User Manual

270-418-01

System Monitor Board
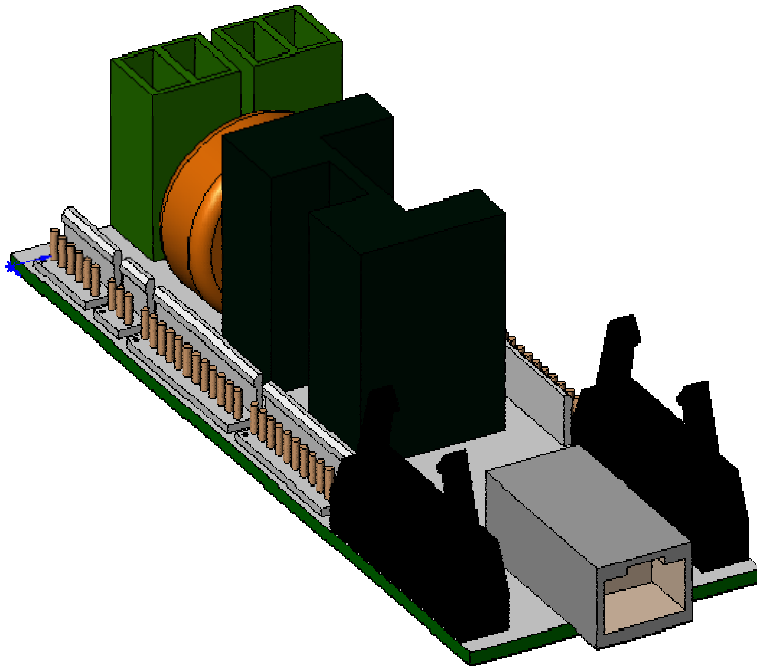
Revision History

Date	REV	Notes
29-June-2007	A	Initial Release
4-October-2007	B	Many updates

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1.0   Overview

The Hybricon monitor board is a highly configurable unit. Most limits and operational parameters can be easily changed by the user via the RS-232 port or network port. Since the basic operation is the same whether a RS-232 or network connection is used, most of the instructions below are valid for either type of connection. Where differences exist, they will be noted.

Even though every attempt has been made to insure that this manual is accurate, code updates will sometimes change menu options or the action of some options. Contact Hybricon Corporation at 978-772-5422 if you have any questions.

The monitor operates stand-alone. A terminal or network connection is not required for the normal operation of the unit. The addition of these external devices does provide the ability to monitor performance remotely or to change the configuration of the monitor.

Some configuration queries are context-sensitive and may result in a change to the next configuration question depending on what was entered for the former question. For example: If the characterization of the fans is not selected, the monitor will not present a choice to control fan speed.

2.0   Getting Started

To configure the monitor, connect a console terminal or PC terminal emulator to the RS-232 port or connect through the Ethernet interface to monitor or change the settings. By going through the menus, you can fully understand its capabilities. If you plan on connecting the unit to a network, it MUST be configured using the RS-232 port. If you aren't using a network connection, and if you want to accept the default "as shipped" configuration, then you have to do nothing. The Hybricon monitor board will actively monitor and control the power and cooling of the system.

NOTE: *Changing passwords or configuring the IP address can only be accomplished over RS-232. This is set up this way for security purposes.*

2.1   Connecting to the Monitor Board VIA RS-232

To connect the Hybricon monitor board to a terminal (or a PC with terminal emulation software such as Hyper Term, Terra Term Pro or ProComm), use a cable (typically a standard 9 pin d-sub) wired according to Table 1 – RS-232.

Table 1 – RS-232

	Monitor RS1	9-pin D-Sub Connector
Ground	1	5
Transmit	2	2
Receive	3	3

The settings for the terminal or emulator must be according to Table 2 - Terminal Settings.

Table 2 - Terminal Settings

EMULATION	ANSI, VT52 or VT 100
BAUD	9600 (see note)
PARITY	NONE (or OFF)
DATA BITS	8
STOP BITS	1
HANDSHAKING	NONE (This is sometimes called "Flow Control")
DUPLEX	FULL (do not echo characters locally)

NOTE*: The network port has priority over the RS-232 connection. When a telnet session is in progress, or when UDP or SNMP protocols are enabled, the RS-232 port will become inoperable. If it is necessary to regain local RS-232 control to a network-connected unit, you can either reset the unit, or in the case of telnet (only), you can disconnect the network cable. It may take up to a minute before local control is re-established.*

NOTE: *The default baud rate of the unit as shipped is 9600 baud. However, a menu option allows for the selection of 57,600 baud. If you connect to a unit that has been set to this higher baud rate, the message "USE 57600 baud" will be displayed. Simply change the baud rate of your terminal to use this higher rate*

2.2   Security and Passwords

If you are using a local connection (RS-232), you do not need a password to view the operation of the monitor. You do need a password to change the settings of the monitor. If you are logging on via a network, you must have a password to view any operations.

The initial password is "HYBRICON" unless the customer has requested this to be customized. For security reasons, you should change this password immediately. Please be careful to remember any new password. If you do forgot the password you will need to call Hybricon at 978-772-5422 in order to obtain a special code which will set the passwords back to the default value of "HYBRICON". If you need to make this call, please document the unit's "sign-on" serial number, since for security reasons, the reset code is unique to each unit. The sign-on serial number can be found on the PLED display or on the PC screen when the system is first powered. (You can also get the serial number by issuing a command (see Section 6 Maintenance Functions)

Changing passwords and network parameters are blocked to anyone using the network port. Because of this restriction, you must set all passwords using the RS-232 port. As you would with passwords and settings of your local computer, write down all system monitor passwords and settings and keep them in a secure place.

2.3   Connecting to a network

Whether connecting directly to the Internet or only to your company's Intranet, the procedure is basically the same.

The network ip and protocols must be set up using an RS-232 connection. Before attaching the Hybricon Monitor Board to any network, confirm with your IT department that you have network access and a (preferably) static ip available for use by the unit. In addition, any firewalls will need to be configured to allow access. Telnet is the Monitor Boards default protocol. To set the unit up for UDP or SNMP, you will have to go to the MAINTENANCE/ADVANCED menu.

Connect to the Monitor Board as described in the section on RS-232 above. Turn it on, and when you see the sign-on screen on your terminal, choose option "5" - Maintenance, then "D" for "Set IP/Subnet Mask/Gateway/Timeouts of NET Port" At this point type in the desired ip address. Be careful with your typing, since only a simple text input routine is used (the backspace key will work, however). You will have to enter three numbers for every octet. For example: if you wish to enter 192.168.0.2, pad the number with zeros (eg 192.168.000.002). After you have entered all 4 octets, the message "Writing Address to Network Port" will be displayed. The operation will take about 15 seconds, and the unit will start again using the new parameters. The default subnet mask is "255.255.255.000", and the default gateway is "000.000.000.000" For more details, go to the section in this manual dealing with the MAINTENANCE menu. The RuSH can utilize a dynamic IP if the network has a DHCP server. In this case, set the IP address to "000.000.000.000". The (user selectable) unit name will become the DHCP name.

Connect your unit to your network using an ordinary Ethernet Category 5 cable (do not use a cross over cable). Assuming you are using telnet, start a telnet session using the IP address you set earlier. Use the default telnet port of 23. The unit's Serial Number and Unit Name should appear. Type in a User or Administrator password (both are "HYBRICON" originally). You should now be able to view the operation of the unit. It is recommended that you do NOT use the ordinary DOS (Windows command-prompt) telnet client. This program echoes locally-typed characters by default. This makes the displays hard to read. Use a dedicated telnet program instead (HyperTerm or TerraTerm, both are free and work fine. In the case of HyperTerm, pick "WINSOCK" as the connection method).

2.4 Differences between local (RS232) Control and network operation

TELNET:

Telnet Operation over a network is identical to local operation (over RS-232) with a few minor exceptions. When logging on over the network, you must enter a password. This can be EITHER the user or administrator password (this requirement can be defeated with a menu option). You will be given up to 3 times to enter a correct password. If you fail on the third attempt, you will get the message that you have been "locked out". This lockout period lasts for one minute. After that timeout, you will again be allowed to attempt to log in. The network connection has priority over the local connection. When a telnet session is in progress, the local users will be prevented from access. To totally disable network operation, disconnect the network cable. It may take up to one minute before the local connection becomes active. If either UDP or SNMP modes are selected, as soon as the unit goes into the "Running" mode, the RS-232 port becomes inactive. If it is necessary to change setups via RS-232, the RuSH will have to be power-cycled. After power up, it will accept RS-232 input for about 15 seconds before the "Running" prompt is displayed and the serial port becomes unusable.

When connected over the network, it is not possible to change the password, protocols or ip addresses- even if you log in as Administrator.

UDP:

The UDP connection is designed to provide a machine-to-machine connection. The protocol is defined as "connectionless in that it does not provide "ACK" responses. In other words, data is sent out but there is no guarantee that any device has received it. This can be very useful if the Monitor Board must send data to more than one receiving device, or more than one device is sending commands to the Monitor Board. Normally the user specifies the IP and port number of the "target" (or remote) machine – this is the machine that will receive information from the Monitor Board as well as the local port number of the Monitor Board. This is the port number that any machine sending data to the Monitor Board should use. If it is desired to send data to ALL devices on a subnet, the broadcast IP address of XXX.XXX.XXX.255 can be used. When the UDP protocol is selected, the user is prompted to select a "display interval". This interval is used to periodically send the output of the "Q" command (see the exact syntax below). If a display interval is not selected, the status of the unit will not be periodically sent. The user will need to issue the "Q" command to request the status. If the "send error status" menu option has been selected, any error messages will be sent out, however. Even though passwords are not necessary to VIEW the output, a user or administrator password is necessary to CHANGE any of the parameters – unless ALL password checking has been turned off with the 'Y' option in the ADVANCED menu.

SNMP:

SNMP is another popular machine-to-machine protocol. When selected, the Monitor Board becomes an SNMP agent. In order to properly communicate with this agent, your SNMP host needs to be loaded with the proper MIB (Management Information Base). Extra information on SNMP can be found near the end of this manual. SNMP uses the UDP protocol as a transport mechanism. If you select SNMP, you will be asked for the IP address and the port number of the SNMP host. The default port number of 161 is used for SNMP traps.

2.5   Main Menu

If you use the terminal setup as described above and power up the system status board, a Main Menu similar to the one below will be presented:

SYSTEM MONITOR
HYBRICON 1015060F8F

System HRS = 6.9
FW 64-1015060F8F
C/S = C46F

XPORT Ver D6.10
IP=XXX.XXX.XXX.XXX
Subnet Key 16
Gateway IP = 000.000.000.000
MAC Addr = 00-20-4A-91-C1-BF
S/N = Z851
Unit Name = 2Us02
H/W 06-1015060B
PW REQ for ENET
ENET enabled
RS-232 PW req
TCP,In/Out Ports = 23
Analog Temp Sensors
PS FAIL Det Enabled = N
Relay Activation on fail = N

Volt Monitoring = Mon 3.3V = Y
Mon 5V   = Y
Mon 12V = Y
Mon -12V = Y
Mon 24V = N
 # Temp Sensors = 2
 # Fans   = 3
Fan Start Temp = 30
Fan End Temp   = 40
Scroll Data = Y
Send ERR Status Changes (Not avail with SNMP) = N

5V Min   4875
5V Max   5250
3.3V Min 3250
3.3V Max 3450
12V Min   11640
12V Max   12600
-12V Min 11640
-12V Max 12600
Temp Warn 50
Temp Max 60
Control Fans = Y
Fan Temp Start = 30
Fan Temp End   = 40
Number of Controlled Fans = 3
Shut Down PS on overtemp = Y
Restart PS if Temp drops below limit = N
Shut Down PS on Overvoltage = N
Shut Down PS on Fan Fail = Y

Close Contacts to Shutdown Supply
(1)Power Supply or (2) = 1
PSFAIL Detect? = N
Relay Activation on fail ? = N
Detect Power Switch = N
NORMAL LED mode

Enter
1 - Change Temp Limits and Num of Controlled Fans
2 - Set Volt Limits (+5 /-2.5%)
3 - Set Volt Limits (+5 / -5%)
4 - Change which parameters are sensed (and how)
5 - Maint functions

The first 36 or so items are presented for information. The intent is to tell the user the current settings of the unit. When the Main Menu is presented, 8 seconds are allowed to select one of the 5 options mentioned at the bottom. If you do not choose one of the options within 8 seconds, the system will automatically start monitoring using the values shown. If you simply want to monitor the the output without changing any parameters, you don't have to do anything at this point. The unit will start by itself, and will announce that fact by displaying the word "RUNNING

The lower part of this Main Menu, from the "Enter" line downward is presented any time the machine is running and the <ESC> key is pressed. The presence of this screen indicates you are in COMMAND MODE.

Appendix A has a flow chart showing the standard process for configuring/programming a monitor board at first setup. The remainder of this manual is written to go through a standard setup based on that flow chart.

3.0 Configuring Monitor Board Fans (Most Systems ship Pre-configured)

Unless directed by the factory it is highly unlikely that you will need to configure the fans. This section is included as a reference in case you are directed to configure the fans, or if you purchase the board not installed in a chassis. It is recommended that you contact Hybricon before performing this step.

3.1 Characterize Fans

"Characterizing" fans is the first thing you should do after installing or removing fans. This
process allows the Monitor Board to determine the exact number and performance of the fans connected to it (remember, all
fans should be of the same type). The number of fans detected will be permanently stored in non-volatile memory on the
Monitor Board. The characterization cycle may take several minutes.

Step 1 – From the Main Menu choose option 5.
Step 2 – Enter the password when prompted.
You should now see the following menu options:

Total Power On Hours = 0.0

System Maximum Temperature = 23

1 Characterize Fans
3 Last Error Status
4 Firmware Parameters
5 Total NonResettable Hours
7 Change Signon Message
8 Change Unit Name
9 Advanced Functions
A Write Directly to PLED
B Change Admin Password
C Change User Password
D Change the IP/Subnet Mask Gateway IP/Timeout of the Net Port

Step 3 – Choose Option 1 (*Characterize Fans*)
The Hybricon monitor board will now perform the characterization as outlined below.

Phase#1   *Determines if the monitor has control of the fan at all.*
Phase#2   *Slowly increases the speed of the fans while watching the RPM and the voltage being applied to them. If either the maximum RPM or the maximum voltage is reached, the PWM value at that point is stored as the maximum that will be used for all fan operations.*
Phase#3   *Soft-starts the fans at the maximum value set in Phase#2, decreases the fan speed and notes how the fans operate. Determines PWM vs. RPM characteristics.*
Phase#4   *Shuts off the fans, then slowly increases the PWM value until the fans reach a certain minimum RPM. If the fans fail to start at the user-set minimum value (as set in the "F" option of the ADVANCED menu), the minimum value is over-ridden with a new, higher value.*
Phase#5   *The number of connected fans is determined.*

Only the fan connected to the FAN1 terminal will actually be measured, but other fans will be sensed.

After characterization, the system will report the number of fans detected. This number should be the actual number of fans in the system.

The Monitor Board determines the number of fans on the basis of tachometer signals. It first checks for a valid tachometer signal on FANTACH1 input, then at FANTACH2 input, etc. It stops when it no longer detects any tachometer signal. For this reason, if the system has 9 fans, but the tachometer is bad on fan #3, the Monitor Board will determine that the system has only 2 fans. If an
improper number of fans are detected, go into the MAINTENANCE menu and choose ADVANCED, then option "C" (check all fans). This will display the RPMs of all connected fans. If some are missing, check to insure that the fans are spinning and their tachometers are connected. You may have to replace one or more fans.

NOTE: *The auto characterization setting will pick a speed of around 1300 RPM. If this speed is to low for the fan (the fan stalls) the characterization will fail and you will be required to manually set the MIN RPM. You can also choose to set the min/max and also any voltage other than 12VDC by running the advanced setup.*

3.2 *Advanced Fan Setup*

3.2.1 Min/Max Fan RPM

The Monitor Board normally picks a speed of around 1300 RPM for the "idle"
speed. This is the lowest speed the fan is allowed to run. However, certain chassis may require faster fan minimum speeds for proper cooling. You can adjust that here. Likewise, it is sometimes desirable to set the fan maximum speed.

Whenever either item is changed, the fan will automatically go into the Characterization process.

Table 3 - Min/Max Speed Options

Minimum Fan RPM Options		Maximum Fan RPM Options	
Option	RPM	Option	RPM
0	*1300**	0	4000
1	1700	1	5000
2	2000	2	6000
3	2200	3	7000
4	2400	4	8000
5	3000	5	9000
6	4000	*6*	*10000**
7	5000	7	11000
8	8000	8	12000

		9	13000

* Identifies the default Values. (You do not need to configure the min/max fan speed if the fans run with the default values.).

3.2.2 MAX Voltage

This option allows you to specify a maximum voltage that will be delivered to the fans. (The default value is 13V).

Using the option allows you to have a higher input voltage and run lower voltage fans. An example would be to have a 24V supply but configure the Hybricon monitor board to run 12V fans.

It is critical to understand that this voltage can only be set when characterizing the fans. Once the fans are characterized, changing the input voltage will change the fan voltage (Example – If you had the system set of 24V input and 12V max for fans and specified a fan voltage value in excess of what the fans are specified for, than the fans will operate much faster than necessary and may become permanently damaged).

* It is recommended that the fan/monitor board power is from a constant regulated supply, and not run from a variable input power.

PROCEDURE FOR CHANGING MIN/MAX RPM's AND MAX VOLTAGE.

Step 1 – From the Main Menu choose option 5 (*Maint Funtions*).
Step 2 – Enter the password when prompted.
The following menu options are then presented:

> *Total Power On Hours = 1.3*
>
> *System Maximum Temperature = 23*
>
> *1 Characterize Fans*
> *3 Last Error Status*
> *4 Firmware Parameters*
> *5 Total NonResettable Hours*
> *7 Change Signon Message*
> *8 Change Unit Name*
> *9 Advanced Functions*
> *A Write Directly to PLED*
> *B Change Admin Password*
> *C Change User Password*
> *D Change the IP/Subnet Mask Gateway IP/Timeout of the Net Port*

Step 3 – Choose Option 9 (*Advanced Functions*)
The following menu options are then presented:

> *'B' Change the BAUD rate of the serial port*
> *'C' Check ALL fans*
> *'D' Toggle DEMO mode*
> *'E' Block input from Ethernet port*
> *'F' Change the fan Minimum/Maximum speeds*
> *'H' Clear POH*
> *'K' Toggle SHUT OFF FANS (volatile)*
> *'N' Network Protocols*
> *'P' Output Pin Control Set*
> *'R' RESET main processor*
> *'T' Clear MaxTemp / MinTemp*
> *'U' Toggle requirement for Ethernet login and PW*
> *'V' Toggle PW checking on RS-232*
> *'X' Select Temperature Sensor Type*

'Y' Toggle Disable ALL Password Checking
'Z' RESET System Monitor

Step 4 – Choose Option F (*Change Fan Min/Max speed and Max Fan Voltage*)
The following menu options are then presented:

Fan MIN RPM:
0=1.3K,1=1.7K,2=2K,3=2.2K,4=2.4K,5=3K,6=4K,7=5K,8=8K Currently 4

Step 5 – Enter the correct number for the MIN RPM.
The following menu options are then presented:

Fan MAX RPM: 0=4K,1=5K,2=6K,3=7K,4=8K,5=9K,6=10K,7=11K,8=12K
9=13K Currently 6

Step 6 – Enter the correct number for the MAX RPM.
The following menu options are then presented:

Fan MAX Voltage (10-30) currently 13

Step 7 – Enter the desired voltage.
The monitor board will characterize the fans after you enter this voltage.

The display will present the status of the characterization process:

Characterizing
First Phase
Second Phase
Third Phase

PWMVAL = 126, RPM = 6750
PWMVAL = 122, RPM = 6540
PWMVAL = 118, RPM = 6390
PWMVAL = 114, RPM = 6270
PWMVAL = 110, RPM = 6090
PWMVAL = 106, RPM = 5910
PWMVAL = 102, RPM = 5760
PWMVAL = 098, RPM = 5610
PWMVAL = 094, RPM = 5370
PWMVAL = 090, RPM = 5220
PWMVAL = 086, RPM = 5010
PWMVAL = 082, RPM = 4800
PWMVAL = 078, RPM = 4620
PWMVAL = 074, RPM = 4470
PWMVAL = 070, RPM = 4200
PWMVAL = 066, RPM = 3870
PWMVAL = 062, RPM = 3450
PWMVAL = 058, RPM = 2940
PWMVAL = 054, RPM = 2340

Fourth Phase
Fifth Phase
Fan Min Val = 54
Fan Max RPM = 6750
Fan Max PWM = 126
Num Fans = 6
Completed

NOTE: Once the fans have been successfully characterized, you will be able to set a fan curve in the main menu Option 1.

4.0   Main Menu Options

> *Enter*
> *1 - Change Temp Limits and Num of Controlled Fans*
> *2 - Set Volt Limits (+5 /-2.5%)*
> *3 - Set Volt Limits (+5 / -5%)*
> *4 - Change which parameters are sensed (and how)*
> *5 - Maint functions*

4.1   Change Temp Limits and Num of Controlled Fans *(OPTION 1)*

This option allows you to set upper/lower voltage monitoring thresholds, upper and lower temperature thresholds, as well as a setting a fan curve profile.

Step 1 – From the Main Menu choose option 1.

Step 2 – Enter the password when prompted.

Step 3 – Temperature warning
   The following menu option is presented:
   Temp Warn? [40]   (Degrees C)
   Enter the temperature warn as a whole number. (This is the setting which tells the monitor board at what temperature you should issue the warning.)

Step 4 – Temperature Maximum
   The following menu option is presented:
   Temp Max? [50]
   Enter the temperature Max as a whole number. (This is the setting which tells the monitor board when to shut down the system if that option is selected.)

Step 5 – Number of Controlled Fans
   The following menu option is presented:
   Num of Controlled Fans? [3]
   This is asking for the number of fans which will be controlled by the monitor board. Any fans not being controlled by the monitor board will be monitored for fan failure (speed drops below 800 RPM). The default value is the total number of tachometer signals detected during fan calibration. Enter the number of fans to be controlled.

Step 6 – Restart Temperature (only available if *Restart on cooldown* is enabled)
   The following menu option is presented:
   Restart Temp? [30]
   This is the temperature setting to which the temperature must fall below to cause a RESTART after an over temperature shutdown has occurred. Of course, both "Over Temperature Shutdown" AND "Restart on Temperature Decrease" must be ON for this to be meaningful.

Step 7 – Temperature at which fans start increasing speed
   The following menu option is presented:
   Temp at which fans START increasing speed? [22]
   Enter the low end temperature as a whole number.

Step 8 – Temperature at which fans reach full speed
   The following menu option is presented:
   Temp at which fans REACH full speed? [45]
   Enter the high end temperature as a whole number.

4.2   Set Voltage Limits +5%, -2.5% (OPTION 2)

Allows you to set the voltage sensing limits to +5%, -2.5%.

> **Step 1** – From the Main Menu, select option 2.
> **Step 2** – Enter the password when prompted.

The system will now use the voltage range you selected to report errors in voltage.

4.3   Set Voltage Limits +/- 5% (OPTION 3)

Options 2 and 3 on the main menu allow you to change the voltage limits.

> **Step 1** – From the Main Menu, select option 3.
> **Step 2** – Enter the password when prompted.

The system will now use the voltage range you selected to report errors in voltage.

NOTE: *The system default is +/- 5%.*

4.4   Change Which Parameters Are Sensed and How (OPTION 4)

The Hybricon monitor board has a number of configurable options that can be set at install time or changed during operation.

> **Step 1** – From the Main Menu choose option 4.
> **Step 2** – Enter the password when prompted.
> You will now be prompted to configure the following options. Please note that the menu is dynamic in that the subsequent query will depend on the responses to the previous. For example, if you enter "N" for monitoring -12V, the query to shutdown the power supply on a -12V under voltage condition will not be asked.

> *Monitor -*
> *3.3V (Y/N)? Y   SD on UNDER Volt (Y/N) Y*
> *5V   (Y/N)? Y   SD on UNDER Volt (Y/N) Y*
> *12V (Y/N)? Y   SD on UNDER Volt (Y/N) Y*
> *-12V (Y/N)? Y   SD on UNDER Volt (Y/N) Y*
> *24V (Y/N)? N*
>
> *Num Temp Sensors (0-4) [2] 2*

> | | |
> |---|---|
> | *Control Fan Speed (Y/N)* | *Y* |
> | *Scroll(Y/N)* | *N* |
> | *ERR to RS232 & Net(Y/N)* | *N* |
> | *Overtemp SD (Y/N)?* | *Y* |
> | *RESTART on cooldown(Y/N)* | *N* |
> | *Fan Fail SD (Y/N)* | *Y* |
> | *Overvoltage SD (Y/N)* | *Y* |
> | *30 sec SD delay (Y/N)* | *N* |
> | *Open/Close to SD (O/C) [C]* | *C* |
> | *Power SW Detect (Y/N)* | *N* |
> | *EN PSFAIL det (Y/N)* | *N* |
> | *Relay Active on Fail* | *N* |

NOTE: *For a list of default values see Appendix G.*

4.4.1   Voltage Monitoring

The Hybricon monitor board is normally used to measure system voltages (+3.3V, +5, +12V, -12V), but in some cases, this is not desirable or required. If no voltages are connected to the voltage inputs, then this feature can and should be turned off, otherwise false errors will be generated.

If voltage monitoring is turned enabled (default) and the following conditions are met:
> 1) Any voltage is above or below the limit
> 2) The LED display is connected

Then the corresponding voltage LED will flash (RED for two seconds, OFF for two seconds RED for two seconds...). If any voltage is below the limit shown above, the corresponding LED will be RED.

The PLED (if included) will display whichever voltages have been selected for monitoring.

The system monitor uses the voltage inputs in several ways;

- Displays the actual voltages of each via the RS-232 port (or Ethernet).
- Displays the actual voltages of each on the PLED.
- If any voltage is above or below the set limits (Set using option 2 or 3 in the main menu)., the PLED will announce that fact with a message such as "5V High"," -12V Low", etc. The display will show up to 4 out-of tolerance values at one time.
- Flashes the corresponding voltage indicator LED a RED color when the corresponding voltage exceeds the upper limit and lights the LED a steady RED when the voltage is below the lower limit.
- Triggers the output of error codes (Must have "*ERR to RS232 & Net*"enabled).
- Sends an SNMP "trap" (if SNMP is selected).
- Shuts down the power supply when any voltage exceeds 110% of the voltage max set point. (Must have voltage testing and shutdown on overvoltage ON). If automatic shutdown on overvoltage is ON, then the unit can be set to shut down immediately, or wait for 30 seconds before shutdown using the menu option for this purpose. (This automatic shutdown can be over-ridden with the "Immediate Command" BATTLESHORT).

Due to the nature of power supplies, hysteresis has been added to the voltage monitoring circuitry. The 3.3V and 5V monitors have 50mv of hysteresis, while the +12V and -12V monitors have 100mv of hysteresis.

For example, if the lower 5V limit is set to 4750mv, as the voltage drops below 4750mv, an error will be sensed. However, the voltage will have to rise above 4800mv (4750 + 50mv) before the error is "cleared".

NOTE: *Voltages are expressed in MILLIVOLTS (thousands of a volt), so 4750mv is equal to 4.5V.*

4.4.1.1   Shut Down On Undervoltage

If the *SD on Undervoltage* feature is enabled ("Y"), then when any monitored voltage is below the minimum threshold by 10% for 10 seconds, then the power supply (or supplies) will be shut down. Pressing <ESC> on the RS232 terminal, or cycling AC power will restart the unit.

* The unit will NOT restart by itself if the voltage goes above the lower limit.

NOTE: *This option requires that you connect the enable feature of the power supply to the Hybricon monitor board.*

4.4.2 Num Temp Sensors (0-4)

The System monitor board can receive the output from 0 to 4 temperature sensors. The system responds to the sensor with the highest temperature regardless of how many are connected. The sensors are normally placed in the hottest areas of the chassis, such as over the processor air output, the power supply air output, and/or over any special card that dissipates a lot of power.

The sensors must be connected in numerical order - that is, if 3 sensors are used, they must be connected to sensor input 1, sensor input 2 and sensor input 3. Do not set the number of sensors higher than the actual number in the system or false errors shall be generated.

This is an auto-detected parameter, and will normally be set up correctly on first initialization or by forcing a re-initialization by holding the "I" key during power up. You may however, wish or need to change this number for special applications.

NOTE: *The temperature sensors are used to control fan speed. Therefore, the Hybricon monitor cannot be set to control fan speed unless at least one temperature sensor is selected.*

When the temperature of the hottest sensor exceeds the "Temp Warn" limit, the "TEMP" LED will blink (RED for two seconds, OFF for two seconds, RED for two seconds, etc.) The PLED (if included) will display "TEMP WARN".

When the temperature Max Limit is exceeded, the LED will glow steady RED. The PLED will display "TEMP MAX LIMIT EXCEEDED". If the unit is set to shutdown the power supply, it will do so at this time, and if the PLED is connected, it will report "OVERTEMP SHUTDOWN, CYCLE PWR or <ESC>.

It will be necessary to shut off AC power to the system until the PLED goes blank or for about 10 seconds to restart it (unless you have restart when temperature drops below X temp on). Typing the <ESC> key will also restart the system.

NOTE: *If no temperature sensors are connected, the Temperature LED will glow a steady green and no temperature error messages will be generated*

The system monitor uses the temperature information in several ways:

- Displays the actual temperatures of each sensor via the RS-232 port (or Ethernet.)
- Displays the actual temperatures of each sensor on the PLED (if installed).
- Controls the fan speed (if *Control Fan Speed* is set to Yes and fans are powered from the System monitor board). The user-selectable "fan curve" parameter controls the translation between temperature and fan speed (see Section 0 Change Temp Limits and Num of Controlled Fans).
- Flashes the Temperature LED RED when any one of the sensors exceeds the temp WARN limit and lights the Temperature LED a steady RED when the temperature of any one sensor exceeds the temp Maximum limit.
- Triggers the output of error codes (Must have "*ERR to RS232 & Net*" enabled).
- Sends an SNMP "trap" (if SNMP is selected).
- Shuts down the power supply when any ONE of the sensors reaches the MAX temp limit. (Must have shutdown on overtemp set to "Y" and the PScontrol outputs connected to the logic shutdown of the power supply). If automatic shutdown on overtemp is ON, then the unit can be set to shut down immediately, or wait for 30 seconds before shutdown using the menu option for this purpose. (this automatic shutdown can be over-ridden with the "Immediate Command" BATTLESHORT).

NOTE: *The temperature sensors used with the system monitor are not thermistors; they are special analog types that output l0mV/ degree Fahrenheit. The Fahrenheit value is converted to Celsius by the monitor's firmware.*

4.4.3 Control Fan Speed

The system monitor can monitor the speed of up to 9 system fans (by watching the fan tachometers) whether or not the unit is set to control the fan speed. The system monitor does not have a large enough power supply to drive the fans directly, the fan power must come from the system power supply. The control circuits on the system monitor takes the power from the (external) power supply and changes the voltage applied to the fan terminals. The same voltage is applied to all 9 fans. This fan control voltage is filtered DC and has very little ripple. The system monitor has dedicated pins for fan power and fan GND (return) that must be connected to the supply that is used to power the fans. It should be noted that the fan GND pins MUST be connected to the "reference ground" (system monitor logic GND) at some point external to the system monitor.

Note also that the unit will only allow control of fan speed if one or more temperature sensors are connected and enabled. It is intended that the system monitor be used with ordinary tachometer fans (3-wire) that produce two pulses/revolution with an open-collector output. This covers the vast majority of fans. 4-wire fans that have their own speed control are not needed, and generally will not work properly with the system monitor.

If the fans are powered from the system monitor, and it is set to NOT control fan speed, the fans will run at a speed that has been previously set in the menus. Depending on your model, this maximum speed can be either: 1) The fan's maximum speed, 2) A menu-set maximum speed or 3) A maximum speed determined by the maximum voltage that is set by the user. The last option is useful when only 12V fans are available, yet the power supply that must be used to power the fans has an output that is greater than 12V.

NOTE: *Before the system monitor can be used to control or monitor fans, a CHARACTERIZATION must be performed! (See Section 3.1 Characterize Fans)*

If the system monitor is set to control fan speed, you will be able to set a "Fan Start" temperature and a "Fan End" temperature (See Section 0 Change Temp Limits and Num of Controlled Fans). The fans have an "idle" speed (defined by the system monitor as "fan minimum speed"). This is the lowest speed they will normally run (typically this is about ½ the max RPM for most fans). Upon startup, the fans run at this speed. When the unit goes into the "Running" mode, the fan speed control loop starts and when the "Fan Start" temperature is reached by the hottest temperature sensor, the fans will start increasing their speed until the hottest sensor is at the "Fan End" temperature, at which point the fan will be running at the maximum speed allowed. This "maximum speed allowed" will be either the maximum speed of the fans OR the maximum fan speed set in the fan control menu OR the speed the fan runs when it is fed the maximum voltage set in the fan control menu - whichever is the lowest.

The system monitor uses fan speed information is used in several ways:

- Displays the actual RPM of each fan on the PLED
- Turns on the FAN LED whenever a fan drops below 50% of the speed of the fastest fan, or below 800 RPM, whichever is greater. If the system monitor is controlling fan speed, whenever a fan enters an error condition (i.e. runs too slowly) ALL the remaining fans are run at 100% speed until the error condition is cleared.
- Reports the number of the failed fan on the PLED.
- Sends an SNMP "trap" (if SNMP is selected).
- Flashes the FAN LED corresponding to the number of fan that is in error.
- Shuts down the power supply after 30 seconds of a fan fail (if shutdown on FanFail is selected and BATTLESHORT is not selected). This 30 second delay for shutdown after a fan fail is always enabled and is independent of the normal menu option to wait 30 seconds before a shutdown.

4.4.4 Scroll

Depending on the application, you may wish to send continuously updating information to the serial port, such as when you want to view it on a terminal. However, if you are using a computer to parse the data, the large amount of unimportant information can present an overrun condition to computer serial input.

When set to "Y", System monitor will output continuous data at 9600 or 57,600 baud via its RS-232 port or the network port. All voltages, temperature, and RPM of each fan will be reported at least once every 20 seconds.

NOTE: *This setting determines the default startup condition. Pressing the 'S' key on the terminal keyboard at anytime will start continuous updating of the display. Pressing 'S' again will stop it.*

4.4.5 Err to RS232 & Net

When set to "Y", the RuSH will output error messages in the form
EVXXXXXXXXETYYYYYYYYYEF*ZZZZZZZZZZZZZZZZ*

EVXXXXXXXX stands for "Error Voltage", where "X" reports WHICH voltage is out of normal limits as well as the "direction" (high or low).

The code is printed as a binary number. 8 bits are displayed.
> Bit 0 (the LSB) is set if the 5V line is low (below the set level)
> Bit 1 is set if the 3.3V line is low.
> Bit 2 will be set if the 12V line is low.
> Bit 3 will be set if the -12V line is low.
> Bit 4 will be set if the 5V line is high. (above the set level)
> Bit 5 will be set if the 3.3 V line is high.
> Bit 6 will be set if the 12V line is high.
> Bit 7 will be set if the -12V line is high.

NOTE: *Bits 1 and 5 will never be set if the 3.3V monitoring option is turned off.*

NOTE: *In some variants of the firmware, an EXTRA 8 bits are displayed. These are used to indicate the status of units that monitor more than the standard 4 VME/cPCI voltages. These extra bits will be "to the left of" the standard output.*

ETYYYYYYYY stands for Error Temperature, where "Y" is set if an individual sensor is above the WARN or MAX threshold.

The code is printed as a binary number. 8 bits are displayed.
> Bit 0 will be set if Temp sensor "1" is above the MAX threshold.
> Bit 1 will be set if Temp sensor "2" is above the MAX threshold.
> Bit 2 will be set if Temp sensor "3" is above the MAX threshold.
> Bit 4 will be set if Temp sensor "1" is above the WARN threshold.
> Bit 5 will be set if Temp sensor "2" is above the WARN threshold.
> Bit 6 will be set if Temp sensor "3" is above the WARN threshold.

Just like in the monitoring section, if a temperature sensor is turned off, it will never report an error.

EFZZZZZZZZZ stands for Error Fan, where "Z" is set if an individual fan is running below the low RPM threshold. The LSB represents fan 1, bit 1 represents fan 2 etc.

The code is printed as a binary number. 9 bits are displayed.

The error codes are sent out the serial or network port (when the function is enabled) ONLY when there is a status change. That is, if the system is operating within set limits, nothing is sent out. If one of the sensors should report an error, the error code is sent out ONCE. If the error goes away, another error code string is sent out ONCE.

For example if fan1 drops below the RPM limit, the code EV00000000ET00000000EF000000001 will be sent out once.
If the fan should regain speed, the code EV00000000ET00000000EF000000000 will be sent once.

Note that error status is ALWAYS output to the LEDs and to the PLED display.

4.4.6 Overtemp SD

It is often desirable to shut off a unit in the case of extreme over temperature in order to protect devices or circuits. If the "Overtemp SD" feature is enabled "Y" when the temperature of the hottest sensor reaches the Temp Max limit, the power supply (or supplies) will be shut down. Pressing <ESC> on the RS-232 terminal, or power cycling will restart the unit.

NOTE: *On some power supplies, the power supply fans continue to run even though the supply has been shut down*

NOTE: *This option requires that the system monitor must be connected to the ENABLE inputs of the power supply(s). The Processor interrupt line "PINT1" will be driven LOW for 200ms, and 10 seconds later, the supplies will be shut down.*

4.4.7 Restart on Cooldown

This option allows the system to restart (assuming there was a shut down due to over temperature) if the system temperature returns to a level below the shutdown temperature the set.

- If Restart on cooldown is enabled "Y", and the power supply shutdown is caused by an over temperature then the power supply will restart if the temperature drops below the set restart temperature.

- If Restart on cooldown is disabled "N", the only way to keep the system from shutting down is to invoke Battleshort mode.

Once you have enabled this option you will now have to set up the temperature you want the system to restart at (See Section 0 Change Temp Limits and Num of Controlled Fans)

NOTE: *This option requires that the system monitor must be connected to the ENABLE inputs of the power supply(s). The Processor interrupt line "PINT1" will be driven LOW for 200ms, and 10 seconds later, the supplies will be shut down.*

4.4.8 Fan Fail SD

In many designs if one fan fails, the system will reach over temperature shortly after the failure. If the Fan Fail SD feature is enabled, the power supply will shut down when one or more fans fails.

NOTE: *This option requires that the system monitor must be connected to the ENABLE inputs of the power supply(s). The Processor interrupt line "PINT1" will be driven LOW for 200ms, and 10 seconds later, the supplies will be shut down.*

4.4.9 Overvoltage SD

If the *Overvoltage SD* feature is enabled ("Y"), then when any monitored voltage exceeds the maximum threshold by 10% for more than 10 seconds, then the power supply (or supplies) will be shut down. Pressing <ESC> on the RS232 terminal, or cycling AC power will restart the unit.

NOTE: *The unit will NOT restart by itself if the voltage goes below the upper limit.*

NOTE: *This option requires that the system monitor must be connected to the ENABLE inputs of the power supply(s). The Processor interrupt line "PINT1" will be driven LOW for 200ms, and 10 seconds later, the supplies will be shut down.*

4.4.10 30 Second SD Delay

This option allows the system to continue to run for 30 seconds after any error generated that would cause a power supply shut down.

NOTE: *This option requires that the system monitor must be connected to the ENABLE inputs of the power supply(s). The Processor interrupt line "PINT1" will be driven LOW for 200ms, and 10 seconds later, the supplies will be shut down.*

4.4.11 Open/Close to SD

Some supplies require a "short" (connection) between two terminals to shut them down, while others require an "open" (non-connection). This setting allows for the use of either type. Most supplies require a closed connection to shut down. "ATX" style supplies require an open connection. This is an auto-detected parameter, and will normally be set up correctly on first initialization, or by forcing a re-initialization by holding the "I" key during power up. You may however, wish or need to change this number for special applications

NOTE: *If this is set incorrectly, the power supply will fail to start on power up.*

NOTE: *This option requires that the system monitor must be connected to the ENABLE inputs of the power supply(s). The Processor interrupt line "PINT1" will be driven LOW for 200ms, and 10 seconds later, the supplies will be shut down.*

4.4.12 Power SW Detect

Turn on this option if you need to sense the condition of a power switch. This turns on a special function in the case where the System Monitor board is powered directly from the mains and is not shut off when the power switch is shut off. If the System Monitor was allowed to run, and the power supply was shut off, the Monitor would report errors, since all voltages and fan speeds would go to zero. By connecting the power switch to a pin, and turning on this option, these false errors are suppressed.

NOTE: *This option requires that you connect a switch (or device that generates a signal) to the system monitor board – See*

Appendix D – System Monitor Interconnects *for connector/pin requirements.*

4.4.12.1 Power Switch Off when H/L

If this option is selected, a sub-menu is presented asking: OFF when HIGH (H) or LOW (L) ? [H]. This works as expected. Depending on the wiring of your unit, you may have a logic high or low when the switch is off. The proper setting will depend on your wiring scheme . If this is set improperly, the system monitor board display will go OFF when the main system is turned ON and vice versa. This is an auto-detected parameter, and will normally be set up correctly on first initialization, or by forcing a re-initialization by holding the "I" key during power up. You may however, wish or need to change this number for special application

4.4.13 EN PSFAIL Det

This option allows the monitoring of two supplies and reporting which power supply failed if there is a failure to either of the supplies.

An error message will be displayed on the PLED or through the network connection indicating there is a failed power supply and identifying which supply failed.

NOTE: *Currently the Hybricon monitor board is only configured to handle a total of 2 supplies.*

NOTE: *This option requires that you connect a DC okay (or some type of power OK) signal for each power supply to the Hybricon monitor board – See appendix C for connector/pin requirements.*

4.4.14 Relay Activation

This option will allow you to activate a lamp or sounding device during any error condition. Pressing <ESC> will drop the relay.

Relay output (both Normally Open and Normally Closed contacts available) for switching 250V at up to 250ma.

NOTE: *This option requires that you connect a device (must be externally powered) and signals to the Hybricon monitor board – See Appendix C – Monitor Card for connector/pin requirements.*

5.0   Maintenance Functions

The following section outlines some of the maintenance functions that are available in all Hybricon monitor boards.

> **Step 1** – From the Main Menu choose option 5.
> **Step 2** – Enter the password when prompted.
> You should now see the following menu options:
>
> *Total Power On Hours = 1.3*
>
> *System Maximum Temperature = 23*
>
> *1 Characterize Fans*
> *3 Last Error Status*
> *4 Firmware Parameters*
> *5 Total NonResettable Hours*
> *7 Change Signon Message*
> *8 Change Unit Name*
> *9 Advanced Functions*
> *A Write Directly to PLED*
> *B Change Admin Password*
> *C Change User Password*
> *D Change the IP/Subnet Mask Gateway IP/Timeout of the Net Port*

5.1 Characterize Fans - *See Section 3.1 Characterize Fans (Option 1)*

5.2 Last Error Status (Option 3)

Selecting this item presents codes for the last error. Errors are kept in two locations in non-volatile memory. This feature can be very useful in determining if the unit suffers from an intermittent condition (e.g. a fan running, stopping, running, etc.)

5.3 Firmware Parameters (Option 4)

Selecting this item presents the firmware revision and checksum information. This information is very useful should you need any assistance from Hybricon.

Code Ver 64-1015060F8F

Checksum = 4687

5.4 Total NonResettable Hours (Option 5)

Pressing this key shows the TOTAL hours the unit has run.

5.5 Change Signon Message (Option 7)

The Sign-On message is displayed on the PLED (if included) and on the terminal every time the unit is restarted. If you would like to change the message to something like "Hybricon Model #1234", this is your chance. Please be aware that, due to PLED limitations, the sign on message is limited to 2 lines of 20 characters each. Be careful with your typing. There is no backspace or editing option, so if you make an incorrect entry, you will have to start over.

5.6 Change Unit Name (Option 8)

As shipped, the Unit has no name (blank). To help identify the unit, you should give it some descriptive name, such as "SYS A". You can enter up to five alpha-numeric characters. This name is displayed every time the unit starts, and also at the network login screen. In addition, this name is shown whenever the "Q" (Query) command is invoked.

NOTE: *If you plan on using DHCP you must assign each unit a unique unit name.*

5.7 Advanced Functions (Option 9)

 (See Section 6.0 Advanced Functions)

5.8 Write Directly PLED Input (Option A)

This is an "electronic bulletin board" that allows you to place a non-volatile message on the PLED. Useful when you need to draw attention to a unit.

- The characters are loaded into a 40 byte buffer that will hold the text until you hit return or enter a 40th character.

- The display consists of 2 lines, 20 characters long each which needs to be considered for formatting of the display.

- The backspace key is active for corrections.

- The message will remain until a power cycle, monitor board reset, or you clear the message using with the following procedure.

    o Type ":" and then <enter>. (You will not see the ":" on the screen.)

5.9 Change Admin Password (Option B)

The default is "HYBRICON" (all upper case), but it is recommended that you change this to another value for security purposes.

5.10 Change User Password (Option C)

The default is "HYBRICON" (all upper case), but it is recommended that you change this to another value for security purposes.

5.11 Change the IP/Subnet Mask Gateway IP/Timeout of the Net Port (Option D)

It is recommended that you disconnect the network cable when performing this operation to avoid any possible conflicts within your network. When typing in the new IP Address, type three characters for each octet. For example: for .2, type in "002".

After you have made your entry, it will take up to 15 seconds to re-configure the network port. Be careful when using this function, as bounds-checking is NOT used. Type carefully. If you make an incorrect entry, press the <ESC> key and start over.

The default timeout is 1 minute - meaning that if no data is sent or received over the network port for 1 minute, the connection will be dropped. If you want the connection to never time out, this should be set to '0"

Local IP   ***.***.***.***
Subnet Mask Key (see Table 4 below) – Default 00
Gateway IP ***.***.***.***
Updating EXPORT Wait 15 seconds

Table 4 - Subnet Mask Key

NetMask Value	Mask Key
0.0.0.0	00
255.255.255.248	03
255.255.255.240	04
255.255.255.224	05
255.255.255.192	06
255.255.255.128	07
255.255.255.0	08
255.255.254.0	09
255.255.252.0	10
255.255.248.0	11
255.255.240.0	12
255.255.224.0	13
255.255.192.0	14
255.255.128.0	15
255.255.0.0	16
255.254.0.0	17
255.252.0.0	18
255.248.0.0	19
255.240.0.0	20
255.224.0.0	21
255.192.0.0	22
255.128.0.0	23
255.0.0.0	24

- The default ip of the system Monitor is 192.168.000.002
- The default Subnet Mask is 000.000.000.000.
- The default Gateway IP is "000.000.000.000". You can choose any other Gateway address you want but if used, **it must be in the same subnet as the system monitor IP.**

Some ip addresses and subnet masks are incompatible. It is up to the user to select the proper mask for any given address.

You should be aware that you must always enter the desired values for all the requested parameters. Unlike in some other menus, simply hitting <ENTER> will not choose the default or currently-set parameter.

If you wish to use DHCP – Set the IP to 000.000.000.000 The DHCP name will be the UNIT NAME that you can select as item number 8 in the MAINTENANCE menu. If you are using DHCP it is highly recommended that you give the unit a name other than the default (which is just a blank string), so you can later find the unit on your network.

If you want or need to change port numbers or protocols, you will have to use the "Network Parameters" section in the "Advanced" menu Advanced Functions

NOTE: *This feature is not available over the network. You must log in with the administrator password via RS-232 to use this feature.*

6.0   Advanced Functions

The following section outlines some optional functionality that is available in all HYBRICON monitor boards.

Step 1 – From the Main Menu choose option 5.
Step 2 – Enter the password when prompted.
You should now see the following menu options:

Total Power On Hours = 1.3

System Maximum Temperature = 23

1 Characterize Fans
3 Last Error Status
4 Firmware Parameters
5 Total NonResettable Hours
7 Change Signon Message
8 Change Unit Name
9 Advanced Functions
A Write Directly to PLED
B Change Admin Password
C Change User Password
D Change the IP/Subnet Mask Gateway IP/Timeout of the Net Port

Step 3 – Choose option 9 (*Advanced Functions*).
You should now see the following menu options:

'B' Change Serial Port BAUD rate
'D' Toggle DEMO mode
'E' Block ENET input
'F' Change Fan Min/Max speed and Max Fan Voltage
'G' Clear Error Log
'H' Clear POH
'I' Toggle IMMEDIATE mode for OUT4,OUT5
'L' Change LED modes
'N' Network Protocols
'R' RESET backplane(s)
'S' To set INIT state of GPIO pins
'T' Clear MaxTemp / MinTemp
'U' Toggle ENET login and PW req

> 'V' Toggle PW checking on RS-232 AND ENET
> 'Y' Toggle Fan run after PSOFF
> 'Z' RESET RuSH

6.1   Change Serial Port BAUD rate (Option B)

This option allows you to select the Baud Rate you would like to connect at. The default setting is for 9600 however the Hybricon monitor board also supports 57600.

NOTE: *During start up, the monitor will transmit a few unintelligible characters. This is actually the board checking the baud rate. If the rate is set wrong an error message will be created telling you that the baud rate is incorrect.*

6.2   Toggle DEMO mode (Option D)

In DEMO mode, all the normal timeouts are increased approximately 3X. This can be a big help when you are first learning to use the system monitor.

6.3   Block ENET Input (Option E)

Selecting this option effectively "disconnects' the Ethernet port from the system monitor and prevents a telnet session from "hijacking' the RS-232 connection. This option does not work when in SNMP or UDP modes.

6.4   Change Fan Min/Max speed and Max Fan Voltage (Option F)

(See Section 3.2 Advanced Fan Setup)

6.5   Clear Error Log (Option G)

This function allows the "volatile" error log to be cleared. This is useful when troubleshooting a system to see if an error is a new occurrence or something that happened in the past.

6.6   Clear POH (Option H)

This function allows the "volatile" Power On Hours counter to be reset. This counter is very useful to use for maintenance schedules. Once scheduled maintenance has been performed, the counter can be reset.

NOTE: *This does not clear Permanent POH counter.*

6.7   Toggle IMMEDIATE mode for OUT4, OUT5 (Option I)

This function allows the general I/O out 4 and 5 pins to be toggled for multiple uses. When this function is off the pins are used for a RESET signal (See Section 6.10 Reset Backplanes).

When this function is on the pins are used as for general I/O lines. Anytime the command 0xC0abc is received, the contents of "abc" will be written directly to OUT5,OUT4, and BOUT2 respectively.

6.8   Change LED mode (Option L)

This function allows the LED outputs connections from the monitor card to be used in different ways include Normal, Mode A and Mode B.

NORMAL MODE: The LEDs are illuminated to either RED or GREEN depending on the state of the monitored parameters as listed below. The following table lists the LED functions as well as the ground and Vcc for those LEDs on connector H1. The LED outputs are true LOW, and have 330 ohm current-limiting resistors on board.

Table 5 - LED Connector H1

Pin Number	Function
1	Vcc
2	Vcc
3	+3.3V OK (Green)
4	+3.3V not OK (Red)
5	+5V OK (Green)

6	+5V not OK (Red)
7	+12V OK (Green)
8	+12V not OK (Red)
9	-12V OK (Green)
10	-12V not OK (Red)
11	Temperature OK (Green)
12	Temperature not OK (Red)
13	Fan OK (Green)
14	Fan not OK (Red)
15	Ground
16	Ground

MODE A: This makes the LED's H1.3 – H1.10 change functionality to user programmable. By sending binary code to the monitor board you can turn on (or off) each LED or multiple LEDs.

This functionality is used by sending an "Immediate Command" (anytime the monitor board is in the RUNNING mode). The format for this "Immediate Command" is "*" (0x2a) followed by a byte, this will set pins 3-10 to the bit pattern in the byte. For Example: sending "*" followed (quickly) by 0xaa will set pin 3 LOW, pin 4 HIGH, pin 5 LOW, pin 6 HIGH, pin 7 LOW, pin 8 HIGH, pin 9 LOW and pin 10 HIGH. Pin 3 is the LSB. Because most programs have a problem sending a 0x00 (nul), the immediate command ")" (0x29) sent by itself (with no leading asterisk) will set all bits LOW.

Table 6 - LED to H1 Connector Interface

Byte	Connector H1 Pin
0000000X	H1.3
000000X0	H1.4
00000X00	H1.5
0000X000	H1.6
000X0000	H1.7
00X00000	H1.8
0X000000	H1.9
X0000000	H1.10

After sending the binary to the monitor board you will see the equivalent ASCII text. The ASCII equivalent of this byte will be 00000000. Setting a bit to a 1 will turn the LED off, and setting the bit to a zero will turn the LED on.

MODE B: The function of the "Temperature Green LED" (H1 pin 11) changes. Temperature Green - H1 pin 11 has the opposite state as J4 pin 2 (INP1). That is when J4 pin 2 is logic low, output H1 pin 11 is logic high. All the other LED's operate normally.

6.9   Network Protocols (Option N)

This allows for the setting of the Network parameters. This is where you can change the port number and even the protocol – telnet/UDP/SNMP.

You will have to use this function to make the Hybricon monitor board an SNMP agent (see SNMP Section 8 for more details).

TCP, UDP or (use TCP for telnet). TCP = 0, UDP = 1, SNMP = 3

6.10 Reset Backplane(s) (Option R)

This option will allow you to reset up to four backplanes individually or together.

RESET Backplane (1), Backplane (2), Backplane (3), Backplane (4) or ALL (A)

Choose 1,2,3 or 4 to reset the individual backplane or 5 to reset all backplanes together. When option "A" (RESET ALL) is chosen, all 4 backplanes are RESET sequentially, not simultaneously.

All the outputs are OPEN COLLECTOR. The only one that has a local pull-up to VCC is BACKPLANE RESET (J3-10), which has a 2.2K pull-up.

You can also issue RESETS to 1 & 2 (BPRESET, BOUT1) by pulling BIN3 'low' One RESET is issued every time this signal is brought low.

NOTE: *In order to use all 4 resets you must have the option for toggle immediate mode for out4, out5 to off (See Section Toggle IMMEDIATE mode for OUT4, OUT5). You also will not have the option for resetting backplane (3) or backplane (4) unless IMMEDIATE mode is off. (Reset backplane (1) and backplane (2) work regardless of the IMMEDIATE setting).*

NOTE: *This option requires that you connect the backplane reset for each backplane to the Hybricon monitor board (See*

Appendix D – System Monitor Interconnects *for Pins)*

6.11 To set INIT state of GPIO pins (Option S)

This utility initializes the state of J4-7,J4-9,J4-10 respectively by entering logic level with 1s (high) and 0s (low)

See Appendix C & D for connector/pin requirements.

6.12 Clear MaxTemp/MinTemp (Option T)

The monitor board tracks the highest and lowest temperature the board has been subjected too. This function allows you to clear those values.

6.13 Toggle ENET login and PW req (Option U)

This option is useful if you will be using a computer to communicate with the system monitor board. The option is only valid in the telnet mode. UDP and SNMP operation never requires a login or password.

Note: *This simply eliminates the password normally required to VIEW the output over the network. It does NOT eliminate the requirement for a password to CHANGE parameters.*

6.14   Toggle PW checking on RS-232 AND ENET (Option V)

This utility toggles whether a password is required or not required for the RS-232 and ENET. This is very useful for machine-to-machine communication.

6.15 Toggle Fan run after PSOFF (Option Y)

This function allows you to set the fans up to run after you invoke the "immediate" command PSOFF (See Section 7.3 Remote Shutdown/Turn on for description of PSOFF).

NOTE: *This function is only possible if the power source used to power the fans is not part of the payload power.*

6.16 RESET RuSH (Option Z)

This utility allows you to reset the monitor board without power cycling. Keep in mind all volatile commands will also be reset (PLED messages, error codes, etc.)

NOTE: *Only use this command if instructed by Hybricon personnel. This will reset everything. You will also need the serial number of the board as well as the MAC Address.*

7.0   Immediate Commands

Certain commands are available in any menu, or to perform special one-time actions. At normal run time, the available immediate commands are Direct PLED (:), Battleshort (BS), Remote Turn ON/OFF (PSON, PSOFF, PS1ON, PS2ON, PS1OFF and PS2OFF), Unique 4 Bit Chassis Address (%), Escape (ESC), Unit Serial Number (N), and Query (Q).

7.1   Direct PLED Input (:)

This option will allow you to send a text message directly to the PLED display.

Step 1 – In 'Running' mode type a colon ":" followed by the text that you want to display.

There are a few things to note about this option.

- When you type ":" it will not show on the screen.
- The characters are loaded into a 40 byte buffer that will hold the text until you hit return or enter a 40th character.
- The display consists of 2 lines, 20 characters long each which needs to be considered for formatting of the display.
- The backspace key is active for corrections.

- The message will remain until a power cycle, monitor board reset, PSON, or you clear the message using with the following procedure.

  o Type ":" and then <enter>. (Remember you will not see the ":" on the screen.)

NOTE: *When each character is received, a 3 second timer is started. If the next character is not received within that period, the buffer is flushed and the routine is exited.*

7.2   Battleshort (BS)

This will prevent any automatic shutdown, regardless of the error condition. If you have a PLED on the system, it will display the word BATTLESHORT letting the operator know the mode the chassis is in.

Step 1 – In 'Running' type "BS" (capital letters only).

NOTE: *This option disables all the protection the monitor offers to your system, and the only way to exit battleshort mode is to power cycle the board or do a monitor board reset.*

7.3   Remote Turn ON/OFF (PSON, PSOFF)

This option allows you to remotely shut down or turn on the power supply(s). When the power supply(s) have been remotely shut off, the LEDs will flash RED for a very short period every two seconds.

To turn the power supply(s) **OFF**:

Step 1 – In 'Running' type "PSOFF" (capital letters only).

Step 2 – Enter the password when prompted.

Step 3 – You will now have to enter "Y" when you are asked if you are SURE.

The power supply will then shut down.

To turn the power supply(s) **ON**:

Step 1 – In 'Running' type "PSON" (capital letters only).

Step 2 – Enter the password when prompted.

NOTE: *If you have more than one power supply in the system you can remotely turn on/off one supply independent of the other. This is done by adding the supply number to the command after the PS (example – Turn on power supply one type PS1ON)*

NOTE: *This function will also shut down the fans, unless you have set the fans to run after the power supply is turned off (See Section 6.15 Toggle Fan run after PSOFF)*

NOTE: *This option requires that the system monitor must be connected to the ENABLE inputs of the power supply(s). The Processor interrupt line "PINT1" will be driven LOW for 200ms, and 10 seconds later, the supplies will be shut down.*

7.4   Unique 4 Bit Chassis Address (%)

This option allows you to assign a unique 4 BIT address to each monitor board/chassis by setting 4 pins to logic high or low.

Entering % at any time will read the state of the user inputs 1-3 and fan tach 9. A binary response will be sent as well as an ASCII text to your hyper terminal session.

Note – *This option is not available via SNMP at this time.*

7.5   ESCAPE/Main Menu (ESC KEY)

Pressing this key "breaks" the program flow, and takes you to the main menu.

7.6   Unit Serial Number (N)

Shows the unit's serial number

7.7 Query (Q)

This is the "QUERY" command. Invoking this command gives a special output in the form of -

:SN=12345678,UN=TEST1,IP=192.168.000.002,V3=03392,V5=05006,V+12=12058,V-12=12072,T1=21,T2
=21,T3=00,T4=00,F1=01725,F2=01770,F3=00000,F4=00000,F5=00000,F6=00000,F7=00000,F
8=00000,F9=00000,OT=0,OV=0,OC=0000,PS1=1,PS2=1,MSG=0,SW=1,PROT=TEL ,I3=00,I5=0
0,I12=00,I-12=00,CODE=1013426E,ENET=06.10,POH=00000.0,MAXTMP=23,MINTMP=21
,PROC=00,LOADER=FF
;EV00000000ET00000000EF000000000OT0OV0OC0000PS11MSG0SW1

Note the two strings. The first, beginning with a colon (:) shows exact parameters. No <CR> (0xd) or <LF> (0xa)
characters are present – except at the beginning and end.

All output is in ASCII. The meaning is as follows:

SN	8 alpha characters. The serial number of the unit. Left justified padded with spaces (0x20)
UN	5 alpha characters. The Unit Name. Also used for DHCP name. Left justified, padded with spaces.
IP	12 numbers and 3"." The IP number of the unit
Vx	5 digits. The voltages in millivolts. "00000" if not used/selected
Tx	2 digits. The temperatures of the sensors. "00" if no sensor connected.
Fx	5 digits. Fan RPM. If a fan isn't connected, its RPM will be reported as "00000"
OT	1 digit ("0" or "1"). "0" if the Overtemp limit has not been reached, "1" if it has been reached.
OV	1 digit ("0" or "1"). "0" if the Overvoltage limit has not been reached, "1" if it has been reached.
OC	4 digits (all either "0"s or "1"s). The digits (left to right) nominally represent 3.3V,5V,12V and -12V respectively. The digits are "0" if the associated voltage is not in an overcurrent condition.
PS1,PS2	1 digit ("0" or "1"). "0" if the associated power supply is turned OFF, "1" if turned ON (by the Monitor board). Of course, this is only valid if the monitor board is controlling the power supplies.
MSG	1 digit ("0" or "1"). "0" if the monitor board is not showing a (user written) message on the PLED
SW	1 digit ("0" or "1"). "0" if the power switch is turned OFF. (not valid if the monitor board is not connected to the power switch and the "detect power switch" option is not turned ON.
PROT	4 characters. Either "TEL ", "UDP " or "SNMP ". Left justified and padded with spaces (0x20), where appropriate.
Ix	2 digits. Currents in whole amps (separate unit required)
CODE	11 characters. The version of the firmware in the monitor board. Left justified, and padded with spaces.
ENET	5 characters. The version of the firmware in the monitor board Ethernet port.
POH	7 digits. The power on hours, and tenths of the monitor board.
MAXTMP	2 digits. The maximum temperature (in Celsius) the monitor board has been subjected to.
MINTMP	2 digits. The minimum temperature (in Celsius) the monitor board has been subjected to.
PROC	2 digits ("0" or "1"). Used by monitor board to determine the processor type.
LOADER	2 digits (Hexadecimal). Used by monitor board to determine the bootloader type.

The second string is begun with a ";". No <CR><LF> characters are added – except at the end.

EV	8 digits ("0" or "1") The digits, leftmost to rightmost represent Voltage Errors, and are read as: -12V high, 12V high 3.3V high, 5V high, -12V low,12V low,3.3V low, 5V low (NOTE: In some special variants of the firmware, this is stretched to 16 bits, with the left-most 8 bits representing special voltages)

ET	8 digits ("0" or "1") leftmost to rightmost represent Temperature Errors, and are read as: T4 warn,T3 warn,T2 warn, T1 warn, T4 error,T3 error, T2 error, T1 error
EF	9 digits ("0" or "1") leftmost to rightmost represent Fan speed Errors, and are read as: Fan9,Fan8,Fan7,Fan6,Fan5,Fan4,Fan3,Fan2,Fan1
OT	1 digit ("0" or "1") "0" if the overtemp limit has not been reached, "1" if it has been reached.
OV	1 digit ("0" or "1") "0" if the overvoltage limit has not been reached, "1" if it has been reached.
OC	4 digits ("0" or "1") the digits (left to right) nominally represent 3.3V, 5V, 12V and -12V respectively. The digits are "0" if the associated voltage is not in an overcurrent condition.
PSxx	2 digits ("0" or "1") "0" if the associated power supply is turned OFF, "1" if turned ON (by the monitor board). Of course, this is only valid if the monitor board is controlling the power supplies. The leftmost digit represents power supply #1, the rightmost power supply #2.
MSG	1 digit ("0" or "1") "0" if the monitor board is not showing a (user written) message on the PLED
SW	1 digit ("0" or "1") "0" if the power switch is turned OFF. (not valid if the monitor board is not connected to the power switch and the "detect power switch" option is not turned ON.

This last string is followed by a <CR><LF> (0xd,0xa)

NOTE: *In some cases, additional items may be added (humidity, for example). In this case, the additional items will generally be added at the END of one or both strings.*

8.0   Other Functionality

There are other pieces of functionality that are added to the system board that might now be driven by a menu.

8.1   ERROR signal (GPIO)

Whenever the monitor board shutdown timer routines are entered, the OUT3 pin will be driven LOW. This pin is driven HIGH upon power up or RESET. OUT3 is a CMOS (+/- 30mA , 0-5V swing) output.

The shutdown routines are entered whenever two conditions are met:

1. A particular ERROR condition exists (OverTemp, OverVoltage or FanFail) AND
2. The menu option to shut down on the particular error condition is turned ON.

9.0   SNMP

It is expected that the MIB used with this agent is DAWNVME-MIB.txt dated 10/10/06 or later. The MIB contains all the possible sensor types, commands and expected responses.

In SNMP mode the unit will become an "SNMP Agent" and will use the IP address set by the user. 192.168.000.002 is the default. DHCP is NOT supported.

The SNMP commands "**GET, GETNEXT, SET, WALK** and **TRAP** are supported.

GET, GETNEXT, SET and WALK messages will be received by the agent on UDP port 161. Whenever the agent receives a message it will reply with a message to whatever IP and port it received the message from.

NOTE: *The host machine must always be on the same sub-net as the agent.*

In order for the SNMP option to work properly, the unit must be set up first. The maximum "index" or sensor number is determined by the setup. That is, if only two temperature sensors are selected in the menu, and the command GET dawnVMETemperature.3 is issued, an error (bad sensor number) will be returned. The fans work in a similar fashion. If there are 6 system fans, the command GETNEXT dawnVMEFanSpeed6 will return the value for temperature sensor 1 (the next sensor in the tree).

The **TRAP** messages will be sent to the IP address specified when the SNMP mode is invoked. If you wish to change this address, you will have to use the sequence described above to go into the SNMP mode again, whereupon you will be allowed to re-enter the destination IP address. All traps will be sent to UDP port 162 as defined in the SNMP spec.

The Trap messages do not contain the magnitude of the error, only the error device (type) and the actual unit (subtype). If you wish to determine the actual magnitude, you will have to issue the GET or GETNEXT commands to read the numerical values.

Each type (voltage, fan, temperature) is treated as a unit. For example, if there are several fans that error at the same time, only one trap will be generated. The value returned will be that of the highest-numbered sensor that failed. Once a trap has been issued for a given type, no more traps will be issued for that type unless all the errors of that type are cleared by the Hybricon monitor board. Traps are issued only when a device goes into an error condition, that is, a trap is not issued if that device goes back into the normal range.

If a sensor has two levels of failure (such as temperature), a trap will be issued when the FIRST level is achieved. In other words, a trap will be issued at the temperature WARN level.

To Enter SNMP mode:

   Step 1 – From the Main Menu choose option 5 (Maintenance).

   Step 2 – From the Maintenance Menu choose option 9 (Advanced functions).

   Step 3 – From the Advanced Functions menu choose option 'N' (Change Network Parameters).

   Step 4 – Choose '3' at this point and it will prompt you for an IP address.

   Step 5 – Enter the IP address you want all the traps sent to. (This is not the IP address of the unit, you need to set that using option 'D' on the maintenance menu (See Section 5.11)).

   The board will then enter SNMP mode and the serial (RS-232) port will become inoperative.

To Exit SNMP mode:

   Step 1 – Power cycle the monitor board.

   Step 2 – From the Main Menu choose option 5 (Maintenance).

   NOTE**:** *You will only have a short time when this option screen is available, after that the monitor board will enter into the SNMP mode.*

   Step 3 - From the Maintenance Menu choose option 9 (Advanced functions).

   Step 4 – From the Advanced Functions menu choose option 'N' (Change Network Parameters).

   Step 5 – Choose '1' at this point and it will prompt you to choose a port. (You will typically choose the default port 23 for this).

   The board will then be in telnet mode and the serial port will become operative.

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Appendix A – Monitor Setup Flowchart

```
                    ┌──────────────────┐
                    │    POWER UP      │
                    └──────────────────┘
                              │
                              ▼
                          ╱Fan    ╲        No      ┌──────────────────┐
                        ╱Requirements╲─────────────▶│ Set Min/Max RPM  │
                        ╲   Set?    ╱               │  and Voltage     │
                          ╲      ╱                  │  (Section 3.2)   │
                              │ Yes                 └──────────────────┘
                              ▼                              │
                    ┌──────────────────┐                     │
                    │ Characterize Fans│                     │
                    │  (Section 3.1)   │                     │
                    └──────────────────┘                     │
                              │                              │
                              ▼                              │
                    ┌──────────────────┐                     │
                    │ Define Fan Curve │                     │
                    │  (Section 4.1)   │                     │
                    └──────────────────┘                     │
                              │                              │
   ┌──────────────────┐      ▼                              │
   │Change Voltage    │  No ╱Voltage╲                        │
   │Limits            │◀────╱ Limits ╲◀──────────────────────┘
   │(Section 4.4.1)   │     ╲  Set?  ╱
   └──────────────────┘      ╲     ╱
            │                    │ Yes
            │                    ▼
            │          ┌──────────────────┐
            └─────────▶│Configure Parameter│
                       │    Sensing       │
                       │  (Section 5.0)   │
                       └──────────────────┘
                              │
                              ▼
                       ┌──────────────────┐
                       │   Configure      │
                       │  Maintenance     │
                       │  Functions       │
                       │     (6.x)        │
                       └──────────────────┘
                              │
                              ▼
                       ┌──────────────────┐
                       │  Perform System  │
                       │     Testing      │
                       └──────────────────┘
```
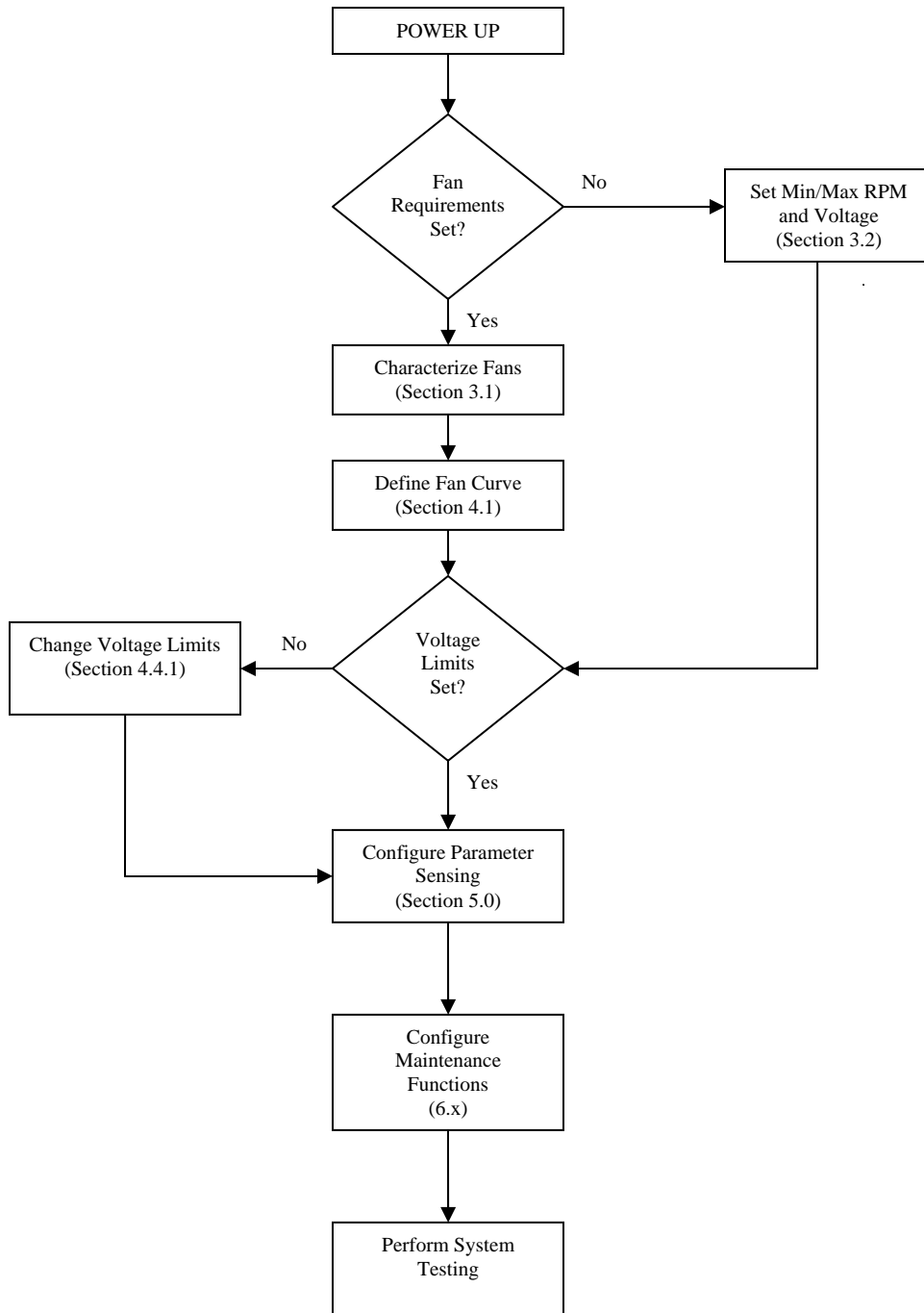
Appendix B – SNMP Commands

32 bits are sent out in response to the SNMP GETSTATUS command, there meaning is as follows:

-12V Low	("1" = FAIL, "0" = OK)	-12 Volts is below threshold set.
12V Low	("1" = FAIL, "0" = OK)	12 Volts is below threshold set
3VLow	("1" = FAIL, "0" = OK)	3.3 Volts is below threshold set
5VLow	("1" = FAIL, "0" = OK)	5 Volts is below threshold set
-12V High	("1" = FAIL, "0" = OK)	-12 Volts is above threshold set
12V High	("1" = FAIL, "0" = OK)	12 Volts is above threshold set
3V High	("1" = FAIL, "0" = OK)	3.3 Volts is above threshold set
5V High	("1" = FAIL, "0" = OK)	5 Volts is above threshold set
Temp4 Warn	("1" = FAIL, "0" = OK)	Temp Sensor 4 has exceeded the warn value set up.
Temp3 Warn	("1" = FAIL, "0" = OK)	Temp Sensor 3 has exceeded the warn value set up.
Temp2 Warn	("1" = FAIL, "0" = OK)	Temp Sensor 2 has exceeded the warn value set up.
Temp1Warn	("1" = FAIL, "0" = OK)	Temp Sensor 1 has exceeded the warn value set up.
Temp4 Fail	("1" = FAIL, "0" = OK)	Temp Sensor 4 has exceeded the Max value set up.
Temp3Fail	("1" = FAIL, "0" = OK)	Temp Sensor 3 has exceeded the Max value set up.
Temp2Fail	("1" = FAIL, "0" = OK)	Temp Sensor 2 has exceeded the Max value set up.
Temp1Fail	("1" = FAIL, "0" = OK)	Temp Sensor 1 has exceeded the Max value set up.
Fan9 Fail	("1" = FAIL, "0" = OK)	Fan 9 has failed
Fan8Fail	("1" = FAIL, "0" = OK)	Fan 8 has failed
Fan7Fail	("1" = FAIL, "0" = OK)	Fan 7 has failed
Fan6Fail	("1" = FAIL, "0" = OK)	Fan 6 has failed
Fan5Fail	("1" = FAIL, "0" = OK)	Fan 5 has failed
Fan4Fail	("1" = FAIL, "0" = OK)	Fan 4 has failed
Fan3Fail	("1" = FAIL, "0" = OK)	Fan 3 has failed
Fan2Fail	("1" = FAIL, "0" = OK)	Fan 2 has failed
Fan1Fail	("1" = FAIL, "0" = OK)	Fan 1 has failed
BattleShort	(1 = ON, 2 = OFF)	Reports whether battleshort is on or off.
PowerSupply1 status	(1 = ON)	Provides the status of the power supply identified as 1.
PowerSupply 2 status	(1 = ON)	Provides the status of the power supply identified as 2.
OverTemperatureShutdown	("0" = OK, 1 = Shutdown)	Identifies if the chassis is shutdown because of an over temperature situation.
OverVoltageShutdown	("0" = OK, 1 = Shutdown)	Identifies if the chassis is

		shutdown because of an over voltage situation.
FanFailShutdown	("0" = OK, 1 = Shutdown)	Identifies if the chassis is shutdown because of an Fan Fail situation.
"0" (Spare)	Last Byte Sent	Not used

NOTE: *The "Shutdown" bits will never be set when in "BattleShort" mode, since the Hybricon monitor board will never force a shutdown. If the 30-second delay feature is enabled, the shutdown bits will only change from 0->1 after the 30 second delay, however the error bits will be set to "1" as soon as the error is detected.*

Appendix C – Monitor Card Pin Assignment

POWER SUPPLY
IN 9-35VDC

1	SGND
2	VIN
3	VIN
4	SGND

TEMPERATURE
SENSORS

1	SGND
2	TEMP1
3	VCC
4	SGND
5	TEMP2
6	VCC
7	SGND
8	TEMP3
9	VCC
10	SGND
11	TEMP4
12	VCC

FAN
TACHOMETERS

1	TACH1
2	TACH2
3	TACH3
4	TACH4
5	TACH5
6	TACH6
7	TACH7
8	TACH8
9	TACH9
10	SGND

ERROR LEDS

1	VCC
2	VCC
3	LED3G
4	LED3R
5	LED6G
6	LED6R
7	LED12G
8	LED12R
9	LED-12G
10	LED-12R
11	LEDTG
12	LEDTR
13	LEDFG
14	LEDFR
15	SGND
16	SGND

FAN POWER
IN (12-28VDC 20A)
SOURCE IMPEDANCE MUST
BE VERY LOW

1	PGND
2	FANIN

FAN POWER
OUT (0-28VDC 20A)

1	PGND
2	FANOUT

RS-232

1	SGND
2	TX232
3	RX232

LCD CONTRAST
PLED BRIGHTNESS

10/100 ENET

FACTORY PROGRAMMING
HEADER (NOT INSTALLED)

POWER SUPPLY
CONTROL

1	OPTO1-
2	OPTO1+
3	OPTO2-
4	OPTO2+
5	SGND
6	IN3/SW

SWITCH IN

RELAY

1	RYNO
2	RYCOM
3	RYNC

VOLTAGE SENSE IN

1	SGND
2	SEN3
3	SEN5
4	SEN12
5	SEN24
6	SEN48
7	SAUX5
8	SEN-12
9	VCC
10	BPRES
11	VCC
12	SGND

GENERAL I/O

1	SGND
2	IN1
3	IN2
4	IN3/SW
5	IN4
6	BOUT1
7	BOUT2
8	OUT3
9	OUT4
10	OUT5
11	I2CSDA
12	I2CSCL

LCD/PLED/VF
DISPLAY

1	VCC
2	SGND
3	LCDRS
4	CONT/BR
5	LCDE
6	LCDRW
7	N.C.
8	N.C.
9	N.C.
10	N.C.
11	LCDDB1
12	LCDDB0
13	LCDDB3
14	LCDDB2
15	SGND
16	N.C.

NOTE:

FAN POWER GROUND (PGND)
MUST BE CONNECTED TO
SIGNAL GROUND (SGND)
EXTERNAL TO BOARD!

Appendix D – System Monitor Interconnects

Table 7 - Monitor Card Connector Pin-out

		Hybricon Monitor		
				Pin
J1	**Fan Tach Signals**	**Uses**	**Type**	**Characteristics**
1	Fan Tach 1	Fan Tach/General Input	I/O	a
2	Fan Tach 2	Fan Tach/General Input	I/O	a
3	Fan Tach 3	Fan Tach/General Input	I/O	a
4	Fan Tach 4	Fan Tach/General Input	I/O	a
5	Fan Tach 5	Fan Tach/General Input	I/O	a
6	Fan Tach 6	Fan Tach/General Input	I/O	a
7	Fan Tach 7	Fan Tach/General Input	I/O	a
8	Fan Tach 8	Fan Tach/General Input	I/O	a
9	Fan Tach 9	Fan Tach/General Input	I/O	a
10	Signal GND			c
				Pin
J2	**Temp Sensors**		**Type**	**Characteristics**
1	Signal GND		Power	c
2	Sensor 1 IN	Temp Sensor/Analog In/Digital In	I/AI	b
3	VCC		Power	d
4	Signal GND		Power	c
5	Sensor 2 IN	Temp Sensor/Analog In/Digital In	I/AI	b
6	VCC		Power	d
7	Signal GND		Power	c
8	Sensor 3 IN	Temp Sensor/Analog In/Digital In	I/AI	b
9	VCC		Power	d
10	Signal GND		Power	c
11	Sensor 4 IN	Temp Sensor/Analog In/Digital In	I/AI	b
12	VCC		Power	d
				Pin
J3	**BP Interface**		**Type**	**Characteristics**
1	Signal GND		Power	c
2	Sense3	Volt Measurement /Analog In/Digital In	I/AI	e
3	Sense5	Volt Measurement /Analog In/Digital In	I/AI	f
4	Sense12	Volt Measurement /Analog In/Digital In	I/AI	g
5	Sense24	Volt Measurement /Analog In/Digital In	I/AI	h
6	Sense48	DO NOT USE!		i
7	Sense Aux 5	Volt Measurement /Analog In/Digital In	I/AI	f
8	Sense -12	Volt Measurement	AI	k
9	VCC		Power	d
10	BP RESET	Open-Collector Output	O	l
11	VCC		Power	d
12	Signal GND		Power	c

			Type	Pin Characteristics
J4	**General I/O**		**Type**	**Pin Characteristics**
1	Signal GND		Power	c
2	INP1	Digital In	I	a
3	INP2	Digital In	I	a
4	INP3	Digital In	I	a
5	INP4	Digital In	O	m
6	BOUT1	Open Collector Output	O	n
7	BOUT2	Open Collector Output	I/O	n
8	OUT3	CMOS output/Digital In	I/O	o
9	OUT4	CMOS output/Digital In	I/O	o
10	OUT5	CMOS output/Digital In	I/O	o
11	I2CSDA	I2C/CMOS output/Digital In	I/O	p
12	I2CSCL	I2C/CMOS output/Digital In	I/O	p
				Pin
J5	**Power Feed**		**Type**	**Pin Characteristics**
1	Signal GND		Power	c
2	Vin	RuSH Powr Supply Input	Power	q
3	Vin	RuSH Powr Supply Input	Power	q
4	Signal GND		Power	c
				Pin
J6	**PS Control**		**Type**	**Pin Characteristics**
1	Opto1 -	Opto Coupler Emitter	SW	r
2	Opto1 +	Opto Coupler Collector	SW	r
3	Opto2 -	Opto Coupler Emitter	SW	r
4	Opto2 +	Opto Coupler Collector	SW	r
5	Signal GND		Power	c
6	INP3	Same as J4-4	I	a
				Pin
J7	**Fan PWR IN**		**Type**	**Pin Characteristics**
1	Vfan	High Current Fan drive Power	HIGH PWR	s
2	PWR GND	High Current GND	HIGH PWR	t
				Pin
J7	**Fan DRIVE**		**Type**	**Pin Characteristics**
1	Fan Pwr Feed	Fan Drive Output	HIGH PWR	u
2	PWR GND	High Current GND	HIGH PWR	t

P1	Special Purpose		Type	Pin Characteristics
1	Vcc		Power	v
2	Vcc		Power	v
3	N.C.			v
4	GND		Power	v
5	PCLK	Programming/Clk Hearbeat	I/O	v
6	PDATA	Programming/Digital I/O	I/O	y
7	RESET/INP5	Programming/Digital Input/Write Protect/RESET	I	y
H1	LED DRIVE		Type	Pin Characteristics
1	Vcc		Power	d
2	Vcc		Power	d
3	LED3GREEN	3.3V Indicator GREEN LED	I/O	w
4	LED3RED	3.3V Indicator RED LED	I/O	w
5	LED5GREEN	5V Indicator GREEN LED	I/O	w
6	LED5RED	5V Indicator RED LED	I/O	w
7	LED12GREEN	12V Indicator GREEN LED	I/O	w
8	LED12RED	12V Indicator RED LED	I/O	w
9	LED-12GREEN	-12V Indicator GREEN LED	I/O	w
10	LED-12RED	-12V Indicator RED LED	I/O	w
11	LEDTGREEN	Temperature Indicator GREEN LED	I/O	w
12	LEDTRED	Temperature Indicator RED LED	I/O	w
13	LEDFGREEN	Fan Indicator GREEN LED	I/O	w
14	LEDFRED	Fan Indicator RED LED	I/O	w
15	GND		Power	c
16	GND		Power	c
H2	LCD/PLED DRIVE		Type	Pin Characteristics
1	Vcc		Power	d
2	GND		Power	c
3	R/S	R/S	I/O	o
4	C/B	Contrast/Brightness	AO	x
5	EN	ENABLE	I/O	o
6	R/W	Read/Write	I/O	o
7	N.C.			
8	N.C.			
9	N.C.			
10	N.C.			
11	D5	Data5	I/O	o
12	D4	Data4	I/O	o
13	D7	Data7	I/O	o
14	D6	Data6	I/O	o
15	GND		Power	c
16	N.C.			

Table 8 - Monitor Card Input/Output Signal Characteristics

Type Key	
I	Digital Input
O	Digial Output
AI	Analog Input
AO	Analog Output
Power	Power or GND
HIGH PWR	Fan Power or GND

Pin Characteristics

a	2.2K Pull-up to VCC. Thresholds 1.5/3V, current-limited, 30V Max
b	47K Pull-down. As analog in - 4.096V max, As Digital In - Thresholds 1.5/3V, 5V in MAX, As Digital Out 30 MA bidirectional CMOS drive. Not current-limited.
c	Common circuit GND
d	5V nom. Can provide 250mA to external ckt when 8-38VDC fed into J5 When power not fed to J5, entire ckt can be powered by feeding 4.5-6-5VDC into this pin.
e	2K pull-down. As analog in: 4.096V max. As Digital In - Thresholds 1.5/3V, current-limited,30V Max
f	3K pull-down. As analog in: 6.144V max. As Digital In: 15V Max
g	7.6K pull-down. As analog in: 19.6V max. As Digital In 40V Max
h	14K pull-down. As analog in: 28V max. As Digital In 48V Max
i	This pin has been "borrowed" for special use - DO NOT USE.
k	9.5K pull-up to 4.096. -19.45V max.
l	Open-collector 30mA/5V max, 2.2K pull-up to VCC
m	10k pull-down. Thresholds 1.5/3V Current-limited, 30V Max
n	Open-collector 30mA/30V max, no pull-up
o	As input: Thresholds 1.5/3V, 5V max. As output 30mA bidirectional CMOS drive, not current limited
p	10K pull-up to VCC. As input: thresholds 1.5/3V, 5V max. As output 30mA bidirectional CMOS drive, not current limited
q	8.5-38VDC @ 200mA max to power RuSH
r	30V/15mA opto
s	Fan power feed. 50V max (rev B hardware)
t	See above
u	Fan power output. Up to 25A/48V drive
v	Special Purpose. Do not use
w	As input :Thresholds 1.5/3V. As output - 330 Ohm current-Limit resistor (for direct LED drive)
x	0-5V Output ~= 5K source Z.
y	WRITE PROTECT - jumper ON = Bootloader inoperative, jumper OFF= Bootloader works.

Appendix E – Default Values

| Function	Default Value
Voltage Limits (see section 4.1)	±5%
Temp Warn?	40ºC
Temp Max?	50ºC
Number of Controlled Fans	Determined at setup – The number of fans is detected by the monitor board.
Restart Temp?	30ºC
Temp at which fans START increasing speed?	22ºC
Temp at which fans REACH full speed?	45ºC
3.3V (Y/N)? (Note – Y will invoke another option SD on UNDER Volt (Y/N) will appear – this default is N)	Y
5V (Y/N)? (Note – Y will invoke another option SD on UNDER Volt (Y/N) will appear – this default is N)	Y
12V (Y/N)? (Note – Y will invoke another option SD on UNDER Volt (Y/N) will appear – this default is N)	Y
-12V (Y/N)? (Note – Y will invoke another option SD on UNDER Volt (Y/N) will appear – this default is N)	Y
24V (Y/N)? (Note – Y will invoke another option SD on UNDER Volt (Y/N) will appear – this default is N)	Y
Num Temp Sensors (0-4) [3]	Determined at setup – the number of sensors is detected by the monitor board.
Scroll(Y/N)	N
ERR to RS232 & Net(Y/N)	N
Overtemp S/D (Y/N)?	N
Cooldown RESTART (Y/N)	N
Fan Fail SD (Y/N)	N
Overvolt S/D (Y/N)	N
30 sec S/D delay (Y/N)	N
Open/Close to S/D (O/C) [O]	O
Power SW Detect (Y/N)	N
EN PSFAIL Det (Y/N)	N
Relay Active on Fail (N)	N

Telnet IP 192.168.0.2 port 23

Appendix F – Loading New Firmware

Firmware upgrades can only be done through the RS-232 port.

You will need to obtain a copy of mcLoader from Hybricon with the firmware upgrade.

1. Connect computer to monitor board using RS-232 cable (RS1 Connector on monitor board). Have the power to the monitor switched off.
2. Launch mcLoader application you should see the following screen.
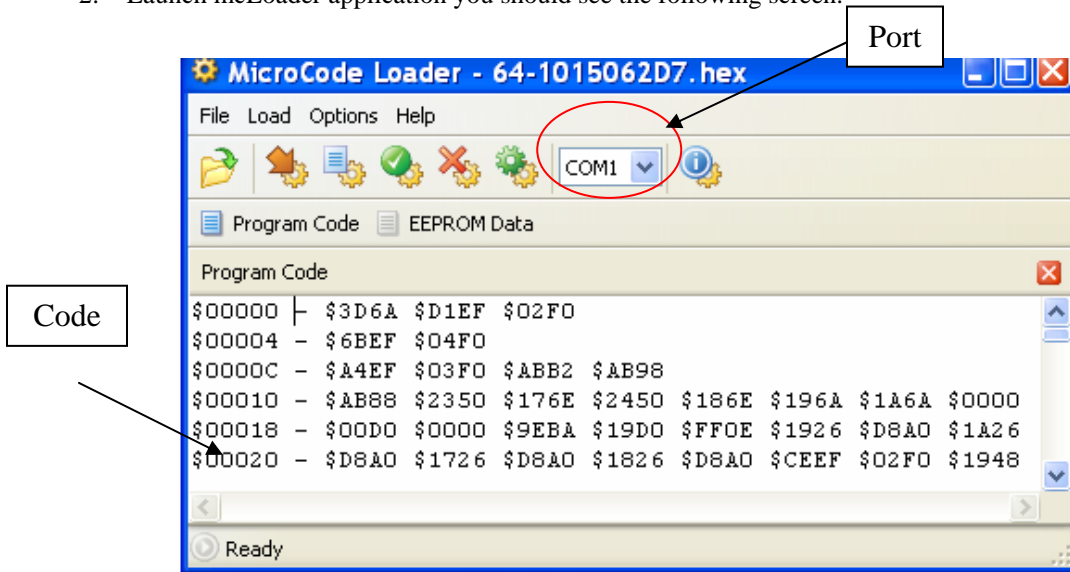
3. Verify that the correct port is selected.

Typically you will be connected to the monitor board through COM1.

4. Select the code to load.
   a. File > Open > Browse to find the firmware upgrade (.hex file).

5. Load the code.
   a. Load > Program
   b. You will get a Loader Message "Reset Required"

6. Reset Monitor Board
   a. Switch the power to the monitor board on.
   b. You will get a message "Programming" and you will see the status bar showing the progress of the programming.

At this point the new firmware is loaded, you will need to go through the complete monitor setup again with the new firmware.

Appendix G – Update XPORT

*XPORT updates can only be done through the Ethernet connection.*

You will need to obtain the xport upgrade software package and an authorization key from Hybricon.

<u>Software Setup</u>

1. Load the .net framework.
2. Install the Lantronix Port Installer.

<u>XPORT Upgrade</u>

1. Record the serial number (printed on bottom of monitor board) and MAC address (printed on XPORT/Ethernet Connection).
2. Connect the XPORT to your computer.
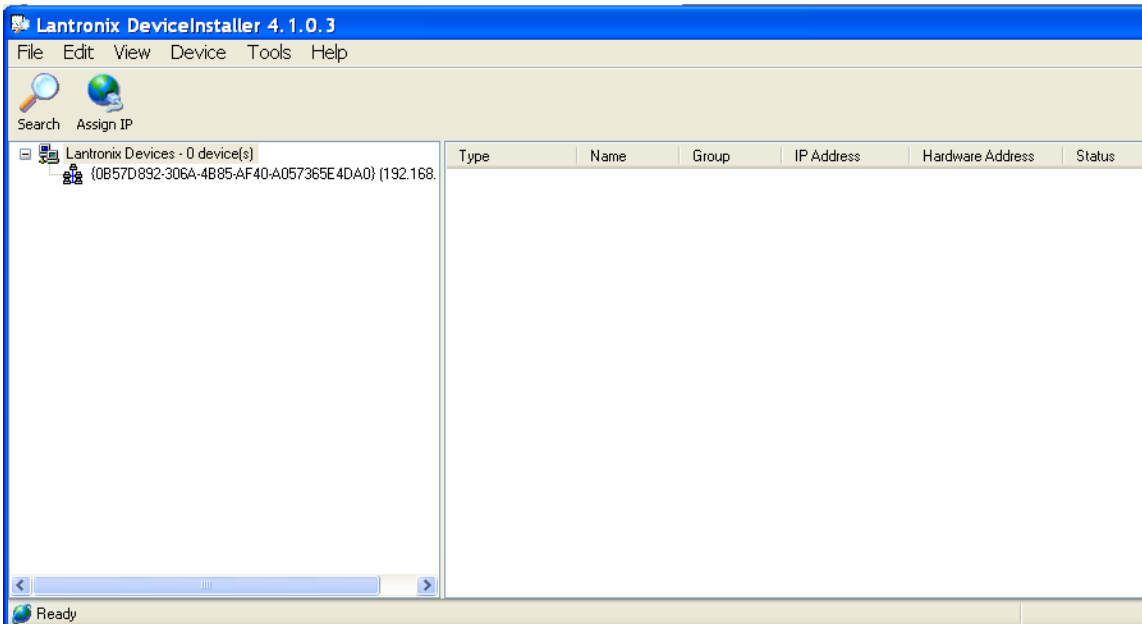
3. Start the Lantronix Port Installer.
   a. The software my find the XPORT after a few seconds.
   b. If the XPORT is not found, you will need to manually find it.
       i. Device > Add Device
       ii. You will now be prompted to enter the IP address or DNS server. Enter 192.168.0.2.
   c. Right Click on the XPORT in the right pane.
       i. Click the UPGRADE icon on the toolbar.
       ii. Choose "Create a custom installation…"
       iii. Browse for the XPORT Upgrade firmware from Hybricon (should be xpt03_6102GCBx.ROM.
       iv. Load the Firmware.

   d. Right Click on the XPORT in the right pane.
       i. Click the TELNET Tab
       ii. At the menu prompt enter 10 (it is not an option listed on the menu display).
       iii. Enter the 16 bit code you were provided with (you will need to hit space or enter after each two characters you enter).

   e. You should see a message like " Init_APS in EEPROM + PLUS! Forced".

Appendix H System Specifications

Input Voltages: To power unit -
9.5 –38VDC @ 150mA

Fans -
10-52VDC @ 25A Fan Power–used only if the unit controls the speed of system fans.

The fans need to be of the type in which the tachometer produces 2 square-wave pulses per revolution and has open-collector drive. This is the type used in the vast majority of fans.

Temperature:
Board: -54C to 85C Standard (95C Special order)
Temp sensors: Standard -17 to 125C
                          Extended range sensors -40 to 125C

If unit is not powering external fans , no airflow is needed below 65C. Above 65C 10 LFM is required.

If the unit powers fans, no airflow is needed below 50C. Above 50C, 30 LFM is required.
Humidity
0% - 95% R.H. (non-condensing) 0-100% (conformal coated) Special order

Shock/Vibration
25Gs swept 1HZ – 20Hz . 35G 1 time shock.