4820 DC Load
User Manual

Part No. 09-0288

REVISION E

January 19, 2008

Document History

Rev X1	**Preliminary**	**11/4/04**	**C. A. R.**
Rev X2	**Add operation section**	**11/30/04**	**R. W.**
Rev X3	**Add constant power description to software operation. Fix various grammar and spelling errors.**	**12/2/04**	**R. W.**
Rev X4	**Added detail to operating envelopes, added additional communication information, referred to the fast portion of the load consistently as the "digital section", and other clean up.**	**12/6/04**	**R. W.**
Rev X5	**Update screen captures and other corrections**	**5/5/05**	**R. W.**
Rev A	**Update screen captures and other corrections. Release ECO 15952**	**6/22/05**	**P. G. B.**
Rev B	**ECO 15967**	**8/8/05**	**BH**
Rev C	**ECO 16017**	**12/8/05**	**BH**
Rev D	**ECO16091 Update to detail new SW/FW features supporting serial VIDs and an increase in the digital load step to 60A.**	**6/28/06**	**RW**
Rev E	**ECO 16650 Add SVID control to user interface.**	**1/19/08**	**RW**

TABLE OF CONTENTS

1. DESCRIPTION

The Model 4820 is an electronic programmable DC load targeted to test low voltage high current high di/dt DC/DC converters located on computer motherboards.

There are two parts to the 4820, an S400 Control Module and a remote Load Pod. The Control Module sits in a S400 chassis and controls the remote Load Pod. The remote Load Pod contains two loads, a very slow Linear (Static) load for constant current and a fast Digital (Dynamic) Load designed for maximum di/dt. The Load Pod plugs into a CPU socket on the motherboard.

Several different load Pods are required, one for each UUT interface.

An update was done in June 2006 and provides enhanced capabilities. Please see section 5. "June 2006 – SVID/60A Update" for more information.

1.1 Features

Both Loads Voltage, Current, Power	0.8 to 1.6V, 0 to 160A, 140W continuous 200W peak
Linear Load Voltage, Current, Power	0.6 to 2.0V, 0 to 110A, 90W continuous 125W peak
Digital Load Voltage, Current, Power	0.8 to 1.6V, 0 to 50A, 50W continuous 75W peak
Di/dt Digital Load	0.1A/µSec to greater than 400A/µSec
Programmable Modes	Constant Current with both loads Constant Resistance with Digital Load Transient Mode with Digital Load Constant Power with both loads Constant Temperature
Measurements	Voltage, current, power and temperature
Protection	Over voltage, current, power, temperature Reverse voltage

1.2 Block Diagram

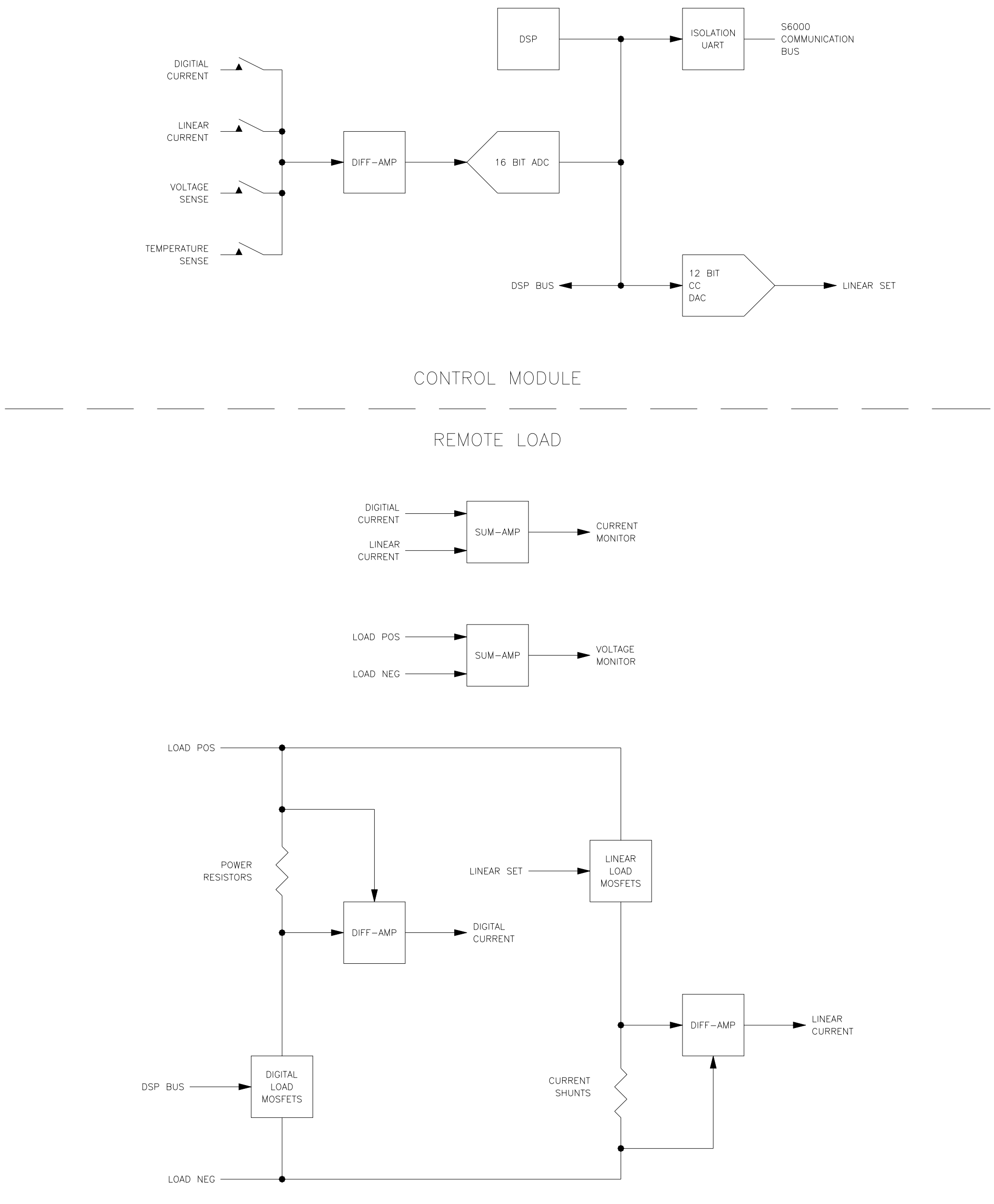
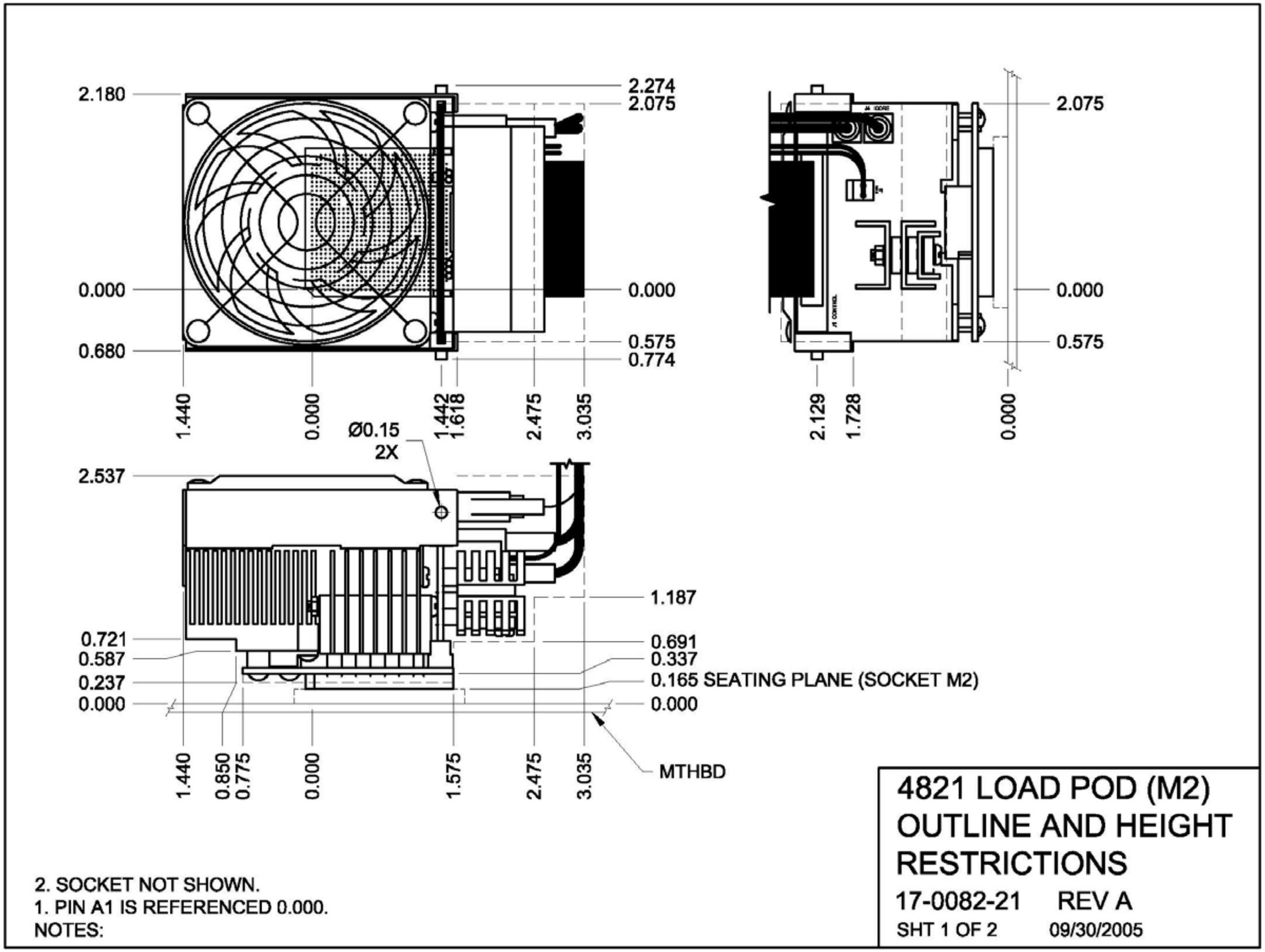
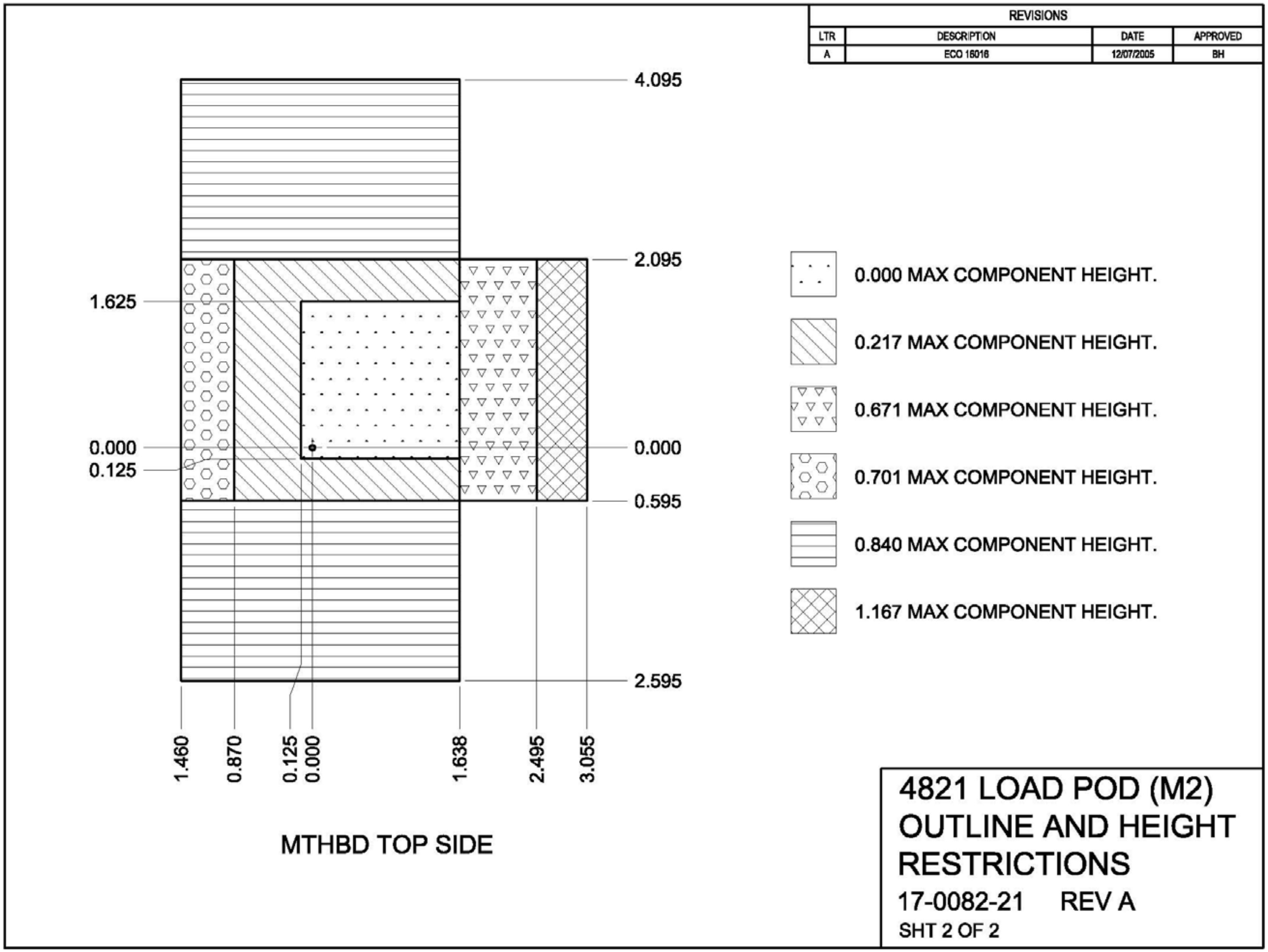


Figure 1 – Block Diagram

1.3 Mechanical Drawings

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0.217 MAX COMPONENT HEIGHT.
0.671 MAX COMPONENT HEIGHT.
0.701 MAX COMPONENT HEIGHT.
0.840 MAX COMPONENT HEIGHT.
1.167 MAX COMPONENT HEIGHT.
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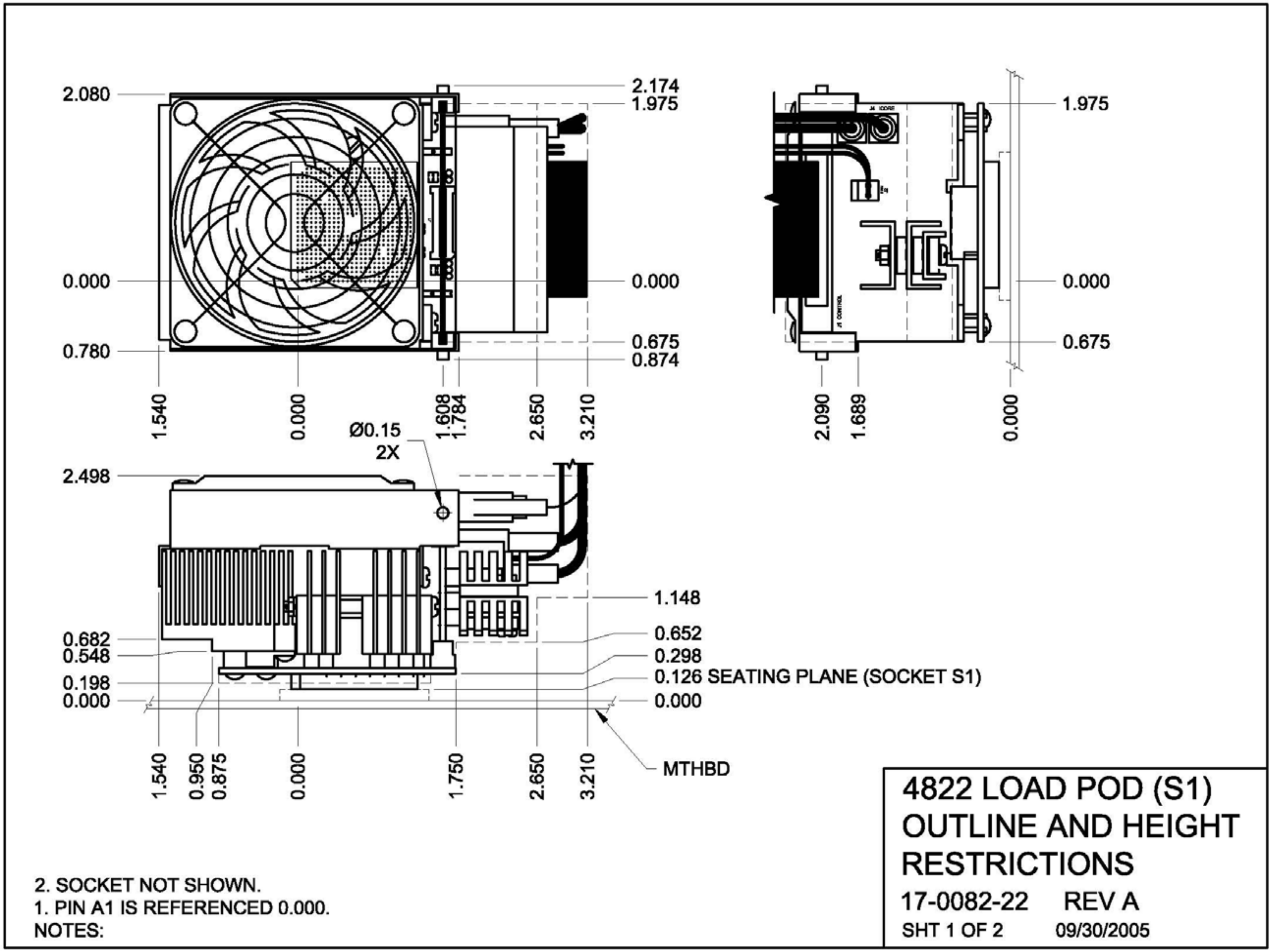
4821 LOAD POD (M2)
OUTLINE AND HEIGHT
RESTRICTIONS
17-0082-21 REV A
SHT 2 OF 2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0.126 SEATING PLANE (SOCKET S1)
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0.875
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4822 LOAD POD (S1)
OUTLINE AND HEIGHT
RESTRICTIONS
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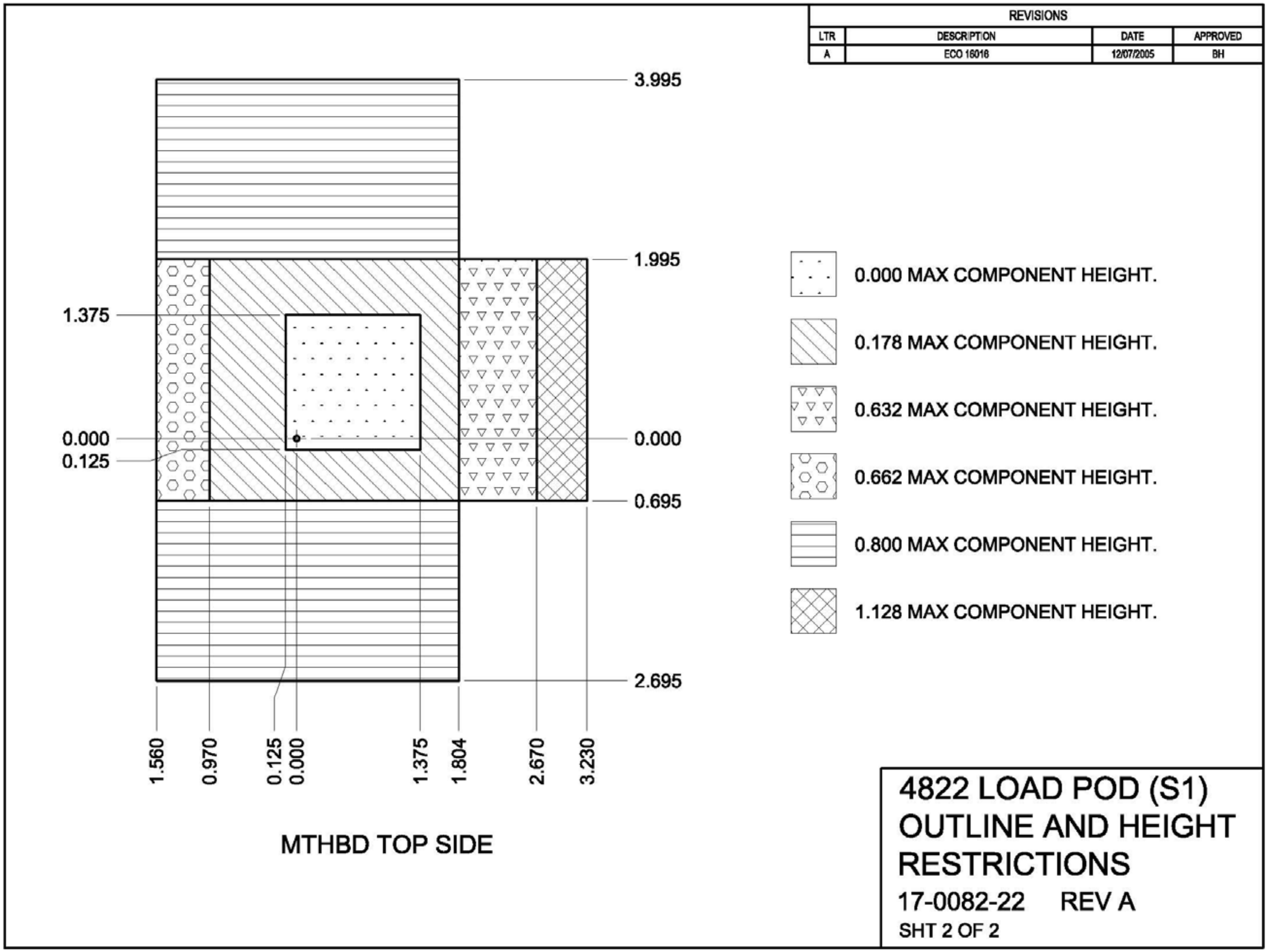
2. SOCKET NOT SHOWN.
1. PIN A1 IS REFERENCED 0.000.
NOTES: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3.230
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OUTLINE AND HEIGHT
RESTRICTIONS
17-0082-22 REV A
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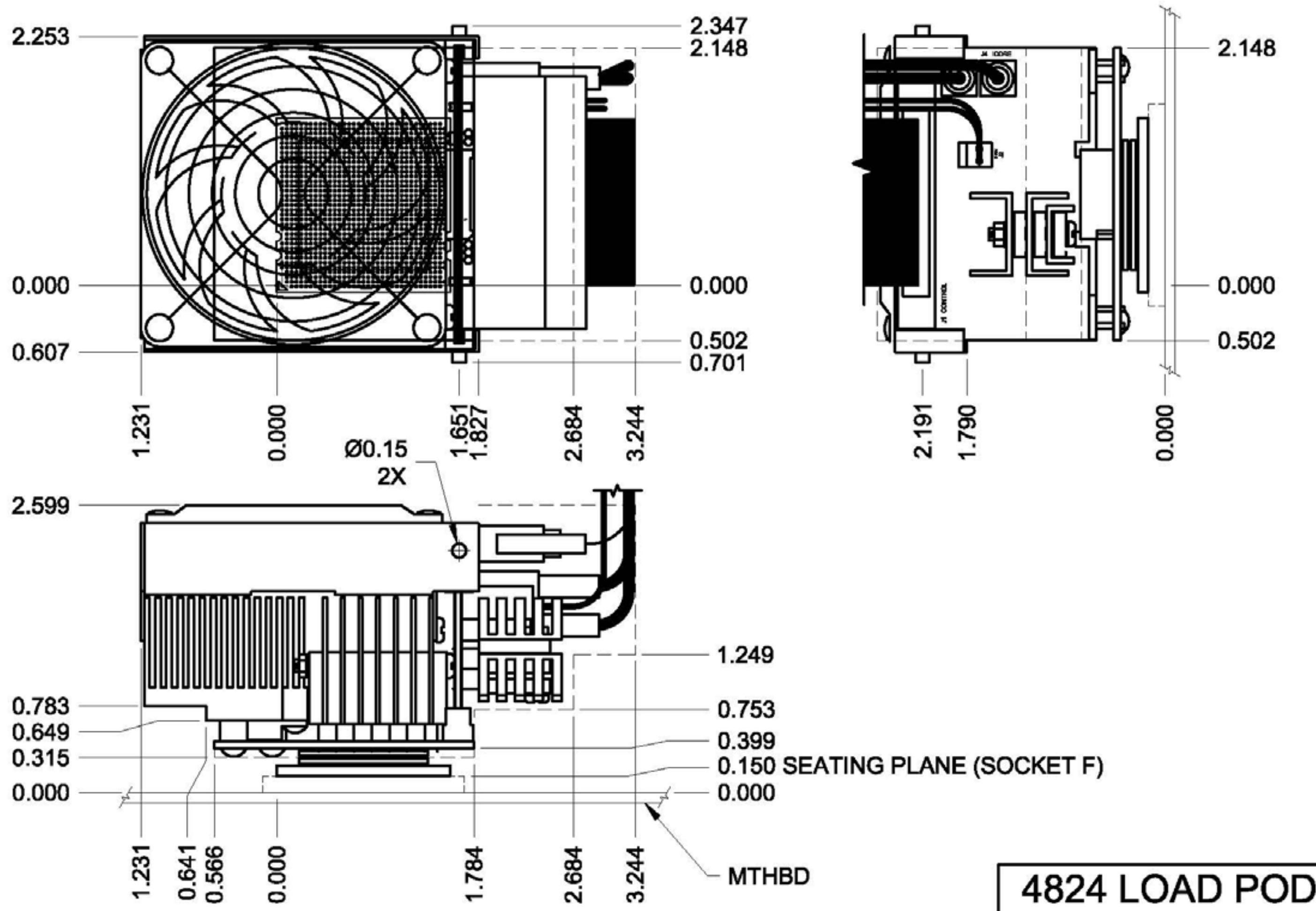

2. SOCKET NOT SHOWN.
1. PIN A1 IS REFERENCED 0.000.
NOTES:

4824 LOAD POD (L1)
OUTLINE AND HEIGHT RESTRICTIONS

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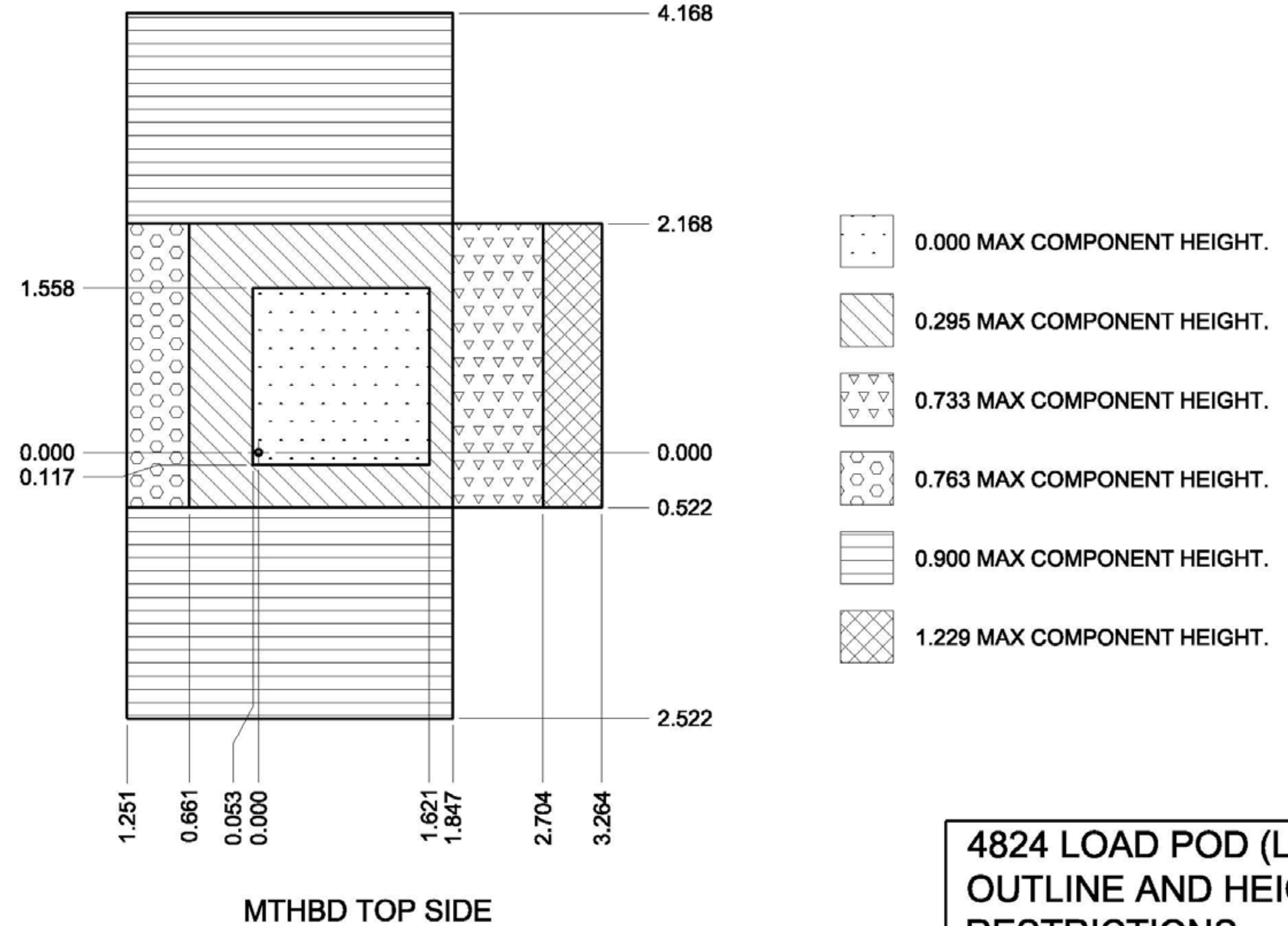


4824 LOAD POD (L1)
OUTLINE AND HEIGHT
RESTRICTIONS
17-0082-24 REV A
SHT 2 OF 2

1.4 Dual Load Operating Envelope

When operating the load, both the linear and the digital sections are used in parallel to achieve the total performance shown in the figure below. The continuous curve is the operating envelope that can be maintained (with adequate cooling and inlet air conditions) for an indefinite period-of-time. The peak curve shows the operating envelope limited to approximately five seconds.

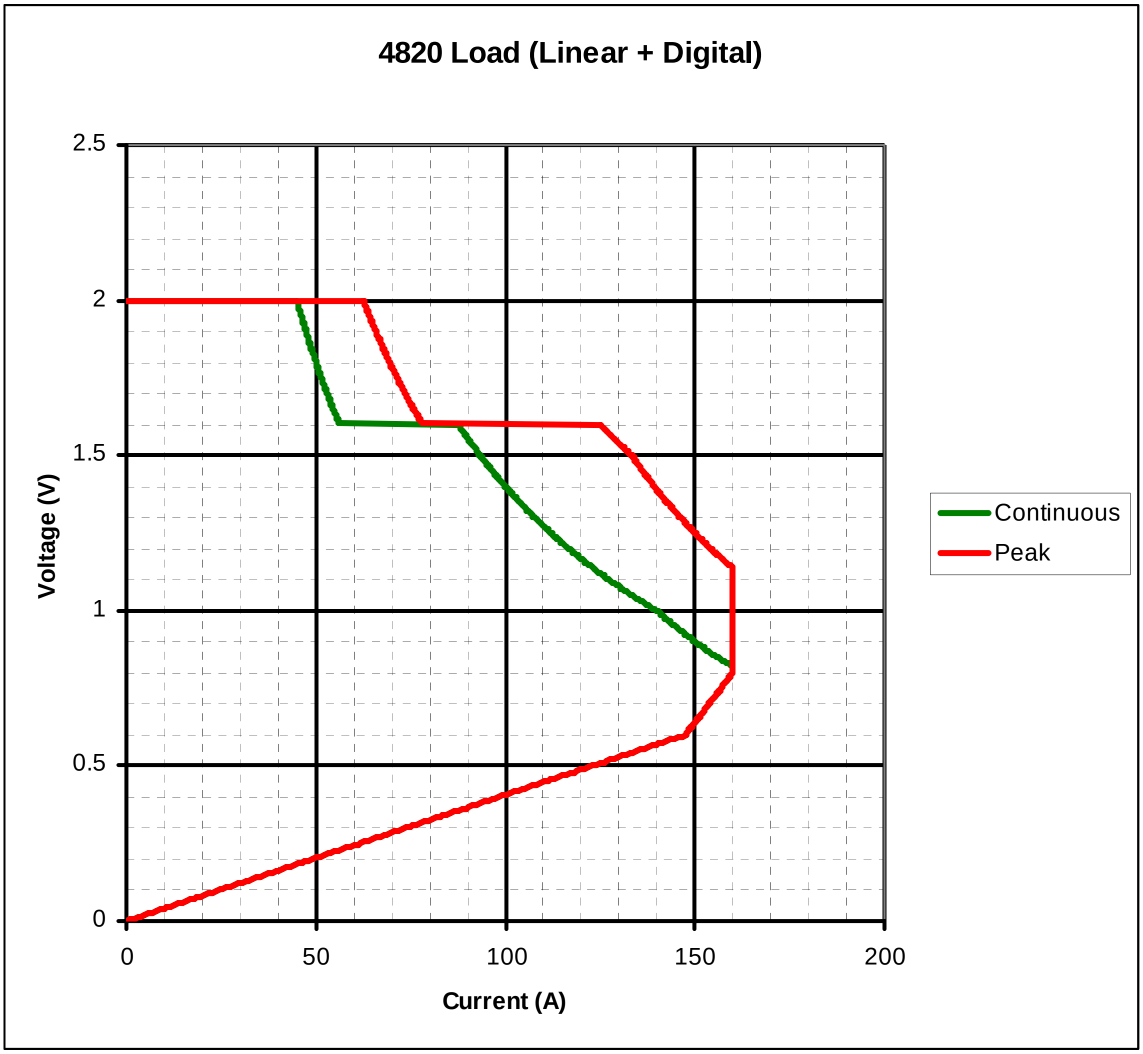


Figure 2 - Combined Operating Envelope

1.5 Linear Load Operating Envelope

The linear portion of the load provides the baseline loading to which is applied the fast digital load transients. The following diagram illustrates the operating envelope for only the linear section of the load. The continuous curve is the operating envelope that can be maintained (with adequate cooling and inlet air conditions) for an indefinite period-of-time. The peak curve shows the operating envelope limited to approximately five seconds.

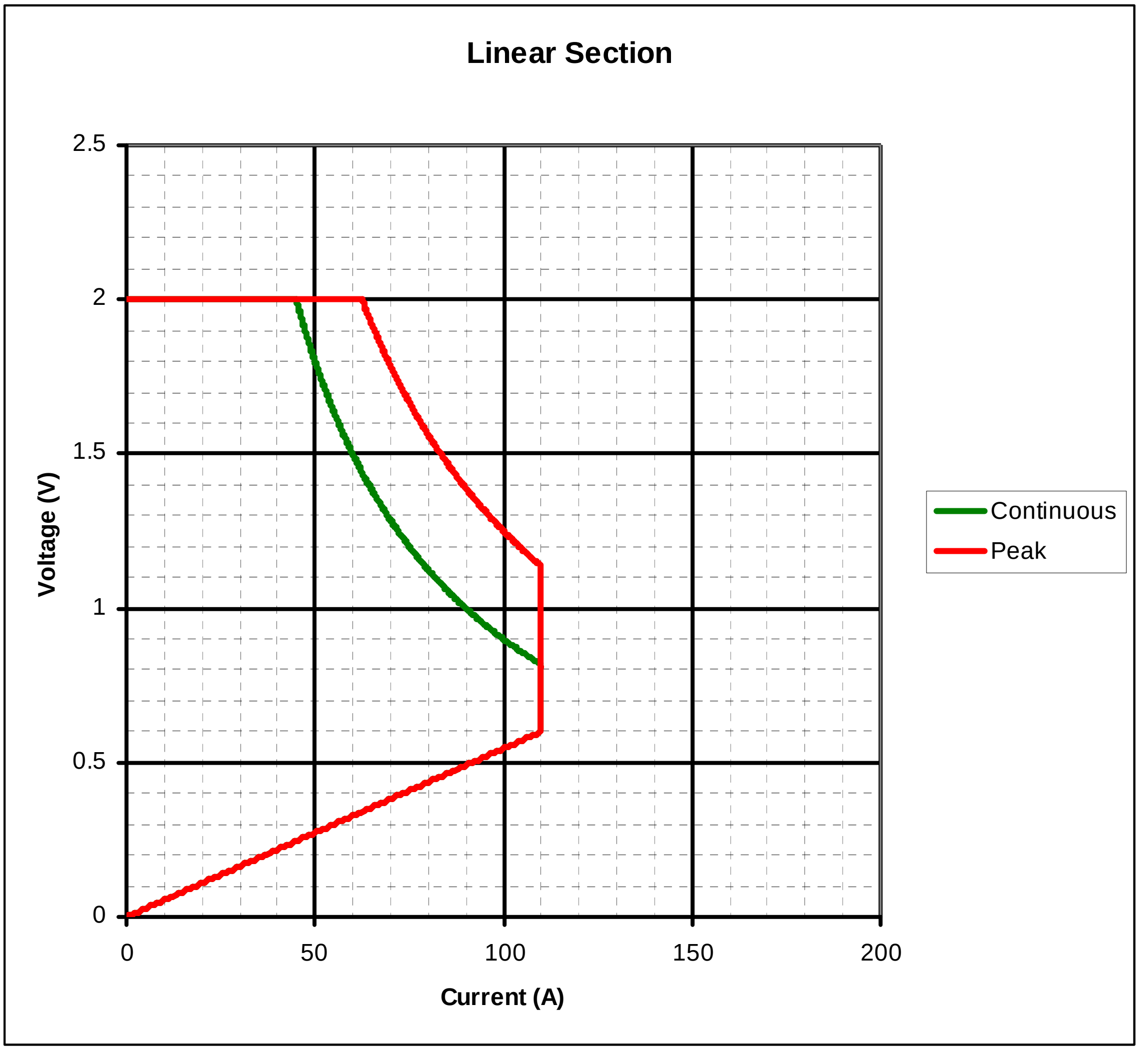


Figure 3 - Linear Section Only Operating Envelope

1.6 Digital Load Operating Envelope

The digital portion of the load provides the high-speed transient capability of the load. The following diagram illustrates the operating envelope for only the digital section of the load. The continuous curve is the operating envelope that can be maintained (with adequate cooling and inlet air conditions) for an indefinite period-of-time. The peak curve shows the operating envelope limited to approximately five seconds.

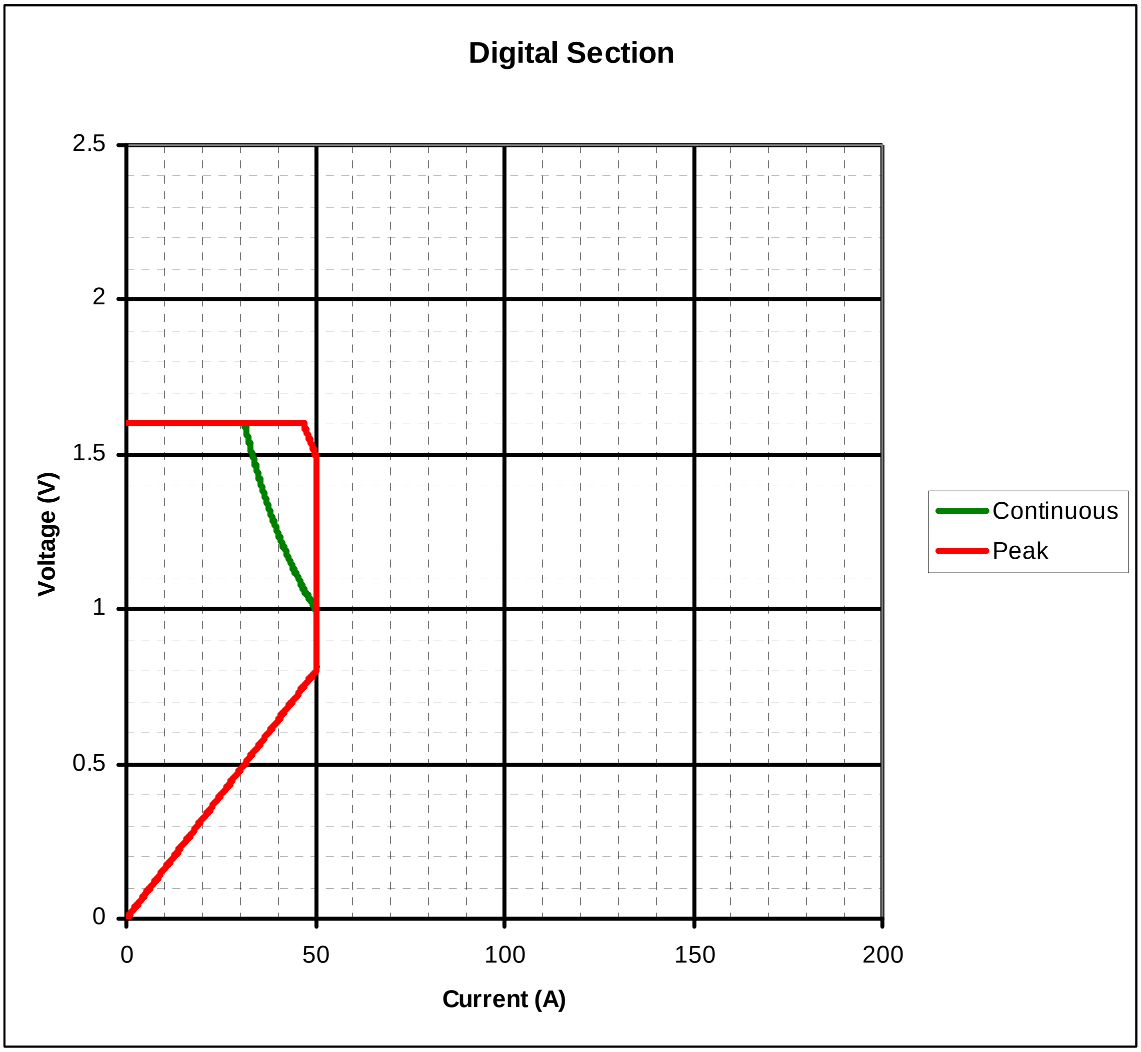


Figure 4 - Digital Section Only Operating Envelope

2. SPECIFICATIONS

2.1 S400 Chassis

2.1.1 Input Power

The instrument can be ordered from the factory for either single phase 115 VAC, single phase 230 VAC.

Single Phase Power 115 VAC	
Input Voltage Range	103 to 132 VAC
Frequency	47 to 440 Hz
Input Current	30 Amps Max
Maximum Output Power	1,200 Watts per Chassis
Single Phase Power 230 VAC	
Input Voltage Range	208 to 264 VAC
Frequency	47 to 440 Hz
Input Current	30 Amps Max
Maximum Output Power	2,400 Watts per Chassis

2.1.2 Soft Start

Instrument includes soft start circuitry to limit turn-on surge current.

2.1.3 Physical

Size: 5 ¼" (h) x 19"(w) x 22"(d)

Weight: Master Chassis: <26 lb.
Modules: <6 lb.

Chassis slides: The instrument accommodates CHASSIS TRAK P/N CTHRS-1-18 slides.

2.1.4 Airflow

The cooling fans are located in the front of the S400 chassis. Air is drawn in from ventilation holes located in the front section of the top, side and bottom panels. The air exits through the rear panel.

2.1.5 Module Removal

The modules are easily removed or replaced by first uncovering the top cover and then extracting from the instrument.

2.1.6 Rear Panel Connections

All I/O functions are accomplished using rear panel mounted connectors.

2.2 Programmable Features

Programmable features are accessed through the emPower device driver and soft-panel. Note that the load (both sections) operates in either constant current or constant power mode, not both simultaneously.

Constant Current Linear Load	Range Accuracy Resolution	0 to 110A 1% of set + 1% of range 0.025% of range
Transient Current Digital Load	Range Accuracy Resolution	0 to 50A 1% of set + 1% of range 1% of range
Slew Rate Digital Load	di/dt	0.1A/µSec to greater than 400A/µSec
Transient Mode Digital Load	Settings Total Period Delay Resolution Accuracy Modes	100 1µSec to 10Sec 500nanoSec to 5Sec 100nanoSec 0.1% ± 200nanoSec Single burst or continuous
Constant Power Linear Load	Range Accuracy Resolution	90W 1% of set + 1% of range 0.025% of range
Constant Power Digital Load	Range Accuracy Resolution	50W 1% of set + 1% of range 1% of range
Linear Load Heat Sink Temperature	Range Accuracy Resolution	0 to 90°C 5% of set 1% of range

2.3 Measurements

All measurements are made with a single 16bit ADC sampling at a fixed rate of 78,125 samples per second. A four-channel multiplexer switches between voltage, linear current, digital current and temperature. Measurements are averaged over a programmable aperture time from 0.001 to 10 seconds (see Figure 1 – Block Diagram).

Current Linear load	Range Accuracy Resolution	0 to 110A 1% of reading, + 1% of range 0.0015% of range
Current Digital Load	Range Accuracy Resolution	0 to 50A 1% of reading + 1% of range 0.0015% of range
Voltage	Range Accuracy Resolution	0 to 2V 0.1% of reading, + 0.1% of range 0.0015% of range
Power	Range Accuracy Resolution	0 to 320W voltage + current 0.0015% of range
Linear Load Heat Sink Temperature	Range Accuracy Resolution	0 to 150°C 2% of reading 0.0015% of range

2.4 Total Power

0 to 140W continuous, 200W peak for less than 5 seconds.

2.5 Voltage Linear Load

0.6 to 2V full current, current reduces to 0A at 0V.

2.6 Voltage Digital Load

0.8 to 1.6V full current, current reduces to 0A at 0V.

2.7 Current Digital Load

During constant current operation, the voltage is measured and the correct resistors are selected to obtain the desired current.

During Transient operation, the nominal or last voltage measurement is used to calculate the resistor values which cause the transient current.

2.8 Current Monitor

Differential current sense is used. An SMB connector drives 1millivolt per amp into a 50-ohm terminator, 2millivolt per amp unterminated. This signal is referenced to the load negative input.

2.9 Voltage Monitor

Differential voltage sense is used. An SMB connector drives 1volt per volt into a 50-ohm terminator, 2volts per volt unterminated. This signal is referenced to the load negative input.

2.10 DINs

Eight digital inputs are provided at the Load Pod; one is PWROK and seven general purpose input. The reference level is resistor selectable to be one half of VDDIO or a fixed voltage.

2.11 DOUTs

Eight open collector outputs are provided at the Load Pod; seven are used for VID control and one general-purpose output.

Eight additional open collector outputs are provided at the control module, for general-purpose output.

2.12 Triggers

Trigger output is provided.

2.13 Size

One S400 Control Module and a 4 x 2.7 x 2.4 inch remote Load Pod.

2.14 Weight

10 lbs.

2.15 Remote Sense

Hard wired to UUT connection.

2.16 Communication

Implements and conforms to the S400 command packet protocol and via standard RS-232 serial 9-pin connector.

2.17 Protection

Over-voltage and reverse-voltage protections are provided by the avalanche rated body diode in the power MOSFETs.

Over-voltage, over-temperature, over-current and over-power protection are provided in firmware.

Over-temperature protection of the Digital Load may cause the Linear Load to run cooler than programmed.

2.18 Isolation

1000VAC between AC input and (load or chassis ground), ± 100VDC between load and chassis ground.

2.19 Calibration

Closed cover, all adjustments are done in software and stored in an on-board FLASH.

Equipment Required:

Multimeter, Hewlett Packard Model 3458A or equivalent

NHR Model 3100 Universal Calibrator.

2.20 Self-test

Power-up self test is implemented in firmware and will report comprehensive error messages about the status of the input, output, control board, and protection mechanisms.

2.21 Performance Monitoring

Performance monitoring is performed continuously by the 4820 DC load's controller. In case of measurement ambiguities, over/under range conditions, heat sink temperature limits reached, et cetera, an appropriate error or warning is sent to the controlling device. The controlling software will display an error or warning as appropriate.

2.22 Temperature

Operating from 0 to 35°C at full power, de-rate to 85% of full power at 42°C; de-rate to 70% of full power at 50°C.

Specifications apply at 23 ± 5°C after 10-minute warm-up.

2.23 Control power

Conforms to S400 input power.

2.24 Processor

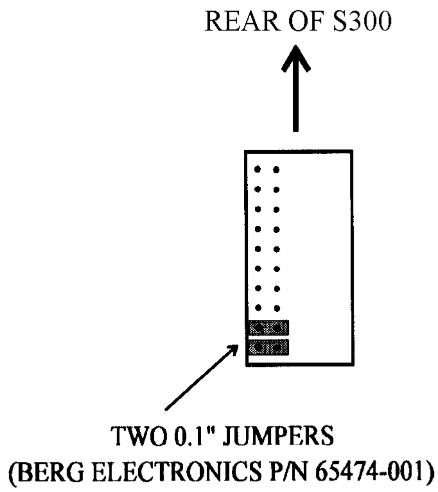
Texas Instruments TMS320C32 Floating Point DSP is used for all control.

3. INSTALLATION

3.1 S400 Chassis

Each S400 module has two connectors which plug into the motherboard inside the S400 chassis. Mate modules with the motherboard from the rightmost slot toward the leftmost, with respect to the S400 front panel. If there is a filler panel in that slot, remove it first by unscrewing the two holding screws. Once the module has been placed firmly into the S400 slot, align and tighten the thumbscrews located on the rear of the DC module.

If it is desired to leave a slot blank, two bus continuation connectors must be placed in each slot that is to be skipped.

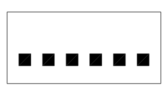
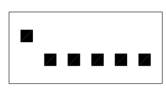
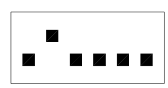
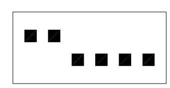


3.2 Control Module

3.2.1 Address Switch

Before a module is inserted into the S400 chassis, the MODULE ADDRESS needs to be set. The address must be a unique number (for a given controller chassis) between hexadecimal 1 and 3F (decimal 1 and 63). This address is programmed into the module using the 6-bit address switch on the bottom of the Control Module. This address switch setting must match the software address. The LSB is labeled 1 toward the rear or Load Pod Connector. The MSB is labeled 6 toward the front of the module. When a switch bit is moved toward the outside of the module, the bit is set to 0. When a switch bit is moved toward the inside of the module, the bit is set to 1. If all six positions of this switch are off when the load is turned on, it will boot from firmware in EPROM and not from FLASH. This is useful if the firmware in FLASH has been corrupted.

Example:

COMMUNICATION ADDRESS	0X00	0X01	0X02	0X03
ADDRESS SWITCH POSITION				

3.2.2 Baud Rate

A baud rate of 19.2k or 38.4k may be selected. In most cases, 19.2k (factory default) will be used, however, if you want to change the desired baud rate, select with jumper W2 on the control PCA.

3.2.3 Connectors

3.2.3.1 Load Pod

This cable runs from the Control Module to the Load Pod.

3.2.3.2 DOUTS

Eight open collector outputs DOUT8 – DOUT15 are provided at the control module, for general-purpose output.

3.3 Load Pod

3.3.1 Hardware Installation

Unpack the load. Save the packing material if a need arises to return the load.

The Load Pod consists of two parts. A Load Pod Power assembly has large heat sinks and plugs into the CPU socket. A Load Pod Interface assembly connects between the Load Pod Power assembly and the cable to the Control Module.

Release the ZIF socket on the Mother Board under test. Plug the Load Pod Power assembly into the CPU socket on the Mother Board and close the ZIF socket. Plug the Load Pod Interface assembly into the Load Pod Power assembly. Attach the cable from the Load Pod to the Control Module.

3.3.2 Airflow

The load may dissipate 140W of heat. Allow for 30CFM of air to enter the top and exit the sides of the load.

3.3.3 Connectors, Load Pod Interface

3.3.3.1 Control

This cable runs from the Control Module to the Load Pod

3.3.3.2 Fan

This connector supplies 7.0 to 14 volts to drive the fan. The voltage will vary to control heat sink temperature.

3.3.3.3 V Core

An SMB connector drives 1volt per volt into a 50-ohm terminator, 2volts per volt unterminated. This signal is referenced to the load negative input.

3.3.3.4 I Core

An SMB connector drives 1millivolt per amp into a 50-ohm terminator, 2millivolt per amp unterminated. This signal is referenced to the load negative input.

3.3.3.5 Load Power

This edge card connector connects to the Power PCA.

3.3.4 Connectors, Load Pod Power

3.3.4.1 Load Interface

This edge card connector connects to the Interface PCA.

3.3.4.2 PGA

This is inserted into the CPU socket.

3.4 Software Installation

IMPORTANT

The emPower software can only be installed on the following operating systems:
- Windows 2000
- Windows XP

Close all programs that are currently running in windows. Insert the CD into the drive. If the setup program does not autoplay, view the contents of the disk and double-click on “Setup” to start installation. Follow the instructions on the screen.

3.5 System Controller to S400 Communications

The S400 chassis requires an RS-232 serial connection to the PC. This can be achieved in one of two ways:

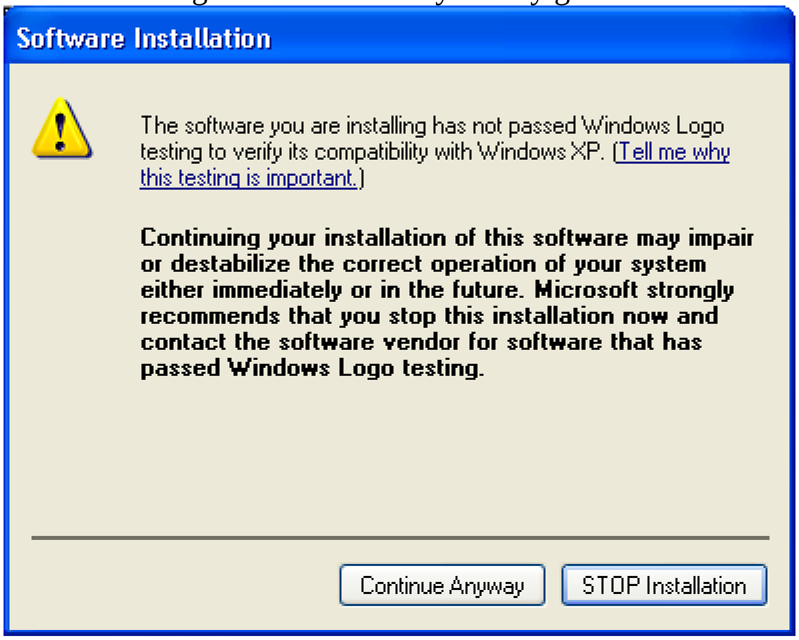
1. Use a standard PC serial port. Because of the nature of the communications protocol, many after-market serial cards will not work. Contact NHR customer support for a list of serial cards known to work with the NHR hardware.
2. Using a USB to Serial adapter (NHR PN 15-1596-00). ONLY the NHR USB to serial adapter will work with the emPower software. See USB Installation below for more details.

3.5.1 USB Installation

IMPORTANT - Do not connect the USB device to the computer until AFTER the emPower software installation has completed (see 3.4 Software Installation)

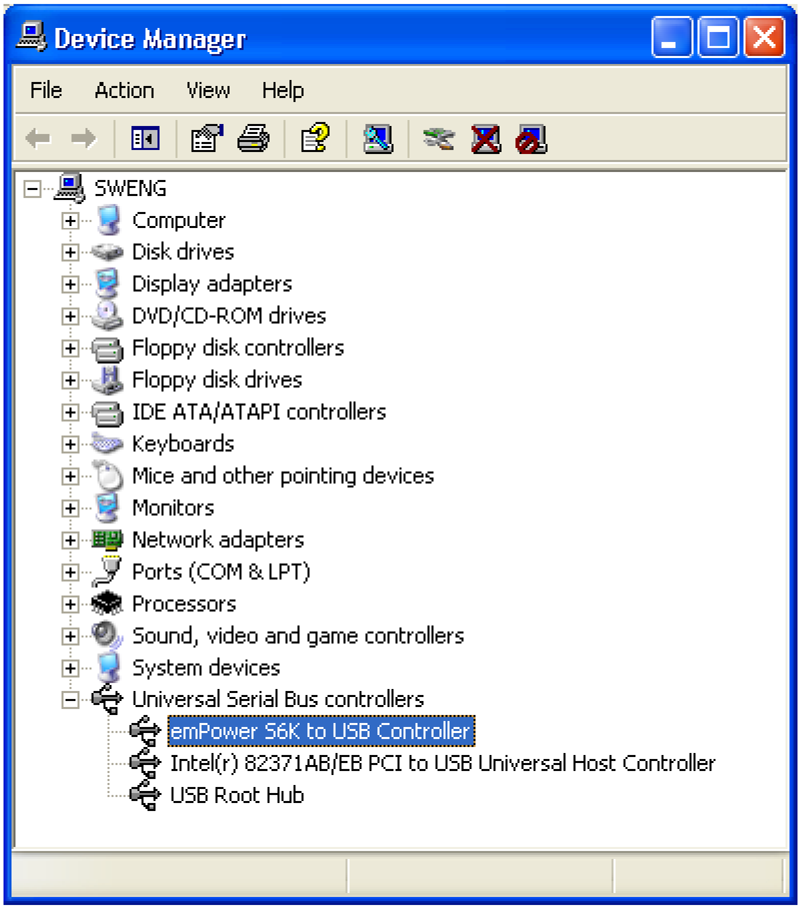
Connect the USB communication device (NHR PN 15-1596-00) to an available USB port on your PC. Windows will detect the new hardware. When prompted to select manual or automatic driver installation, choose automatic.

When installing on Windows XP you may get a software installation warning:

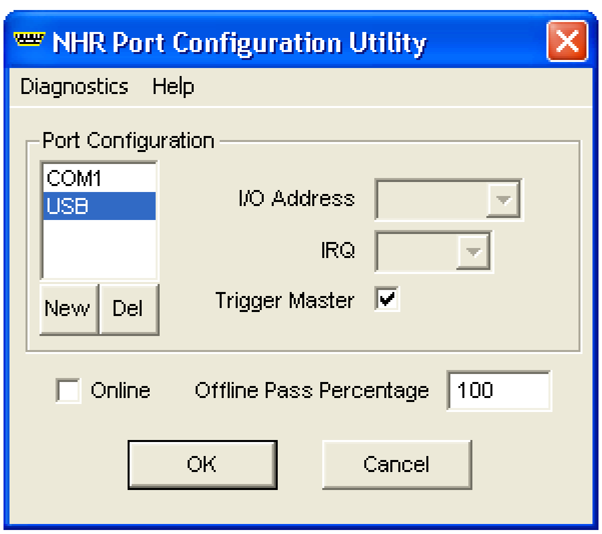


Select ‘Continue Anyway’ to complete a successful installation of the emPower S6K to USB Controller drivers.

Device Manager (found under the System Properties | Hardware menu) may be used to verify the correct installation of the emPower S6K to USB Controller. It should be located in the device manager under the Universal Serial Bus controller’s category. When it has been successfully installed, you should be able to see it as shown below.



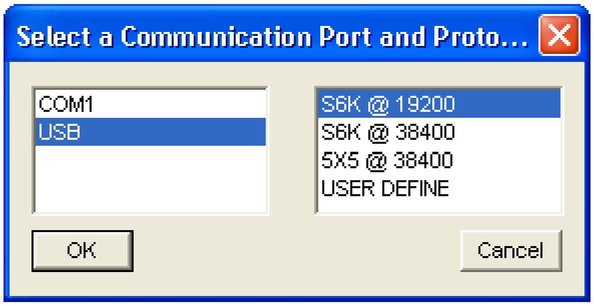
Before the USB adapter can be used to control your hardware, you must first add a USB port to the Port Configuration Utility. Locate and start the utility located at Programs | NH Research | emPower | PortCfg. You must configure the USB port that your hardware is connected to one time only in order for the software to recognize the USB converter correctly.



DESELECT the "Online" checkbox. This will keep the software from attempting to communicate while the configuration is being changed.

Click the “New” button and select USB port. Select Ok to save and end the Port Configuration Utility. Ensure compatibility with other emPower software by selecting Trigger Master for the port that is used to connect to the hardware.

Close Port Configurator with the “OK” button. Then start the “Hardware Configuration”. Use the NHRConfigurator to select the correct communication port and protocol for your hardware. The current configuration may be changed by highlighting the current protocol in the right pane, activating the context menu (right click) and selecting ‘Configure…’



Select the correct communication port (“USB”) and protocol. This will be either “S6K @ 19200 bps” or “S6K @ 38400 bps” depending on the baud rate that your hardware is set to. The default is “S6K @ 19200 bps”.

4. OPERATION

4.1 Hardware Operation

4.1.1 Status Indicator

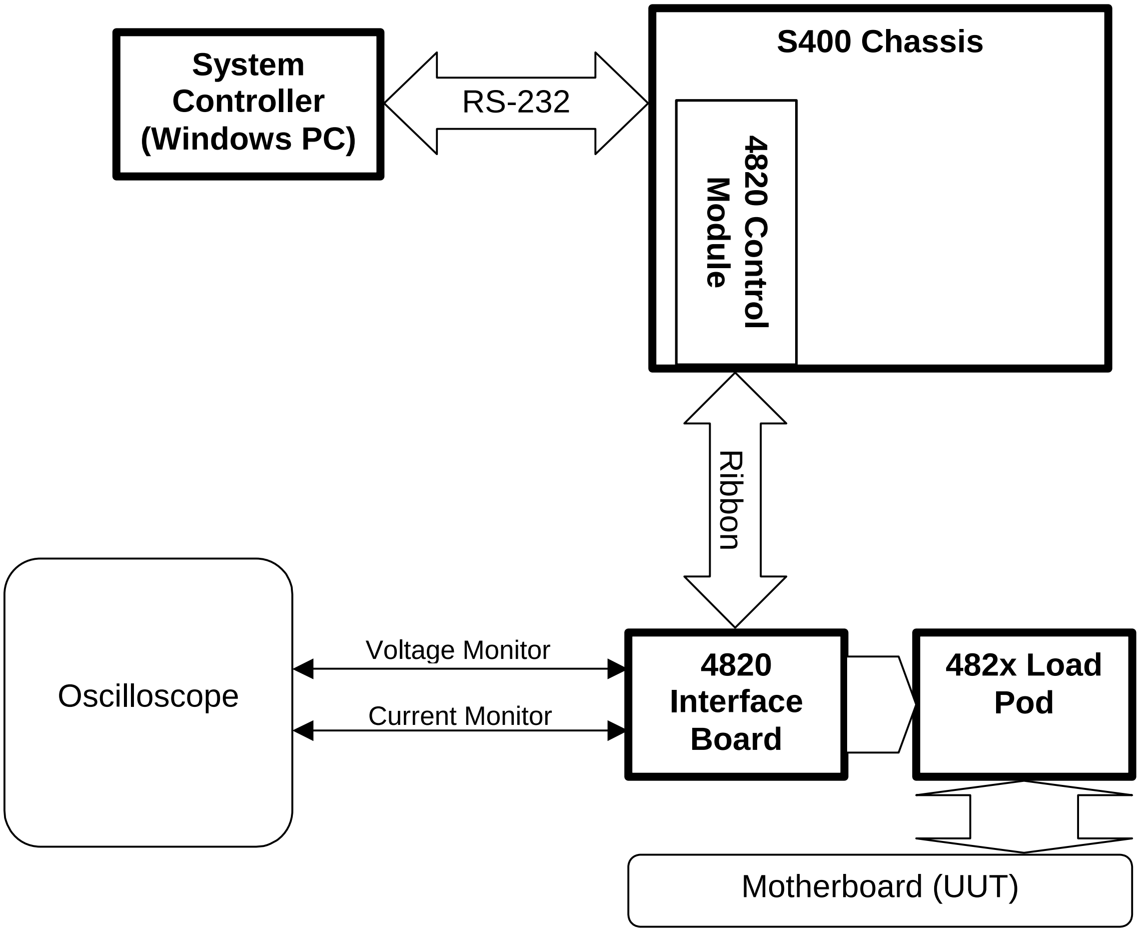
This yellow indicator may be seen by looking into the rear of the Control Module. This LED blinks at a one hertz rate during normal operation. This LED blinks at an 8-hertz rate during an error condition. If the LED is not blinking, remains off or on, the CPU in the control module is not operating.

4.1.2 COM Indicator

This green indicator may be seen by looking into the rear of the Control Module. This LED will blink when the computer is communicating with any device on the bus. This LED stays on when the computer is communicating with this load. If it remains off, there is no communication on the bus.

4.1.3 4820 DC Load

The 4820 DC Load is the generic name for a series of loads used to emulate the power requirements of a number of AMD processors. A complete load consists of five major components (see figure below).



The System Controller is a standard Windows PC running Windows 2000 or Windows XP. It connects to the S400 Chassis via an RS-232 serial interface. The S400 Chassis can contain up to six modules in any combination. In addition to one or more 4820 control modules, you may also install any other S400 compatible DC Loads or DC Sources. The 4820 Control Module connects to the 4820 Interface board via a 60-pin high-density ribbon cable. The interface board connects to the load pod via a card edge connector.

4.1.4 Connecting a Load Pod

Before connecting or disconnecting a load pod, the module must be in the off state. When controlling the module interactively, that is accomplished with the large on/off button on the panel. When running a test, it will be automatically put in the off state when the test is completed. It will be in an off state when emPower is not running or after a reset.

WARNING!!!

The 4820 Load MUST be in the OFF state BEFORE connecting or disconnecting ANYTHING!

That includes the ribbon cable between the control module and the interface board, the interface board to the load pod, AND the load pod to the motherboard.

The following sequence should be followed to connect a new load pod type to the control module.

WARNING!!!

The motherboard MUST be OFF BEFORE connecting or disconnecting the Load Pod!

1. Ensure the load is in the off state.
2. Disconnect the interface board from the ribbon cable.
3. Reinsert the interface board in the load pod and store them together. It is VERY IMPORTANT that the interface board and matching load pod remain together since the calibration data for the pod is contained in an EEPROM on the interface board.
4. Attach the new interface board to the ribbon cable.
5. Ensure the power is removed from the motherboard.
6. Attach the load pod to the motherboard to be tested. The load pod is specific to the type of AMD processor the motherboard is designed to support. Currently the 4821 Load Pod is for the M2 socket, the 4822 is for the Socket F, and the 4823 is for the S1 socket.
7. Be sure the load pod is firmly attached to the motherboard then insert the interface board in the load pod.
8. Perform testing.
9. Repeat for each motherboard, skipping steps 2 through 4 if the load pod is correct.

4.2 Software Operation

The load can be operated in one of three ways: interactively from the emPower control panel; in an automated test program created and executed in emPower; and, by using an ActiveX client controlling the load through the NHR ActiveX server. Each of these methods is described below.

4.2.1 emPower

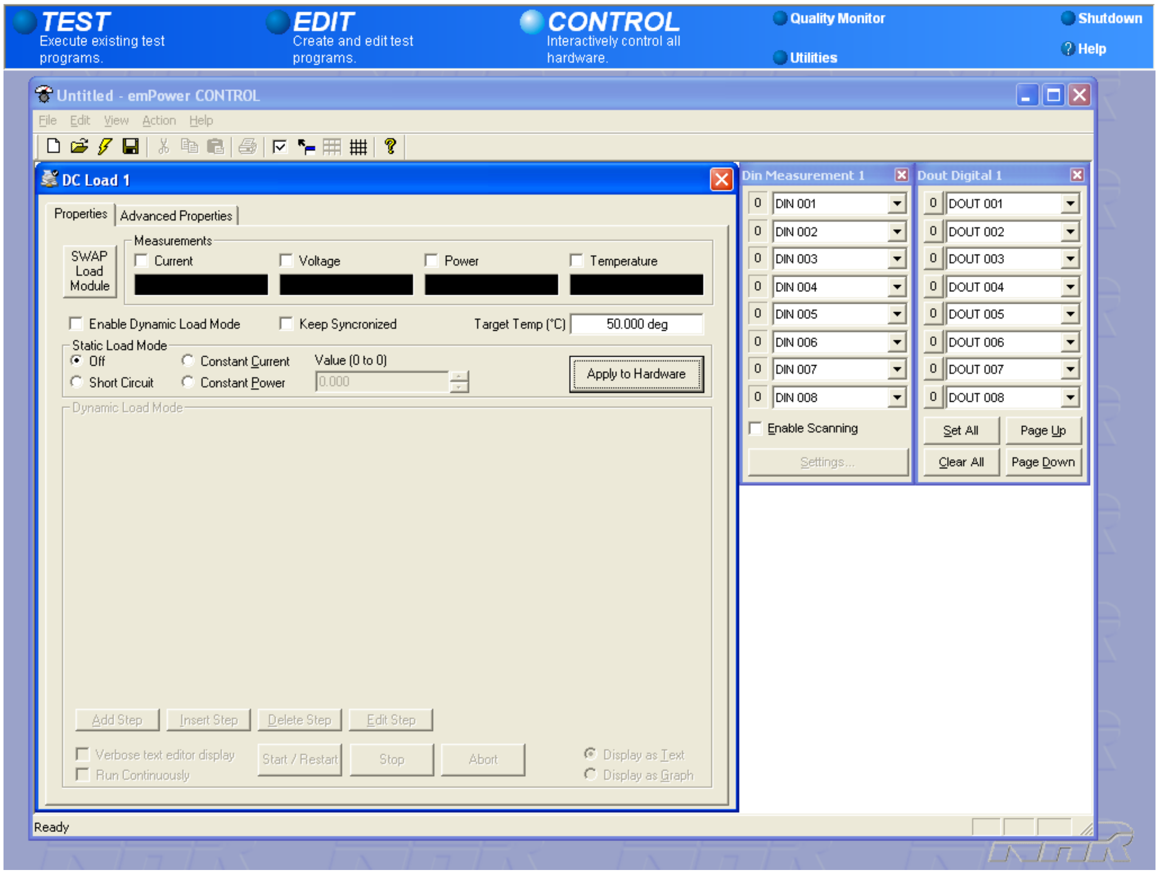
Whether interactive control or automated test program operation is desired, the starting point is the emPower test system environment. Please refer to the following documents for general information on the emPower test system environment.

*em**Power**®* Operator's Quick Reference (NH PN 09-0277)
*em**Power**®* Quick Start Guide (NH PN 09-0261)
*em**Power**®* Test Reference Manual (NH PN 09-0271)
*em**Power**®* Edit Reference Manual (NH PN 09-0270)
*em**Power**®* Control Reference Manual (NH PN 09-0275)
*em**Power**®* Utilities Reference Manual (NH PN 09-0269)
*em**Power**®* Test Routine Reference Manual (NH PN 09-0253)
*em**Power**®* Device Driver Reference Manual (NH PN 09-0252)
*em**Power**®* Datalog Driver Reference Manual (NH PN 09-0251)

The 4820 is seen by emPower like any other load. It can be controlled interactively by using "Control," it can be controlled as part of an automated test program by creating the test program in "Edit" and executing the test program in "Test."

4.2.1.1 Interactive Control

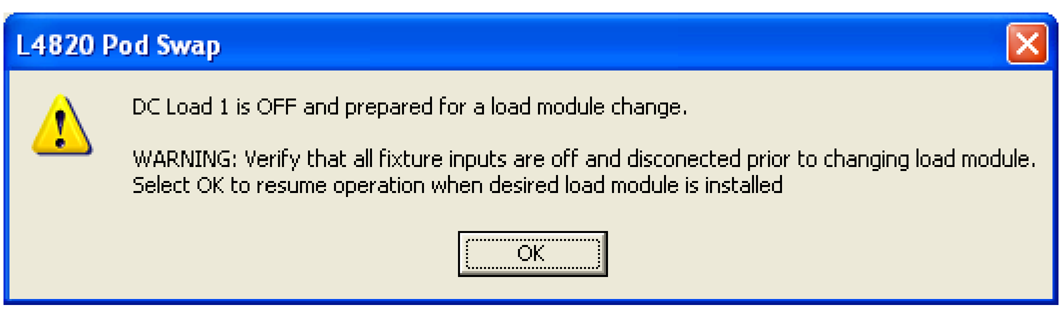
Start "Control" from the emPower app bar.



Digital inputs (Dins) can be monitored using the dialog titled "Din Measurement 1," while the state of the digital outputs (Douts) can be controlled with the dialog titled "Dout Digital 1."

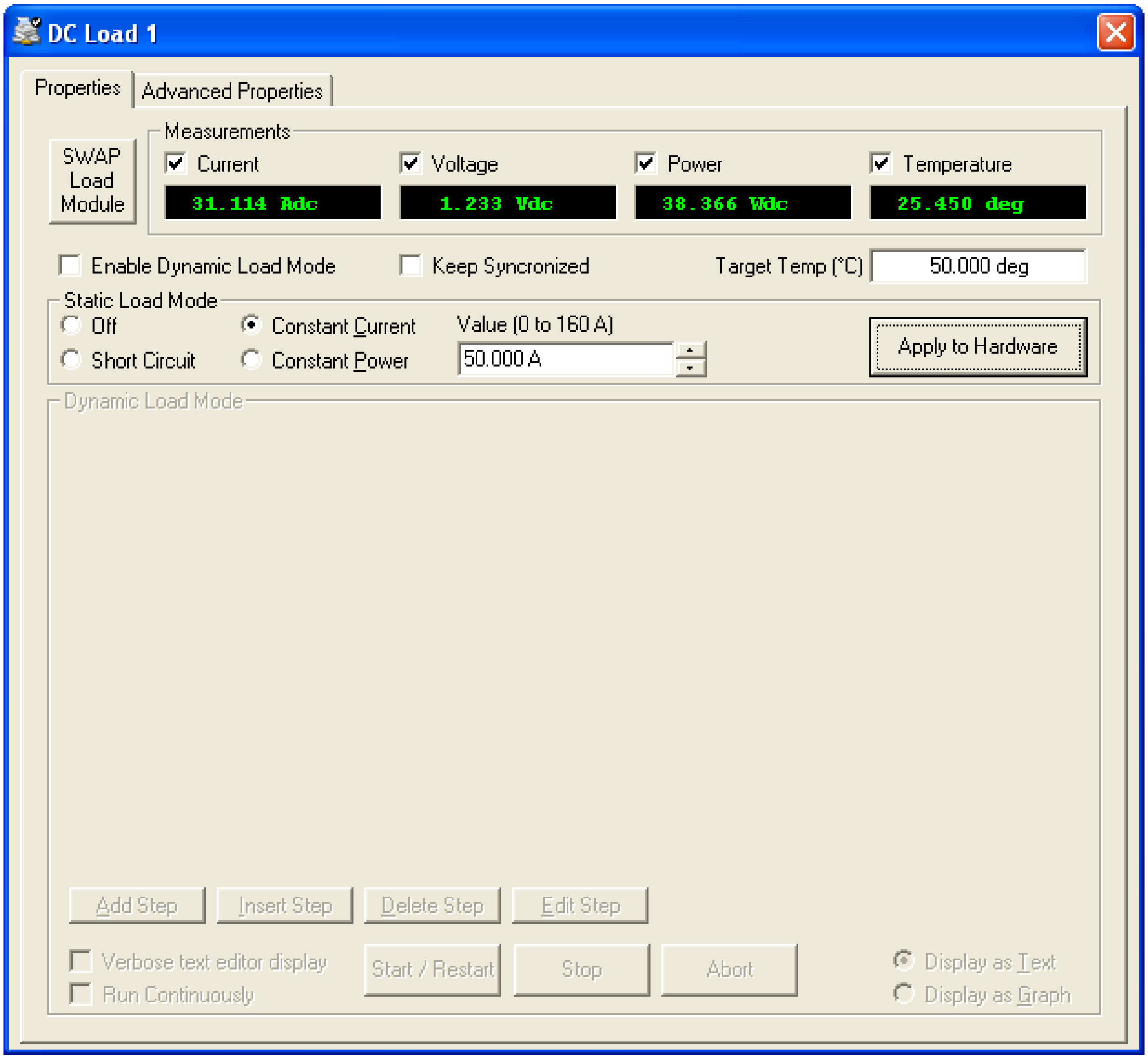
The interactive control panel is used to control load settings and measurements. The load can be operated in static mode or dynamic mode based on the "Enable Dynamic Load Mode" checkbox.

The SWAP Load Module button in the upper left is to turn the load off to allow disconnecting/connecting load pod cables or hardware. The message box below is displayed to indicate it is safe to change load pod hardware.

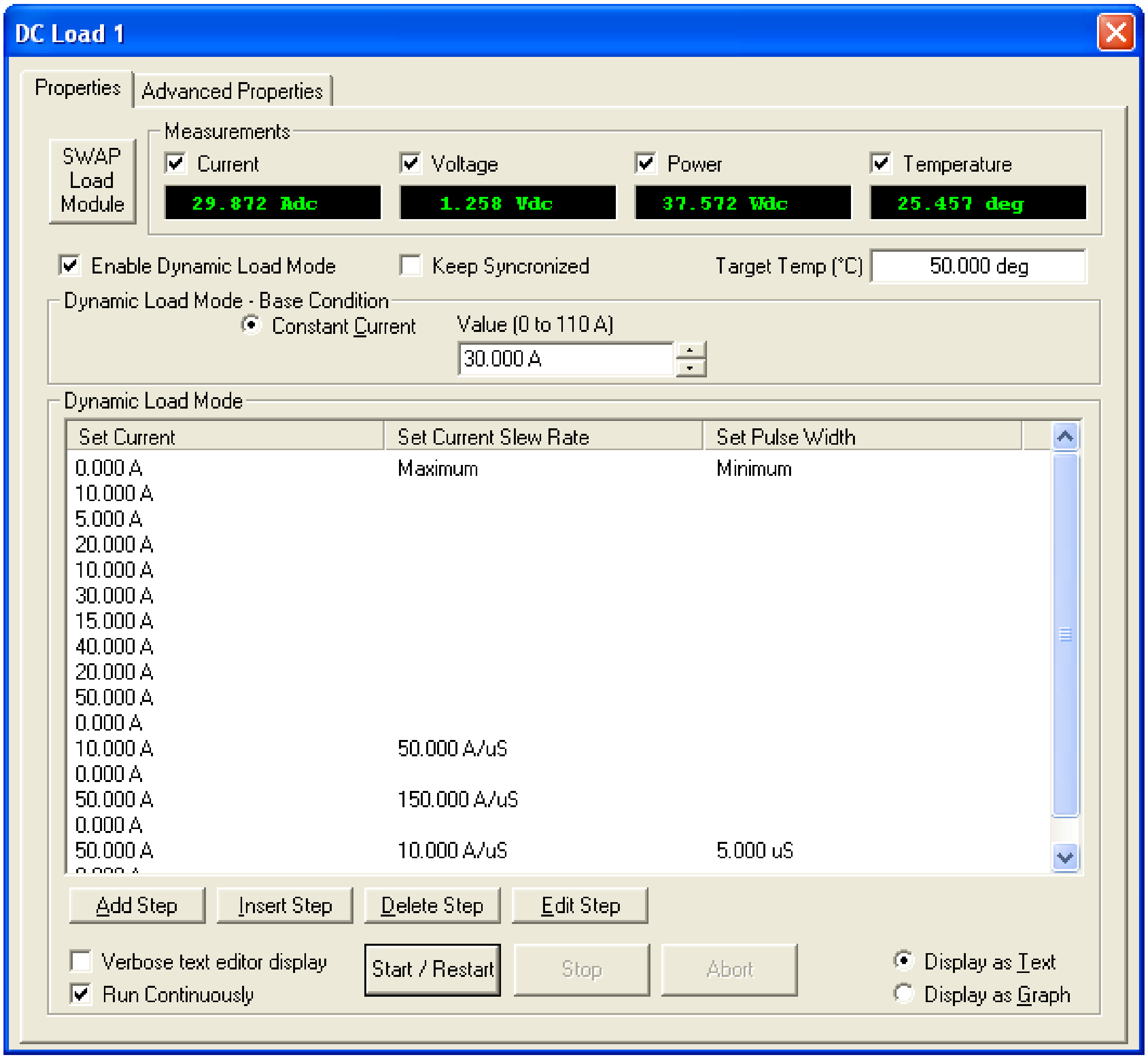


The "Measurements" will constantly update the measurements that have been selected. Just check the checkbox for the desired measurement. The update rate will decrease as additional measurements are made. The current measurement is the sum of the base current plus the dynamic current. It will not be accurate during transient operation because it is much slower than the transient current changes.

When operating in static mode, the load is programmed in a steady-state condition. In this mode, the load supports Off, Short Circuit, Constant Current, and Constant Power.



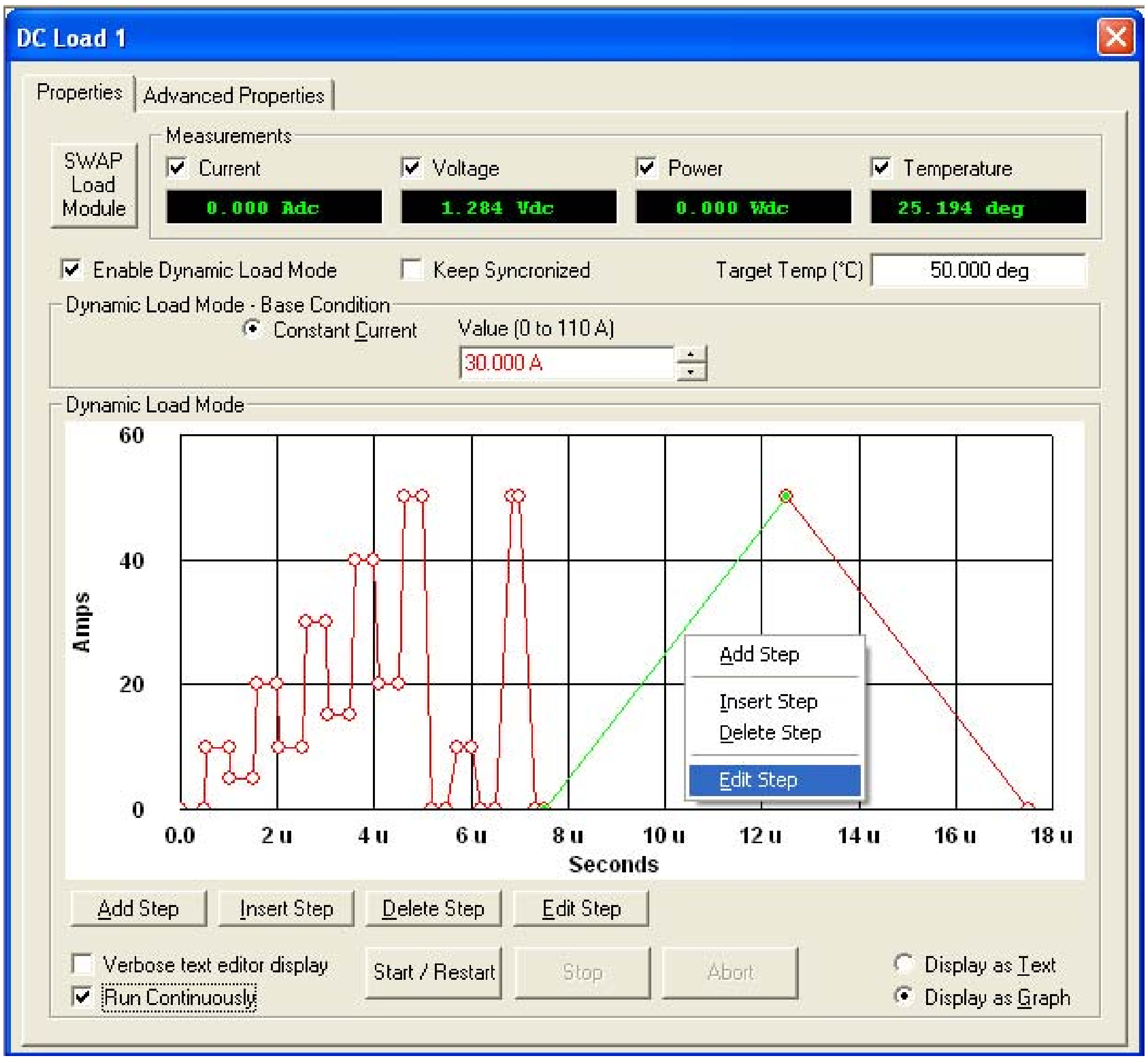
When operating in dynamic mode, there are two sections to program, the base-condition and the dynamic section.



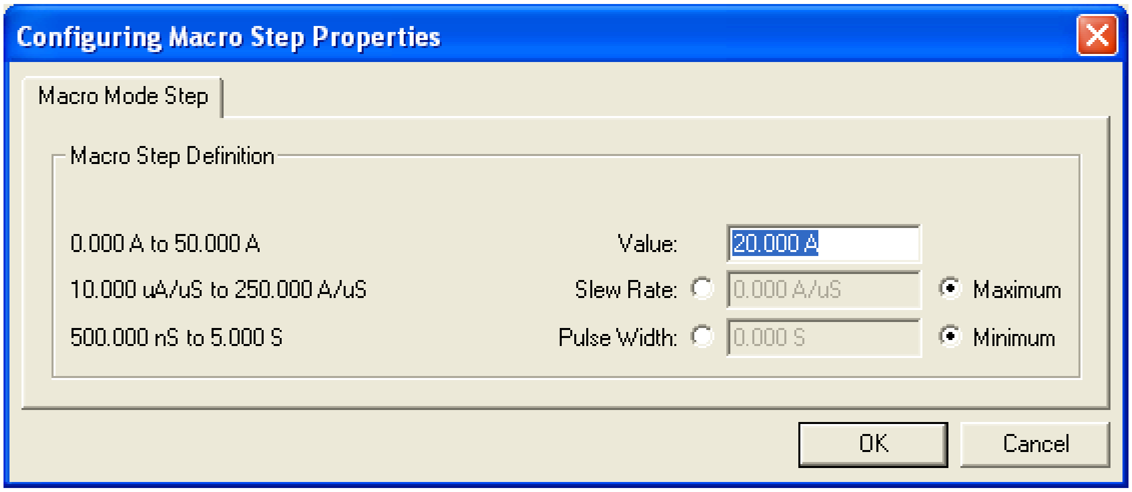
The "Base-Condition" section, when in constant current mode, allows control over the linear section of the load. The linear section is used to establish a base current level while the digital section provides the transient capability (see "Dynamic" pane description below).

While maintaining a constant current or power setting, the load will attempt to maintain the target temperature. For example, with constant current at 25A and 50 degrees C programmed, the load will maintain 25A of current regardless of voltage changes (within the operating envelope). While maintaining the current, it will monitor the heat sink temperature of the linear load. If the temperature is less than the target temperature, the fan will be running at the minimum speed. When the temperature reaches the target temperature, the fan speed will be controlled to maintain the target temperature. Once the fan is operating at the maximum speed, the temperature will climb above the target temperature. If the temperature of the heat sink reaches 100 degrees C, the load will shut itself off to prevent damage. Note that the temperature being regulated is that of the linear section only. The heat output of the digital (dynamic) section is not monitored. However, the minimum fan speed is determined by the power of the digital section to ensure adequate cooling for that section of the load.

The “Dynamic” pane allows control of the digital section of the load to create transients and is available only in constant current mode. The digital section only operates in a simplified constant current mode. While idle (not running a transient) the load will monitor the voltage and adjust the resistance to maintain the current at the last set value. When a transient is run, the voltage is measured prior to executing the transient and the resistive values needed for the transient are determined. Then the transient is executed and the predetermined resistances are applied at the appropriate time. If the voltage changes while the transient is running, the current will vary proportionately.



Programming the transient can be done graphically or in text form as selected on the user interface.



Regardless of the method of entry, the transient is programmed as a series of points defined by current, slew rate and pulse width. The current range of the digital section is 0 to 50 amps. When executed, the transient current will be applied in addition to the base current. For example, if operating in the constant current mode and the linear section is programmed for 25 amps, the digital load of 0 to 50 amps is added to the base condition giving a transient capability of 25 to 75A. If the base value is changed, the transient values will shift accordingly.

When the “Run” button is pressed when the “Run Continuously” checkbox is unchecked, the transient will execute once and then stop. The last value in the transient will be maintained. When run with the “Run Continuously” checkbox checked, the transient will execute repeatedly. While the transient is running, the “Run” button changes into a “Stop” button. If “Stop” is pressed, the transient will be stopped immediately. To end a continuously running transient at the end of a complete cycle, uncheck the “Run Continuously” checkbox.

4.2.1.2 Automated Test Program

Using the 4820 load in a test program is similar to any load supported by emPower. Please refer to the other documents for more detailed information.

5. JUNE 2006 – SVID/60A UPDATE

In June 2006 an update to the 4820 series loads was made available. The update requires firmware, emPower, and test program changes to take affect. The following table describes the version numbers and their effect.

emPower	4820 FW	Features	Test Program Notes
< 6.11E	< 1.10	Original capabilities as described in this document chapters 1 – 4.	A program written with an emPower prior to 6.11E will work fine. Programs written with an emPower version at or beyond 6.11E will not load.
>= 6.11E	>= 1.10	New features as described in this attachment.	Existing programs will continue to work without modification. Program changes required to use serial VIDs or take advantage of 60A step.
>= 6.11E	< 1.10	New features available off-line only.	A run-time error will be generated if a program is run that is using the new features.
< 6.11E	>= 1.10	Compatible with programs written with versions prior to 6.11E.	A program written with an emPower prior to 6.11E will work fine. Programs written with an emPower version at or beyond 6.11E will not load.

5.1 Digital Load Max to 60A

The maximum digital load step has been increased to 60A (previously 50A). The following specifications apply:

Both Loads Voltage, Current, Power	0.8 to 1.6V, 0 to 160A, 150W continuous 215W peak 0.9 to 1.6V, 0 to 170A, 150W continuous 215W peak
Linear Load Voltage, Current, Power	0.6 to 2.0V, 0 to 110A, 90W continuous 125W peak
Digital Load Voltage, Current, Power	0.8 to 1.6V, 0 to 50A, 60W continuous 90W peak 0.9 to 1.6V, 0 to 60A, 60W continuous 90W peak

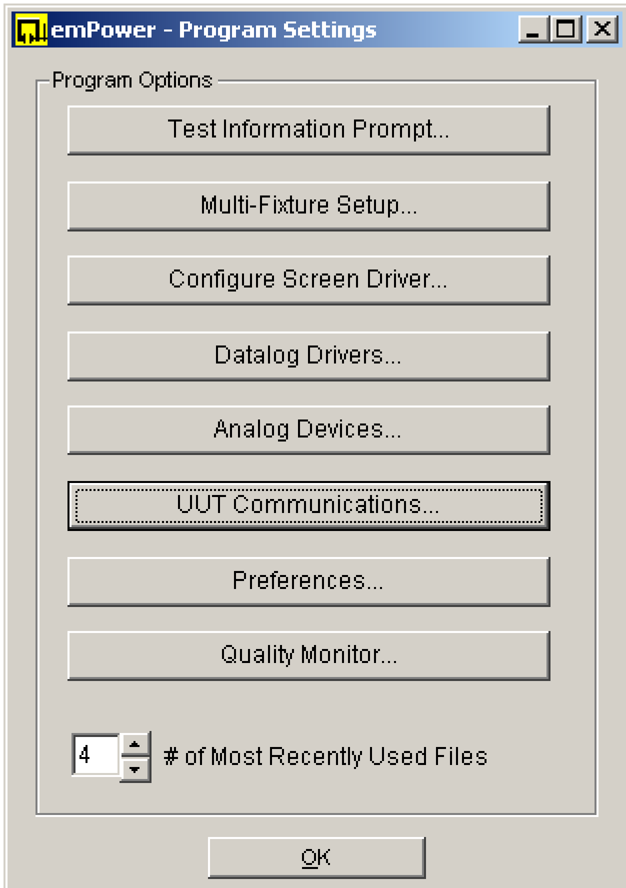
5.2 Serial VID Support

The load now supports sending VID settings in both parallel and serial mode. If you desire to use parallel VIDs, no change needs to be made to the test programs. The VID pattern is set as a "Digital Vector" and will be applied to all of the digital outputs in parallel.

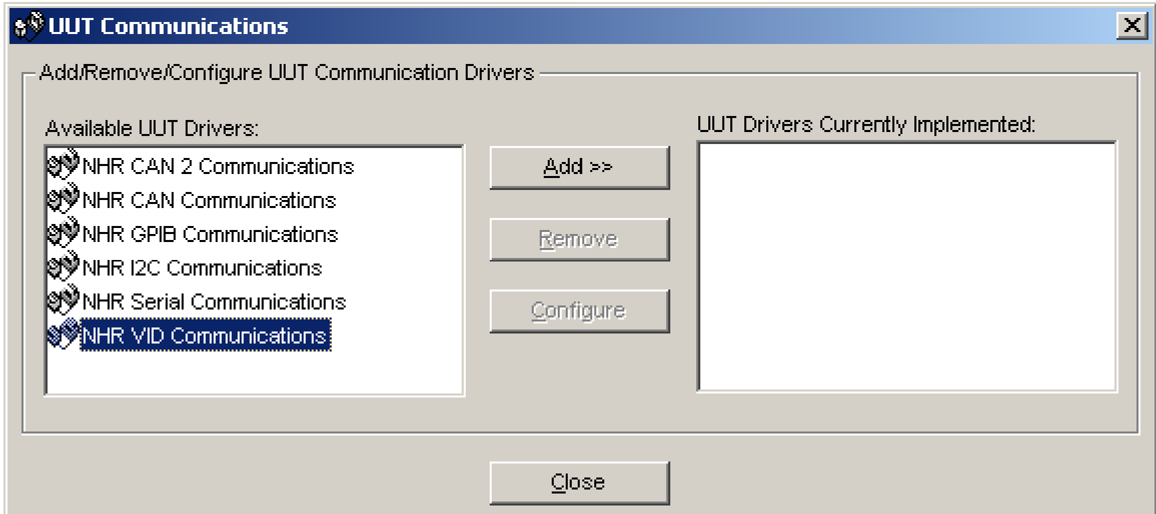
To use the serial VIDs, existing test programs would need to be modified or new test programs created.

Serial VID support requires two items in the test program:

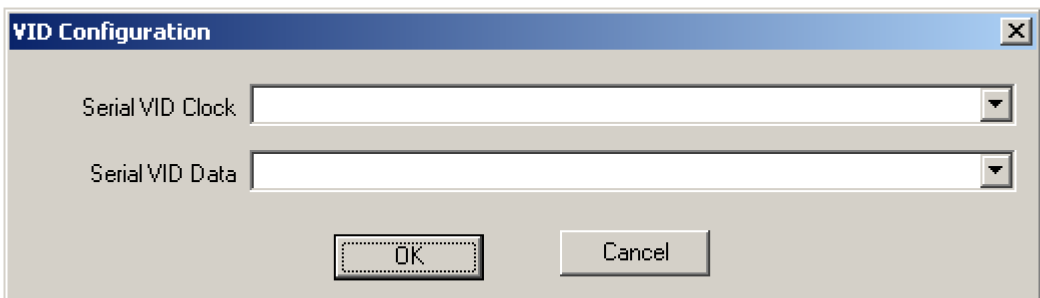
1. Create an NHR VID Communications object
    a. Select the menu item "Program" and then select "Settings."



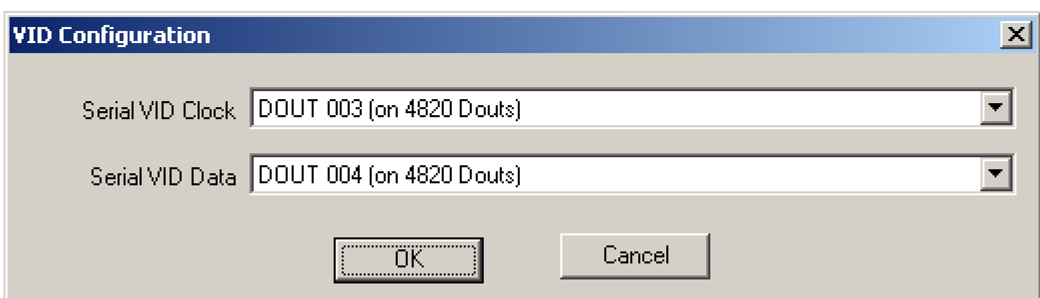
b. Click on “UUT Communications…”



c. Select “NHR VID Communications” from the available UUT drivers list and click the “Add” button. The VID Configuration dialog should appear.



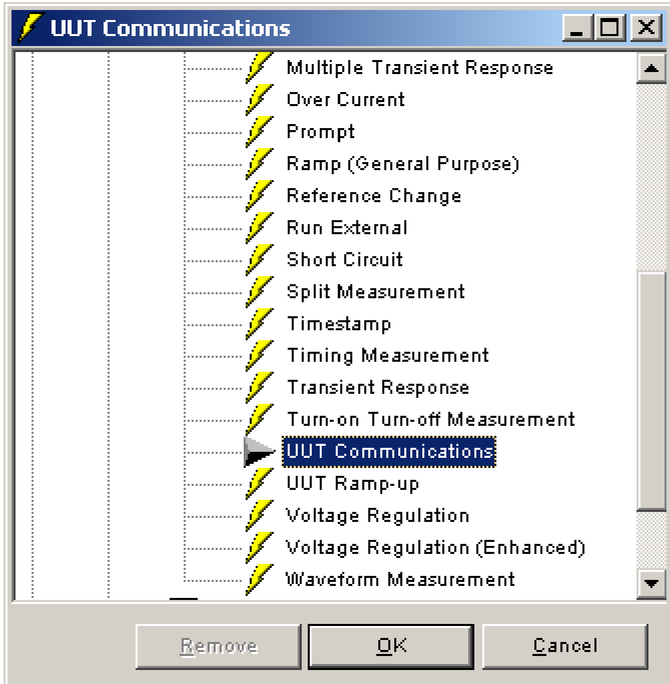
d. Choose the appropriate digital outputs for the clock and data lines and click Ok.



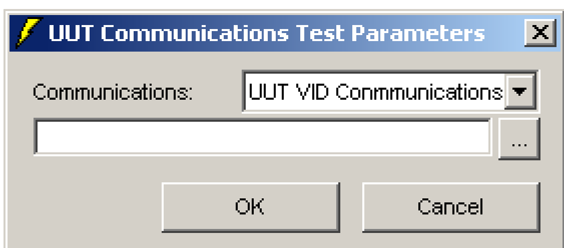
e. Close all dialogs.

2. Create a test step in the program prior to applying and digital vectors to set the system to serial mode.

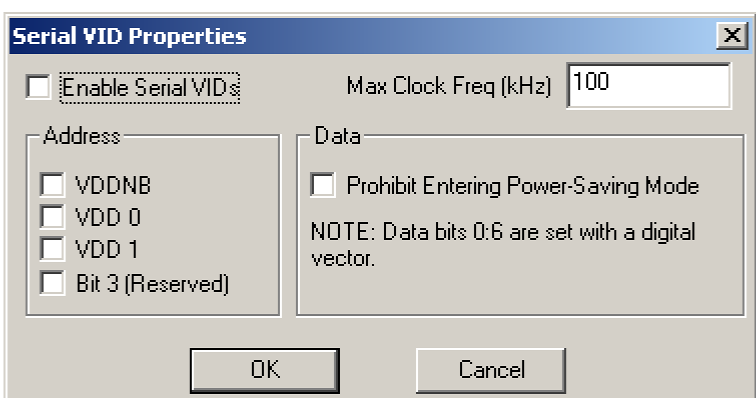
a. Add a “UUT Communications” test routine.



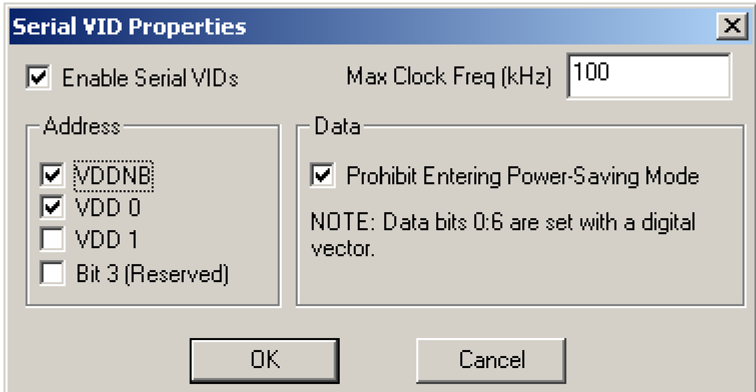
b. Be sure the UUT VID Communications object is selected.



c. Press the ellipsis (…) button.



d. Check the “Enable Serial VIDs” checkbox and any other serial options desired and press OK.



You can now run the test program. When the new test step is executed, all digital vectors applied will send the data serially. The options chosen in the UUT Communications test routine will apply until another UUT Communications test routine changes it. You can have as many test steps setting the serial options as desired.

6. JANUARY 2008 – SVID USER INTERFACE UPDATE

In January 2008 an update to the 4820 series loads was made available. The update requires emPower to take affect.

The control panel user interface has been updated to support direct control of the VIDs (both serial and parallel). Select the desired mode. If serial mode is selected, the serial VID settings are enabled. Make the desired choices and press the “SetVID” button to send the settings to the hardware.