ProDAQ

User Manual

ProDAQ 1630

VXI-1 Rev.4 Mainframe

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bustec

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Reference Documents

Title	Number
VXI-1 Rev. 4 Specification (http://www.vxibus.org/files/VXI_Specs/VXI-1_4-0%2020100527.pdf)	

Glossary

Safety

This equipment contains voltage hazardous to human life and safety and is able to inflict personal injury. Disconnect the device from the AC line (mains) before opening the covers as described in chapter 3.4.

To operate this device, use a three-conductor power cord and an power outlet providing protective earth. Do not use a two-conductor extension cord or a three-prong/two-prong adapter.

If you replace the power cord provided, make sure that the replacement is rated for the power consumption stated in the specifications.

Do not position the device so that it is difficult to operate the disconnecting device.

If the equipment is used in a manner not specified by the manufacturer, its safety may be impaired.

Waste Electrical and Electronic Equipment (WEEE)

This product complies with the WEEE Directive 2002/96/EC marking requirement. The affixed product label indicates that you must not discard this electrical product in domestic household waste.

Product Category: Monitoring and Control Instrumentation

To return unwanted products, contact Bustec Ltd.

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1. Introduction

1.1. Overview

The ProDAQ 1630 chassis is a compact design with high density, highly sophisticated modular designed power supplies. The power supply features medium output power up to 2.5 kW, with extremely low noise and ripple (PARD). The 8U, 13-slot chassis offers superior cooling due to an efficient air guiding system. The fan tray has three high efficient DC-fans, situated at the lower rear side in a removable fan tray. The alphanumeric display and the Ethernet port allow for both local and remote monitoring of all supply voltages, fan speeds and temperatures.

Figure 1 - ProDAQ 1630 VXIbus Mainframe for VXI-1 Rev.4 Systems

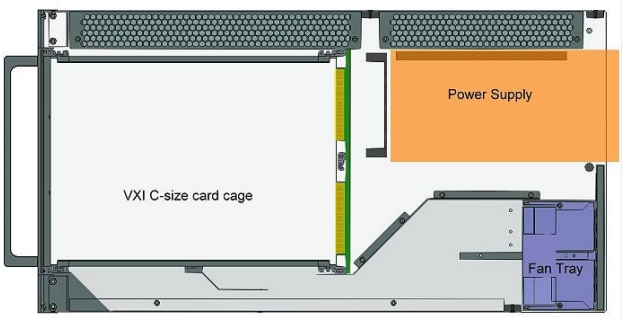
The backplane is designed especially for the new high-speed transfer modes and additional clock and trigger signals introduced in the VXIbus specification VXI-1 Rev. 4.0. The new, 5-row P1/P2 connectors are backwards compatible with the 3-row connectors on legacy VXIbus modules.

1.2. Power Supply

The micro-processor controlled power supply features an auto-range AC input with power factor correction and is protected against any failure such as over- and under-voltage, over current, over temperature and shorts to ground as well as shorts between supplies.

1.3. Cooling

The ProDAQ 1630 features a 3U fan tray in the rear of the chassis, a 1U compression chamber below the VXI card cage and a 1U exhaust above the card cage.



The fan tray hosts three individually controlled long-life DC fans with an adjustable speed between 1200 and 3600 rpm.

1.4. Monitoring

The ProDAQ 1630 feature an alphanumeric display for local monitoring and a Ethernet port for remote monitoring. The embedded Web page can be accessed with any standard browser. A C/C++ based driver allows monitoring access from applications.

2. Operation

The ProDAQ 1630 can be operated locally via the switches and display on the front panel or remotely via the VXIplug&play driver provided.

2.1. Front Panel Controls

The ProDAQ 1630 features a number of switches, LEDs and a display on the front panel to operate the chassis.

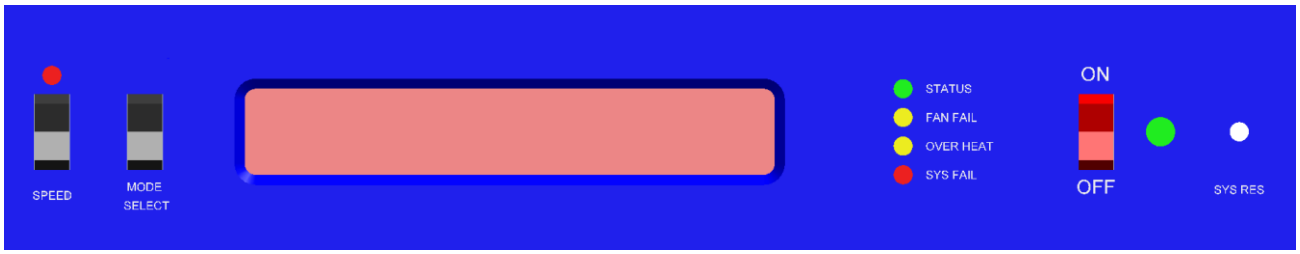


Figure 2 - ProDAQ 1630 Front Panel Controls

From the right to the left they are:

SYS RES	System reset switch. This switch is recessed behind the panel to avoid accidental usage.
Main Power LED (green)	Shows the status of the main power.
Main Power Switch	Toggle Switch to power the chassis on/off. Push the top part to power the chassis on; push the bottom part of the switch to power the chassis off.
Status LEDs	STATUS Status of the supply voltages. Will lit green if all voltages are within limits. FAN FAIL Yellow if a fan failure was detected, off otherwise. OVERHEAT Yellow if an over-temperature condition was detected on the power supply. SYSFAIL Shows the status of the VXIbus SYSFAIL* line. Red if the line is asserted.
Alphanumeric Display	Allows to program or monitor voltages, fan speeds, connection parameters etc.
MODE SELECT	Switch to step through the menus and submenus displayed in the alphanumeric display and change settings.
SPEED	Switch to increase or decrease the speed of the fans in the fan tray. Push the top part of the button to increase the speed or the bottom part of the switch to decrease the speed.

2.2. Programming via the front-panel switches

After the chassis has been powered on by using the main power switch the main operation modes can be selected by pushing the “Mode Select” switch up or down. Many main operation modes do have one or more submenus, which can be accessed by a special procedure.

The front panel-switches for programming are used in the following way:

Symbol	Description	Remarks
P▲	Push “Power” switch up (Press upper part, direction “ON”)	**Main operation mode:** Switch the crate on. **Submenu:** OK button. Used to enter the selected submenu, request to change a value, accept the changes.
P▼	Push “Power” switch down (Press lower part, direction “OFF”)	**Main operation mode:** Switch the crate off. **Submenu:** CANCEL button. Used to leave a submenu, discard the changes.
M▲	Push “Mode Select” switch up (Press upper part of the switch)	**Main operation mode:** Select the next operation mode. **Submenu:** Change the selected item to the next possible state.
M▼	Push “Mode Select” switch down (Press lower part of the switch)	**Main operation mode:** Select the previous operation mode. **Submenu:** Change the selected item to the previous possible state.

After the chassis is powered on using the main power switch (P▲) the “Mode Select” switch can be used to step through the main operation modes. Once the desired main operation mode is displayed in the alphanumeric display, the associated submenu can be entered by pushing both the power switch and the mode select switch up and holding them in this position for approx. 4 seconds. If there is more than one submenu associated with a main operation mode, the mode select switch (M▲ or M▼) can be again used to select the desired one. During this procedure, the display may either display one line of constantly, alternate between two lines of information or blink for the parts that can be altered. In the following example two lines in the “Display” column denote the alternating display of these two lines in the display. Parts that are shown blinking in the display are shown with alternate background color:

Description	Switch	Display
Switch the chassis on	P▲	+5V 5.01V 1.2A
Select the desired main operation mode	M▲ or M▼(until the right mode is displayed)	TCPIP: no link
Enter submenu	M▲ (push and hold), P▲ (push and hold both switches for appr, 4 seconds)	Config: Wait ↓ Config: Wait… ↓ Config: Ready! ↓ TCPIP Address 192.168.91.80
Select submenu “TCPIP Gateway”	M▲ or M▼(until the right menu/setting is displayed)	TCPIP Gateway 192.168.91.94
Enter this menu	P▲	192.168.91.94
Change the value	M▲ or M▼	196.168.91.94
Accept change, to next item	P▲	196.168.91.94
Accept change, to next item	P▲	196.168.91.94
Accept change, to next item	P▲	196.168.91.94
Back to submenu selection	P▲	TCPIP Gateway 196.168.91.94
Leave submenu	M▼	TCPIP: no link

The following table shows the operation modes and associated submenus. Values in the “Display” column are examples only and depend on your settings and module configuration etc.

Operation Mode / Submenu	Display
Display voltage and current of the selected output channel	+5V 5.01V 12.A
Change of the current limit	+5V Ilim 15.A
Fine adjustment of the output voltage	+5V Uadj +50%
Change the output voltage (coarse)	+5V Unom 5.00V
Change the overvoltage protection threshold	+5V OVP 6.00V
Change of the overcurrent switch-off threshold	+5V IOff 30.A
Change of the undervoltage switch-off threshold	+5V Umin 4.50V
Change of the overvoltage switch-off threshold	+5V Umax 5.50V
Display the TCP/IP connection state Possible values & symbols are: no link (no cable connected) 10M (connected to 10M network) 100M (connected to 100M network) HD (half duplex) FD (full duplex) ↓, ↑, ↕ (Frame received, transmitted, both)	Ethernet 100M FD
Change the TCP/IP address	TCPIP Address 192.168.91.80
Change the TCP/IP subnet mask	TCPIP SubnetMask 255.255.255.224
Change the TCP/IP gateway address	TCPIP Gateway 192.168.91.94
Allow writes (e.g. switch on/off) via the web server	HTTP:read/write
Change TCP/IP negotiation settings	TCPIPnegotiation AutoNegotiation
Display of the ethernet hardware address (MAC). This address is written at the type plate, too.	TCPIP MAC Addres 0050-C22D-C231
Change the TCP/IP port of the web server	HTTP Port 80
Change the TCP/IP port of the SNMP server	SNMP Port 161
Restore the default SNMP settings	SNMP Default No
Display the fan rotation speed	
Change the time for which the fans will continue running after switching the power supply off	

2.3. Build-in Web Server

After you have configured the TCP/IP port via the local controls, you can open the web page of the ProDAQ 1630 in any browser simply by typing the IP address in the address line of the browser. The web page shown displays relevant information regarding the voltages and temperatures of the chassis and allow you to operate the main power, reset line and fan speed.

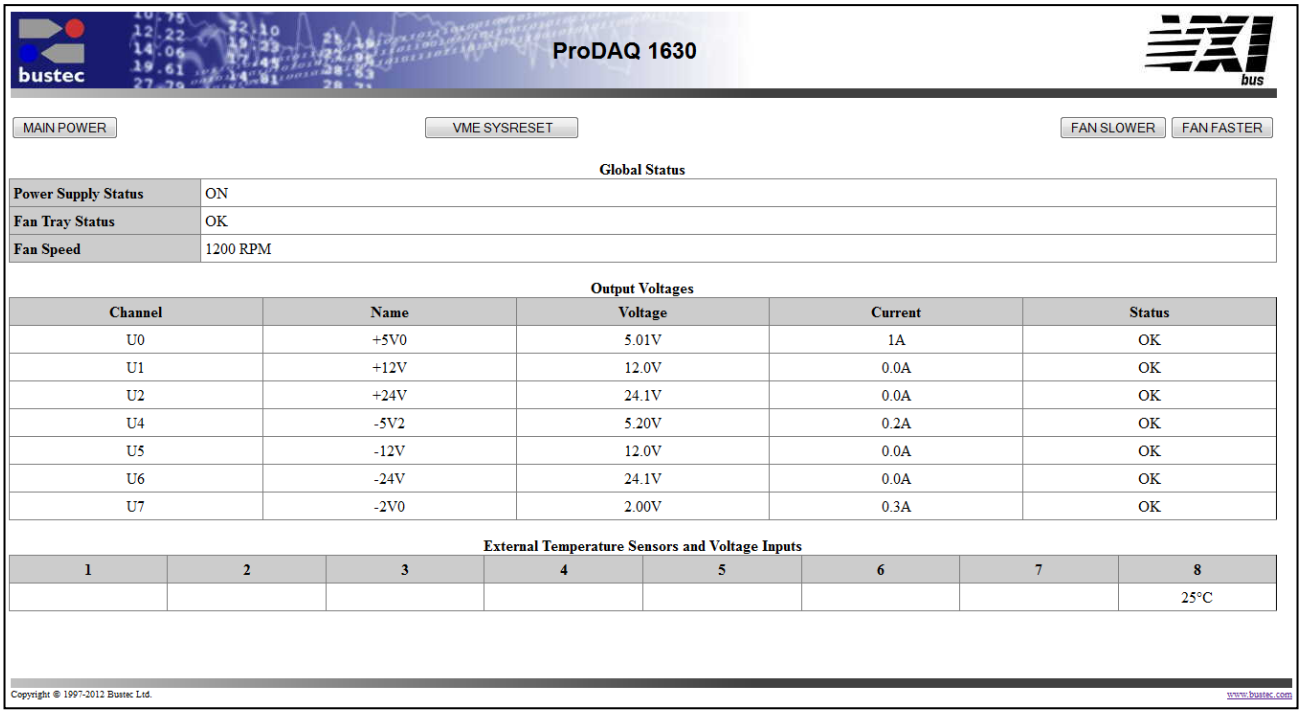


Figure 3 - ProDAQ 1630 Web Page

The button “MAIN POWER” allows you to power on/off the chassis (bus power). “VME SYSRESET” allows you to assert the SYSRESET* line on the bus to issue a general system reset. The buttons “FAN SLOWER” and “FAN FASTER” decrease/increase the fan speed.

2.4. VXIplug&play Driver

The VXIplug&play driver for the ProDAQ 1630 is designed to connect to the chassis via the TCP/IP link. You will need to configure the TCP/IP port of the ProDAQ 1630 and connect it to your network to be able to remotely access the chassis using the driver.

2.4.1. Connecting to the ProDAQ 1630

To connect to the ProDAQ 1630, use the driver function **`bu1630_init()`** with a resource string specifying the usage of a TCPIP socket (see Figure 4, ①). The IP address used in the resource string must be the address the chassis was configured for. Now you can use the driver function to monitor the crate or control its settings. To close the connection, use the function **`bu1630_close()`** (see Figure 4, ②).

```
#include <visa.h>
#include <bu1630.h>

main (int argc, char **argv)
{
     ViStatus status;
     ViSession sesn;
     ViChar descr[256];

     /* connect to a ProDAQ 1630 */
①    if ((status = bu1630_init("TCPIP0::192.168.91.80::SOCKET",
                                    VI_TRUE, VI_TRUE, &sesn)) != VI_SUCCESS)
     {
          viStatusDesc (sesn, status, descr);
          printf ("Error: bu3416_init() failed due to %s\n", descr);


          return -1;
     }

     /* operation */


②    bu1630_close (sesn);

}
```

Figure 4 - Connecting to the ProDAQ 1630

2.5. Getting Status Information

After the connection is established, the driver functions can be used to obtain status information from the chassis. There are several functions available:

`bu1630_getMainPowerState()`	returns the current status of the main power. If the parameter *onoff* returns VI_TRUE, the chassis is powered on.
`bu1630_getStatus()`	returns information about several items such as failures, power and whether the SYSFAIL line was asserted.
`bu1630_getOutputVoltages()`	returns the current values of the output voltages supplied to the VXIbus.
`bu1630_getOutputCurrents()`	returns the current values of the current used on different the output voltages supplied to the VXIbus.

bu1630_getOutputStatus() returns the status of the output voltages supplied to the bus. If one of the states returned as VI_TRUE, an over/under-voltage, over-current or over-temperature condition exists on the related supply.

The following example shows some of the functions:

```
#include <visa.h>
#include <bu1630.h>

main (int argc, char **argv)
{
     ViStatus status;
     ViSession sesn;
     ViChar descr[256];
     ViBoolean mainPower, inputFailure, outputFailure, fanFailure, sensorFailure, sysfail;
     ViReal64 p24V_V, p12V_V, p5V_V, m2V_V, m5_2V_V, m12V_V, m24V_V;

     /* connect to a ProDAQ 1630 */
     if ((status = bu1630_init("TCPIP0::192.168.91.80::SOCKET",
                                      VI_TRUE, VI_TRUE, &sesn)) < VI_SUCCESS)
     {
          viStatusDesc (sesn, status, descr);
          printf ("Error: bu1630_init() failed due to %s\n", descr);


          return -1;
     }

     If ((status = bu1630_getStatus (sesn, &mainPower, &inputFailure, &outputFailure,
                                    &fanFailure, &sensorFailure, &sysfail))) < VI_SUCCESS)
     {
          bu1630_error_message (sesn, status, descr);
          printf ("Error: bu1630_ getStatus() failed due to %s\n", descr);


          return -1;
     }

     if (mainPower == VI_TRUE)
          printf ("Chassis is powered on!\n");
     if (inputFailure == VI_TRUE)
          printf ("Input Power failure happened!\n");
     if (outputFailure == VI_TRUE)
          printf ("Output Power failure happened!\n");
     if (fanFailure == VI_TRUE)
          printf ("Fan Tray failure happened!\n");
     if (sensorFailure == VI_TRUE)
          printf ("Temperature at temperature sensor too high!\n");
     if (sysfail == VI_TRUE)
          printf ("SYSFAIL* signal asserted!\n");

     if ((status = bu1630_getOutputVoltages (sesn, &p24V_V, &p12V_V, &p5V_V, &m2V_V,
                                                &m5_2V_V, &m12V_V, &m24V_V)) < VI_SUCCESS)
     {
          bu1630_error_message (sesn, status, descr);
          printf ("Error: bu1630_ getStatus() failed due to %s\n", descr);


          return -1;
     }

     printf ("Current voltages of supply rails are:\n");
     printf ("+24V: %f, +12V: %f, +5V: %f, -2V: %f, -5.2V: %f, -12V: %f. 24V: %f\n",
                               p24V_V, p12V_V, p5V_V, m2V_V, m5_2V_V, m12V_V, m24V_V);


     bu1630_close (sesn);
}
```

Figure 5 - Obtaining Status Information

For more information, refer to the driver help file and the examples in the drivers “Examples” folder.

2.6. Controlling the Fan Speed

The driver provides two functions for monitoring and controlling the speed of the fans. Both functions return or accept values for the fan speed in RPM (revolutions per minute) in the range between 1200 rpm and 3600 rpm. The function **`bu1630_setFanSpeed()`** (see Figure 6, ①) is used to set the speed of the fans while **`bu1630_getFanSpeed()`** (see Figure 6, ②) will return the current speed of the fans.

```
#include <visa.h>
#include <bu1630.h>

main (int argc, char **argv)
{
     ViStatus status;
     ViSession sesn;
     ViChar descr[256];
     ViInt32 speed;

     /* connect to a ProDAQ 1630 */
     if ((status = bu1630_init("TCPIP0::192.168.91.80::SOCKET",
                                        VI_TRUE, VI_TRUE, &sesn)) != VI_SUCCESS)
     {
          viStatusDesc (sesn, status, descr);
          printf ("Error: bu3416_init() failed due to %s\n", descr);


          return -1;
     }

①    if ((status = bu1630_setFanSpeed (sesn, 2400)) < VI_SUCCESS)
     {
          viStatusDesc (sesn, status, descr);
          printf ("Error: bu3416_init() failed due to %s\n", descr);


          return -1;
     }

     /* Introduce a delay to allow the fans to speed up/down to the new setting */
     Sleep (5000); /* sleep 5 sec */

②    if ((status = bu1630_getFanSpeed (sesn, &speed)) < VI_SUCCESS)
     {
          viStatusDesc (sesn, status, descr);
          printf ("Error: bu3416_init() failed due to %s\n", descr);


          return -1;
     }

     if (speed != 2400)
          printf ("Fan control failure, new speed is %ld instead of 2400\n", speed);

     bu1630_close (sesn);

}
```

Figure 6 - Controlling the fan speed

Additionally the two functions **`bu1630_setFanDelay()`** and **`bu1630_getFanDelay()`** can be used to control the amount of time the fans continue to blow after the chassis is powered down. The time can be specified in seconds in the range between 0 and 900 seconds.

3. Specifications

3.1. General

Number of Slots	13 C-size VXI
Backplane	Monolithic 13 slot VXI-1 rev. 4 compliant backplane, 5-row J1/J2, 8 layer PCB, active termination and active automatic daisy-chain

3.2. Cooling

Cooling Capacity	2.5 kW
Number of Fans	3
Fan speeds	1200 to 3600 rpm

3.3. Monitoring

Interface Type	100 Mbit Ethernet
Protocols	HTML (Embedded Web Server) SNMP (Remote Monitoring/Control)
Available Information	Fan Speed Voltage/Current (per supply) Temperature

3.4. Electrical Performance

Available Current (max)	Voltage (V) Current(A) +24 23 +12 23 +5 115 +2 45 -5.2 45 -12 23 -24 23
Available Power (max)	1200 W @ 110 VAC 2500 W @ 230 VAC
Input	100 - 240 VAC, 50 - 60 Hz, max. 16 A
Protection	All voltages are protected against over- and under-voltage, over-current, over-temperature and shorts.

3.5. Physical Specifications

Dimensions	19 in. x 8U x 590 mm
Weight	38 kg

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