3, 5 - 0V
- Pin 2 - PE2 (short this to Pin 1 for 10 seconds until all LEDS switch off for default reset)
- Pin 4 - PE3
- Pin 6 - PE4
- Pin 7,9,11,13 - 3V3 output (This is designed to power any external unit which may be connected to the port)
- Pin 8 - PE5
- Pin 10 - PE6
- Pin 12 - PB0
- Pin 14 - PB2
- Pin 15 - PB4
- Pin 16 - PB3

2.12 RS232 Serial Port

The RS232 port and USB are provided for remote control and configuration. Currently the selected port is used for telemetry output.

The data rate is set at 57,600 Baud, 8 bit data, 1 stop bit and no parity.

PL22

- Pin 1 - TXD232 (to PC RS232 Input)
- Pin 2 - RXD232 (from PC RS232 Output)
- Pin 3 - 0V (to PC 0V)

2.13 USB Port

This is connected to a PC via a standard USB cable. The relevant software should auto install over the internet or via cached drivers. It will be necessary to select the relevant COM port as allocated by Windows.

By default this will typically be COM4. This can be checked/changed via Windows system manager.
USB1

2.14 Reset

The unit may be reset to defaults by shorting PL9 pins 1 and 2 for approximately 10 seconds. After reset all LEDs will go out. At this point release the short circuit. The unit will reboot with factory default settings.

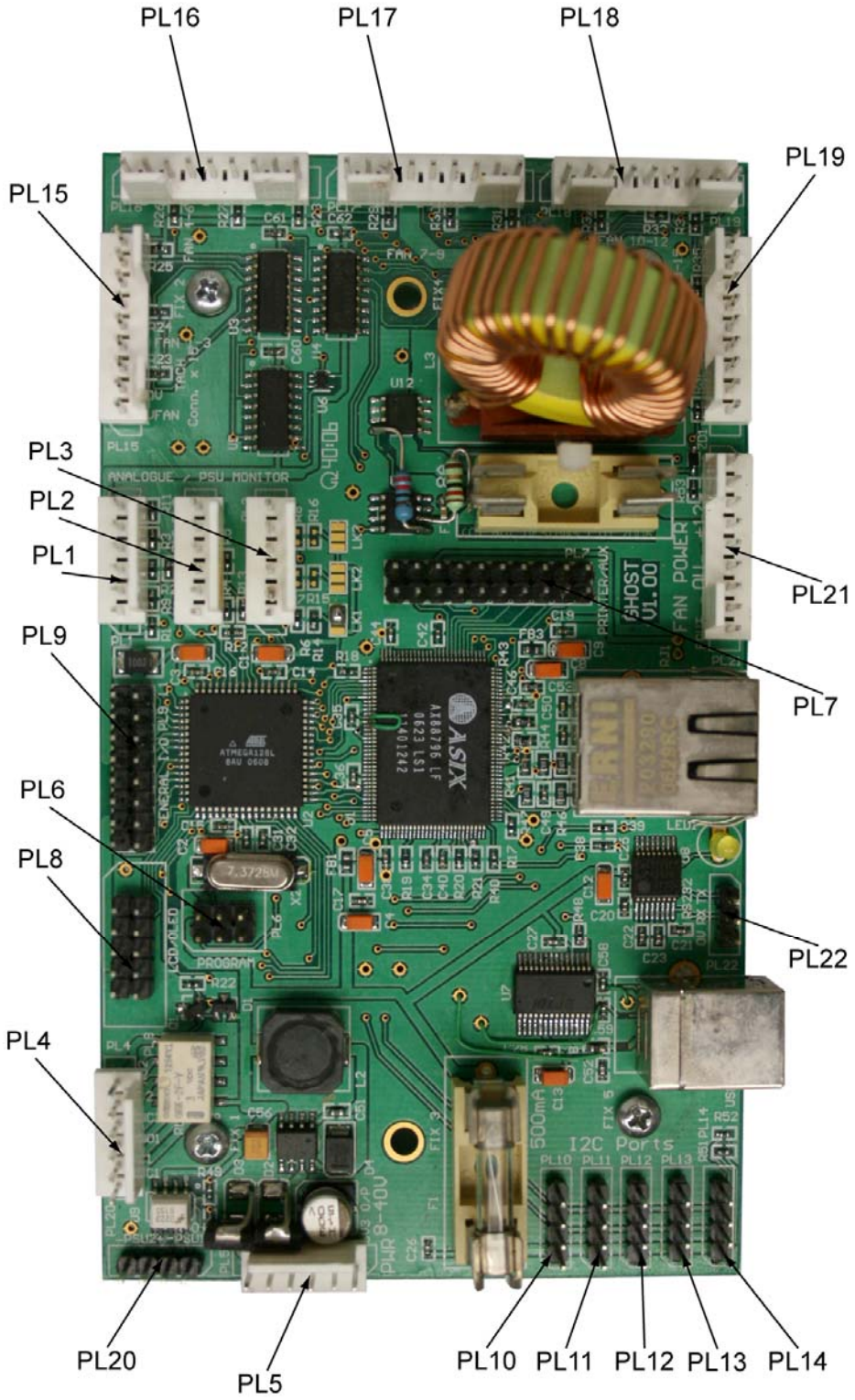

Figure 2-1. Pin-outs

3. Display

When the user first connects to the unit a display similar to below will be seen.

To log on to the system click on the logon tab and use the default credentials:

- User Name: “admin”
- Password: “ghost”

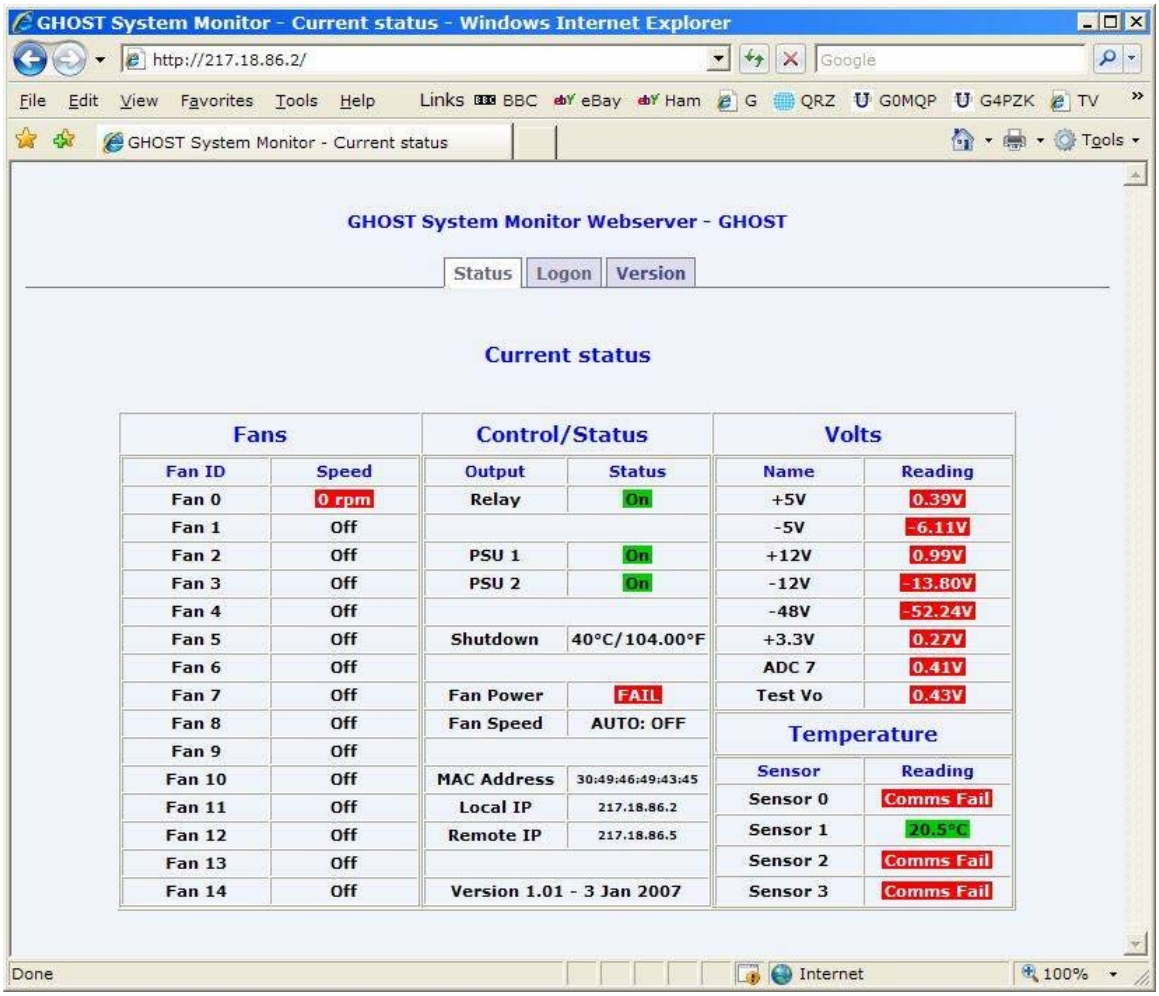

Figure 3-1. Status Screen – Before Login

After successful logon you should see a screen as below.

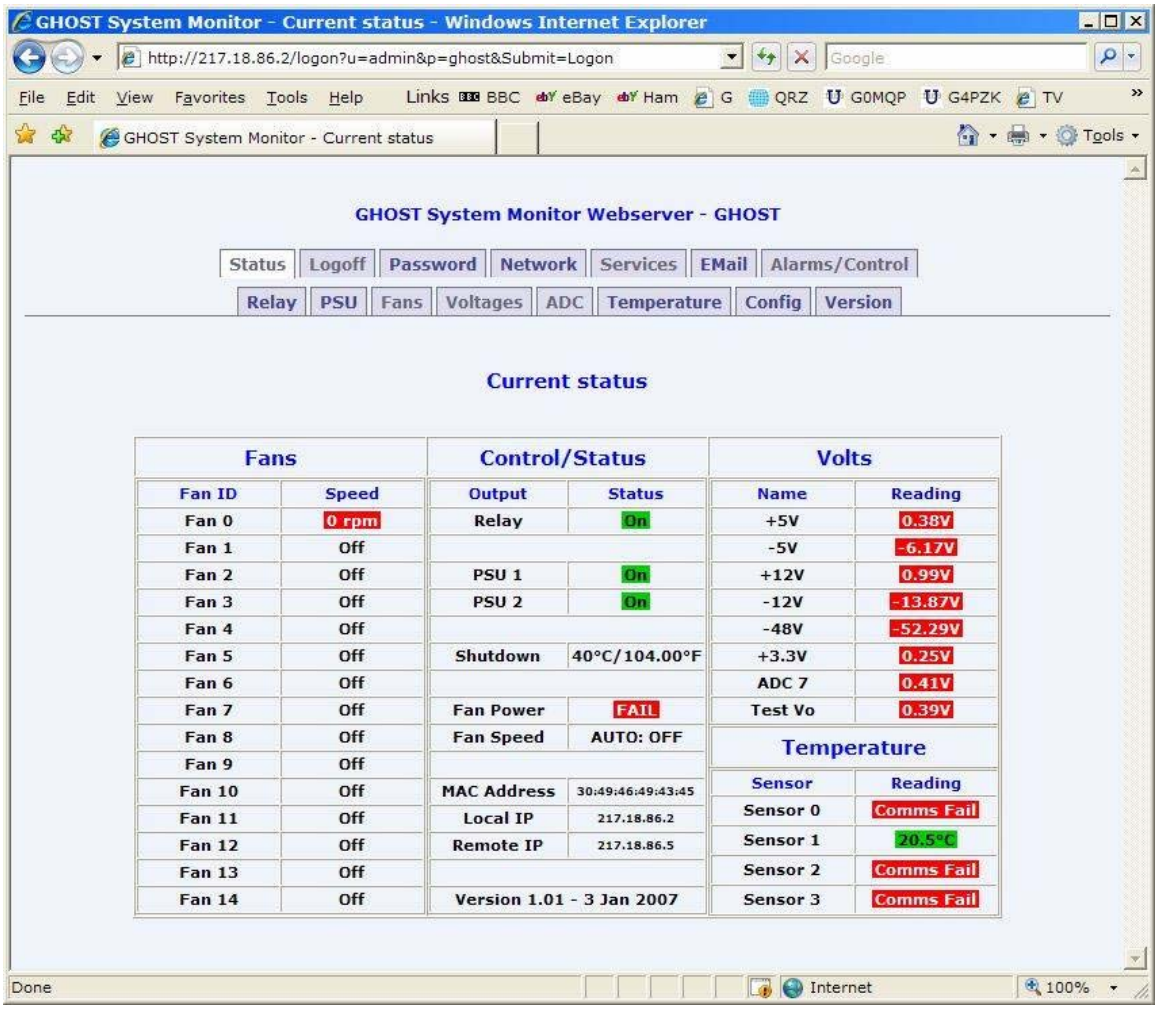

Figure 3-2. Status Screen – After Login