DSAENCL 3200
DIGITAL SENSOR ARRAY ENCLOSURE

INSTRUCTION and SERVICE MANUAL

05/2005

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2) On receipt of shipping instructions, forward the product, transportation prepaid. Repairs will be made and the product returned.
3) All shipments should be made via "Best Way". The product should be shipped in the original packing container or wrapped in protective material and surrounded by a minimum of four (4) inches of a shock absorbing material.

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Specifications

Modules/Inputs per module	8/16
Channel Inputs	128 Maximum
Power Requirements	115 or 230 Vac 50 or 60 Hz
Communications Protocol	Ethernet 100Base-T - TCP/IP or UDP
Maximum Data Acquisition Rate	200 samples/channel/sec
Communications Rate Ethernet	 100 Mbits/sec
Dimensions (LxWxH)	19.0in x 8.75in x 15.0in (48.26 cm x 22.23 cm x 38.1 cm)
Weight (including 8 modules and back blocks)	62.5 lbs (28.4 kg)
Operating Temperature	0°C to 50°C
Storage Temperature	-20°C to 75°C
Operating and Storage Humidity	0 to 90% (noncondensing)

General Description

The DSAENCL3200 is designed to permit Rackmount Electronic Pressure Scanners to be utilized in an Ethernet system. Each DSAENCL3200 can accept up to 8 DSA3016 Electric Pressure Scanners, each with up to 16 inputs.

The DSAENCL3200 contains 3 A/D's, 2 to measure pressure inputs and one to measure temperature inputs. It also contains an imbedded computer, RAM memory, and a hard disk drive. The DSAENCL3200 uses Windows XP®Embedded as an operating system. Connections for a, monitor, keyboard and mouse are available at the rear of the DSAENCL3200. A USB connection is also available in the DSAENCL3200. A user may connect to these inputs and operate the DSAENCL3200 as a stand alone computer.

When a ZOC16TC module is to be used with a DSAENCL3200, it must have an RTD installed so a three dimensional Pressure/Temperature characterization table can be generated. These coefficients can then be downloaded into the DSAENCL3200 and used to generate temperature corrected Engineering Unit data.

Installation

This section will contain any special installation drawings.

Getting Started

The DSAENCL3200 is a stand alone pressure scanning system. It incorporates a microprocessor, RAM, a Hard Disk, and other interface boards to scan pressures in Rackmount Electronic Pressure Scanners. These pressures are converted to Engineering Units using the same methods as the Digital Sensor Array. A user should be familiar with Windows XP to best understand the operation of the DSAENCL3200.

Hardware

The DSAENCL3200 is furnished with a set of mounting ears so the unit may be mounted in a standard 19 inch rack. Support rails are also furnished to help support the enclosure. It is important to note that the DSAENCL3200 uses a Compact Flash Card as a hard disk drive. Although a Compact Flash is designed for rough service, it cannot be subjected to severe shock or vibration. If the DSAENCL3200 could be subjected to shock and vibration levels above 5 g's, shock mounts MUST be used. Figure 1 shows the mounting dimensions and details. Dimensions in parentheses are millimeters. Figure 2 on the next page is a close up of the rear panel. Figure 3 is a more detailed view of the local connections. It also shows the access to the Compact Flash Disk Drive.

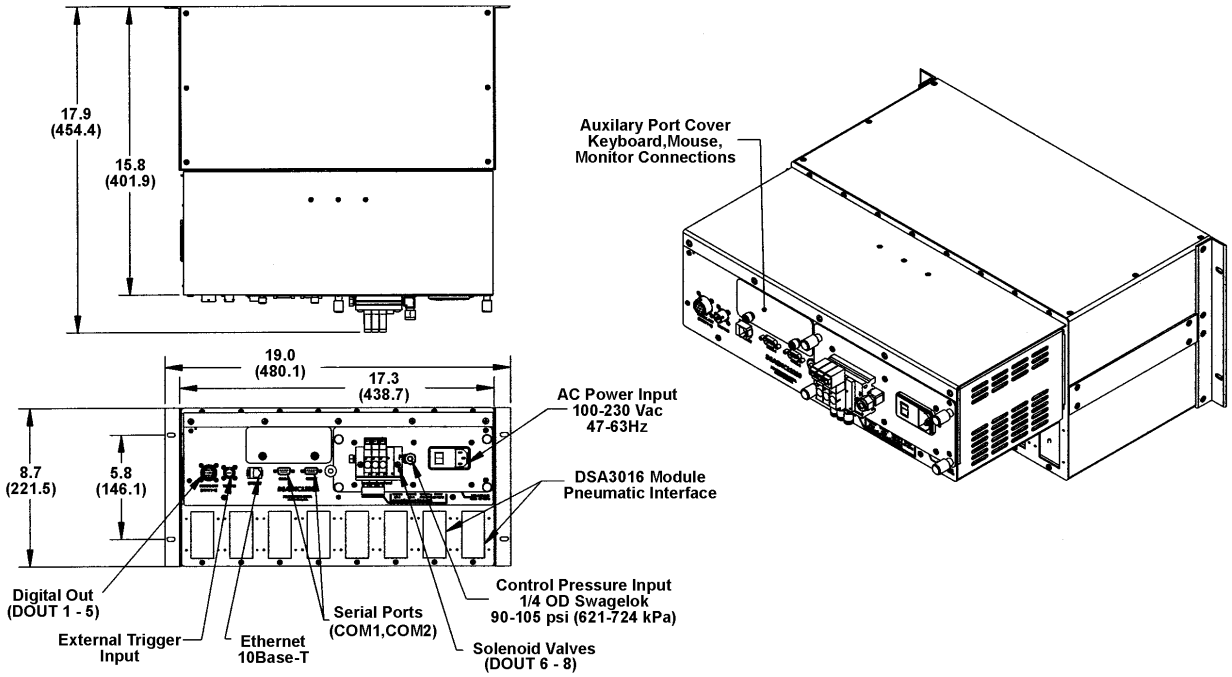


Figure 1 - DSAENCL3200 Physical Measurements and Mounting Dimensions

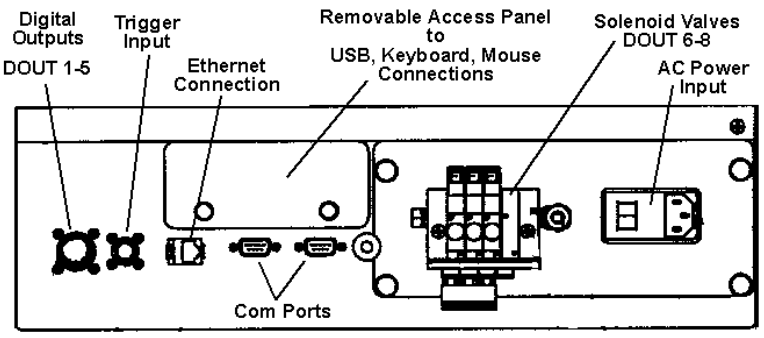


Figure 2 - DSAENCL3200 Rear panel

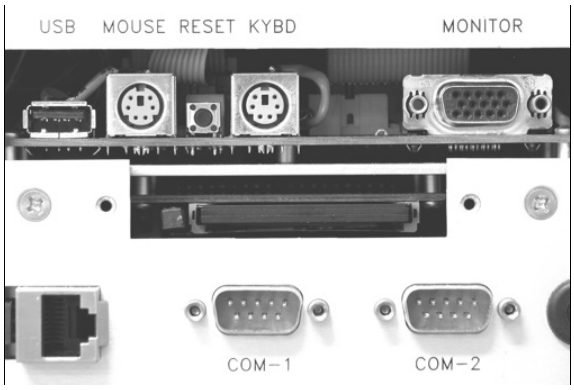


Figure 3 - Local Connection and Hard Disk Drive details

Power Requirements

The DSAENCL3200 operates from 115 Vac 60 Hz or 230 Vac 50 Hz. It generates ±15.00 Vdc, +5.00 Vdc, and +24 Vdc internally. Power connections are made through a Power Entry Module.

It is very important to insure that the cooling fan is operating whenever power is applied to the DSAENCL3200. If the cooling fan is not functioning, the DSAENCL3200 **MUST** be shut down as soon as possible. The processor will overheat and could be damaged if cooling air flow is lost.

Ethernet Connections

The Ethernet Adapter is built into the EBX Computer Board. An RJ45 connector is available on the rear panel. The Ethernet speed is 100Base-T. All connections must conform to IEEE802.3. The DSAENCL3200 Ethernet is 100% Novell NE2000 compatible.

For more information refer to the DSAENCL3200 Software Requirements Specification.

The RJ-45 jack is shown below for customer reference.

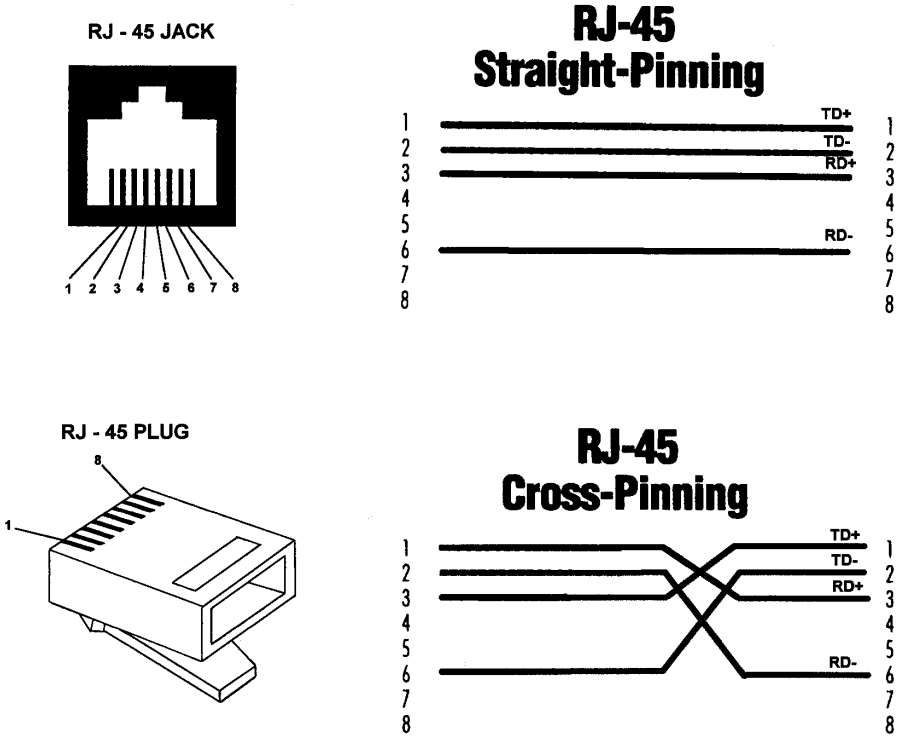


Figure 4 - RJ - 45 Plug and Jack

Serial Connection

Each DSAENCL3200 has two Serial connections. The Serial connections are only used for communication with a SPC3000 Calibrator or another Auxiliary Serial Device. For more information on the serial communications, please refer to the RAD3200 Software Specification. The connections conform to the RS232C standard. The connector wiring is shown in Figure 5 below.

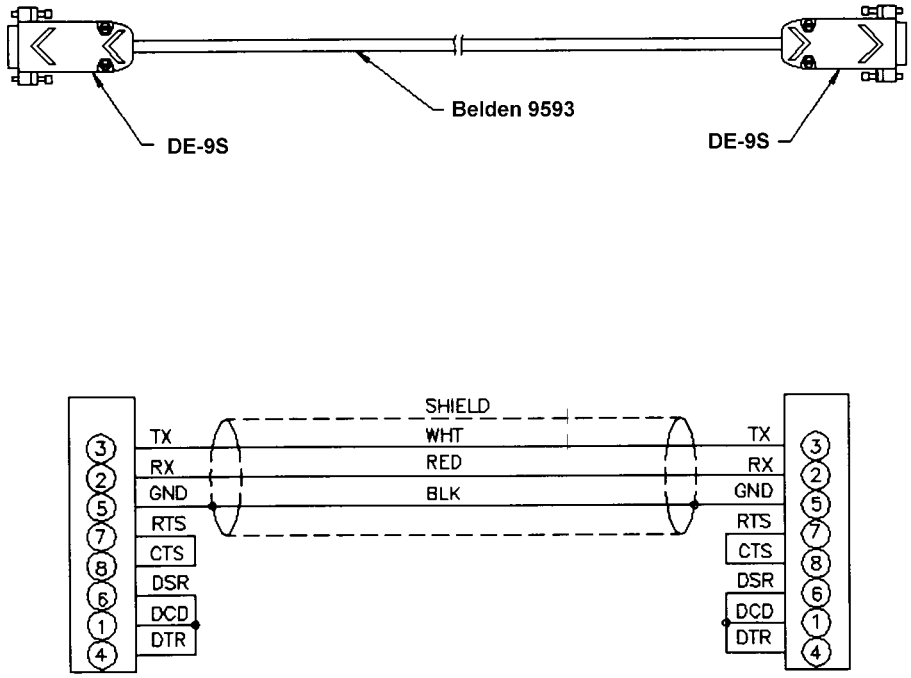


Figure 5 - RS232C Wiring

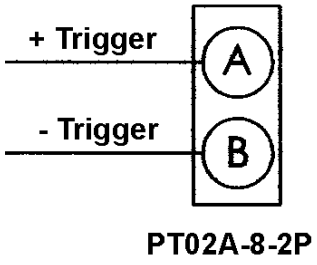
Digital I/O Connections

Each DSAENCL3200 has a Digital Output and a Trigger Input Connector. A maximum of Five(5) Digital Outputs may be configured. Configuration information may be found in the Software Specification

The Trigger Input is edge triggered. The input pulse should have a minimum voltage of 9 Vdc at 6.5 ma. The maximum trigger voltage is15 Vdc. The Trigger Input mating connector is a PT06A-8-2S

Digital Outputs are 24 Vdc @ 500 mA maximum. The Digital Output mating connector is a PT06A-12-10P

Figure 6 shows the wiring of the Trigger Input, Figure 7 shows the wiring of the Digital Outputs.



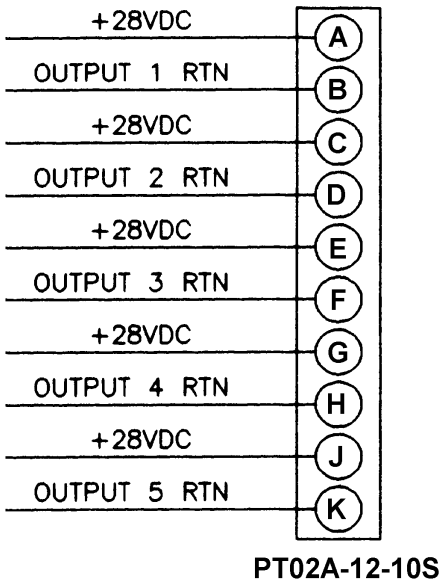


Figure 6 - Trigger Input Wiring

Figure 7 - Digital Output Wiring

DSA3016 Input Connections

Each DSAENCL3200 is designed to accept inputs from up to eight(8) DSA3016, or ZOC16TC, or ZOC16 EIM modules or any combination. Each input module may have up to 16 Pressure inputs. In order to get the full benefit of the DSA Technology, ZOC16TC modules must have an RTD installed so the DSAENCL3200 can measure the temperature of the module. A ZOC16EIM does not require an RTD. No other special wiring is required.

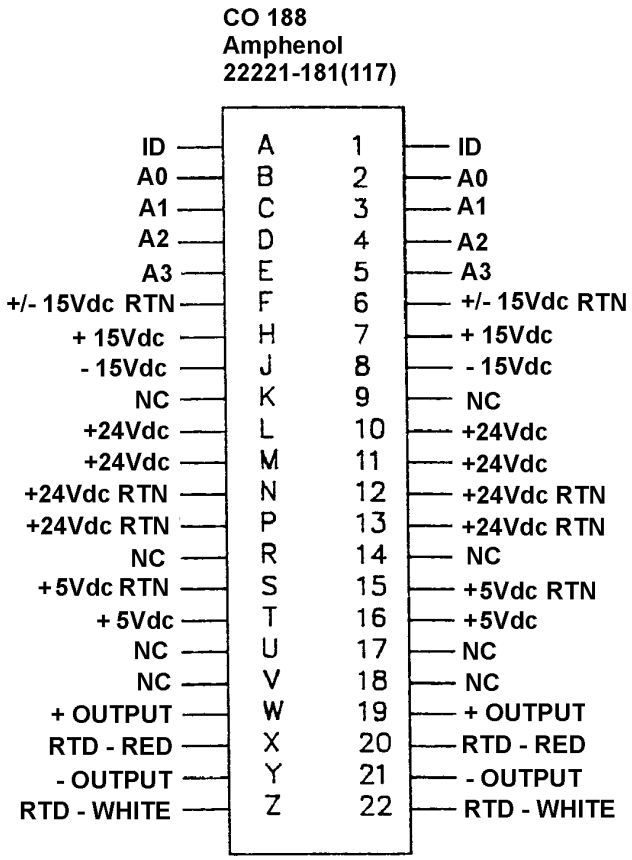


Figure 8 - DSAENCL3200 Backplane pinouts

DSA3016 ID Chip and ID Switch

All DSA3016 modules manufactured after September 1, 2004 have an ID chip and enabling switch installed. The ID chip is programmed with information describing the module. This feature will make these modules fully compatible with DSAENCL3200 series enclosures. The ID chip ouputs information on the same pins used as the Strobe Line in HyScan systems. The ID Enable switch has two positions, I and S. When the switch is in the I position, the ID chip data will be output to an Enclosure on pins A and 1 on the backplane connector. When the switch is set to the S position, pins A and 1 will be used as a Strobe Line to enable Ring Mode addressing.

All DSAENC3200 Enclosures have an ID Enable switch. These enclosures are shipped with the switch set to the I position. A user must be very careful when installing modules into a DSAENCL3200. Although ZOC16 and ZOC16TC modules can be installed in a DSAENCL3200, the ID enable switch setting may have to be modified. Please refer to Figure 9, Table 1 and the section on the ID Enable Switch in this manual for more information on the ID enable switch settings.

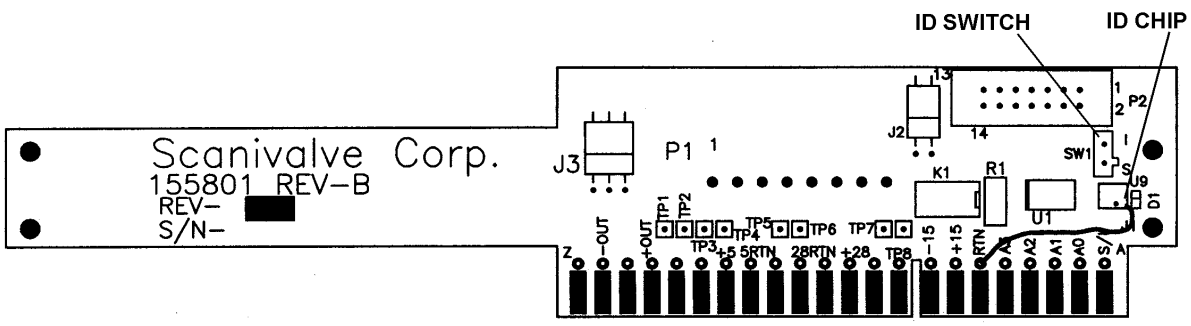


Figure 9 - DSA3016 ID Chip and Switch Location

DSAENCL3200 ID Enable Switch

All DSAENCL3200 series Enclosures have a ID Enable Switch. The switch has two position: S and I. The S position disables the ID Chip output line. This will permit a user to install ZOC16 or ZOC16TC modules into the enclosure without damage to the enclosure or module. The I position enables the ID chip output line. All enclosures are shipped with the ID enable switch set to the I position. The table below documents the compatibility of various modules and enclosure configurations. For more information, please contact Scanivalve Corp, Technical Service Department

Module	ENCL2100	DSAENCL3000	DSAENCL3200 IDSW = S	DSAENCL3200 IDSW - I
ZOC16TC	OK	OK	OK	NO
DSA3016 No ID Chip	OK	OK	OK	NO
DSA3016 IDSW = S	OK	OK	OK	NO
DSA3016 IDSW = I	NO	OK	NO	OK
SPC3000	OK	OK	OK	OK

Table 1 - Module and Enclosure ID Chip Compatibility

DSAENCL3200 - Setting the ID Enable Switch

The ID Switch setting may be modified by a user. The switch is mounted on the backplane daughter board. It may be accessed by removing the cover plate on the electronics section of the DSAENCL3200.

To change the setting of the ID switch, shut down the DSAENCL and remove AC power from the enclosure.

Remove the five (5) screws holding the electronics cover in place and slide the cover off.

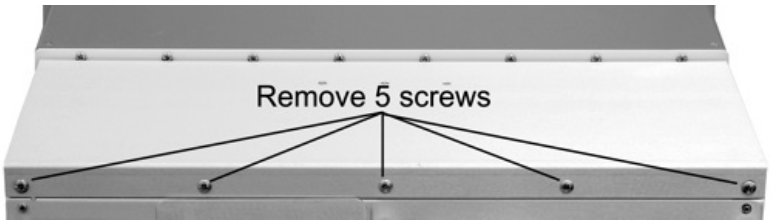
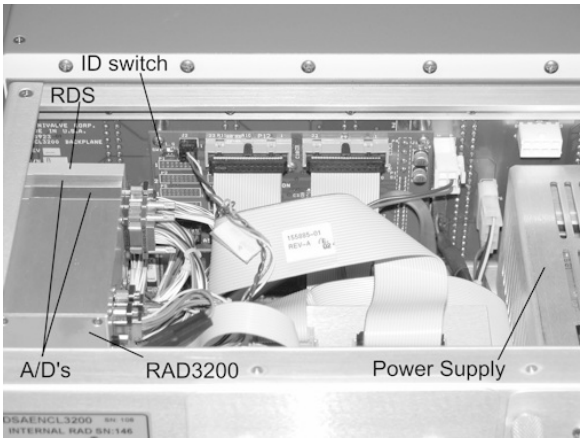


Figure 10 - DSAENCL Electronics cover plate removal

The ID switch is located at the left side of the electronics enclosure, looking from the rear. Figure 11 shows the location of the ID switch with references to other electronic components.



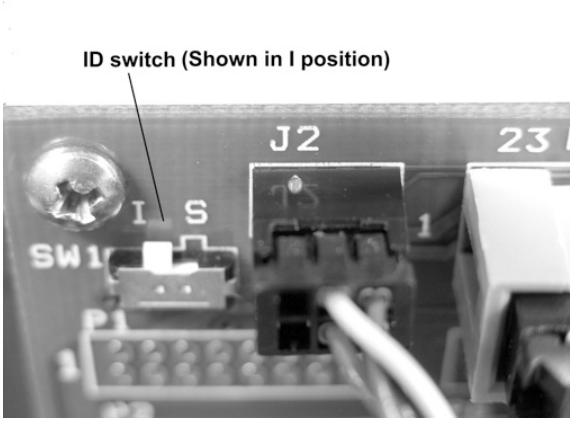


Figure 11 - ID Switch Location and detail

Software

When the DSAENCL3200 is mounted and the power requirements are met, the unit is ready to be configured for use. All configuration variables must be set using a communications program or by using the DSAENCL3200 as a stand alone computer. A user may remove the access cover and connect a keyboard, mouse, and a monitor to the DSAENCL3200 and use it as a computer. The DSAENCL3200 uses Embedded Windows XP Embedded as an operating system.

A user may connect another computer to the DSAENCL3200 and communicate by one of the following protocols and associated programs:

Ethernet

TelNet - A program furnished with Windows 98. This permits a network connection to the DSAENCL3200. A TelNet session is described later in this manual.

HyperTerminal - HyperTerminal may be configured for a winsock terminal program in Windows NT, 2000, and XP.

Other commercially available programs such as LapLink, PROCOMM, or any communications program may be used to load configuration files to the DSAENCL3200. A HyperTerminal Winsock session is described later in this manual.

DSMLINK - A program written by Scanivalve Corp. This program allows a user to communicate with a DSAENCL3200. It operates in Windows 98, NT, 2000, and XP.

DSM LabView VI - A driver written by Scanivalve Corp for use with LabView. There is two versions of this driver. One for use in LabView versions 5 and 6, and a version for use with LabView Version 7. These VI's are very simple, designed to assist a user in establishing communications with a DSAENCL3200.

Operation

This section contains information and procedures required for the proper operation of the DSAENCL3200 .

The DSAENCL3200 series enclosures are a stand alone data system. They use Windows XP Embedded as an operating system. When power is first applied, a DSAENCL3200 will self boot and execute a program named: **RAD.EXE**. The entire boot up process requires approximately 2-3 minutes. When the DSAENCL3200 is ready to accept commands a prompt symbol will be transmitted to the host computer.

Operation of the DSAENCL3200 may be monitored or controlled by connecting a computer to the Ethernet connection, or by removing the rear access cover and connecting a monitor, keyboard, and mouse to the processor board.

Modules

The DSAENCL3200 will support any existing DSA3016, ZOC16TC, or ZOC16EIM Module. The ZOC16TC modules must have an added RTD so the DSAENCL3200 can properly determine the temperature plane to be used. DSA3016 Modules should only be inserted or removed with their power switch off. All other ZOC modules should only be installed or removed from the DSAENCL3200 with the DSAENCL3200 power off. Configuration of the DSAENCL3200 may be checked during warm up. At this time, if calibration coefficients have been installed, it is very important to verify that the modules are connected to the proper inputs. Otherwise, data may be invalid.

Local Connections

The DSAENCL3200 may be operated in the local mode by removing the rear access cover and connecting a monitor, keyboard, and mouse to the connection points provided on the processor board. Refer to figures 1, 2, 3, and 23 for more information.

In the Local Mode, the DSAENCL3200 operates as a stand alone computer.

Ethernet Connections

All DSAENCL3200's are equipped with an Ethernet port. The Ethernet speed is 100Base-T connections. No variables need to be modified to use this connection.

IP Address

All DSAENCL3200 Enclosures have a preset IP address that can be modified by a user, if desired. The preset IP address is 191.30.36.xxx where xxx is the serial number of the unit.

Multiple Ethernet Connections

The DSAENCL3200 Enclosures will not support multiple Ethernet connections. However, if a second Ethernet connection is made to a DSAENCL 3200, the current connection will be dropped for the new connection. The DSAENCL 3200 will output the following message when a command is entered from the new connection:

RCV Error Code 10053

Changing the IP Address

The IP Address can be modified by changing the settings of the TCP/IP Properties associated with the Local Area Connection. The IP Address can only be modified by changing the settings of the Windows IP address assignments. These assignments can only be modified when the DSAENCL3200 is in Local Mode with a Keyboard, Monitor and Mouse connected.

To change the IP Address:
- Select Start
- Select Control Panel

From the Control Panel Window:
- Select Network Connections

From the Network Connections Window:
- Select Local Area Connection

The Local Area Connection Status window will open,
- Click on Properties

The Local Area Connection Properties Window will open,
- Left Click once on Internet Protocol (TCP/IP) to highlight the line
- Click on Properties

Click the appropriate Radio Button for the IP Address assignment
- Click on: Obtain an IP address automatically if the LAN is controlled by a server
- Click on: Use the following IP address if the LAN is a dedicated LAN.

Enter the IP address and Subnet Mask.

The DNS settings should be set to suit the Local Area requirements.
- Click OK to save the changes.
- Click OK to exit the Local Area Network Properties Window
- Close the Local Area Status Window

Close the Network Connections Window.

NOTE: At this point, the new IP address can be used. However, these changes will be lost if the configuration changes are not saved. Please refer to the section on saving configuration changes for a procedure.

Saving Configuration Changes

Changes to the C: Drive in the DSAENCL3200 require the execution of a configuration manager program. The DSAENCL 3200 Hard Disk Drive is labeled as Drive C and Drive D. However, Drive D is actually a folder on Drive C. Drive D changes do not require execution of the configuration manager program.

Storing Data on Drive D

Data files and program files may be written to Drive D as needed. The memory allotted to this drive is limited. No special procedures are required to make changes to Drive D permanent.

RAD Configuration Variables

Changes to RAD software Configuration Variables are permanent as soon as a SAVE command is issued.

Operating System Changes

Changes to the operating system require a special procedure. This includes changes to any software or driver installed on the C Drive, IP Address changes, Clock and Date Settings, or any write to Drive C.

Select: Start
Select: Run

The Run Window will open.
In the window labeled: Open:, Enter the following command:

ewfmgr -commit c:
Click OK to execute the program

Execute a “clean” shutdown of Windows

Select: Start
Select: Turn off Computer
Select: Restart

When the DSAENCL3200 has completed the restart, verify the IP Address setting.

TelNet Host Operation - Windows 95 and 98

A host computer may be used to control the DSAENCL3200 without special software. The host to DSAENCL3200 connection should be made using an Ethernet connection.

Open a **TelNet** session.
Select: Terminal
Select: Preferences
Enable Local Echo
Set the Emulation to VT100/ANSI
Select: Connect
Select: Remote System
Host Name: Enter: 191.30.16.xxx Where: xxx is the serial number
Port: Select: Telnet
TermType: Select: vt100
If the computer opens a Dial Up Box,
Click on Cancel

When the TelNet session is open, any command listed in the Software Requirements Specification may be entered. Responses will be displayed in the TelNet Window. Please refer to the Software Requirements Specification furnished with the DSAENCL3200.

HyperTerminal Ethernet Operation - Windows NT, 2000, and XP

Open the HyperTerminal program

Select: Start
Select: Programs
Select: Accessories
Click on Hyperterminal

A HyperTerminal Window will open

Double Click: Hyperterminal.exe

A New Connection Window will open

Enter a name for the session and Click OK

A Connect to Window will open

Click on the down arrow by the Connect Using Box and click on TCP/IP(Winsock)
Enter the IP address of the Host Computer in the Host Address Box
The HyperTerminal window will indicate that a connection has been made.

Check the setup

Select: File
Select: Properties

A Properties Window will open.

Click on the Settings Tab
Emulation Mode should be Auto Detect
Terminal should be ANSI

Click on the ASCII Setup Button

For best operation, The check boxes for:
Send line ends with line feeds, and Echo typed characters locally may have to be checked

Configuration Variables

The DSAENCL3200 contains many configuration variables which must be set up properly in order for the DSAENCL3200 to function correctly. These variables are arranged in groups to aid the user in the setup of the DSAENCL3200. This section contains recommended setup information. It is expected that the information in this section will permit a user to set up and check out a DSAENCL3200. The user must be aware that the setup may need to be modified depending upon test requirements. It is recommended that a user read, and be completely familiar with, the RAD 3200 Series Software Requirements Specification before attempting to set up a DSAENCL3200.

The DSAENCL3200 Configuration Variables are set up to default settings that will generally permit the user to communicate using Ethernet TCP/IP. If communications cannot be established, then the setup will have to be started in the local mode. This requires a keyboard, monitor(VGA or better), and a mouse. Refer to figure1, 2, and 3 for more information on connecting these devices.

Please refer to the RAD 3200 Series Software Requirements Specification for more information on the proper syntax and methods for verifying and/or modifying Configuration Variables.

Identification Variables - List I

The first variables to set are the Identification variables. A List I command to the DSAENCL3200 will result in the following:

```
List I
        SET NL 0
        SET DISPIN 0
        SET HAVENET 1
        SET HAVEARINC 0
        SET CONOUT 2
        SET NETOUT 2
        SET FORMAT 0
        SET NETIN 1
        SET IFUSER 1
        SET ECHO 0
        SET CAL 0 9600
        SET CALSCHED 0 rp 0
        SET AUX 0 9600 1
        SET AUXSCHED 0 rp 0
        SET RESCAN 1 2500
        SET TWOAD 1
```

Module Variables - List mi x Where x = the module position number

Each module installed in a DSAENCL3200 must be defined and enabled. Definition of the module includes setting the number of ports, the full scale values and the number of negative points in the module calibration. A multi range module must have each group of ports defined. The high and low pressure units should be set no more than 20% over the actual range to permit some overpressure indication. A list MI command must be entered for each module and the module information verified. If the Profile List is correct, this information is read from the module mpf file.

NOTE: A User should not modify these settings. They are defined when the modules are calibrated at the factory. Modifications to these settings will corrupt the module MPF file.

For example, two 16 channel modules, one with a full scale of 15 psi and the other with a full scale of 5 psi, installed in positions 1 and 2, should look as follows:

```
LIST  mi 1
REM1 1 Comment line 1
REM1 2 Comment line 2
REM1 3 Comment line 3
REM1 4 Comment line 4
SET TYPE1 0
SET ENABLE1 1
SET NUMPORTS1 16
SET NPR1 15
SET LPRESS1 1..16 -16.65
SET HPRESS1 1..16 16.65
SET NEGPTS1 1..16 4
SET MODTEMP3 0 1.000000
```

```
LIST mi 2
REM1 1 Comment line 1
REM1 2 Comment line 2
REM1 3 Comment line 3
REM1 4 Comment line 4
SET TYPE2 0
SET ENABLE2 1
SET NUMPORTS2 16
SET NPR5 5
SET LPRESS2 1..16 -5.55
SET HPRESS2 1..16 5.55
SET NEGPTS2 1..16 4
SET MODTEMP3 0 1.000000
```

A 16 channel module with ranges of 15 and 50 psi installed in position 3 would be set up as follows:

```
LIST mi 3
REM3 1 Comment line 1
REM3 2 Comment line 2
REM3 3 Comment line 3
REM3 4 Comment line 4
SET TYPE3 0
SET ENABLE3 1
SET NUMPORTS3 16
SET NPR3 50
SET LPRESS3 1..8 -16.65
SET LPRESS3 9..16 -16.65
SET HPRESS3 1..8 16.65
SET HPRESS3 9..16 55.55
SET NEGPTS3 1..8  4
SET NEGPTS3 9..16 2
SET MODTEMP3 0 1.000000
```

Conversion Variables - List c

Once the modules have been defined and enabled, the conversion variables should be set to the units desired. . The following are the default settings:

```
List c
SET ZC 1
SET UNITSCAN psi
SET CVTUNIT 1.000000
SET BIN 0
SET EU 1
SET CALZDLY 5
SET MPBS 0
SET CALPER 500
SET CALAVG 32
SET MAXEU 9999.00
SET MINEU -9999.00
SET STARTCALZ 0
SET FILLONE 0
SET A2DCOR 1
```

General Scan Variables - List s

This group sets up the scan function. This is the group to define the scan rate, trigger and some output functions. The default settings follow:

```
List s
SET PERIOD 500
SET ADTRIG 0
SET SCANTRIG 0
SET PAGE 0
SET QPKTS 0
SET SIMMODE 0
SET BINADDR 0 0.0.0.0
SET IFC 62 0
SET TIMESTAMP 1
SET FM 1
SET TEMPPOLL 1
```

Digital I/O Variables - List d

This group sets up the Digital Inputs and Outputs. If functions such as Scan, Purge and Calibrate Zero are to be controlled externally, the applicable variable must be set correctly. The defaults follow:

```
List d
SET DOUTPU 0
SET DOUTCALZ 60
SET DOUTPGSEQ 0
SET DOUTPG e0
SET DOUTSCAN 20
SET DLYPGSEQ 1
SET DLYPG 10
SET DOUTREADY 40
SET BANKA 0
SET BANKB 0
SET BANKUSR 0
```

Scan Group Variables - List sg x Where x = the Scan Group Number

Each DSAENCL3200 can have as many as 8 different scan groups set up. A scan group is enabled by entering a channel or range of channels in the chanx variable. A scan group must be cleared by first setting chanx to 0 before entering a new range of channels to be scanned. Refer to the RAD3200 Software Requirements Specification for more information on Scan Groups. A user must be aware that a maximum of 128 channels may be displayed in a HyperTerminal or Telnet application. The following example will scan the modules enabled in the MI examples with an average of 16 samples:

```
List sg 1
SET AVG1 16
SET FPS1 0
SET SGENABLE1 1
SET CHAN1 1-1..3-16
```

If a user wished to scan each enabled module at different averages, then 3 scan groups could be set up. Examples follow:

```
List sg 1
SET AVG1 16
SET FPS1 0
SET SGENABLE1 1
SET CHAN1 1-1..1-16

List sg 2
SET AVG2 32
SET FPS2 0
SET SGENABLE2 1
SET CHAN2 2-1..2-16

List sg 3
SET AVG3 8
SET FPS3 0
SET SGENABLE2 1
SET CHAN3 3-1..3-16
```

Temperature Offset Variables - List o

These are factory set based on the RTD's used to measure the ZOC module temperature. The settings should not be modified by an end user. The following examples show the offset settings for a Nickel-Iron RTD(604Ω at 0°C).

```
List o
SET TEMPB1 -192.9757
SET TEMPB2 -192.9757
SET TEMPB3 -192.9757
SET TEMPB4 -192.9757
SET TEMPB5 -192.9757
SET TEMPB6 -192.9757
SET TEMPB7 -192.9757
SET TEMPB8 -192.9757
```

Temperature Gain Variables - List g

These are factory set based on the RTD's used to measure the ZOC module temperature. The settings should not be modified by an end user. The following examples show the gain settings for a Nickel-Iron RTD(604Ω at 0°C).

```
List g
SET TEMPM1 0.0228
SET TEMPM2 0.0228
SET TEMPM3 0.0228
SET TEMPM4 0.0228
SET TEMPM5 0.0228
SET TEMPM6 0.0228
SET TEMPM7 0.0228
SET TEMPM8 0.0228
```

Module Profile List - List p

The DSAENCL3200 firmware (RAD.exe) uses the Module Profile List to determine which module is installed in a certain position so the proper mpf file can be loaded into memory. It is very important that the information in this list is correct. If the module serial numbers are not entered correctly, the conversion tables will not be correct.

List p<CR>
SET RADSN 116
SET SN1 253
SET SN2 254
SET SN3 255
SET SN4 181
SET SN5 188
SET SN6 201
SET SN7 249
SET SN8 122

Interface Programs

Scanivalve Corp has several programs for use with DSAENCL3200 Enclosures. These programs will help simplify the setup, collect data and re-calibrate the modules. For more information on these contact Scanivalve Corp, Sales and Marketing, or check our website: www.scanivalve.com.

RADLink

This program, written in Visual Basic for operation in Windows 2000 or XP, will assist a user in the setup of a DSAENCL3200. It has limited data collection capabilities. This program has a nominal cost.

DSM LabView VI

Two versions of LabView Drivers are available. One for use with LabView Versions 5 and 6, and one for use with LabView Version 7. The LabView Drivers are simple drivers designed to establish communications. They will pass commands to the DSAENCL and receive the responses from the Enclosure. Both drivers come with example VI's. This program has a nominal cost. RADLink is bundled with this program.

DSM/RAD Field Cal

This program, written in Visual Basic for operation in Windows 2000 or XP, will re-calibrate a DSA3106 module installed in a DSAENCL3200. The program will compare the data collected to the existing MPF file and correct all Master Temperature Coefficient Planes. This program does not require the use of an oven to perform the calibration. This program is distributed at no charge.

BTEL

This program is a console program that will transfer data from a DSAENCL to a host computer in Binary UDP format. This will allow very fast scan and data transfer rates. The program operates out of a DOS window. It also has a utility program to convert the Binary data to ASCII so it can be imported to a spreadsheet program. This program is distributed at no charge.

Digital I/O Control

A DSAENCL3200 has one(1) Trigger Inputs and five(5) Digital Outputs. The Digital Outputs may be configured to operate, control, or monitor certain external functions. Some of the more common uses are documented in this section.

Purge Sequence Control

A Digital Input may be configured to initiate a Purge Sequence. The input must transition from a logic zero to a logic one to be valid.

The Purge Sequence may be initiated in two ways:

1. Issue the **PURGE** command when the DSAENCL3200 is in **READY** mode
2. Apply a signal, to the digital input assigned to purge, when the DSAENCL3200 is in **READY** or **SCAN** mode.

Purge Command

The following is the sequence for a purge operation when **PURGE** is initiated by the Purge command:

1. The DSAENCL3200 receives the Purge command and is in the **READY** mode.
2. The digital output are set according to the **DOUTPGSEQ** configuration variable.
3. These output remain set until **DLYPGSEQ**, configurable from 0 to 5 seconds, times out. If 0 is set, No Delay occurs. Default is 1 second.
4. The digital output are set according to **DOUTPG** configuration variable.
5. These output remain set until **DLYPG**, configurable from 0 to 3600 seconds, times out or a **STOP** command is issued. When 0 is set, the delay is infinite. A **STOP** command must be used to terminate the Purge Sequence when delay is set to 0. Default is 10 seconds.
6. When the Purge Sequence is complete, the digital output are set according to the **DOUTPGSEQ** configuration variable.
7. These output remain set for the delay set in **DLYPGSEQ**.
8. When **DLYPGSEQ** times out the DSAENCL3200 returns to the **READY** mode.

Purge Digital I/O

The following is the sequence for a Purge operation when initiated by the purge digital input, as assigned by the **DINPG** configuration variable:

1 The purge signal is received by the DSAENCL3200. If the DSAENCL3200 is in the **READY** mode, the Purge Sequence will be initiated. If the DSAENCL3200 is in the **SCAN** mode, the SCAN function is suspended for the duration of the purge sequence.
2. The digital output are set according to the **DOUTPGSEQ** configuration variable.
3. These output remain set until **DLYPGSEQ**, configurable from 0 to 5 seconds, times out. If 0 is set, no delay occurs. Default is 1 second.
4. The digital output are set according to **DOUTPG** configuration variable.
5. These output remain set until DLYPG, configurable from 0 to 3600 seconds, times out or a **STOP** command is issued. When 0 is set, the Delay is infinite. A STOP command must be used to terminate the Purge Sequence when delay is set to 0. Default is 10 seconds.
6. When the Purge Sequence is complete, the digital output are set according to the **DOUTPGSEQ** configuration variable.
7. These output remain set for the delay set in **DLYPGSEQ**.
8. When **DLYPGSEQ** times out, the DSAENCL3200 returns to the mode it was in when the digital signal was received. If the DSAENCL3200 initiated the Purge Sequence from the **READY** mode, it will return to the **READY** mode. If the DSAENCL3200 initiated the Purge Sequence from the **SCAN** mode, the **SCAN** function will be resumed.

ZOC16EIM Setup

A ZOC16EIM may be used with a DSAENCL3200. It does require a different setup from a DSA3016 or ZOC16TC. A ZOC16EIM does not require an RTD since it is not affected by temperature. Also, the data from the ZOC16EIM is should be unaffected by the setting of UNITSCAN and CALZ. The following setup changes must be made in order for the DSAENCL3200 to interface to a ZOC16EIM:

Set Module type to 4. This variable is TYPEn in the MI x variable.
Set TempBn to 0
Set TempGn to 0

A single look up table may be installed for the ZOC16EIM. Because the Temp EU conversion will always be 0, this will be sufficient for proper EU conversion. A sample mpf file for a ZOC16EIM may be found below. Only channels 1 and 16 have been shown because of space considerations. The actual file should contain data for all 16 channels.

```
REM<serial number> 1      Comment   line    1
REM<serial number> 2      Comment   line    2
REM<serial number> 3      Comment   line    3
REM<serial number> 4      Comment   line    4
SET TYPE<<serial number> 4
SET ENABLE<serial number> 1
SET NUMPORTS<serial number> 16
SET NPR<serial number> 10
SET LPRESS<serial number> 1..16 0.000
SET HPRESS<serial number> 1..16 10.000
SET NEGPTS<serial number> 1..16 0
SET MODTEMP<serial number> 0 1.000000
SET TEMPM<serial number> 0.0
SET TEMPB<serial number> 0.0
INSERT 00.00 <serial number>-1 0.0 0 M
INSERT 00.00 <serial number>-1 2.00 6400 M
INSERT 00.00 <serial number>-1 3.10 9920 M
INSERT 00.00 <serial number>-1 4.20 13440 M
INSERT 00.00 <serial number>-1 5.30 16960 M
INSERT 00.00 <serial number>-1 6.50 20800 M
INSERT 00.00 <serial number>-1 7.50 24000 M
INSERT 00.00 <serial number>-1 8.60 27520 M
INSERT 00.00 <serial number>-1 9.90 31680 M
    :   :       :       :       :       :
    :   :       :       :       :       :
INSERT 00.00 <serial number>-16 0.0 0 M
INSERT 00.00 <serial number>-16 2.00 6400 M
INSERT 00.00 <serial number>-16 3.10 9920 M
INSERT 00.00 <serial number>-16 4.20 13440 M
INSERT 00.00 <serial number>-16 5.30 16960 M
INSERT 00.00 <serial number>-16 6.50 20800 M
INSERT 00.00 <serial number>-16 7.50 24000 M
INSERT 00.00 <serial number>-16 8.60 27520 M
INSERT 00.00 <serial number>-16 9.90 31680 M
```

Calibration

All modules that will be used with a DSAENCL3200 must be fitted with an RTD so the DSAENCL3200 can determine the temperature of the module. This is critical to allow a user to achieve the best possible accuracy in a system. A module, once calibrated, may be used in any position in a DSAENCL3200. It may even be moved to a different DSAENCL3200 with no loss in accuracy.

Each module modified and/or calibrated at the Scanivalve Factory will be returned with a diskette containing calibration coefficients in a file with the extension **.MPF**. The coefficients are in a text format to permit an easy download to a DSAENCL3200.

DSAENCL3200 Coefficient Installation Procedure

1. Connect a host computer to the Ethernet port.
2. Install the disk with the ZOC Module coefficients into a drive.
3. Transfer the file(s) from the disk to the RAD directory on Drive D using Windows Network Neighborhood.
4. Issue a RELOAD command to the DSAENCL3200.

DSAENCL3200 Coefficient Installation Procedure (Alternate Method)

1. Connect a keyboard, monitor and mouse to the DSAENCL3200.
2. Using a second computer, transfer the new MPF files from the supplied disk to a jump drive.
3. Insert the jump drive in the USB port of the DSAENCL.
4. Transfer the file(s) from the jump drive to the RAD directory on Drive D.
5. Issue a RELOAD command to the DSAENCL3200.

Pneumatics

The DSAENCL3200 has built in pneumatic solenoids for control of CALZ, RUN, and PURGE. These solenoids are configured to operate from Digital Outputs 6, 7, and 8. These were selected because they do not interfere with the possible use of Digital Outputs 1-5. Figure 12 shows the solenoids, pneumatic fittings, and the Control Pressure Input on the Rear Panel of a typical DSAENCL3200. Figure 13 is a close up of the silk screen legend documenting the valves, their function and the DOUT command that controls each one.

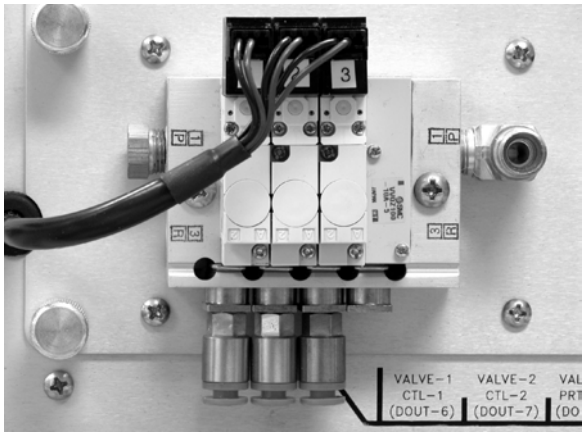


Figure 12 - DSAENCL Control Pressure Pneumatic Block

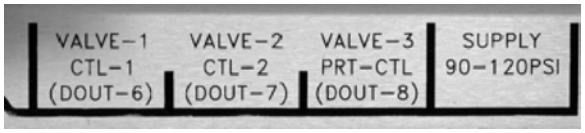


Figure 13 - DSAENCL Control Pressure Pneumatics Legend

Control Pressure Pneumatic Block Details

A user does not need to make any electrical connections to the Solenoid Valves. All electrical connection are made and tested at the Scanivalve Factory.

If the DSAENCL 3200 is purchased as part of a system, the unit will be shipped with all tubing connection made and tested at the factory. In this case, a user must only connect is a Control Pressure Supply Pressure to the Control Pressure Input fitting. The pressure should be 95 psi unless DSA3016 modules with a full scale input pressure greater than 500 psi (3450 kPa) are installed. The Control Pressure Input supply must be 120 psi (825 kPa) for that installation.

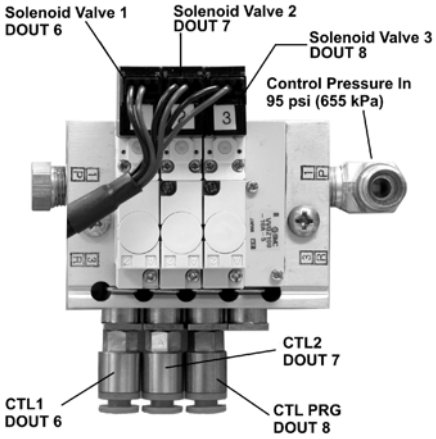


Figure 14 - DSAENCL Control Pressure Pneumatic Block Details

If the DSAENCL3200 has been purchased as a spare or without modules, a user will have to connect the control pressure valves to the module back blocks. Figure 15 shows the three connection points on a typical rear access back block.

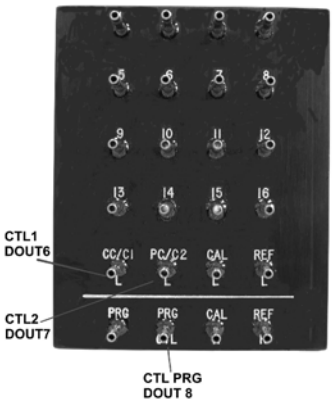


Figure 15 - Typical DSA3016 Rear Access Back Block

The methods required to connect the control pressure tubing to the rear back blocks will depend on the type of back block. For information on connections to the back blocks, please contact Scanivalve Corp, Product Support Department for more information.

Solenoid Valve Tube Connections

The DSAENCL3200 Solenoid valves use a SMC IQH3-M5 fitting for the tubing connection. This fitting has an internal compression o-ring that “captures” the tube and forms a leak tight seal. It is designed to accept a 0.187 inch (4.75 mm) OD plastic tube. Figure 16 shows the fitting and the tube connection.

To connect a tube:

1. Cut the tube end square. The cut must not be angled. Angled ends may result in leaks. The fitting has an internal compression o-ring that “captures” the tube forming a leak tight seal.
2. Insert the tube into the fitting. The tube will meet resistance from the compression o-ring after approximate 0.375 inches(9.5 mm) has been inserted.
3. Force the tube into the compression fitting. The tube will encounter a stop after another 0.25 inches(6.35 mm) has been inserted.

To Disconnect a tube, Press the release ring (Figure 16, view 3)toward the body of the fitting while pulling on the tube. The tube will slide out of the fitting. The release ring will only move about 1 mm.

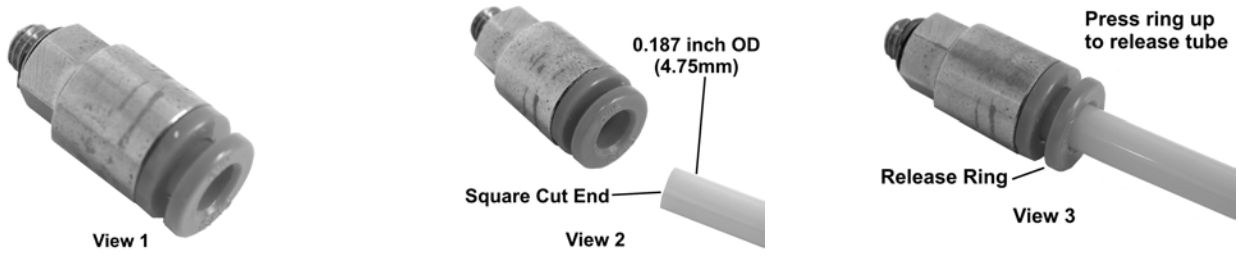


Figure 16 - Control Pressure tubing connection

Maintenance

The DSAENCL3200 is built from subassemblies. Many of these subassemblies are shared with other variations of the DSAENCL3200 family. All of the subassemblies are field replaceable. This section shows the major subassemblies. The major subassemblies are:

EBX Processor Board
EBX Breakout Board
RADBase3200
RAD3200 A/D Modules
RAD3200 RDS Module
Compact Flash Solid State HDD
Power Supply
Cooling Fan

Figure 17 is a Block Diagram of the DSAENCL3200. Figure 18 is an exploded view of the DSAENCL3200. Each of the major subassemblies is identified. Figures 19 and 20 show the Internal Cable Connections. Figures 21 through 26 document the RAD3200 installed in the DSAENCL3200. Figures 27 and 28 show the EBX Processor Board and the EBX Breakout Board. Figure 29 shows the DSAENCL3200 Power Supply and the Power Distribution Cable.

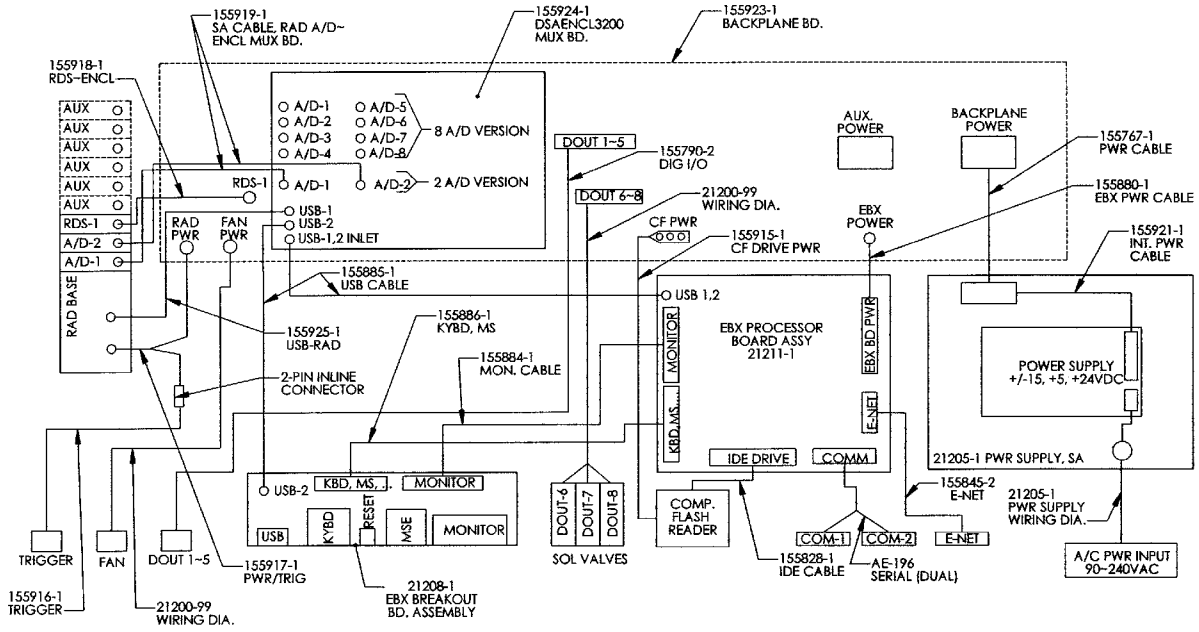


Figure 17 - DSAENCL Block Diagram

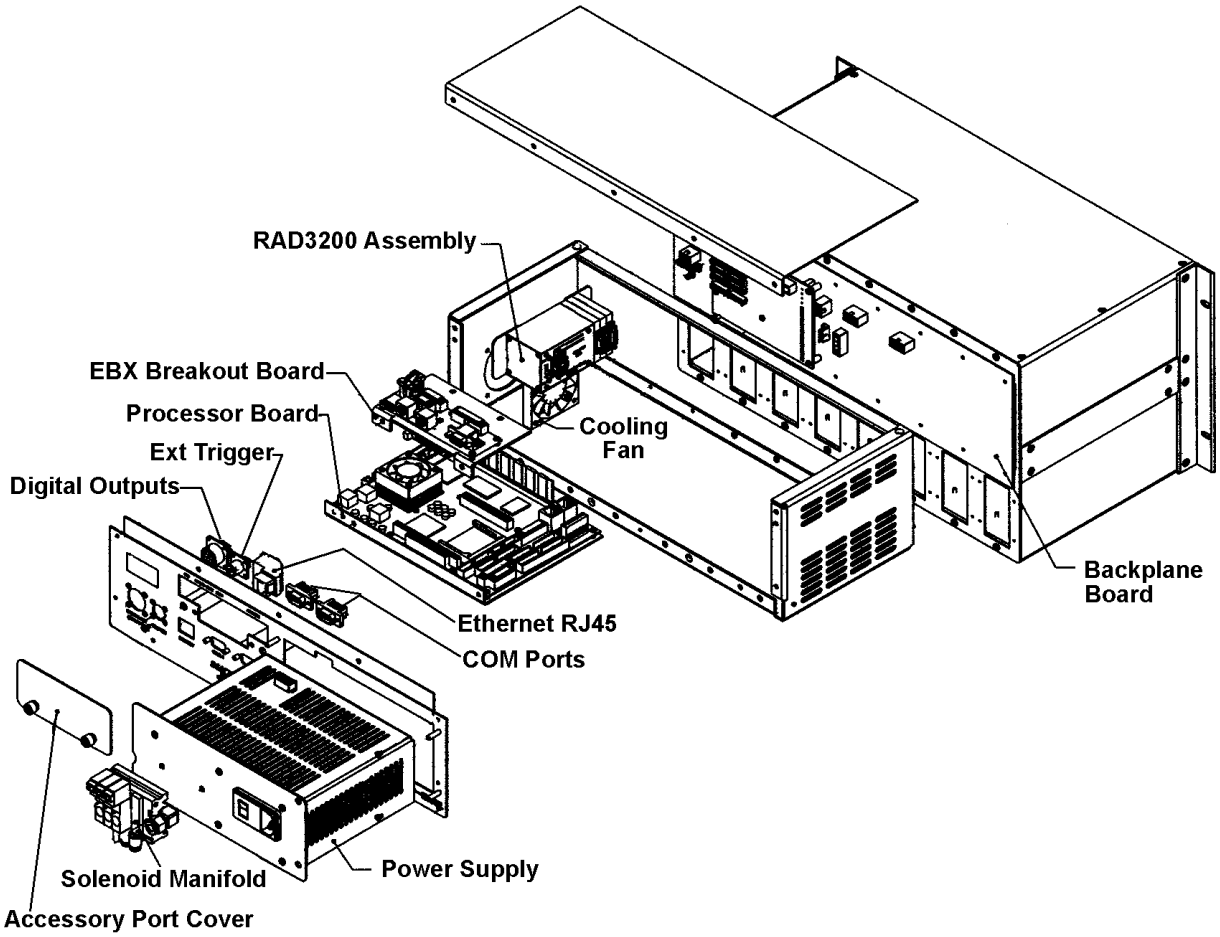


Figure 18 - DSAENCL3200 Exploded View

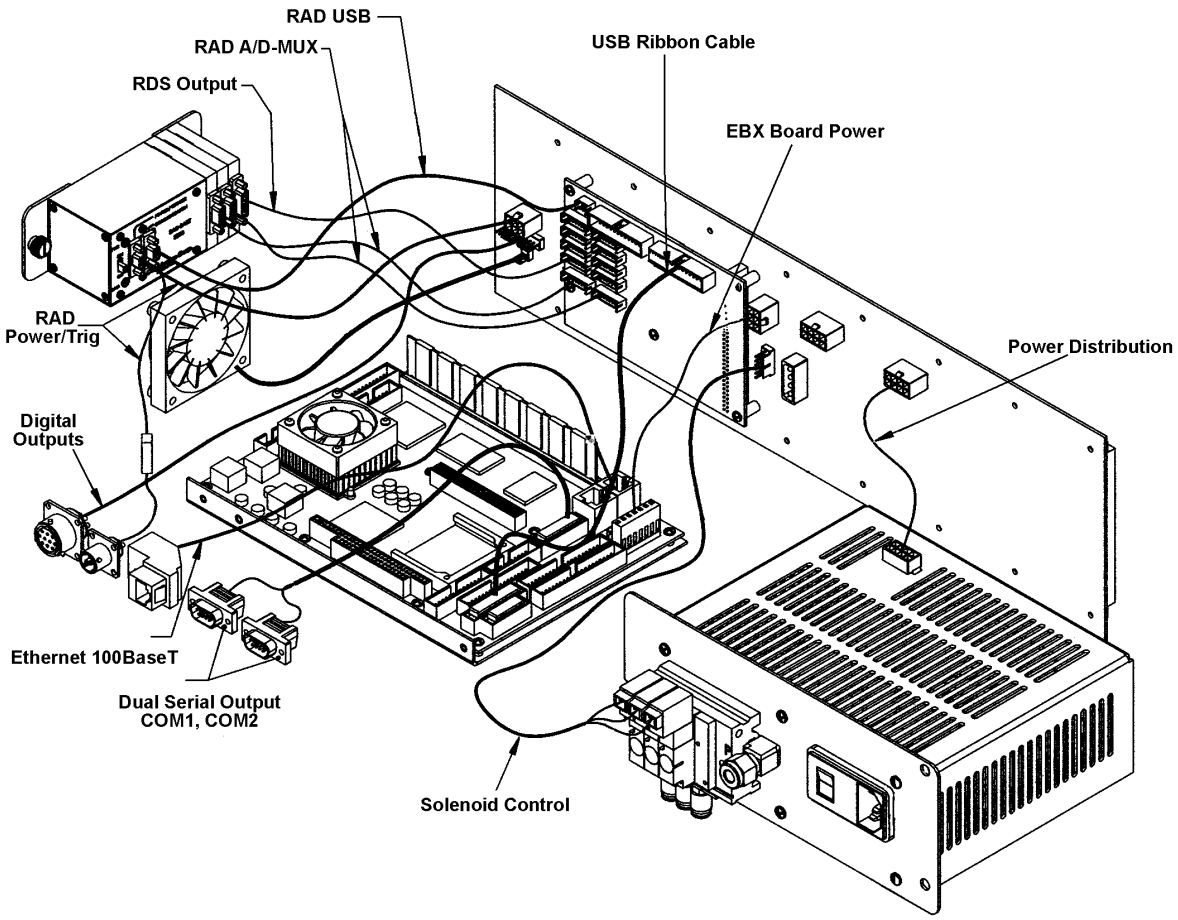


Figure 19 - DSAENCL3200 Internal Cable Connections, Part 1

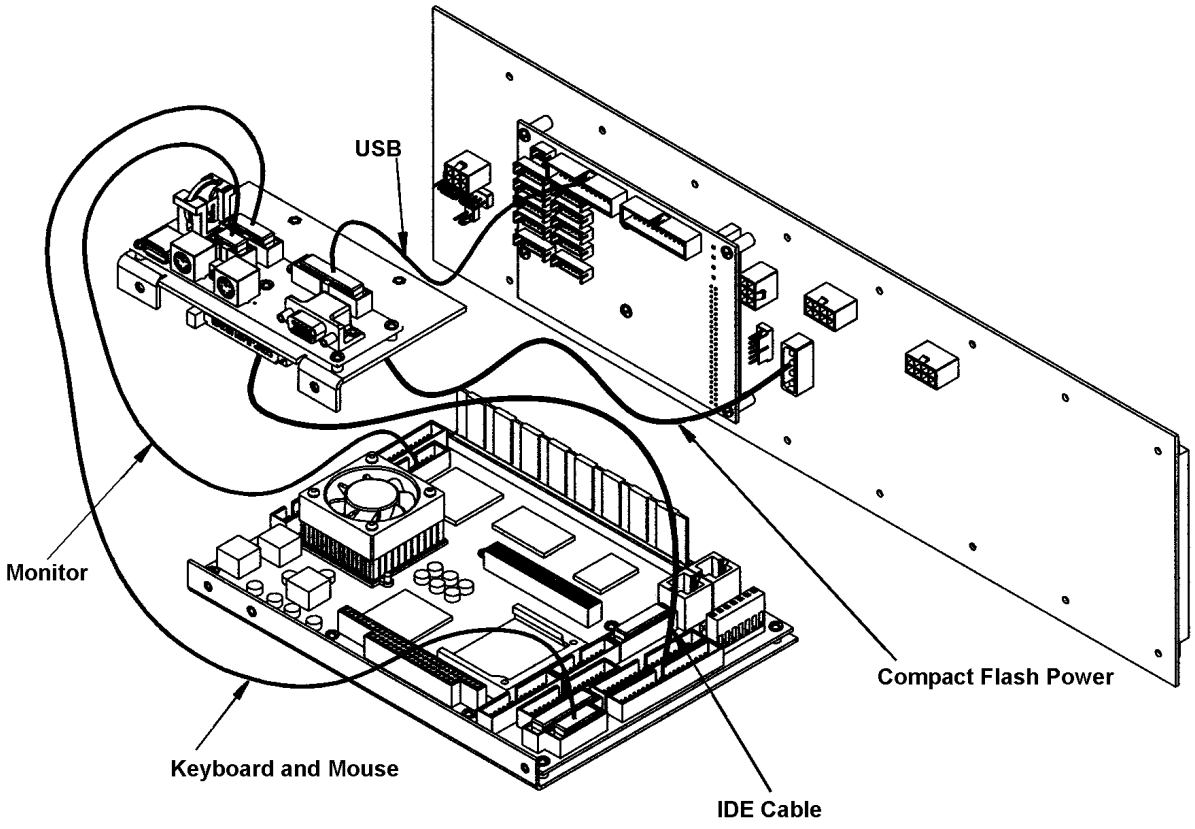


Figure 20 - DSAENCL3200 Internal Cable Connections, Part 2

RAD3200 Subassembly

The DSAENCL3200 uses a RAD3200 to scan the modules and convert the input pressures to A/D counts. An exploded view of the RAD Subassembly is shown in Figure 21.

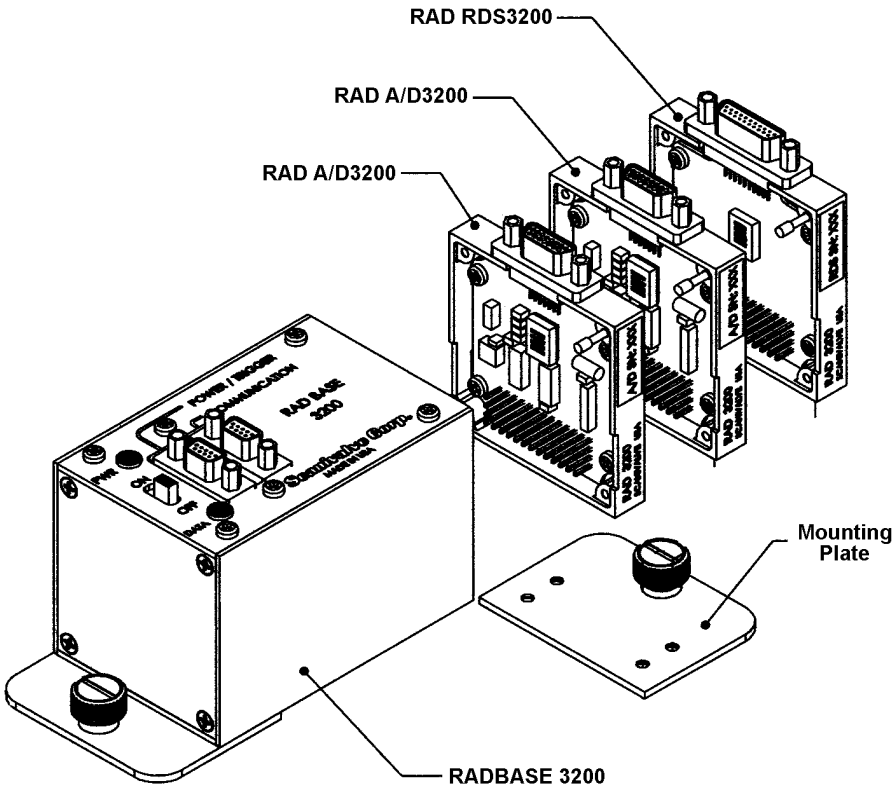


Figure 21 - RAD3200 Subassembly

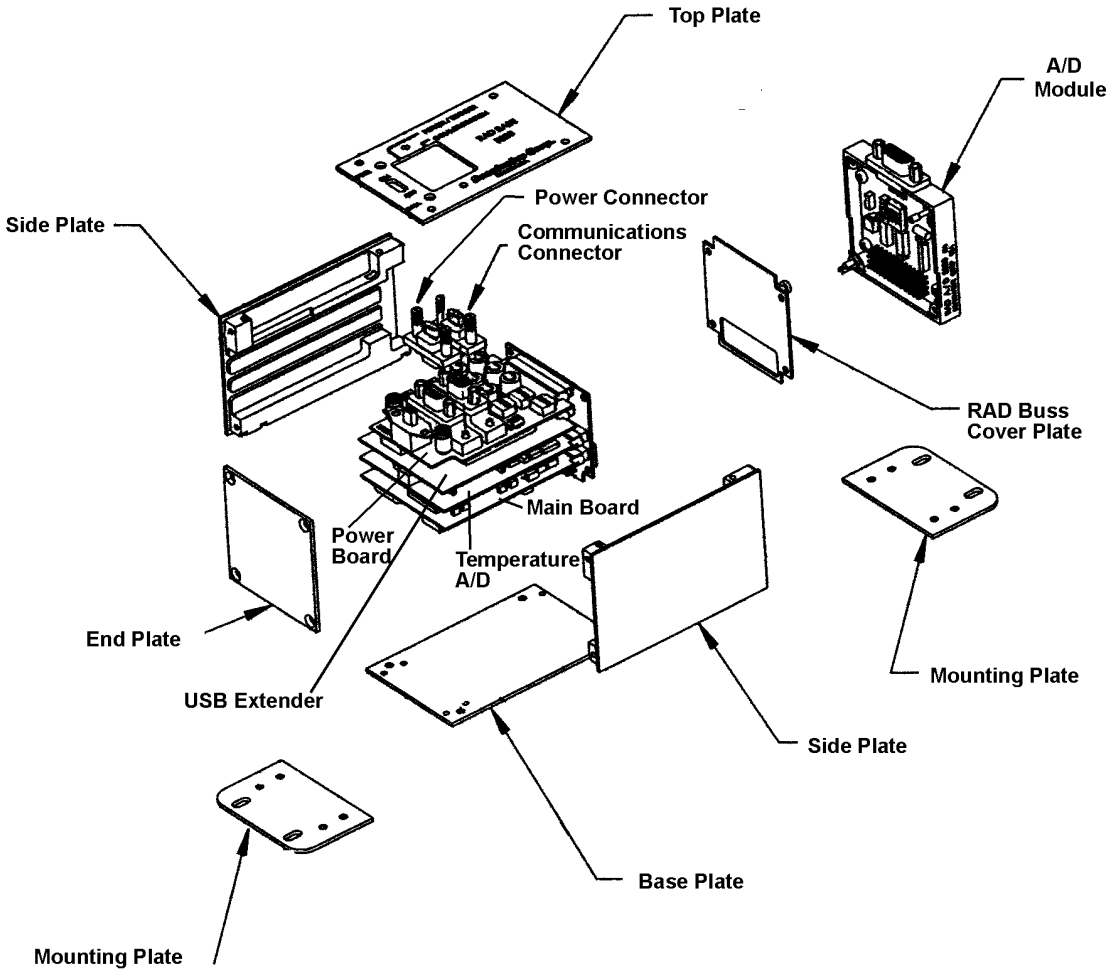


Figure 22 - RAD3200 Exploded View

RAD A/D 3200 - Remote A/D Modules

Each RAD3200 may have up to 9 A/D modules connected. One for Temperature and eight for Modules. The Temperature A/D is installed in the RADBASE. The other 8 pressure A/D modules may be connected and disconnected as needed for a given test requirement. The temperature and pressure A/D's are **NOT** interchangeable.

Each A/D module has an ID chip installed. The ID chip identifies the module by type, location and serial number. Each module can be characterized to correct for zero and gain errors, thus minimizing system errors. This information is contained in the ID chip. When the RAD.exe program is started, the software identifies each A/D and maps the correction coefficients into memory. These data are used during the conversion of the analog inputs to an engineering unit to minimize errors from the A/D's.

The A/D modules have a DIP switch used to identify the position of the A/D. This switch must be set by the user when the A/D is installed. The A/D modules DIP switches must be set for a position between 1 and 8 (binary 0 - 7). The actual physical position of the modules is not important.

NOTE: Although the physical position of the A/D modules is not important, Scanivalve Corp recommends that the A/D modules be installed in order to prevent confusion and erroneous data.

A truth table showing the DIP switch settings is shown in Table 2.

The temperature A/D has a gain of 2.916. The pressure A/D has a gain of 2.854.

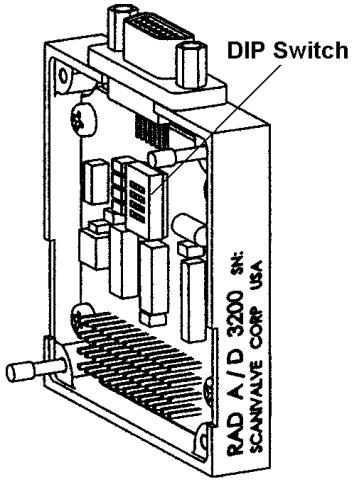


Figure 23 - RAD3200 Pressure A/D Module

Position	SW1	SW2	SW3	SW4
1	ON	ON	ON	ON
2	OFF	ON	ON	ON
3	ON	OFF	ON	ON
4	OFF	OFF	ON	ON
5	ON	ON	OFF	ON
6	OFF	ON	OFF	ON
7	ON	OFF	OFF	ON
8	OFF	OFF	OFF	ON

Table 2 - RAD3200 A/D Module DIP Switch Settings

RDS 3200 - Remote Digital Switch

The RDS, Remote Digital Switch, contains eight(8), software controlled and optically isolated, switches. The switches are controlled by the Digital Output Configuration Variables or the DOUT Commands in the RAD software. For more information on the Digital Outputs, please refer to the RAD3200 Software Requirements Specification.

Each switch is rated for 1 A at 60 V. The Voltage may be AC or DC. If the switches will be used to switch power, the power must be supplied by the user.

The RDS has a four position DIP switch that is used to set the address, or position in the RAD3200. The RDS must always be the last unit in the system. The A/D modules may be installed in positions 1 through 8 (binary 0 - 7). An RDS is always position 9(binary 8) or higher. The RAD may accept up to 8 RDS Modules which must be programmed as positions 9 through 16 (binary 8 to 15) respectively. A truth table for the RDS DIP switch setting is shown in Table 3.

The first RDS must be installed in location 9. The DOUT commands will not function unless the first RDS is in that location. If an RDS is not installed correctly, an error will be reported at boot up.

A mating connector, Cannon MDM-21PH003L-A174, is supplied with each RDS. The pinout of the RDS is shown in Figure 26.

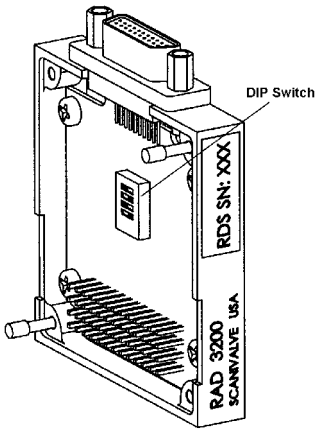


Figure 24 - RDS 3200 - Remote Digital Switch

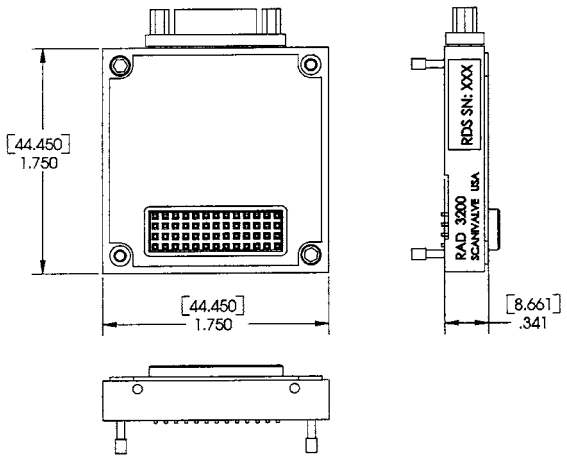


Figure 25 - RDS3200 Dimensions

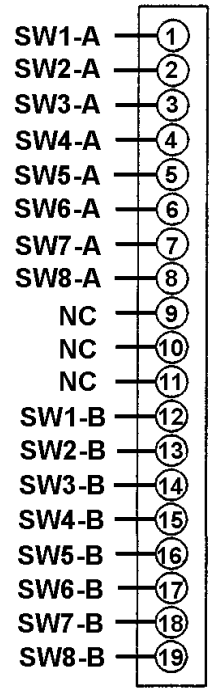


Figure 26 - RDS3200 Pinouts

Position	Channels	SW1	SW2	SW3	SW4
9	1 - 8	ON	ON	ON	OFF
10	9 - 16	OFF	ON	ON	OFF
11	17 - 24	ON	OFF	ON	OFF
12	25 - 32	OFF	OFF	ON	OFF
13	33 - 40	ON	ON	OFF	OFF
14	41 - 48	OFF	ON	OFF	OFF
15	49 - 56	ON	OFF	OFF	OFF
16	57 - 64	OFF	OFF	OFF	OFF

Table 3 - RDS 3200 DIP Switch Settings

Processor Board

All variations of the DSAENCL3200 enclosures use an EBX Processor Board. The processor board contains all of the connections required for the DSAENCL3200 to operate in a stand alone mode.

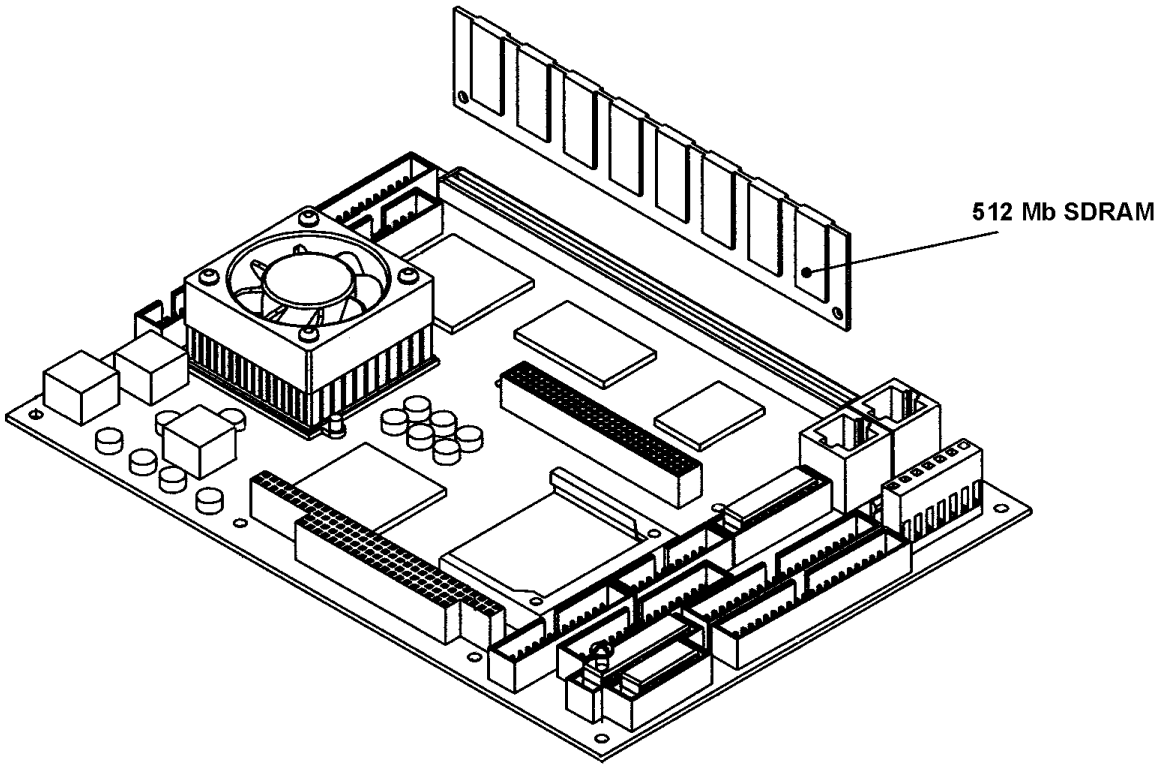


Figure 27 - DSAENCL3200 EBX Processor Board

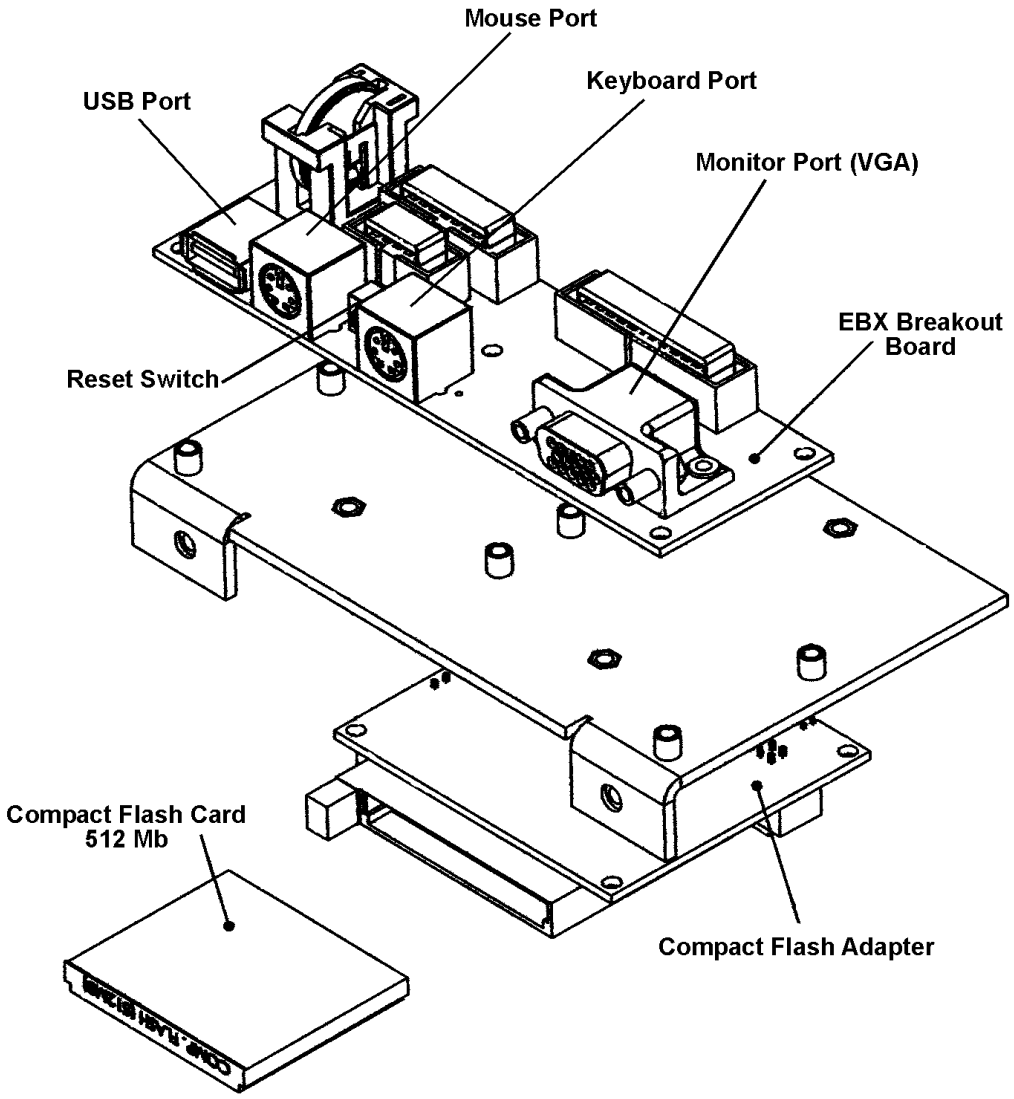


Figure 28 - DSAENCL3200 EBX Breakout Board and Compact Flash Installation

Power Supply

The DSAENCL3200 Power Supply converts the AC Input voltage to:±15 Vdc, + 5Vdc, and +24 Vdc , and outputs and distributes the voltages to the various circuit boards and RAD3200. An exploded view of this power supply is shown in figure 29.

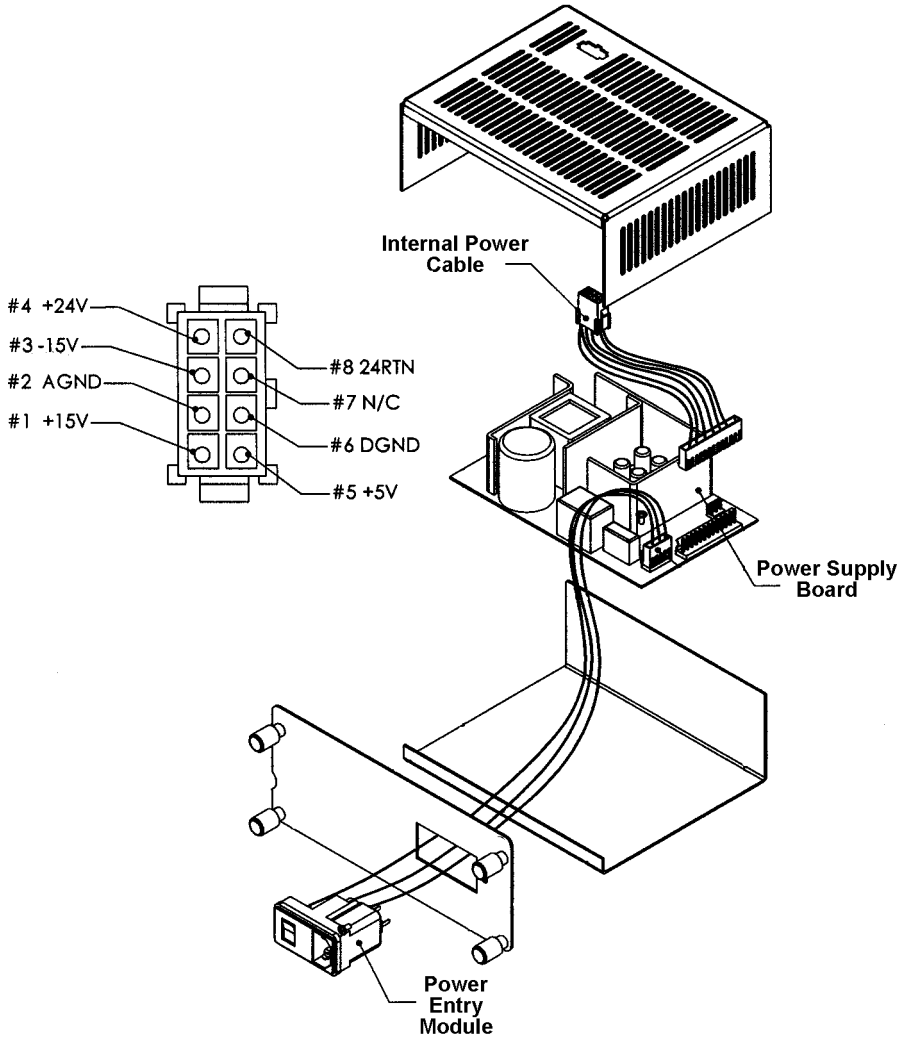


Figure 29 - DSAENCL3200 Power Supply and Power Distribution

Special Hardware

Hard Disk Drive

The Hard Disk Drive used in the DSAENCL3200 is a Compact Flash. It has a capacity of 512 Mbytes. It may be removed by the user for data security. Access is through the access panel on the rear of the enclosure.

Cooling Fan

The cooling fan is a Mechatronics F4010H05. The power requirements are 5 Vdc @ 100ma. It rotates at 4200 rpm and provides an air flow of 4.6 scfm.

The fan must not be obstructed. The EMI mesh should be cleaned occasionally in order to keep the cooling air flow at a maximum.

NOTE: The DSAENCL3200 **MUST** be shut down as soon as possible if the cooling fan is not operating. Continued operation of the DSAENCL3200 without sufficient cooling air will result in damage to the microprocessor.

ZOC16TC RTD Installation

Although it is highly recommended that users return ZOC16TC modules to Scanivalve for retrofit to a DSA configuration, a user may make the conversion in the field. Figure 25 shows the installation of the RTD. Figure 8 details the DSAENCL Backplane connections. More detailed instructions are available on request from Scanivalve Corp.

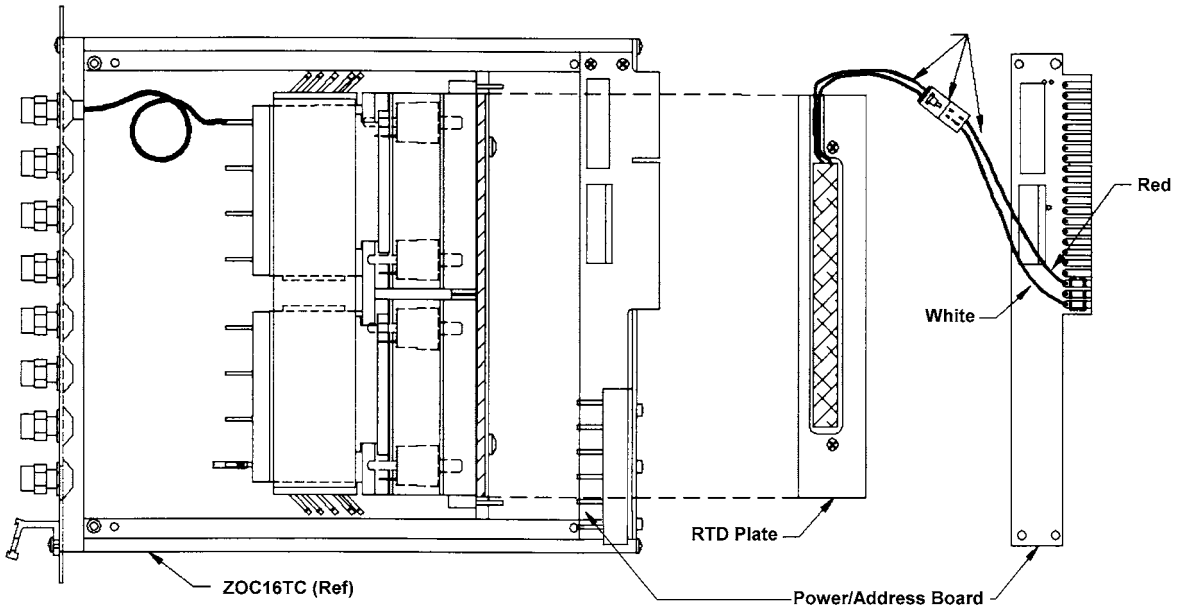


Figure 30 - ZOC16TC RTD Installation