DSAENCL 4000 SERIES
SOFTWARE REQUIREMENTS SPECIFICATION

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DSAENCL CONTROL AND CONFIGURATION

The operation of each DSAENCL is controlled by sending commands to selected units via the network. The DSAENCL returns data or information over the same network to the requesting client/host.

DSAENCL COMMAND STRUCTURE and SYNTAX

This section describes the commands used to control the DSAENCL. The DSAENCL software performs the following general tasks:

1) Read and filter the raw A/D counts that represent pressure and temperature.
2) Convert the pressure A/D counts to user chosen pressure units.
3) Receive and execute commands via the Ethernet or Local.
4) Output converted data, status, setup and calibration data over the Ethernet or Local outputs.

When a DSAENCL module is in a “not ready” mode, all commands are disabled except STATUS and STOP.

COMMAND FORMAT

Each of the commands are explained with the following sections: command, syntax, arguments, description, and returns.

COMMAND lists the name of the command.
SYNTAX lists the format of the command. The following conventions are used:

BP	Boldface letters indicate command keywords and operators. Within the discussion of syntax, bold type indicates that the text must be entered exactly as shown.
expression	Words in italics indicate place holders for information you must supply, or information returned by the calibrator, such as a coefficient name or pressure data.
[/H]	Items in square brackets are optional.
,	Commas separate options, only one of the options may be used.
<CR>	Items in angle brackets are used for names of keys on a typical keyboard. The carriage-return key, sometimes marked as a bent arrow, Enter, or Return on the key board, is called <CR>.

Spaces, as used in the syntax, are entered as spaces.
DESCRIPTION describes the function of the command.
RETURNS lists the format of the information that the unit returns to the host.
A **PROMPT (>)** will be output when the DSAENCL is ready to accept a command.

TCP/IP does not guarantee that packet boundaries will be maintained between a Host and a DSAENCL. Therefore, **ALL** commands from a Host **MUST** be terminated properly with one of two options using the NL configuration variable. The two options are:

CR-LF (ASCII 13 - ASCII 10) or CR (ASCII 13)

When a communications variable is modified, the DSAENCL program must be restarted, preferably with the **RESTART** command, in order for the changes to take effect.

DSAENCL4000 COMMAND LIST

COMMAND **A/D CALIBRATION (NON-TEMPERATURE COMPENSATED)**

SYNTAX **A2DCAL <*module*> <*index*> <*voltage*> <CR>**

ARGUMENTS

module	The A/D module being calibrated. 0 is the DSAENCL, 1 to 8 indicate pressure A/D's.
index	the Calibration point, 0 through 15
voltage	the applied calibration voltage

DESCRIPTION This command is used to produce the voltage correction table for a non-temperature compensated A/D. Although 16 points may be applied, a user may use as few as three points.

RETURNS <*nl*>

nl	end of line

EXAMPLE To calibrate a non-temperature compensated A/D module installed in position 1, apply a series of voltages. The entries may be as follows:

```
A2DCAL 1 0 0.0000
A2DCAL 1 1 0.5000
A2DCAL 1 2 1.0000
A2DCAL 1 3 1.5000
A2DCAL 1 4 2.0000
A2DCAL 1 5 2.5000
```

NOTE This command will only generate the correction table. It does not convert the table to a set of coefficients. Coefficients are generated by the A2DCALC command and written to the A/D module using the IDPWRITE command.

COMMAND **A/D CALIBRATION (TEMPERATURE COMPENSATED)**

SYNTAX **A2DTCAL <*module*> <*t index*> <*point index*> <*voltage*> <CR>**

ARGUMENTS

module	The A/D module being calibrated. 0 is the Enclosure temperature A/D, 1 to 8 indicate pressure A/D's.
t index	The temperature index, 0 through 7
point index-	the Calibration point, 0 through 15, for a t index
voltage	the applied calibration voltage

DESCRIPTION This command is used to produce the voltage correction table for a temperature compensated A/D. Although 16 points may be applied at each temperature index, a user may use as few as three points.

RETURNS <*nl*>

nl	end of line

EXAMPLE To calibrate a temperature compensated A/D module installed in position 1, apply a series of voltages. The entries may be as follows:

```
A2DTCAL 1 1 0 0.0000
A2DTCAL 1 1 1 0.5000
A2DTCAL 1 1 2 1.0000
A2DTCAL 1 1 3 1.5000
A2DTCAL 1 1 4 2.0000
A2DTCAL 1 1 5 2.5000
```

NOTE This command will only generate the correction table. It does not convert the table to a set of coefficients. Coefficients are generated by the A2DTCALC command and written to the A/D module using the IDPWRITE command.

COMMAND SYNTAX

A/D COEFFICIENT CALCULATION (NON-TEMPERATURE COMPENSATED)
A2DCALC <*module*> <*number of points*> <CR>

ARGUMENTS

module	The A/D module being calibrated. 0 is the Enclosure A/D, 1 to 8 indicate pressure A/D's.
number of points	the number of points in the coefficient table

DESCRIPTION

This command is used to calculate the voltage correction coefficients for a non-temperature compensated A/D. Three coefficients are generated: ADCC, ADCB, and ADCA. They will only be calculated by this command. IDPWRITE and IDPCONFIRM are used to write these coefficients to the ID chip.

RETURNS

<mod> <ac> <bc> <cc><*nl*>

mod	The A/D module, 0 to 8, where 0 is the and 1 to 8 corresponds to the A/D modules
ac	The A coefficient in the polynomial
bc	The B coefficient in the polynomial
cc	The C coefficient in the polynomial
nl	end of line

EXAMPLE

A series of voltages have been applied using the A2DCAL command. To generate the third order polynomial for the A/D correction for module 1,

Type: A2DCALC 1 6

The DSAENCL software will calculate the polynomial coefficients and return them. They will not be written to the ID chip until IDPWRITE and IDPCONFIRM commands have been executed.

NOTE

This command will only generate the correction coefficients. Coefficients are written to the A/D module ID chip using the IDPWRITE command.

COMMAND SYNTAX

A/D COEFFICIENT CALCULATION (TEMPERATURE COMPENSATED)

A2DTCALC <*module*> <*number of temp planes*> <*number of points* <CR>

ARGUMENTS

module	The A/D module being calibrated. 0 is the Enclosure A/D, 1 to 8 indicate pressure A/D's.
index	the Calibration point, 0 through 15
voltage	the applied calibration voltage

DESCRIPTION

This command is used to produce the voltage correction coefficients for a temperature compensated A/D. Although 16 points may be applied, a user may use as few as three points.

RETURNS

<mod> <ac> <bc> <cc><*nl*>

mod	The A/D module, 0 to 8, where 0 is the Enclosure and 1 to 8 corresponds to the A/D modules
ac	The A coefficient in the polynomial
bc	The B coefficient in the polynomial
cc	The C coefficient in the polynomial
nl	- end of line

EXAMPLE

A series of voltages have been applied using the A2DCAL command. To generate the third order polynomial for the A/D correction for module 1,

Type: A2DTCALC 1 6

The DSAENCL software will calculate the polynomial coefficients and return them. They will not be written to the ID chip until IDPWRITE and IDPCONFIRM commands have been executed.

NOTE

This command will only generate the correction coefficients. Coefficients are written to the A/D module ID chip using the IDPWRITE command.

COMMAND **AUXILIARY COMMAND**

SYNTAX **AUXCMD <*command*> <CR>**

ARGUMENTS < *command*> Any valid string to an auxiliary device connected to a serial port

DESCRIPTION This command permits a host computer to send a command to a device connected to a DSAENCL. The variable: **AUX**, must be enabled for this command to be recognized.

RETURNS <*nl*>
nl end of line

EXAMPLE If a user wanted to command a calibrator, SPC3000, connected to the serial port to apply a pressure to the DSA modules, the following command would be issued:

AUXCMD [a]GP 15 <CR> where a is the address of the calibrator

The calibrator will output 15 psi.

NOTES When BIN is set to 1 and the BINADDR is set to a value other than zero, the data from the AUX or CAL commands are converted to a BINARY format and output over the UDP binary port specified in the BINADDR variable. The data format is:

<ID byte>	1 byte, the value will be 1 if the data are from a calibrator or 2 if the data are from an auxiliary unit.
<pressure>	4 bytes of floating point binary pressure data

COMMAND **CALIBRATE**

SYNTAX **CAL <*press*> <*channels*>**<CR>

ARGUMENTS
<*press*> a real number that represents the calibration pressure for this point.
<*channels*>- a combination of:
module-port for one channel; or:
module-port,module-port for multiple modules; or
module-port...module-port for a range of modules.
Module is the physical location of the module in the system.
Port is a single pressure sample point within a module.

DESCRIPTION This command reads one averaged frame of pressure and temperature counts. The data returned from this command will be lost if it is not captured in a log file or by the Host computer. **NOTE:** The DSAENCL does not control the calibration. It will only read the information when commanded.

RETURNS INSERT <*temp*><*channel*><*press*><*press counts*> M<*nl*>

temp	the temperature plane
channels	the channel in module-port notation
press	the pressure in EU
press counts	the A/D pressure counts(or bits)
nl	end of line

EXAMPLE If a user wanted to calibrate a module installed in position 3 at 15 psi:
Apply the appropriate Control pressures for the module
Connect a pressure standard to the CAL input.
Enter the command:

CAL 15 3-1..3-16<CR>

The DSAENCL will measure the counts for each channel and return the appropriate INSERT commands.

NOTES When BIN is set to 1 and the BINADDR is set to a value other than zero, the data from the AUX or CAL commands are converted to a BINARY format and output over the UDP binary port specified in the BINADDR variable. The data format is:

<ID byte>	1 byte, the value will be 1 if the data are from a calibrator or 2 if the data are from an auxiliary unit.
<pressure>	4 bytes of floating point binary pressure data

COMMAND **CALIBRATE INSERT**

SYNTAX **CALINS <*press*> <*channels*>**<CR>

ARGUMENTS

<*press*> a real number that represents the calibration pressure for this point.

<*channels*> a combination of:
module-port for one channel; or:
module-port,module-port for multiple modules; or
module-port...module-port for a range of modules.
Module is the physical location of the module in the system.
Port is a single pressure sample point within a module.

DESCRIPTION This command reads one averaged frame of pressure and temperature counts and stores the information in memory in the INSERT format shown in the CALIBRATE Command. **NOTE:** The DSAENCL does not control the calibration. It will only read the information when commanded.

RETURNS <*nl*> end of line

When this command returns the prompt, a SAVE command must be issued. The DSAENCL software will insert the stored data in the Module Profile Files.

EXAMPLE If a user wanted to calibrate a module installed in position 3 at 15 psi:

Apply CTL1 and CTL2 Control pressures
Connect a pressure standard to the CAL input.
Enter the command:

CALINS 15 3-1..3-16<CR>

The DSAENCL software will measure the counts for each channel and write the new master plane information into memory.

COMMAND **CALIBRATE ZERO**
SYNTAX **CALZ <CR>**

ARGUMENTS None

DESCRIPTION Commands the DSAENCL to perform a zero calibration. This operation produces A/D count values for each pressure channel that is subtracted from the raw pressure counts before conversion to the engineering units. The data are stored in a Zero Array and a Delta Array. These values may be read by executing a ZERO or DELTA command. This command places the DSAENCL in the CALZ Mode until the command is completed or a STOP command is issued. CALZ requires approximately 15 seconds to complete.

RETURNS <*nl*>
nl end of line

EXAMPLE To update the current ZERO file and correct for any zero drift of the transducers:
Enter the command:

CALZ

The DSAENCL software will measure the zero counts for each channel and update the Zero and Delta Arrays. The DSAENCL software will write the information into the file, ZERO.CFG when a SAVE Command is executed.

NOTES General rules for use of a CALZ command

1. Power Up	A CALZ should be executed after the DSAENCL and DSA3016 modules have stabilized.
2. Power Cycle	A CALZ should be executed if power is cycled, or if a REBOOT, or RESTART command is executed.
3. REBOOT	A CALZ should be executed after a REBOOT command.
4. Module Swap	A CALZ should be executed after a module position swap. If the module has reached stability before the swap, the CALZ may be executed immediately after a LIST SYS U command.
5. Module Change	A CALZ should be executed after a module change. The module should be allowed to stabilize before executing the CALZ command, but after a LIST SYS U command.

The Zero and Delta Arrays are cleared when the DSAENCL is powered down or when a REBOOT command is executed. The data in the ZERO.cfg file is intended to be historical data. The Zero and Delta values are not reloaded at power up or restart because it is impossible to determine how long the power has been off. This also is designed to insure that a new set of zeros is acquired if modules have been switched, or changed without a power cycle.

COMMAND **CALIBRATOR COMMAND**

SYNTAX **CALCMD <*calibrator command*> <CR>**

ARGUMENTS <*calibrator command*> -Any valid Calibrator Command - refer to the applicable Calibrator Software Manual for more information.

DESCRIPTION This command permits a host computer to send a command to one or more Serial Calibrators connected to a DSAENCL. The variable: **CAL**, must be enabled for this command to be recognized.

RETURNS <*nl*>
nl end of line

EXAMPLE If a user wanted to command a calibrator, SPC3000, connected to the serial port to apply a pressure to the DSA3016 modules, the following command would be issued:

CALCMD [a]GP 15 <CR> where a is the address of the calibrator

The calibrator will output 15 psi.

COMMAND **CHANNEL**
SYNTAX **CHAN 1** <CR>

ARGUMENTS none

DESCRIPTION This command outputs the channel configuration for the scan group entered in the argument.

RETURNS CHAN 1: <index><mod><*port*><lpress> <hpress><len><eu><*nll*>

index	the channel index (1 based)
mod	the module number (0 based)
port	the port number in the module (0 based)
lpress	the minimum pressure value
hpress	the maximum pressure value
len	the number of channels in this list
eu	the eu conversion setting, 0 = raw counts, 1 = EU
nl	end of line

EXAMPLE To verify the which channels have been assigned to be output:

Type:

CHAN 1 <CR>

If 2 modules are configured in the scan group, The DSAENCL will return:

```
CHAN 1: 1 1 1 -15.000000 15.000000 32 1
CHAN 1: 1 1 2 -15.000000 15.000000 32 1
CHAN 1: 1 1 3 -15.000000 15.000000 32 1
CHAN 1: 1 1 4 -15.000000 15.000000 32 1
CHAN 1: 1 1 5 -15.000000 15.000000 32 1
CHAN 1: 1 1 6 -15.000000 15.000000 32 1
CHAN 1: 1 1 7 -15.000000 15.000000 32 1
CHAN 1: 1 1 8 -15.000000 15.000000 32 1
CHAN 1: 1 1 9 -15.000000 15.000000 32 1
CHAN 1: 1 1 10 -15.000000 15.000000 32 1
 ::  ::   :  :  :  :  :  ::   ::   ::   ::   :  :
CHAN 1: 1 2 15 -15.000000 15.000000 32 1
CHAN 1: 1 2 16 -15.000000 15.000000 32 1
>
```

This shows that all 16 ports of two 16 channel modules have been assigned in sequence for a total of 32 channels. The modules are installed in positions 1 and 2. The minimum full scale pressure value for both modules is -15.0 engineering units. The maximum pressure value is 15.0 engineering units. The output data will be in engineering units

COMMAND	**CLEAR**
SYNTAX	**CLEAR**<CR>
ARGUMENTS	None
DESCRIPTION	Commands the DSAENCL to clear any errors that have occurred. The errors are sent to the client in response to an ERROR command.
RETURNS	<*nl*> nl end of line.
EXAMPLE	To clear any errors listed in the ERROR Buffer, the following command would be issued: CLEAR <CR> The ERROR buffer will be cleared

.

COMMAND SYNTAX **CONTROL PRESSURE RESET**
DOUTPU<CR>

ARGUMENTS *none*.

DESCRIPTION Resets the control pressures to the power up condition. This also will reset DOUTS that have manually set.

RETURNS <*nl*>
nl end of line.

EXAMPLE To reset the control pressures to the power up mode after several operations of the BANK(x) commands, Type:

DOUTPU<Enter>

COMMAND **DELETE**

SYNTAX **DELETE 0 69[<*channels*>]**<CR>

ARGUMENTS

0	the low point of the temperature planes to be deleted.
69	the high point of the temperature planes to be deleted.
[<channels>]	optional, a channel to be deleted. This may be in the format: *module-port* or *serial number-port* for a single module. *module-port..module-port* or *serial number-port..serial number-port* for a range of channels

DESCRIPTION Deletes all pressure points within temperature planes between 0 and 69 degrees Celsius. Individual Temperature Planes may not be deleted. This allows new MASTER points to be entered via the INSERT command.
NOTE: Refer to the description of the FILL command for more information.

RETURNS *<nl>*

nl end of line.

EXAMPLE To delete the master points for all modules in a system using eight 16 channel modules, the following command would be issued:

DELETE 0 69 1-1..8-16<CR>

To delete the master points for channels 49 through 56 in a DSA3016 installed in position six, the following command would be issued:

DELETE 0 69 6-49..6-56<CR>

To delete the master points for channel 3 in a DSA3016 installed in position four, the following command would be issued:

DELETE 0 69 4-3<CR>

COMMAND	**DELETE FILE**
SYNTAX	**DEL <*filename*>**<CR>
ARGUMENTS	<*filename*> - the file to be deleted in the format: scanxxx.dat
DESCRIPTION	Deletes data files from the ENCL folder on the DSAENCL Micro SD chip.
RETURNS	<*nl*> nl end of line.

EXAMPLE To delete the file, SCAN002.dat from the hard drive:

Type: DEL SCAN002.dat

To verify that the file was deleted, refer to the List Files Command.

COMMAND **DELTA**
SYNTAX **DELTA <*module*>**<CR>

ARGUMENTS <*module*> the module position 1 through 8.

DESCRIPTION Lists the active delta zero correction values that resulted from a CALIBRATE ZERO. These values are used in the conversion of raw counts to Engineering Units (EU). These variables can only be set by executing a CALIBRATE ZERO command. If a module number is not entered, the DELTA values for all active modules are listed.

RETURNS DELTA: <*channel*> <*value*> <*nl*>
DELTA: <*channel*> <*value*> <*nl*>
: : : :
DELTA: <*channel*> <*value*> <*nl*>

channel the channel in module-port format
value the zero correction values
nl end of line.

EXAMPLE To view the DELTA values for the module installed in position one:
Type: DELTA 1<CR>
The DSAENCL will return the current delta values
DELTA: 1-1 40
DELTA: 1-2 38
DELTA: 1-3 29
DELTA: 1-4 31
:: :: :: ::
DELTA: 1-10 34
DELTA: 1-11 35
DELTA: 1-12 27
:: :: :: ::
DELTA: 1-15 30
DELTA: 1-16 29
>

NOTES Delta values are the difference between the current CALZ zero value and the zero value stored in the calibration coefficients. The values tend to be low when a module has been recently calibrated and increase slowly over time as the sensors drift.

It is very important that a user execute a CALZ after the DSAENCL and DSA3016 modules have been allowed to stabilize after power up. Also a CALZ should be executed if power is cycled, or if a REBOOT, or RESTART command is executed.

The Zero and Delta Arrays are cleared when the DSAENCL is powered down or when a REBOOT or RESTART command is executed. The data in the ZERO.cfg file is intended to be historical data. The Zero and Delta values are not reloaded at power up or restart because it is impossible to determine how long the power has been off. This also is designed to insure that a new set of zeros is acquired if modules have been switched.

NOTE: This command is not functional in the DSAENCL4000. It has been left in the command list for legacy.

COMMAND	**DIGITAL OUTPUT**
SYNTAX	**DOUT <*discrete channel*><*status*>**<CR>
ARGUMENTS	<*discrete channel*> - a Digital Output channel 1 through 8. <*status*> 1 = On 0 = Off
DESCRIPTION	Commands the Discrete Output channel on or off.
RETURNS	<*nl*> nl - end of line.
EXAMPLE	In this example, digital output channel 1 will be energized: DOUT 1 1 <CR> In this example, digital output channel 4 will be de-energized. DOUT 4 0 <CR>

COMMAND **ERROR**
SYNTAX **ERROR** <CR>

ARGUMENTS None

DESCRIPTION Lists the errors that have occurred since the last CLEAR. Only the first 30 errors will be listed. If more than 30 errors have occurred, the message:
ERROR: Greater than 30 errors occurred" will appear at the end of the list.

RETURNS ERROR: <*error message*><*nl*>
ERROR: <*error message*><*nl*>
: : : :
ERROR: <*error message*><*nl*>

error message - an error message shown in the error list.
nl - end of line.

EXAMPLE To read the contents of the Error Buffer:
Type: ERROR

The DSAENCL will return the last 30 errors in the format::
ERROR: Module or Port not found
ERROR: List MI no group number
ERROR: Group not between 1 and 8

If no errors have been logged, the DSAENCL will return:
ERROR: No errors

NOTE The Error Buffer is only updated if the configuration variable: IFUSER , is set to 0. When IFUSER is set to 1, errors will be displayed as they occur.

COMMAND **FILL**
SYNTAX **FILL** <CR>

ARGUMENTS None

DESCRIPTION Sorts Fills the Conversion Table temperature planes in ascending order.
The method used to FILL the conversion tables is determined by the setting of the variable: FILLONE. This variable is in the Conversion Group.

If FILLONE is set to zero, the FILL command will fill the conversion tables by calculating the temperature planes between Master Planes.

If FILLONE is set to one, the FILL command will copy the data in the first Master Plane encountered to all other planes. If a second Master Plane is encountered, the FILL will be terminated, and an error will be logged.

RETURNS <*nl*>
nl end of line.

EXAMPLE In this example, new MASTER points have been loaded and the coefficient table must be completed.

Type: FILL<CR>

The FILL command only needs to be used if MASTER points are added to the coefficients and the program is not restarted. When the program is started, restarted, or reloaded, The MASTER points are loaded into memory from the Module Profile Files and a FILL is executed by the program.

COMMAND **FRAME TRIGGER**
SYNTAX **TRIG**

ARGUMENTS None

DESCRIPTION This command acts as a software trigger to the DSAENCL. When ADTRIG is set to 1, an averaged frame of data will be output when the DSAENCL receives the TRIG command or a <TAB> character code (9 HEX or Control I). This will continue until a STOP command is issued or the Frames per Scan variable is met. The data format will depend upon the setting of EU, BIN and FORMAT. This command will also send the command set in the AUXSCHED, and/or CALSCHED variables.

EXAMPLE A scan command is executed with EU set to 1, BIN set to 0, ADTRIG set to 1, and FORMAT set to 0. The DSAENCL will wait for a Hardware trigger, the TRIG command or a <TAB> character (9 HEX or Control I). When one of the Data are scrolled and will be displayed as follows:

Frame # <number>
Time <time> <µs or ms>
<chan> <temp eu>
“ “
” ”
<chan> <temp eu>

For information on other formats, refer to the SCAN command .

COMMAND **INSERT**

SYNTAX **INSERT *<temp><channel><press><press counts>* M**<CR>

ARGUMENTS

<temp> an integer from 0 to 69.75 that represents the temperature in degrees Celsius.

<channel> a combination of *module* and *port*. Syntax is:
module-port or *serial number-port* for one channel.

<press> a real number that represents the calibration pressure point.

<press counts> a signed integer from 32767 to -32768 that represents the current pressure counts from the sensor.

DESCRIPTION

Inserts one pressure-pressure counts entry into the Correction Table. Only master points are accepted.
The LIST MASTER and LIST ALL commands download the contents of the conversion table in the format required by this INSERT command.
If a MASTER plane is overwritten, an error will be generated.

RETURNS

<nl>
nl End of line.

EXAMPLE

Although INSERT commands are most often entered from a Module Profile File, they may be entered from a keyboard.

The following command will insert a master point at 30.5°C for channel 1 of the module installed in position 3. The applied pressure is 11.9998 psi, the measured counts are 26376.

```
INSERT 30.50  3-1    11.9998   26376 M
```

The following command will insert a master point at 48.75°C for channel 9 of the module installed in position 3. The applied pressure is 10.9998 psi, the measured counts are 20254.

```
INSERT 48.75  3-9    10.9998   20254 M
```

The following command will insert a master point at 43.75°C for channel 16 of module serial number 209. The applied pressure is -2.4864 psi, the measured counts are -6651.

```
INSERT 43.75 209-16    -2.4864   -6651 M
```

COMMAND **LIST ALL CONVERSION COEFFICIENTS**

SYNTAX **LIST A *<start temp><end temp> <channels>***<CR>

ARGUMENTS

<start temp>	The lowest temp plane to be returned.
<end temp>	The highest temp plane to be returned.
<channels>	a combination of *module* and a *port*. Syntax is: *module-port* or *Serial number-port* for one channel

DESCRIPTION Lists all of the master points in the temperature-pressure correction matrix. This command places the DSAENCL in the LIST mode until the command is completed or a STOP command is issued.

RETURNS

INSERT <*temp*><*channel*><*press*><*press counts*><M><*nl*>
INSERT <*temp*><*channel*><*press*><*press counts*><M, C, or I><*nl*>
: : : :
INSERT <*temp*><*channel*><*press*><*press counts*><M><*nl*>

temp	the temperature plane
channel	the channel in module-port notation
press	the pressure in EU
press counts	the A/D counts of pressure
M	a Master Plane generated from a calibration
nl	end of line.

EXAMPLE To list all of the coefficients from 14°C to 32°C for channel 1 in a module calibrated from 10°C to 40°C

Type: LIST a 14 32 1-1<CR>

The DSAENCL will return a list of INSERT commands showing the temperature, channel, applied pressure, and counts

```
INSERT 14.00 1-1 -5.958100 -21594 M
INSERT 14.00 1-1 -4.476100 -15127 M
INSERT 14.00 1-1 -2.994200 -8646 M
INSERT 14.00 1-1 -1.470100 -1973 M
INSERT 14.00 1-1 0.000000 4467 M
INSERT 14.00 1-1 1.470100 10917 M
INSERT 14.00 1-1 2.994200 17594 M
INSERT 14.00 1-1 4.476100 24098 M
INSERT 14.00 1-1 5.958100 30603 M
INSERT 23.25 1-1 -5.958100 -21601 M
INSERT 23.25 1-1 -4.476100 -15161 M
INSERT 23.25 1-1 -2.994300 -8714 M
INSERT 23.25 1-1 -1.470100 -2077 M
INSERT 23.25 1-1 0.000000 4332 M
INSERT 23.25 1-1 1.470100 10746 M
INSERT 23.25 1-1 2.994200 17397 M
INSERT 23.25 1-1 4.476100 23863 M
INSERT 23.25 1-1 5.958100 30333 M
INSERT 32.75 1-1 -5.958100 -21636 M
INSERT 32.75 1-1 -4.476100 -15214 M
INSERT 32.75 1-1 -2.994200 -8784 M
INSERT 32.75 1-1 -1.470100 -2162 M
```

COMMAND **LIST A/D CORRECTION TABLE (NON-TEMPERATURE COMPENSATED)**

SYNTAX **LIST A2DCOR <*module*>** <CR>

ARGUMENTS <module> - The A/D location, 0 to 8. Where 0 is the temperature A/D and 1 to 8 are the module locations.

DESCRIPTION Lists the correction coefficients for the A/D in the specified location.

RETURNS A2DCOR <module> <index> <applied voltage> <counts>

module	0 to 8, Where 0 is the temperature A/D in the and 1 to 8 are the module A/D's.
index	the calibration point, up to 16 points may be entered, numbered 0 to 15.
applied voltage	the voltage applied at the calibration point.
counts	the A/D counts measured at the calibration point

EXAMPLE To list the coefficients for the A/D converter in A/D module 1:

Type: LIST A2DCOR 1<CR>

The DSAENCL will return:

```
A2DCOR 1 0 0.00000 0
A2DCOR 1 1 0.00000 0
A2DCOR 1 2 0.00000 0
A2DCOR 1 3 0.00000 0
A2DCOR 1 4 0.00000 0
A2DCOR 1 5 0.00000 0
A2DCOR 1 6 0.00000 0
A2DCOR 1 7 0.00000 0
A2DCOR 1 8 0.00000 0
A2DCOR 1 9 0.00000 0
A2DCOR 1 10 0.00000 0
A2DCOR 1 11 0.00000 0
A2DCOR 1 12 0.00000 0
A2DCOR 1 13 0.00000 0
A2DCOR 1 14 0.00000 0
A2DCOR 1 15 0.00000 0
```

COMMAND **LIST A/D CORRECTION TABLE (TEMPERATURE COMPENSATED)**

SYNTAX **LIST A2DTCOR *<module> <temp>*** <CR>

ARGUMENTS

<module>	The A/D location, 0 to 8. Where 0 is the temperature A/D and 1 to 8 are the module locations.
<t index>	The temperature index, 0 to 7

DESCRIPTION Lists the correction coefficients for the A/D in the specified location.

RETURNS A2DTCOR <module> <t index> <temp><p index> <voltage> <counts><ideal counts>

module	0 to 8, Where 0 is the temperature A/D in the DSAENCL and 1 to 8 are the module A/D's.
t index	the calibration point, each module may have up to 8 points. Each of these points may have up to 16 correction points.
temp	The actual temperature of the index point, read from the ID chip.
p index	Index point, 0 through 16 where the applied voltage, measured counts and ideal counts are read.
voltage	the voltage applied at the p index calibration point.
counts	the A/D counts measured at the p index calibration point
ideal counts	the ideal counts at the p index point at the applied voltage, based on the formula:

$$\frac{AppliedVolts \times 2.852}{10} \times 32767$$

EXAMPLE To list the coefficients for the A/D converter in A/D module 1:

Type: LIST A2DTCOR 1 1<CR>

The DSAENCL will return:

```
A2DTCOR 1 25 0.000000 0 0.000000 0 0
A2DTCOR 1 25 0.000000 1 0.000000 0 0
A2DTCOR 1 25 0.000000 2 0.000000 0 0
A2DTCOR 1 25 0.000000 3 0.000000 0 0
A2DTCOR 1 25 0.000000 4 0.000000 0 0
A2DTCOR 1 25 0.000000 5 0.000000 0 0
A2DTCOR 1 25 0.000000 6 0.000000 0 0
A2DTCOR 1 25 0.000000 7 0.000000 0 0
A2DTCOR 1 25 0.000000 8 0.000000 0 0
A2DTCOR 1 25 0.000000 9 0.000000 0 0
A2DTCOR 1 25 0.000000 10 0.000000 0 0
A2DTCOR 1 25 0.000000 11 0.000000 0 0
A2DTCOR 1 25 0.000000 12 0.000000 0 0
A2DTCOR 1 25 0.000000 13 0.000000 0 0
A2DTCOR 1 25 0.000000 14 0.000000 0 0
A2DTCOR 1 25 0.000000 15 0.000000 0 0
```

COMMAND **LIST CALIBRATION VARIABLES**
SYNTAX **LIST C** <CR>

ARGUMENTS None

DESCRIPTION Lists the Conversion configuration variables from Group C.

RETURNS SET <*variable*> <*value*> <*nl*>
: : : :
SET <*variable*> <*value*> <*nl*>
variable the configuration variable name
value the current setting
nl> end of line.

EXAMPLE To view the current conversion variable settings:

Type: LIST C<CR>

The DSAENCL will return the current conversion settings. They could appear as follows.

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
>

For more information, refer to the Conversion Variable information in this manual.

COMMAND **LIST BOOT LOADER GROUP VARIABLES**
SYNTAX **LIST IP** <CR>

ARGUMENTS None

DESCRIPTION Lists the Identification configuration variables from Group IP.

RETURNS SET <*variable*> <*value*> <*nl*>
SET <*variable*> <*value*> <*nl*>
: : : :
SET <*variable*> <*value*> <*nl*>
variable the configuration variable name
value the current setting
nl end of line.

EXAMPLE To view the current Boot Loader Group Variables settings:

Type: LIST IP<CR>

The DSAENCL will return the current boot loader variable settings. They could appear as follows.

SET IPADD 191.30.46.100
SET SUBNET 255.255.0.0
SET MAC 000.096.093.400.000.103
SET LOGIN Scanivalve
SET PASSWORD Scanner
SET LOGIN1 Scanivalve1
SET PASSWORD1 Scanner1
SET LOGINNAS ScanivalveNas
SET PASSWORDNAS ScannerNas
SET IPADDNAS 10.0.0.55
SET ALLOWANON 1
SET APP Encl4000.hex

NOTE1: Modifications to the variables in this group may result in one or more of the following conditions:

1. Unstable network operation.
2. Problems completing FTP file transfers.
3. Enclosure operational problems

NOTE2: The variables in this group are not saved when a SAVE command is issued. They may only be saved by using the SAVEIP command.

COMMAND **LIST DIGITAL VARIABLES**
SYNTAX **LIST D** <CR>

ARGUMENTS None

DESCRIPTION Lists the Digital Configuration variables from Group D.

RETURNS SET <*variable*> <*value*> <*nl*>
SET <*variable*> <*value*> <*nl*>
: : : :
SET <*variable*> <*value*> <*nl*>

variable	the configuration variable name
value	the current setting
nl	end of line.

EXAMPLE To view the current digital variable settings:

Type: LIST D<CR>

The DSAENCL will return the current digital settings. They could appear as follows.

SET DOUTPU 0
SET DOUTCALZ 60
SET DOUTPGSEQ 0
SET DOUTPG 0
SET DOUTSCAN 4
SET DLYPGSEQ 1
SET DLYPG 10
SET DOUTREADY 8
SET BANKA 0
SET BANKB 0
SET BANKUSR 0

COMMAND **LIST FILE CONTENTS**
SYNTAX **TYPE <*filename*>** <CR>

ARGUMENTS <*filename*> The file to be listed. The file must be in the DSAENCL Folder.

DESCRIPTION Lists the contents of the named file. This command is intended to allow a user to check the contents of one of the setup file son the Micro SD Card..

RETURNS <*nl*>
nl end of line.

EXAMPLE To list the contents of the CV.gpf file, Type

TYPE CV.gpf <enter>

The contents of the file will be listed. The variables listed below are sampling of an actual cv.gpf file

```
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 0 0
::        ::        ::   ::
::        ::        ::   ::
::        ::        ::   ::
SET MPBS 5
SET CALPER 500
SET CALAVG 64
SET MAXEU 9999.00
SET MINEU -9999.00
SET STARTCALZ 2727
SET FILLONE 0
SET A2DCOR 1
SET SIMTMODE OFF
SET SIMTEMP 25.00
>
```

COMMAND **LIST FILES**
SYNTAX **DIR** <CR>

ARGUMENTS None

DESCRIPTION Lists the data files stored In the ENCL folder on the DSAENCL Micro SD Chip. Data filenames are in the standard DOS format: 8.3, where there are 8 characters for the file name and 3 for the file extension.

RETURNS *<filename> <nl>*
: : : :
<filename> <nl>
<nl>

filename	The data file name
nl	end of line.

EXAMPLE To list all data files stored In the ENCL folder on the DSAENCL hard disk drive:

Type: DIR<CR>

The DSAENCL will return a file list

Encl4000.hex	435056
ip.cfg	283
sn.gpf	117
CV.GPF	935
zero.cfg	1656
a2d.cfg	3542
a2dcoef.cfg	229
M1986.MPF	28569
M1980.MPF	28372
M1982.MPF	28659
M1984.MPF	28500

COMMAND **LIST GAIN VARIABLES**
SYNTAX **LIST G <*module*>** <CR>

ARGUMENTS None

DESCRIPTION Lists the active temperature gain set for the module from the Temperature Gain Group, Group G. Module may be the position or the serial number. These data are used to convert temperature counts to degrees Celsius. This is the "M" term in the temperature characterization equation. The value of this term will vary based on the module type. Refer to the section on Temperature Gain Values in the Configuration Variable Section of this manual for more information on the values for the “M” terms.

RETURNS SET TEMPMn <*value*><*nl*>

n	The module position or the serial number
value	The temperature gain value for module n
nl	end of line.

EXAMPLE To verify the temperature gain setting for the module serial number 253,

Type: LIST g 253<CR>

The DSAENCL will return:

SET TEMPM253 0.023559

The gain settings may also be verified by module location. To verify the temperature gain setting of the module installed in position 6,

Type: LIST g 6<CR>

The DSAENCL will return:

SET TEMPM6 0.023559

The temperature gain settings may be verified for all modules installed in the DSAENCL.

Type: LIST g<CR>

The DSAENCL may return:

SET TEMPM1 0.023559
SET TEMPM2 0.023559
SET TEMPM3 0.023559
SET TEMPM4 0.023559
SET TEMPM5 0.023559
SET TEMPM6 0.023559
SET TEMPM7 0.023559
SET TEMPM8 0.023559
>

COMMAND **LIST ID CHIP IDENTIFICATION**

SYNTAX **LIST ID [<loc> <site> <device>]** <CR>

ARGUMENTS

<loc>	the ID chip location, 0 to 16	
<site>	the location type, Where:	A = A/D module, M = DSA3016 module
<device>	must be E for EPROM	

DESCRIPTION Lists the ID chip identification information. DSA3016 modules may only be site 1 through 8. A/D modules may be sites 0 through 8 where the Temperature A/D module can only be site 0. Digital modules are site 9.

RETURNS <index> <loc> <site> <device> <ID> <error>

index	Line number, used for reference only	
loc	the ID chip location, 0 to 16	
site	the location type, Where:	A = A/D module M = DSA3016 module
device	E = EPROM T = Temp S = Switch	
ID	the chip ID number - This number is unique for each ID chip.	
error	any error that may have occurred	

EXAMPLE 1 To view all of the ID information of a DSAENCL with 2 A/D modules, an RDS, and a DSA3016 installed in position 1:

Type: LIST ID<CR>

The DSAENCL may return:

0 1 A T 28644c340000008f None
1 0 A T 286e4c3400000040 None
2 0 A T 28cddb460000000c None
3 1 A E 14ca251e010000f3 None
4 0 A E 142e8e1e01000045 None
5 1 M E 147524ef00000048 None
6 2 A T 28b1de460000003b None
7 2 A E 14e9251e0100001c None
8 9 D E 14ee241e01000054 None

EXAMPLE 2 To view the ID information of the DSA3016 module in location 1

Type: LIST ID 1 M E

The DSAENCL may return:

5 1 M E 147524ef00000048 None

EXAMPLE 3 To view the ID information of the A/D module in location 2

Type: LIST ID 2 A E

The DSAENCL may return:

7 2 A E 14e9251e0100001c None

EXAMPLE 4 To View the ID information of a typical DSAENCL

Type: LIST ID

The Enclosure may return:

0 1 A T 28644c340000008f None
1 0 A T 286e4c3400000040 None
2 0 A T 28cddb460000000c None
3 1 A E 14ca251e010000f3 None
4 0 A E 142e8e1e01000045 None
5 2 A T 28b1de460000003b None
6 2 A E 14e9251e0100001c None
7 9 D E 14ee241e01000054 None

COMMAND **LIST ID CHIP SETTINGS**

SYNTAX **LIST IDP [<loc> <site> <device> <mem>]** <CR>

ARGUMENTS

<loc>	the ID chip location, 1 to 8
<site>	the location type, Where: A = A/D module , M = DSA3016 module
<device>	the device type, always E for EPROM
<mem>	the memory type, Where: E = EPROM, P = PROM

DESCRIPTION Lists the ID chip settings. DSA3016 modules may only be site 1 through 8. A/D modules may be sites 1 through 8. If the location, site, and device are not specified, the settings for all chips will be returned.

RETURNS SET IDP <loc> <site> <device> <mem> <name> <value>

loc	the ID chip location, 1 to 8
site	the location type, Where: A = A/D module, M = DSA3016 module
device	the device type, always E for EPROM
mem	the memory type, Where: P = PROM, E = EPROM
name	the parameter name
value	the parameter value

EXAMPLE 1 To view all of the ID chip information of the chip in A/D module in position 1:

Type: LIST IDP 1 A<CR>

The DSAENCL may return:

SET IDP 1 A E P DFC 1
SET IDP 1 A E P DMC 0
SET IDP 1 A E P SN 111
SET IDP 1 A E P REV A
SET IDP 1 A E P MDATE 7/1/2002
SET IDP 1 A E E ADCA 0.000000
SET IDP 1 A E E ADCB 0.996481
SET IDP 1 A E E ADCC 2.070793
SET IDP 1 A E E ECC 0.001499
SET IDP 1 A E E GAIN 0
SET IDP 1 A E E ACDATE 7/1/2002
SET IDP 1 A E E ADCD 6.50000

EXAMPLE 2 To view the ID chip information of the chip in the DSA3016 module in position 1:

Type: LIST IDP 1 M<CR>

The DSAENCL may return:

SET IDP 1 M E P DFC 2
SET IDP 1 M E P DMC 4
SET IDP 1 M E P SN 301
SET IDP 1 M E P REV A
SET IDP 1 M E P MDATE 1/27/2000
SET IDP 1 M E E RTYPE 0
SET IDP 1 M E E RVALUE 1
SET IDP 1 M E E RCORA 0.000000
SET IDP 1 M E E RCORB 0.000000
SET IDP 1 M E E RCDATE 1/27/2000
SET IDP 1 M E E PCDATE 8/16/2002
SET IDP 1 M E E NPR1 15.000000
SET IDP 1 M E E NPR2 15.000000
SET IDP 1 M E E VALVE 1
SET IDP 1 M E E XDUCER 0

COMMAND **LIST IDENTIFICATION VARIABLES**
SYNTAX **LIST I** <CR>

ARGUMENTS None

DESCRIPTION Lists the Identification configuration variables from Group I.

RETURNS SET <*variable*> <*value*> <*nl*>
SET <*variable*> <*value*> <*nl*>
: : : :
SET <*variable*> <*value*> <*nl*>

variable	the configuration variable name
value	the current setting
nl	end of line.

EXAMPLE To verify the general module configuration settings:

Type: LIST i<CR>

The DSAENCL may return:

```
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 0 0
SET TWOAD 1
```

COMMAND **LIST MASTER CONVERSION COEFFICIENTS**

SYNTAX **LIST M *<start temp><end temp> [<channels>]***<CR>

ARGUMENTS

<start temp>	The lowest temp plane to be returned.
<end temp>	The highest temp plane to be returned.
[<*channels*>]	*channels* is a the combination of *module* and a *port*. Syntax is: *module-port* or *Serial Number-port* for one channel

DESCRIPTION Lists all of the Master Points in the temperature-pressure correction matrix. This command places the DSAENCL in the LIST mode until the command is completed or a STOP command is issued.

RETURNS INSERT <*temp*><*channel*><*press*><*press counts*>M<*nl*>

: : : :

INSERT <*temp*><*channel*><*press*><*press counts*> M<*nl*>

temp	the temperature plane
channel	the channel in module-port or serial number-port notation
press	the pressure in EU
press counts	the A/D counts of pressure
M	indicates this is a Master Plane
nl	end of line

EXAMPLE To view the Master Points between 10°C and 40°C for channel 1 of the module installed in position 1:

Type: List m 10 40 1-1<CR>

The DSAENCL may return:

```
INSERT 14.00 1-1 -5.958100 -21594 M
INSERT 14.00 1-1 -4.476100 -15127 M
INSERT 14.00 1-1 -2.994200 -8646 M
INSERT 14.00 1-1 -1.470100 -1973 M
INSERT 14.00 1-1 0.000000 4467 M
INSERT 14.00 1-1 1.470100 10917 M
INSERT 14.00 1-1 2.994200 17594 M
INSERT 14.00 1-1 4.476100 24098 M
INSERT 14.00 1-1 5.958100 30603 M
INSERT 23.25 1-1 -5.958100 -21601 M
INSERT 23.25 1-1 -4.476100 -15161 M
INSERT 23.25 1-1 -2.994300 -8714 M
INSERT 23.25 1-1 -1.470100 -2077 M
INSERT 23.25 1-1 0.000000 4332 M
INSERT 23.25 1-1 1.470100 10746 M
INSERT 23.25 1-1 2.994200 17397 M
INSERT 23.25 1-1 4.476100 23863 M
INSERT 23.25 1-1 5.958100 30333 M
INSERT 32.75 1-1 -5.958100 -21636 M
INSERT 32.75 1-1 -4.476100 -15214 M
INSERT 32.75 1-1 -2.994200 -8784 M
INSERT 32.75 1-1 -1.470100 -2162 M
INSERT 32.75 1-1 0.000000 4228 M
INSERT 32.75 1-1 1.470100 10615 M
INSERT 32.75 1-1 2.994200 17246 M
INSERT 32.75 1-1 4.476100 23691 M
INSERT 32.75 1-1 5.958100 30136 M
```

COMMAND **LIST MODULE INFORMATION VARIABLES**

SYNTAX **LIST MI <*module*>**<CR>

ARGUMENTS <*module*> module group 1 through 8 or module serial number.

DESCRIPTION Lists the configuration variables from Groups M1 through M8. If the module is not identified, all modules are listed. Each Module Information Group has provisions for up to four comment lines. These lines may be used to aid in the identification of the module group.

RETURNS REM<*module*> *1* <*comment*> <*nl*>
REM<*module*> *2* <*comment*> <*nl*>
REM<*module*> *3* <*comment*> <*nl*>
REM<*module*> *4* <*comment*> <*nl*>
SET <*variable*> <*value*> <*nl*>
SET <*variable*> <*value*> <*nl*>
: : : :
SET <*variable*> <*value*> <*nl*>

variable	the configuration variable name
value	the current setting
nl	end of line.

EXAMPLE 1 To view the configuration of the DSA3016 module installed in position 1,

Type: LIST mi 1<CR>

The DSAENCL may return:

```
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 5
SET LPRESS1 1..16 -6.100000
SET HPRESS1 1..16 6.100000
SET NEGPTS1 1..16 4
SET MODTEMP1 0 1.000000
>
```

EXAMPLE 1 To view the configuration of the module installed in position 7,

Type: LIST mi 1<CR>

The DSAENCL may return:

```
REM7 1 Comment line 1
REM7 2 Comment line 2
REM7 3 Comment line 3
REM7 4 Comment line 4
SET TYPE7 0
SET ENABLE7 1
SET NUMPORTS7 16
SET NPR7 5
SET LPRESS7 1..16 -5.5500000
SET HPRESS7 1..16 5.5500000
SET NEGPTS7 1..16 4
SET MODTEMP7 0 1.000000
>
```

COMMAND **LIST OFFSET VARIABLES**
SYNTAX **LIST O <*module*>**<CR>

ARGUMENTS None

DESCRIPTION Lists the active temperature offsets set for the module from the Temperature Offset Group, Group O. These data are used to convert temperature counts to degrees Celsius. This is the "B" term in the temperature characterization equation. The value of this term will vary based on the module type. Refer to the section on Temperature Gain Values in the Configuration Variable Section of this manual for more information on the values for the “B” terms.

RETURNS SET TEMPBn <*value*> <*nl*>

n	the module position or serial number
value	the current setting
nl	end of line.

EXAMPLE To verify the the temperature offset setting for the module serial number 253,

Type: LIST o 253<CR>

The DSAENCL will return:

SET TEMPB253 -198.514371

The offset settings may also be verified by module location. To verify the temperature offset setting of the module installed in position 6,

Type: LIST o 6<CR>

The DSAENCL will return:

SET TEMPB6 -198.514371

The temperature offset settings may be verified for all modules installed in the DSAENCL.

Type: LIST o<CR>

The DSAENCL may return:

SET TEMPB1 -198.514371
SET TEMPB2 -198.514371
SET TEMPB3 -198.514371
SET TEMPB4 -198.514371
SET TEMPB5 -198.514371
SET TEMPB6 -198.514371
SET TEMPB7 -198.514371
SET TEMPB8 -198.514371
>

COMMAND **LIST PROFILE LIST**
SYNTAX **LIST P** <CR>

ARGUMENTS None

DESCRIPTION Lists the Installed module serial numbers from the Serial Number Profile Group, Group P. These data are used to create Module Profile Files that will hold module specific configuration variables. When the DSAENCL is first booted up, or when a REBOOT command is entered, The software reads the values set in this list and maps the coefficients in the respective MPF files into memory. If a MPF file is not found, default values for the module information data are used. After the initialization is complete, the software searches for ID chip information. If the ID chip information matches the Profile List, no changes are made. If the ID chip information is different from the Profile list, the Profile List is updated. ID chip information will also override Module Information.

NOTE: If serial numbers are not entered, the conversion coefficients will not load.

RETURNS SET DSAENCLSN <*value*> <*nl*>
SET SN1 <*value*> <*nl*>
SET SN2 <*value*> <*nl*>
: : : :
SET SN8 <*value*> <*nl*>

value the serial number of the module installed at that location
nl end of line.

EXAMPLE To Verify the module input configuration

Type: LIST p<CR>

The DSAENCL may return:

SET DSAENCLSN 103
SET SN1 253
SET SN2 0
SET SN3 0
SET SN4 0
SET SN5 0
SET SN6 0
SET SN7 0
SET SN8 0
>

COMMAND **LIST SCAN VARIABLES**
SYNTAX **LIST S** <CR>

ARGUMENTS None

DESCRIPTION Lists the General Scan configuration variables from Group S.

RETURNS SET <*variable*> <*value*> <*nl*>
SET <*variable*> <*value*> <*nl*>
: : : :
SET <*variable*> <*value*> <*nl*>

variable	the configuration variable name
value	the current setting
nl	end of line.

EXAMPLE This command is used to verify the general scan settings of the DSAENCL

Type: LIST s<CR>

The DSAENCL will return:

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

COMMAND **LIST SCAN GROUP VARIABLES**

SYNTAX **LIST SG <*group*>**<CR>

ARGUMENTS <*group*> scan group 1 through 8

DESCRIPTION Lists the Scan Group configuration variables from Groups G1 through G8.

RETURNS SET <*variable*> <*value*> <*nl*>
SET <*variable*> <*value*> <*nl*>
: : : :
SET <*variable*> <*value*> <*nl*>

variable	the configuration variable name
value	the current setting
nl	end of line.

If no channels are assigned to a scan group, the following will be returned for a channel variable:

SET CHAN< *scan group* >0<*nl*>

For more information, refer to the CHAN Scan Variable in the SG Group

EXAMPLE To verify or modify the configuration settings of Scan Group 1,

Type: LIST SG 1<CR>

A typical DSAENCL with a 16 channel module enabled will return:

```
SET AVG1 100
SET FPS1 0
SET SGENABLE1 1
SET CHAN1 1-1..1-16
>
```

NOTE When the SET CHANn parameter is modified, it must be set to 0 before the new channel configuration is entered. If not, the new configuration will be appended to the existing configuration.

For example: if three 16 channel modules are assigned to Scan Group 1, the SET CHAN variable will be:1-1..3-16. If the module assignment is changed to 2 16 channel modules and the channel assignment is not set to 0 before the new assignment: 1-1..2-16 is added, the channel assignment will appear as follows:

```
SET CHAN1 1-1..3-16
SET CHAN1 1-1..2.-16
```

This also applies in cases where a user has software to configure the scan groups prior to a test. If a scan group has channels defined and the channels are defined again without setting the channels to 0 first, the channel assignment will appear twice. If Scan Group 1 has a 32 channel module assigned and it is re-assigned by an initialization program, the channel assignments will appear as follows:

```
SET CHAN1 1-1..1-16
SET CHAN1 1-1..1-16
```

COMMAND **LIST SYSTEM COMPONENTS**
SYNTAX **LIST SYS [<U> or <S>]** <CR>

ARGUMENTS
- blank the existing system information, as determined at power up, will be displayed. No data will be updated.
- <U> the system information will be updated and displayed.
- <S> system information will be displayed using simulated ID chips.

DESCRIPTION Lists the system information. This is the same information displayed at power up. This command must be run when system changes are made after power up.

RETURNS
DSAENCL Serial Number N

LOC	A2DSN	-MODEL-	-SN-	CHAN	VALVE	-NPR1-	-NPR2-	XDUCER	-CAL-DATE-
1									
2									
3									
4									
5									
6									
7									
8									

LOC	-MODEL-	-SN-	CHAN	DESCRIPTION
9				
10				
11				
12				
13				
14				
15				
16				

NOTES Positions 1 through 8 are reserved for A/D modules. All positions do not have to be filled. The positions are identified by the setting of the dip switches on the A/D modules. A standard DSAENCL will only have 2 A/D modules installed. A/D 1 will scan modules installed in positions 1 through 4. A/D 2 will scan module installed in positions 5 through 8. A special order version of the DSAENCL is available with 8 A/D modules.

A List SYS U command will not update the module profile file, nor the module information read from the mpf files during a boot up or restart. If a module is swapped out, or if a module position is changed after the program has started, the program **MUST** be restarted for the module information to be updated.

EXAMPLE 1 To view the current System Information as determined at power up:

Type: LIST SYS<CR>

The DSAENCL will return:

DSAENCL Serial Number 103

LOC	A2DSN	-MODEL-	-SN-	CHAN	VALVE	-NPR1-	-NPR2-	XDUCER	-CAL-DATE-
1	111	DSA3016	300	16	IP	15.00	15.00	DIF	3/16/2005
2	110	DSA3016	311	16	IP	30.00	50.00	DIF	3/18/2005
3		DSA3016	325	16	IP	100.00	100.00	DIF	3/18/2005
4		DSA3016	326	16	IP	100.00	100.00	DIF	3/18/2005
5		DSA3016	341	16	IP	100.00	100.00	DIF	3/19/2005
6		DSA3016	344	16	IP	300.00	300.00	DIF	3/19/2005
7		DSA3016	345	16	IP	300.00	300.00	DIF	3/19/2005
8		DSA3016	361	16	IP	750.00	750.00	DIF	3/20/2005

LOC	-MODEL-	-SN-	CHAN	DESCRIPTION
9			10	
11				
12				
13				
14				
15				
16				

Two A/D 3200 modules connected.

A/D 3200 Sn 111 is installed in Location 1, DSA3016 modules 300, 311, 325, and 326 will be scanned by this A/D module.
A/D 3200 Sn 110 is installed in location 2. DSA3016 modules 341, 344, 345, and 361 will be scanned by this A/D module.

DSA3016 SN300 has 16 channels The Full Scale pressure range of the module is 15 psi. The module is set up as a normal Differential Pressure Module. It was last calibrated March 16, 2005.
DSA3016 SN311 has 16 channels. It is a Dual Range module with full scale ranges of 30 and 50 psi. The module is set up as a normal Differential Pressure Module. It was last calibrated March 18, 2005.
DSA3016 SN325 has 16 channels The Full Scale pressure range of the module is 100 psi. The module is set up as a normal Differential Pressure Module. It was last calibrated March 18, 2005.
DSA3016 SN326 has 16 channels The Full Scale pressure range of the module is 100 psi. The module is set up as a normal Differential Pressure Module. It was last calibrated March 18, 2005.
DSA3016 SN341 has 16 channels The Full Scale pressure range of the module is 100 psi. The module is set up as a normal Differential Pressure Module. It was last calibrated March 19, 2005.
DSA3016 SN344 has 16 channels The Full Scale pressure range of the module is 300 psi. The module is set up as a normal Differential Pressure Module. It was last calibrated March 19, 2005.
DSA3016 SN345 has 16 channels The Full Scale pressure range of the module is 300 psi. The module is set up as a normal Differential Pressure Module. It was last calibrated March 19, 2005.
DSA3016 SN361has 16 channels The Full Scale pressure range of the module is 750 psi. The module is set up as a normal Differential Pressure Module. It was last calibrated March 20, 2005.

EXAMPLE 2 If the enclosure has the modules installed in random positions, the data returned could appear as follows:

DSAENCL Serial Number 103

LOC	A2DSN	-MODEL-	-SN-	CHAN	VALVE	-NPR1-	-NPR2-	XDUCER	-CAL-DATE-
1	111	DSA3016	300	16	IP	15.00	15.00	DIF	3/16/2005
2	110	DSA3016	311	16	IP	30.00	50.00	DIF	3/18/2005
3									
4									
5									
6		DSA3016	344	16	IP	300.00	300.00	DIF	3/19/2005
7		DSA3016	345	16	IP	300.00	300.00	DIF	3/19/2005
8		DSA3016	361	16	IP	750.00	750.00	DIF	3/20/2005

LOC	-MODEL-	-SN-	CHAN	DESCRIPTION
9				
10				
11				
12				
13				
14				
15				
16				

This example shows that modules are installed in positions 1, 2, 6. 7, and 8. A/D1 will scan the modules in positions 1 and 2. A/D 2 will scan the modules in positions 6, 7, and 8.

COMMAND **PURGE**

SYNTAX **PURGE** <CR>

ARGUMENTS None

DESCRIPTION Commands the DSAENCL to initiate a purge sequence. This command may be initiated by entering the command from the local system computer or a host computer. The DSAENCL must be in the READY mode. The purge sequence is:

1. The digital output are set according to the DOUTPGSEQ variable.
2. The output remain set for a delay time set by the DLYPGSEQ variable.
3. When DLYPGSEQ times out, the digital output are set according to the DOUTPG variable.
4. The digital output will remain set until the DLYPG variable is met or until a STOP command is issued.
5. When DLYPG times out or when a STOP command is received the digital output are set according to the DOUTPGSEQ variable.
6. The output remain set for a delay time set by the DLYPGSEQ variable.
7. When DLYPGSEQ times out, the DSAENCL returns to the READY mode.

When a purge is initiated by a digital input, the DSAENCL may be in the READY mode or in the SCAN mode. The purge sequence is the same as above unless the DSAENCL is in the SCAN mode. If the DSAENCL is in the SCAN mode, the scanning will be suspended until the purge sequence is completed. At that time scanning will be resumed.

RETURNS <*nl*>
nl End of line.

EXAMPLE To initiate a PURGE sequence:
Type: PURGE<CR>

NOTE The Purge sequence may be terminated before the sequence is completed by issuing a STOP command, or by pressing the escape key from a serial or Ethernet connection. When the sequence is terminated early, the control valve sequencing will follow the normal end of sequence timing. For example:

A PURGE command is issued to the enclosure. The valves are sequenced as set in DOUTPGSEQ and DLYPGSEQ. When DLYPGSEQ times out, the control valves are set to DOUTPG and the DLYPG timer starts. A STOP command is issued before the DLYPG time has timed out. The control valves are immediately set to the DOUTPGSEQ values and the DLYPGSEQ timer starts. When this timer times out, the enclosure exits the PURGE mode and waits for another command.

COMMAND	**REBOOT**
SYNTAX	**REBOOT** <CR>
ARGUMENTS	None
DESCRIPTION	Commands the DSAENCL software to restart the ENCL4000.hex program.
RETURNS	<*nl*> nl End of line.
EXAMPLE	To initiate a Reboot sequence, Type: REBOOT<CR>

COMMAND	**RESTART**
SYNTAX	**RESTART** <CR>
ARGUMENTS	None
DESCRIPTION	Commands the software to restart the DSAENCL application.
RETURNS	<*nl*> nl - End of line.
EXAMPLE	To initiate a Restart sequence, Type: RESTART<CR>

COMMAND **SAVE**

SYNTAX **SAVE [*modules*]**<CR>

ARGUMENTS [*Modules*] Syntax is:

module	for one module
module,module,module	for several modules
module..module	for a range of modules

Module is the physical location of the module in the DSAENCL3200.

DESCRIPTION Commands the DSAENCL to save the configuration variables, and correction tables to the Micro SD Card. Correction tables are saved as **.MPF** files for all modules specified in the command.
If a module, several modules, or a range of modules is not specified, the correction tables for all enabled modules will be saved.
All configuration variables except the variables in the Boot Loader Group (IP Group)will be saved by any variation of this command.

The following files are updated when a SAVE command is issued:

SN.cfg	The P group configuration variables
ZERO.cfg	The current ZERO and DELTA data from the most recent CALZ.
Mxxxx.mpf	The module calibration coefficients, where xxxx is the module serial number.
CV.gpf	All other configuration variables
A2D.cfg	The A/D correction coefficients.

RETURNS <*nl*>
nl End of line.

EXAMPLES To save the current configuration variable settings and conversion coefficients for all enabled modules
Type: SAVE<CR>

To save the current configuration variable settings and conversion coefficients for module 4 only.
Type: SAVE 4<CR>

To save the current configuration variable settings and conversion coefficients for modules 1, 3, and 7 only.
Type: SAVE 1,3,7<CR>

To save the current configuration variable settings and conversion coefficients for modules 3, 4, 5, 6 and 7 only.
Type: SAVE 3..7<CR>

NOTE: The SAVE command requires approximately 60 seconds to complete. Normally, commands entered during this time would be ignored, but it is possible on rare occasions to cause the enclosure firmware to freeze.

COMMAND **SAVE BOOT LOADER VARIABLES**
SYNTAX **SAVEIP**<CR>

ARGUMENTS None

DESCRIPTION Commands the DSAENCL to save the boot loader configuration variables to the Micro SD Card. Boot loader configuration variables are saved to the ip.cfg file.

The SAVEIP write process requires two commands to complete.

1, The SAVEIP command stages the IP configuration variables and prepares the software to write to the Micro SD Card. This command does not actually perform the write.
2. The write process does not occur until a SAVEIPCONFIRM command is issued. The SAVEIPCONFIRM command is considered to be part of the SAVEIP command.

EXAMPLE To save the current bootloader configuration variable settings

Type: SAVEIP<CR>

The software will return the following message:

WARNING: This action could cause network communication problems. Type SAVEIPCONFIRM confirm SAVEIP or STOP to cancel the operation.

Type SAVEIPCONFIRM to complete the SAVE.

NOTE 1 Changes to the bootloader configuration variables will not take effect until power is cycled, or a REBOOT command is issued.

NOTE 2 The SAVEIP command requires approximately 60 seconds to complete. Normally, commands entered during this time would be ignored, but it is possible on rare occasions to cause the enclosure firmware to freeze..

COMMAND **SCAN**
SYNTAX **SCAN** <CR>

ARGUMENTS None

DESCRIPTION Commands the DSAENCL to scan the pressure sensors and output scan data. The SCAN function operation depends on the setting of ADTRIG and SCANTRIG.

ADTRIG = 0
SCANTRIG = 0

The SCAN function will be initiated immediately when the SCAN command is received. Data will be acquired at the rate determined by the settings of PERIOD, AVGn and the Number of Channels. In a DSAENCL Number of Channels is always 64. Data will be output in Averaged Frames as the Frames are ready until FPS is satisfied or a STOP Command is received.

ADTRIG = 0
SCANTRIG = 1

In this case, a hardware trigger will initiate the SCAN function. The Software trigger will not initiate the SCAN function. Data will be acquired at the rate determined by the settings of PERIOD, AVGn and the Number of Channels. In a DSAENCL, Number of Channels is always 64. Scanning will continue until FPS is satisfied or a STOP command is received. Multiple trigger pulses received during a scan will be ignored.

ADTRIG = 1
SCANTRIG = 0

In this case, the SCAN command only enables the scan function. The DSAENCL will enter the WTRIG mode and wait for a hardware or software trigger. When a trigger is received, the DSAENCL will acquire and output one averaged frame of data and re-enter the WTRIG mode. Data will be acquired at the rate determined by the settings of PERIOD, AVGn and the Number of Channels. In a DSAENCL Number of Channels is always 64. Multiple trigger pulses received during a scan will be ignored. When a Frame has been output, the next trigger will repeat the process. This will continue until the Frames per Scan Variable has been satisfied or a STOP command is received.

RETURNS The format of the returned data is based on the setting of the BIN configuration variable. If BIN is set to 1 the Scan Packets are returned in Binary Format(Refer to the section on Binary Data Packets for more information). If BIN is set to 0, the scan packets are returned in ASCII Format as follows:

<group> <frame> <channel> <pressure> <nl>
<group> <frame> <channel> <pressure> <nl>
:: :: :: :: ::
<group> <frame> <channel> <pressure> <nl>

group	the scan group number from 1 to 8
frame	the current frame number
channel	the channel in module-port format
pressure	the pressure in either counts or real number format based on the setting of the EU configuration variable.
nl	end of line.

EXAMPLE A scan group is set up to display 16 channels of module 1 with fps set to 1

Type: SCAN<CR>

The DSAENCL returns:

```
Group=1 Frame=0000001
101=  0.0052   102= .0086     103= -0.0015   104=  0.0017   105= -0.0162   106=  0.0035
107=  0.0036   108=  0.0114   109=  0.0031   110=  0.0073   111=  0.0111   112= -0.0035
113=  0.0057   114=  0.0097   115=  0.0049   116=  0.0086
```

NOTES

1. Only channels that are listed with the LIST SGn command are returned. The field length is not fixed. Scan Groups are returned as they are ready.
2. All frames are separate parsable frames.
3. If ADTRIG is set to 1, SCANTRIG must be set to 0. If SCANTRIG is set to 1, ADTRIG must be set to 0.

COMMAND SYNTAX

SET

SET <*name*> <*value*><CR>

ARGUMENTS

<*name*> the Configuration Variable to be set or modified.

<*value*> the value to be assigned to that Configuration Variable.

DESCRIPTION

Commands the DSAENCL to set one of the Configuration Variables.

When Configuration Variables are listed with the LIST command, the variables are output in the format required by the SET command. This enables the user to upload the data from a file that has been created by a LIST download.

RETURNS

<*nl*>

nl end of line.

EXAMPLE

This command will change configuration variable settings.

To set zero correction on

Type: SET ZC 1<CR>

To change the pressure units to Pascals

Type: SET UNITSCAN PA<CR>

To change the scan channels in Scan Group 1 from module 2, channels 1 through 16, to module 1, channels 1 through 16:

Type: SET CHAN1 0<CR>

SET CHAN1 1-1..1-16<CR>

COMMAND **SLOTS**

SYNTAX **SLOTS <channel>**<CR>

ARGUMENTS <channel> The channel in module-port format

DESCRIPTION Queries the DSAENCL to return the 10 boundary pressures for the 9 pressure slots defined for a given channel.

RETURNS
Press 9 <*pressure*> <*nl*>
Press 8 <*pressure*> <*nl*>
Press 7 <*pressure*> <*nl*>
Press 6 <*pressure*> <*nl*>
Press 5 <*pressure*> <*nl*>
Press 4 <*pressure*> <*nl*>
Press 3 <*pressure*> <*nl*>
Press 2 <*pressure*> <*nl*>
Press 1 <*pressure*> <*nl*>
Press 0 <*pressure*> <*nl*>

EXAMPLE To determine the boundary pressures for channel 1 of the 5 psi module s/n 253

Type: SLOTS 253-1<CR>

The DSAENCL will return:

Press 9 6.10000
Press 8 4.88000
Press 7 3.66000
Press 6 2.44000
Press 5 1.22000
Press 4 0.00000
Press 3 -1.52500
Press 2 -3.05000
Press 1 -4.57500
Press 0 -6.10000

The pressures applied during a calibration must be selected so that there are not two or more applied pressures in any one slot. The module in the example above has been set up with 4 negative points. By default, it will have 4 positive points as a calibration must always include a zero point.

In this example, the slots for channel 1 of a 15 psi module in input 2 is configured for 2 negative points

Type SLOTS 2-1<CR>

The DSAENCL will return:

Press 9 15.00000
Press 8 12.85714
Press 7 10.71429
Press 6 8.57143
Press 5 6.42857
Press 4 4.28572
Press 3 2.14286
Press 2 0.00000
Press 1 -7.50000
Press 0 -15.00000

COMMAND **STATUS**

SYNTAX **STATUS** <CR>

ARGUMENTS None

DESCRIPTION Commands the DSAENCL to return the current status.

RETURNS STATUS: <*current status*><nl>

Current status: one of the following:

READY	The enclosure is ready to accept any command.
SCAN	The enclosure is in the SCAN mode. The only commands that will be accepted are STATUS or STOP.
CALZ	The enclosure is executing a CALIBRATE ZERO command. The only commands that will be accepted are STATUS or STOP.
IDPWRITE	The enclosure is writing to the ID chip.The only commands that will be accepted are IDPCONFIRM and STOP. No other commands will be accepted.
INVALID	The command entered is not a valid command for the current mode of operation.
FDISK	The enclosure is re-formatting the Micro SD Card.
SAVE	The enclosure is saving the application configuration variables and MPF files.
SAVEIP	The enclosure is saving the Boot Loader IP configuration variables.
PURGE	The enclosure is in the PURGE mode
nl	end of line.

EXAMPLE The STATUS command may be entered at any time. This is one of the commands that will not generate an error if entered while the DSAENCL is not READY.

If the STATUS command is entered while the DSAENCL is on, but inactive, the DSAENCL will return:

STATUS: READY

If the STATUS command is entered while the DSAENCL is executing a Calibrate Zero command, the DSAENCL will return:

STATUS: CALZ

COMMAND	**STOP**
SYNTAX	**STOP** <CR>
ARGUMENTS	None
DESCRIPTION	Commands the DSAENCL to abort the current operation and return to the READY mode. This command may be entered as STOP<eol> or by entering the Escape Key
RETURNS	<*nl*> nl end of line.
EXAMPLE	To abort any function or operation: Type: STOP<CR>

COMMAND **TEMPERATURE**

SYNTAX **TEMP <*type*>**<CR>

ARGUMENTS *type* - May be one of the following:

RAW	Returns the temperature in raw counts.
EU	Returns the temperature in Engineering Units
DEBUG	Returns the temperature update tick. If this count is increasing, it indicates that the background is updating the temperature.
UP	Returns the module temperature counts, the module temperature in degrees C, and the gain and offset values used for the temperature conversion.
CTP	Returns the current temperature plane information.

DESCRIPTION Lists the current temperatures of all 8 modules. If a module is not connected, the returned temperature will be 0

RETURNS TEMP: 1 <*temp*> <*nl*>
TEMP: 2 <*temp*> <*nl*>
: : :
TEMP: 8 <*temp*> <*nl*>
temp - The module temperature in raw counts or engineering units
nl> End of line.

EXAMPLE To view the current temperatures of the modules connected to the DSAENCL
Type: TEMP EU<CR>

The DSAENCL will return:
TEMP: 1 28.75
TEMP: 2 29.25
TEMP: 3 30.00
TEMP: 4 29.50
TEMP: 5 28.25
TEMP: 6 29.50
TEMP: 7 28.50
TEMP: 8 27.50

To view the A/D counts of the temperature inputs
Type: TEMP RAW<CR>

The DSAENCL will return:
TEMP: 1 9731
TEMP: 2 9748
TEMP: 3 9783
TEMP: 4 9767
TEMP: 5 9708
TEMP: 6 9759
TEMP: 7 9723
TEMP: 8 9693

NOTE A counts reading of 32767 indicates an open input. A counts reading of 0 with an engineering unit reading of 0 indicates that the module is not enabled.

COMMAND **TEMPERATURE GRADIENT COMPENSATION**

SYNTAX **TGRAD**<CR>

ARGUMENTS none

DESCRIPTION This command reads the temperature of the A/D modules and stores this information in a table. This table is then used to estimate the A/D module temperatures during a scan based on the temperature of the DSAENCL.

RETURNS <Location> <DSAENCL Temp> <A/D Temp> <Delta Temp> <*nl*>

Location	A/D Location, 1 through 8
DSAENCL Temp	Measured Temperature of the DSAENCL in degrees C
A/D Temp	Measured Temperature of the DSAENCL A/D Module in this location.
Delta Temp	The calculated Temperature differential for the A/D Module in this location.
nl	End of line.

NOTE The DSAENCL software can only read the temperature of the DSAENCL when in the scan mode. The temperature of the A/D modules connected to the DSAENCL can be estimated based on the gradient calculation derived from the table generated by this command.

EXAMPLE A DSAENC has two A/D modules installed To calculate and store the temperature differential for these modules, Type:

TGRAD<enter>

The DSAENCL software will calculate the differential temperatures and return:

Loc 1 Base 33.187500 Temp 28.562500 Delta -4.625000
Loc 2 Base 33.187500 Temp 27.750000 Delta -5.437500

COMMAND	**VERSION**
SYNTAX	**VER** <CR>
ARGUMENTS	none
DESCRIPTION	Requests the version number of the ENCL4000.hex file.
RETURNS	VERSION: *<version string> <nl>*
EXAMPLE	To determine the version of ENCL4000.hex software in use: Type: VER<CR> The DSAENCL will return: VERSION: 5.02v

COMMAND **WRITE ID CHIP VARIABLES**

SYNTAX **IDPWRITE *<address> <site> <device> <mtype>*** <CR>

ARGUMENTS

address	The location of the device. Valid values are 0 through 8, Where 0 can only be the Temperature A/D.
site	A for an A/D, or M for a Module
device	The memory device in the A/D or module. This must always be E for EPROM. The software will select the Device family based on the Name to be modified.
mtype	E for EPROM, or P for PROM. Data stored in PROM may only be set once. If PROM data are set at the Scanivalve Factory, they may not be modified in the field. Data stored in EPROM may be modified by a user.

DESCRIPTION The ID Chip write process requires two commands to complete. The IDPWRITE command stages the ID chip identification variables and prepares the software to write to the ID Chip PROM or EPROM. This command does not actually perform the write. The write process does not occur until a IDPCONFIRM command is issued. The IDPCONFIRM command is considered to be part of the IDPWRITE command

RETURNS SET IDP *<address> <site> <device> <mtype> <name> <value>*

address	The location of the device. Valid values are 0 through 8, Where 0 can only be the DSAENCL Temperature A/D.
site	A for an A/D, or M for a Module
device	The memory device in the A/D or module. This must always be E for EPROM. The software will select the Device family based on the Name to be modified.
mtype	E for EPROM, or P for PROM. Data stored in PROM may only be set once. If PROM data are set at the Scanivalve Factory, they may not be modified in the field. Data stored in EPROM may be modified by a user.
name	The name of the variable
value	The value of the variable

EXAMPLE The IDP variables for the EPROM in a ZOC module have been programmed using the SET IDP Variable commands. When all of the variables have been set, the DSAENCL software must be set up to write to the EPROM. The following command is entered:

IDPWRITE 1 M E E

The DSAENCL returns the following:

SET IDP 1 M E E RTYPE 0
SET IDP 1 M E E RVALUE 1
SET IDP 1 M E E RCORA 0.000000
SET IDP 1 M E E RCORB 0.000000
SET IDP 1 M E E RCDATE 1/26/2004
SET IDP 1 M E E PCDATE 1/1/2000
SET IDP 1 M E E NPR1 1.000000
SET IDP 1 M E E NPR2 1.000000
SET IDP 1 M E E VALVE 2
SET IDP 1 M E E XDUCER 0
Type IDPCONFIRM to confirm IDP write or STOP to escape

If the data is correct, issue the IDPCONFIRM command to write the variables to the EEPROM. If the data are not correct, type STOP and repeat the process to correct the errors.

COMMAND **ZERO**

SYNTAX **ZERO** <CR>

ARGUMENTS *none*.

DESCRIPTION Lists the active zero correction values that obtained from a CALIBRATE ZERO command. These data are used in the conversion of raw counts to Engineering Units (EU). These values may only be set by executing a CALIBRATE ZERO.

RETURNS ZERO: <*channel*> <*value*> <*nl*>
ZERO: <*channel*> <*value*> <*nl*>
: : : :
ZERO: <*channel*> <*value*> <*nl*>

channel	the channel in module-port or serial number-port format
value	the zero correction values
nl	end of line.

EXAMPLE To view the current zeros for module 1

Type: ZERO 1<CR>

The DSAENCL will return:

```
ZERO: 1-1 160
ZERO: 1-2 165
ZERO: 1-3 68
ZERO: 1-4 131
ZERO: 1-5 41
ZERO: 1-6 162
ZERO: 1-7 145
ZERO: 1-8 233
ZERO: 1-9 158
ZERO: 1-10 150
ZERO: 1-11 156
ZERO: 1-12 96
ZERO: 1-13 19
ZERO: 1-14 134
ZERO: 1-15 132
ZERO: 1-16 238
```

DSAENCL CONFIGURATION VARIABLES

GENERAL SCAN VARIABLES (Group S)

VARIABLE	**ADTRIG <*code*>**
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	This variable determines the method for a Frame Trigger. 0 Frame timing is controlled by an internal timer set by PERIOD. 1 Frame timing is controlled by an external hardware or a software trigger. When ADTRIG is enabled, a frame will be triggered whenever a hardware or software trigger input is received. The hardware trigger is a hard wired input to the power input connector. The Software trigger is a TAB, or Ctrl I, character. When a SCAN command is received, the DSAENCL enters a WAIT state until a trigger pulse is received. At that time, the DSAENCL will acquire and output one averaged frame of data and re-enter the WAIT state. This will continue until a STOP command is received or the FPS variable is satisfied. Multiple trigger pulses received during a scan will be ignored.

VARIABLE	**BINADDR <*port*> <*IP address*>**	
VALID VALUES	port	0 to 65535
	IP address	any valid IP address
DEFAULT VALUE	port	0
	IP address	0.0.0.0
DATA TYPE	integer	
DESCRIPTION	When port is set to 0, data are NOT sent out over the binary address port, Data are sent over the standard TCP port. If port is 0 to 65535, data are sent over that port to the IP address identified in a UDP format.	

VARIABLE	**FM <*code*>**
VALID VALUES	1
DEFAULT VALUE	1
DATA TYPE	integer
DESCRIPTION	Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE	**IFC <*char 1*> <*char 2*>**	
VALID VALUES	char 1	Any valid ASCII character
	char 2	Any valid ASCII character
DEFAULT VALUE	char 1	62
	char 2	0
DATA TYPE	integer	
DESCRIPTION	This variable sets the interframe characters to be used when transmitting ASCII unformatted output. If only one character is desired, char 2 must be set to 0. If both characters are set to 0, no interframe characters will be transmitted.	
EXAMPLE	If a Carriage Return is desired between frames, the following command would be used: SET IFC 13 0	

VARIABLE **PERIOD <*period*>**
VALID VALUES 10 to 4294967295
DEFAULT VALUE 500
DATA TYPE integer
DESCRIPTION This master period variable sets the sample rate, in microseconds, of the pressure A/D converters and the one temperature A/D converter. Period is the dwell time between channels. All Scan Groups use the this variable. Period is only one of the terms required to determine data rate. Data rate is determined by the equation:

$$DataRate = \frac{1}{PeriodXNumberofChannelsXAVG)}$$

Data Rate is expressed in Hertz per channel
Period is in microseconds
Channels is always 64 in a standard DSAENCL
AVG is the average term for that scan group

NOTE: Channels will always equal 64 in a DSAENCL with 2 A/D modules. Channels will always equal 16 in a DSAENCL with 8 A/D modules.

VARIABLE **QPKTS <*enable*>**
VALID VALUES 1
DEFAULT VALUE 1
DATA TYPE integer
DESCRIPTION Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE **SCANTRIG <*code*>**
VALID VALUES 0
DEFAULT VALUE 0
DATA TYPE integer
DESCRIPTION Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE **TEMPPOLL <*code*>**
VALID VALUES 1
DEFAULT VALUE 1
DATA TYPE integer
DESCRIPTION Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE **TIMESTAMP <*code*>**
VALID VALUES 0 or 1
DEFAULT VALUE 1
DATA TYPE integer
DESCRIPTION Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

CONVERSION VARIABLES (Group C)

VARIABLE	**A2DCOR <*code*>**
VALID VALUES	0 or 1
DEFAULT VALUE	1
DATA TYPE	Integer
DESCRIPTION	Sets the A/D Correction ON or OFF. 0 Sets A/D Correction OFF 1 Sets A/D Correction ON
NOTE	When A2DCOR is set to 0, the background processing of the A/D correction is terminated.

VARIABLE	**BIN <*code*>**
VALID VALUES	0, or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Sets the format of the output data: (Refer to the packet definitions for more information) 0 Output is in ASCII 1 Output is in binary format

VARIABLE	**CALAVG <*sample average*>**
VALID VALUES	2 to 256
DEFAULT VALUE	32
DATA TYPE	integer
DESCRIPTION	Sets the calibration sample average. This value should be set to insure that a sufficient number of samples will be acquired to insure a stable, noise free calibration.

VARIABLE	**CALPER <*period*>**
VALID VALUES	500
DEFAULT VALUE	500
DATA TYPE	integer
DESCRIPTION	Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only. CALPER is set internally to the same value as PERIOD when PERIOD is set to values equal to or less than 500 microseconds. When PERIOD is set to values greater than 500 microseconds, CALPER will be set to 500.

VARIABLE	**CALZDLY <*delay*>**
VALID VALUES	5 to 128
DEFAULT VALUE	5
DATA TYPE	integer
DESCRIPTION	Sets the delay time, in seconds, before the DSAENCL executes a CALZ Command. This value should be set to insure that a sufficient delay exists so that the Zero Offset data are not biased by residual pressure in the module calibration valves.

VARIABLE **CVTUNIT <*value*>**
VALID VALUES any real number
DEFAULT VALUE 1.0
DATA TYPE float
DESCRIPTION This is the conversion factor to convert from PSI units to the desired scanning units. This value may be set directly or by setting the UNITSCAN variable.

VARIABLE **EU <*code*>**
VALID VALUES 0, 1
DEFAULT VALUE 1
DATA TYPE integer
DESCRIPTION Sets the units of the output data:
0 Output is in raw counts
1 Output is in selected engineering units

When the A/D counts reach 32767 or -32768, and EU is set to 1, the DSAENCL will output the values set in **MAXEU** and **MINEU** to indicate that a conversion error may exist. The DSAENCL will also output these values when the maximum or minimum master conversion planes are exceeded.

VARIABLE **FILLONE <*code*>**
VALID VALUES 0, 1
DEFAULT VALUE 0
DATA TYPE integer
DESCRIPTION Sets the type of fill that will be performed.
0 The pressure conversion planes will be filled using several Master Planes
1 The pressure conversion planes will be filled using a single Master Plane

If FILLONE is set to 1 during the execution of a FILL command, the software will copy the data from the first Master Plane encountered to all other temperature planes. If a second Master Plane is found, the FILL will be terminated and an error will be logged. Normally, a pressure conversion plane is filled using two to nine Master Planes.

NOTE This function is designed for a who user wishes to calibrate his modules at one temperature **and** is able to maintain the temperature of the module(s) to ±0.25°C. If a user is not able to maintain the temperature of his modules to ±0.25°C, large errors may result.

If FILLONE is set to 1 when a full set of coefficients are available, and a **FILL** command is issued, the coefficients will all be set to the value of the first Master Plane in the coefficient file.

VARIABLE	**MAXEU <*value*>**
VALID VALUES	Any valid floating point number
DEFAULT VALUE	9999
DATA TYPE	Floating point
DESCRIPTION	Sets the maximum Engineering Unit Value. This is the number that will be displayed when an overflow condition occurs When the A/D counts reach 32767, and EU is set to 1, the DSAENCL will output 9999 or whatever has been entered as the MAXEU value to indicate that a conversion error may exist. The DSAENCL will also output these values when the maximum or minimum master conversion planes are exceeded.

VARIABLE	**MINEU <*value*>**
VALID VALUES	Any valid floating point number
DEFAULT VALUE	-9999
DATA TYPE	Floating point
DESCRIPTION	Sets the minimum Engineering Unit Value. This is the number that will be displayed when an overflow condition occurs When the A/D counts reach -32768, and EU is set to 1, the DSAENCL will output -9999 or whatever has been entered as the MINEU value to indicate that a conversion error may exist. The DSAENCL will also output these values when the maximum or minimum master conversion planes are exceeded.

VARIABLE	**MPBS <*number of planes*>**
VALID VALUES	0 to 139
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	When an INSERT command is issued and a master point is overwritten, a configurable number of temperature planes on either side of the new MASTER plane are converted to calculated. These points will be recalculated when a FILL command is executed. The number of planes to be entered in this variable may be calculated by the formula: Planes = TEMP * 4 where: TEMP is the number of degrees to be changed. For example, if it is desired to have points ± 4° of the new master plane modified, then MPBS would be set to 16.

VARIABLE	**STARTCALZ <*code*>**
VALID VALUES	0, 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE	**UNITSCAN <*units*>**
VALID VALUES	see list below
DEFAULT VALUE	PSI
DATA TYPE	string
DESCRIPTION	This sets the output engineering units for the DSAENCL. Setting this value will also set CVTUNITS. CVTUNITS may be set to a different value, however UNITSCAN must be set first. The units supported are:

ATM	FTH2O	KGM2	MH2O	OZFT2
BAR	GCM2	KIPIN2	MMHG	OZIN2
CMHG	INHG	KNM2	MPA	PA
CMH2O	INH2O	KPA	NCM2	PSF
DECIBAR	KGCM2	MBAR	NM2	PSI
				TORR

NOTE	If a value other than those listed is entered, The DSAENCL will default to PSI.

VARIABLE	**ZC <*code*>**
VALID VALUES	0, 1
DEFAULT VALUE	1
DATA TYPE	integer
DESCRIPTION	Enables or disables zero correction of the pressure data 0 No zero correction is performed. 1 Zero correction is performed.

DIGITAL OUTPUT CONFIGURATION VARIABLES (Group D)

VARIABLE	**DLYPG <*value*>**
VALID VALUES	0 to 3600
DEFAULT VALUE	10
DATA TYPE	integer
DESCRIPTION	Sets the time, in seconds, that the module inputs will be purged. This is only a part of the total purge sequence time. This timer can be interrupted by a STOP command. When set to 0, the time is infinite and the PURGE sequence can only be terminated by a STOP command.

VARIABLE	**DLYPGSEQ <*value*>**
VALID VALUES	0 to 60
DEFAULT VALUE	1
DATA TYPE	integer
DESCRIPTION	Sets the time delay, in seconds, before purge air is applied to the modules. If 0 is entered, no delay will occur.

VARIABLE	**DOUTCALZ <*value*>**
VALID VALUES	0 to FF Hexadecimal
DEFAULT VALUE	60
DATA TYPE	integer
DESCRIPTION	Enables digital outputs for a **CALZ** operation. Output 1 is the least significant binary bit. Output 8 is the most significant binary bit. The command is entered as 2 hexadecimal digits.

VARIABLE	**DOUTPG <*value*>**
VALID VALUES	0 to FF Hexadecimal
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Enables digital outputs for a **PURGE** sequence. Output 1 is the least significant binary bit. Output 8 is the most significant binary bit. The command is entered as 2 hexadecimal digits.

VARIABLE	**DOUTPGSEQ <*value*>**
VALID VALUES	0 to FF Hexadecimal
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Enables digital outputs to transition from normal operation to **PURGE** operation. Output 1 is the least significant binary bit. Output 8 is the most significant binary bit. The command is entered as 2 hexadecimal digits.

VARIABLE	**DOUTPU <*value*>**
VALID VALUES	0 to FF Hexadecimal
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Enables the digital outputs for normal power up configuration. Output 1 is the least significant binary bit. Output 8 is the most significant binary bit. The command is entered as 2 hexadecimal digits.

VARIABLE	**DOUTSCAN <*value*>**
VALID VALUES	0 to FF Hexadecimal
DEFAULT VALUE	4
DATA TYPE	integer
DESCRIPTION	Enables the digital outputs to indicate that the DSAENCL is in the **SCAN** mode. This variable **ONLY** affects the **DOUT** bit that is enabled. All other outputs are masked. Output 1 is the least significant binary bit. Output 8 is the most significant binary bit. The command is entered as 2 hexadecimal digits.

VARIABLE	**DOUTREADY <*value*>**
VALID VALUES	0 to FF Hexadecimal
DEFAULT VALUE	8
DATA TYPE	integer
DESCRIPTION	Enables the digital outputs to indicate that the DSAENCL is in the **READY** mode. This variable **ONLY** affects the **DOUT** bit that is enabled. All other outputs are masked. Output 1 is the least significant binary bit. Output 8 is the most significant binary bit. The command is entered as 2 hexadecimal digits.

VARIABLE	**BANKA <*value*>**
VALID VALUES	0
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE	**BANKB <*value*>**
VALID VALUES	0
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE	**BANKUSR <*value*>**
VALID VALUES	0 to FF Hexadecimal
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

SCAN GROUP CONFIGURATION VARIABLES (Group 1 Only)

VARIABLE	**AVG1 <*sample average*>** Where n = the scan group number
VALID VALUES	1 - 256
DEFAULT VALUE	16
DATA TYPE	integer
DESCRIPTION	Sets the minimum number of samples to average for Scan Group 1. The average will always be to the module with the greatest number of channels.

NOTE: If **TWOAD** is set to **0**, AVG **must** be set to **2** or more.

VARIABLE	**CHAN1 <*channels*>**
VALID VALUES	<*channels*> *channels* is a combination of a *module* and a *port*. Syntax is: *module-port* for one channel *module-port,module-port* for many channels *module-port..module-port* for a range of channels *Module* is the physical location of the module in the rack or the connector supporting the module. *Port* is a single pressure sample point within a module. When 0 is entered, no channels are assigned to a scan group.
DEFAULT VALUE	0
DATA TYPE	string
DESCRIPTION	Sets the channel assignments in scan group 1. Duplicate *module-port* entries are not permitted in the same module group. For example: the notation: CHAN 1-1,1-1 is not valid. The order of the channels in the output frame is determined by the order of entry. Use the LIST SG1 command to verify the output frame order. Setting the channel variable does not automatically erase old channels. The user is responsible to insure that unwanted channels are cleared before new channels are set. The command : SET CHAN1 0<enter> will clear a scan group

VARIABLE **FPS1 <*frames*>** Where n = the scan group number
VALID VALUES 0 - 4294967295
DEFAULT VALUE 0
DATA TYPE long integer
DESCRIPTION Frames per Scan. Sets the number of averaged frames for Scan Group 1 to be output after a SCAN command is issued. Data will be output at a rate set by the formula below. Averaged frames will be output until the setting of FPS is met. Each Scan group may have a different value of FPS. When set to 0, the scan will continue until a stop command is received.

$$DataRate = \frac{1}{PeriodXChannelsXAVG)}$$

Data Rate is expressed in Hertz per channel
Period is in microseconds
Channels is the number of channels
AVG is the average term for that scan group

NOTE: Channels will always equal 64 in a DSAENCL with 2 A/D modules. Channels will always equal 16 in a DSAENCL with 8 A/D modules.

VARIABLE **SGENABLE1 <*code*>**
VALID VALUES 1
DEFAULT VALUE 0
DATA TYPE integer
DESCRIPTION Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

MODULEn CONFIGURATION VARIABLES (M1 through M8)

VARIABLE	**ENABLEn <*enable*>**	Where n = the module position number
VALID VALUES	1	
DEFAULT VALUE	1	
DATA TYPE	integer	
DESCRIPTION	This variable is not used in the DSAENCL4000. The entry is for legacy support.	

VARIABLE	**HPRESSn <*ports*> <*pressure*>**		Where n = the module position number
VALID VALUES	<*port*> <*pressure*> -	*port*	one port
		port,port	many ports
		port..port	range of ports
		pressure	a real number representing the pressure.
DEFAULT VALUE	1..16 15.0		
DATA TYPE	string		
DESCRIPTION	Defines the maximum pressure for port or ports of the module n.		

VARIABLE	**LPRESSn <*ports*> <*pressure*>**		Where n = the module position number
VALID VALUES	<*port*> <*pressure*> -	*port*	one port
		port,port	many ports
		port..port	a range of ports
		pressure	a real number representing the pressure..
DEFAULT VALUE	1..16 15.0		
DATA TYPE	string		
DESCRIPTION	Defines the minimum pressure for port or ports for the module n.		

VARIABLE	**MODTEMPn <*port number*> <*scale factor*>**		Where n = the module position
VALID VALUES	<*port number*> -	*port number*	the port position to display the module temperature.
	<*scale factor*>	*scale factor*	the temperature scaling factor
DEFAULT VALUE	0 1.0		
DATA TYPE	string		
DESCRIPTION	Defines the module port number to display the module temperature and the temperature scaling factor. If EU is set to 1, the temperature output will be °C times the scale factor. If EU is set to 0, the temperature will be the displayed value divided by 4.		

VARIABLE	**NEGPTSn <*ports*> <*negpts*>**		Where n = the module position number
VALID VALUES	<*port*> - may be defined as:	port	one port
		port,port	many ports
		port..port	a range of ports
	<*negpts*>	an integer that defines the number of master negative points. The maximum number of master negative points is 8.	
DEFAULT VALUE	1..16 4		
DATA TYPE	string		
DESCRIPTION	Defines the number of master negative points for port or ports of the module n.		

VARIABLE	**NPRn <*pressure*>**	Where n = the module position number
VALID VALUES	any valid integer up to 4 digits	
DEFAULT VALUE	15	
DATA TYPE	integer	
DESCRIPTION	Defines the nominal pressure range for the module installed in position n.	

VARIABLE	**NUMPORTSn <*ports*>**	Where n = the module position number
VALID VALUES	16,32, or 64	
DEFAULT VALUE	16	
DATA TYPE	integer	
DESCRIPTION	Defines the number of ports for the module n.	

NOTE1: **NUMPORTSn** must be set to 16 in a DSAENCL.

VARIABLE	**TYPEn <*code*>**	Where n = the module position number
VALID VALUES	0, 1, 2, 3, or 4	
DEFAULT VALUE	0	
DATA TYPE	integer	
DESCRIPTION	This variable defines the module n type:	

0	Standard
1	Absolute
2	Gauge
3	True Differential
4	Electrical Input Module

MODULE PROFILE VARIABLES (Group P)

VARIABLE	**DSAENCLSN <*serial number*>**
VALID VALUES	Any valid integer up to 4 digits
DEFAULT VALUE	0000
DATA TYPE	Integer
DESCRIPTION	The serial number of the DSAENCL.

VARIABLE	**SNn <*serial number*>** Where n = the module position number
VALID VALUES	Any valid integer up to 4 digits
DEFAULT VALUE	0000
DATA TYPE	Integer
DESCRIPTION	The serial number of the module installed in slot n.

IDENTIFICATION CONFIGURATION VARIABLES (Group I)

VARIABLE **AUX *<comport> <BAUD><terminator code>***
VALID VALUES See Below
DEFAULT VALUE comport - 0
BAUD - 9600
Terminator code - 2
DATA TYPE integer
DESCRIPTION Determines and identifies communications to External Serial Devices

Comport	0	No external device connected.
	1	An external device is connected to COM1
	2	An external device is connected to COM2
BAUD	Fixed at 9600.	
Terminator code	0	null terminator
	1	CR
	2	CR LF
	3	LF CR
	4	LF

NOTE When COMPORT 2 is used, the NO HOST dip switch must be set. If not, the enclosure will output sign on information to the serial device.

VARIABLE **AUXSCHED *<enabled> <command> <internal interval time>***
VALID VALUES See Below
DEFAULT VALUE enabled - 0
command - RP
Internal interval time - 0
DATA TYPE integer, string
DESCRIPTION When enabled, identifies the command to be sent to the external serial device when an ADTrig is received. The internal interval time is in milliseconds.

enabled	0	AUXSCHED is not enabled.
	1	AUXSCHED is enabled
command	Any valid command.	
Internal interval time	The valid range is 0 or 500 to 100,000 milliseconds When this time is set to 0, the command will be output immediately with an external trigger. For this function to operate correctly, ADTRIG must also be set to 1.	

VARIABLE **CAL *<comport> <BAUD>***
VALID VALUES See Below
DEFAULT VALUE comport - 0
BAUD - 9600
DATA TYPE integer

DESCRIPTION Determines and identifies communications to Serial Calibrators

Comport	0	No Calibrator is connected.
	1	A Calibrator is connected to COM1
	2	A Calibrator is connected to COM2
BAUD	Fixed at 9600.	

NOTE When COMPORT 2 is used, the NO HOST dip switch must be set. If not, the enclosure will output sign on information to the serial device.

VARIABLE **CALSCHED <*enabled*> <*command*> <*internal interval time*>**
VALID VALUES See Below

DEFAULT VALUE enabled - 0
command - RP
internal interval time - 0

DATA TYPE integer, string

DESCRIPTION When enabled, identifies the command to be sent to the serial calibrator(s) when an ADTrig is received. The internal interval time is in milliseconds

enabled	0	CALSCHED is not enabled.
	1	CALSCHED is enabled
command	Any valid calibrator command.	
Internal interval time	The valid range is 0 or 500 to 100,000 milliseconds When this time is set to 0, the command will be output immediately with an external trigger. For this function to operate correctly, ADTRIG must also be set to 1.	

VARIABLE **CONOUT <*code*>**
VALID VALUES 2
DEFAULT VALUE 2
DATA TYPE integer
DESCRIPTION Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE **ECHO <*enable*>**
VALID VALUES 0 or 1
DEFAULT VALUE 0
DATA TYPE Integer
DESCRIPTION Determines if characters received from the network or the serial host will be echoed back to the host.
0 - Echo is disabled
1 - Echo is enabled

VARIABLE **FORMAT <*code*>**
VALID VALUES 0, 1, or 2
DEFAULT VALUE 0
DATA TYPE Integer
DESCRIPTION Determines if data are to be scrolled on the display.

0	data are scrolled
1	data are displayed in place, formatted for a VT100 terminal.
2	data are output in a debug format: <frame> <A/D 1 m-p> <A/D 1 counts> <A/D 2 m-p> <A/D 2 counts> <eol>

VARIABLE **HAVENET <*code*>**
VALID VALUES 1
DEFAULT VALUE 1
DATA TYPE Integer
DESCRIPTION Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE **IFUSER <*code*>**
VALID VALUES 0 or 1
DEFAULT VALUE 1
DATA TYPE Integer
DESCRIPTION Determines the method of logging errors and if a sign on message will be issued to the serial host.

0 All errors will be logged. Errors may only be accessed by issuing an ERROR command and cleared by issuing a CLEAR command. A sign on message will not be issued to the serial host.

1 All errors will be displayed as they occur. A sign on message will be issued to the serial host.

VARIABLE **NETIN <*code*>**
VALID VALUES 1
DEFAULT VALUE 1
DATA TYPE Integer
DESCRIPTION Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE **NETOUT <*code*>**
VALID VALUES 2
DEFAULT VALUE 2
DATA TYPE Integer
DESCRIPTION Not used in the DSAENCL4000. This variable is a non-operational variable. It is for legacy use only.

VARIABLE **NL <*code*>**
VALID VALUES 0 or 1
DEFAULT VALUE 0
DATA TYPE integer
DESCRIPTION Determines the new line character(s) for all output.
0 - <CR><LF>
1 - <CR>

VARIABLE **RESCAN <*code*>**
VALID VALUES 0
DEFAULT VALUE 0
DATA TYPE integer
DESCRIPTION Not used in the DSAENCL4000. This command is a non-operational command. It is for legacy use only.

VARIABLE **TWOAD <*code*>**
VALID VALUES 1
DEFAULT VALUE 1
DATA TYPE integer
DESCRIPTION Not used in this software version. This command is a non-operational command. It is for legacy use only.

BOOT LOADER IP CONFIGURATION VARIABLES (Group IP)

This group contains all of the network setup variables. All of these variables may be modified using the boot loader program, the serial connection, or the ethernet connection. Changes to the variables in this group do not take effect until the AC power has been cycled.

Modifications to the variables in this group may result in one or more of the following conditions:

1. Unstable network operation.
2. Problems completing FTP file transfers.
3. Enclosure operational problems

The variables in this group are not saved when a SAVE command is issued. They may only be saved by using the SAVEIP command.

VARIABLE	**IPADDR *<IP address>***
VALID VALUES	IP address any valid IP address
DEFAULT VALUE	191.30.46.xxx Where xxx is the serial number of the enclosure
DATA TYPE	integer
DESCRIPTION	The IP Address of the module

VARIABLE	**SUBNET *<Subnet Mask>***
VALID VALUES	Subnet Mask any valid Subnet Mask
DEFAULT VALUE	255.255.0.0
DATA TYPE	integer
DESCRIPTION	The Subnet mask for the module. The subnet mask must be configured for the network where the enclosure will be connected.

VARIABLE	**MAC *<MAC Address>***
VALID VALUES	MAC 000.096.093.xxx.yyy.zzz
DEFAULT VALUE	000.096.093.046.000.xxx Where xxx is the serial number of the enclosure
DATA TYPE	integer
DESCRIPTION	The MAC address of the module. The last three octets may be modified by a user, but it is recommended that they not be modified. The first three octets **MUST NOT** be modified. These octets represent a setting registered to Scanivalve Corp.

VARIABLE	**LOGIN *<User Name>***
VALID VALUES	User Name any valid character string
DEFAULT VALUE	Scanivalve
DATA TYPE	string
DESCRIPTION	The User name for the FTP login

VARIABLE	**PASSWORD *<Password>***
VALID VALUES	Password any valid character string
DEFAULT VALUE	Scanner
DATA TYPE	string
DESCRIPTION	The password associated with the user name for the FTP login

VARIABLE **LOGIN1 *<User Name>***
VALID VALUES User Name any valid character string
DEFAULT VALUE Scanivalve1
DATA TYPE string
DESCRIPTION The User name for a second FTP login. The DSAENCL will support two FTP logins.

VARIABLE **PASSWORD1 *<Password>***
VALID VALUES Password any valid character string
DEFAULT VALUE Scanner1
DATA TYPE string
DESCRIPTION The password associated with the user name for the second FTP login

VARIABLE **LOGINNAS *<User Name>***
VALID VALUES User Name any valid character string
DEFAULT VALUE ScanivalveNas
DATA TYPE string
DESCRIPTION The User name for login to the NAS. The boot loader does not access the NAS (Network Attached Storage) device. This is a place holder in this group for compatibility with the IP group in the application.

VARIABLE **PASSWORDNAS *<Password>***
VALID VALUES Password - any valid character string
DEFAULT VALUE ScannerNas
DATA TYPE string
DESCRIPTION The password associated with the user name for the login to the NAS.

VARIABLE **IPADDNAS *<IP address>***
VALID VALUES IP address any valid IP address
DEFAULT VALUE 0.0.0.0
DATA TYPE integer
DESCRIPTION The IP Address of the NAS.

VARIABLE **ALLOWANON <*code*>**
VALID VALUES 0 or 1
DEFAULT VALUE 1
DATA TYPE integer
DESCRIPTION Determines the new line character(s) for all output.
0 Do not allow anonymous FTP logins
1 Allow anonymous FTP logins

VARIABLE **APP *<Application>***
VALID VALUES Application any valid Application Name
DEFAULT VALUE Encl4000.hex
DATA TYPE string
DESCRIPTION The file name of the application to run. This is the file name that is used when automatically running the application from the boot loader. It is also the file name used when using the RUN command. If this file is not found an error is returned.

ID CHIP CONFIGURATION VARIABLES (Group ID)

VARIABLE	**IDP** ***<loc> <site> <device> <mem> <name> <value>***
VALID VALUES	See Below
DEFAULT VALUE	Varies
DATA TYPE	Integer
DESCRIPTION	Sets the values in an ID Chip. This variable will be used rarely by a user. The ID chips are pre-programmed at the time of manufacture. It is recommended that a customer understand the information in the Section defining the RAD ID Chip Data Format before attempting to modify a setting using this configuration variable.

Loc	The location of the device. Valid values are 0 through 8, Where 0 can only be the Temperature A/D.
Site	A for an A/D, M for a Module, or D for a Digital Module.
Device	The memory device in the A/D or module. This must always be E for EPROM. The software will select the Device family based on the Name to be modified.
Mem	The memory device type. P for PROM or E for EPROM. The Identification data stored in PROM cannot be modified by a user.
Name	The name of the EEPROM data to be modified. Refer to the following lists of parameter names that may be modified.
Value	The new value.

Memory Device Type P (PROM) - All Family Codes - Values may not be modified by a user

DFC	Device Family Code	0 = RAD Temperature A/D Board 1 = RAD Pressure A/D Board 2 = Pressure Scanner Module 3 = RAD Digital I/O Device 4 = Test Fixture (BASM3200) 5 = Voltage Scanner Module (EIM)
DMC	Device Model Code	Family Code = 0 0 = 16 Bit 100 KHz, 5V Ref. Family Code = 1 0 = 16 Bit 100 KHz Family Code = 2 0 = ZOC 3016 1 = ZOC 17 2 = ZOC 22 3 = ZOC 23 4 = ZOC 33 Family Code = 3 0 = Remote Digital Switch, 8 channels Family Code = 4 0 = BASM3200 Family Code = 5 0 = ZOC16EIM 1 = ZOCEIM16 2 = ZOCEIM32
SN	Serial Number	Number 0 – 4096
REV	Revision	Letter Code A – P
MDATE	Manufacture Date	MM/DD/YYYY

Memory Device Type E (EEPROM) - Family Code 0

ADCA	A/D Correction Coefficient A	The A coefficient of A x^2 + Bx + C.
ADCB	A/D Correction Coefficient B	The B coefficient of A x^2 + Bx + C.
ADCC	A/D Correction Coefficient C	The C coefficient of A x^2 + Bx + C.
ADCD	A/D Correction Coefficient D	The D coefficient used in the Temperature correction algorithm.
RV	Reference Voltage	The measured voltage reference value used in the temperature calibration.
ACDATE	A/D Calibration Date	MM/DD/YYYY
SN	RAD Serial Number	Number 0 – 4096
APPTYPE	RAD Application Type	0 = Standalone 1 = Enclosure

Memory Device Type E (EEPROM) - Family Code 1

ADCA	A/D Correction Coefficient A	The A coefficient of A x^2 + Bx + C.
ADCB	A/D Correction Coefficient B	The B coefficient of A x^2 + Bx + C.
ADCC	A/D Correction Coefficient C	The C coefficient of A x^2 + Bx + C.
ECC	Excitation Current Correction	Actual measured excitation current (1.5 mA ideal with exact 5 V reference).
GAIN	Gain Code	0 = 2.852 Gain (Standard)
ACDATE	A/D Calibration Date	MM/DD/YYYY

Memory Device Type E (EEPROM) - Family Code 2

RTYPE	RTD Type Code	0 = Platinum 385 1= Nickel-Iron
RVALUE	RTD Value Code	RTD Type Code = 0 0 = 100 Ohm 1 = 500 Ohm 2 = 1000 Ohm RTD Type Code = 1 0 = 604 Ohm
RCORA	RTD Correction A	A term for Callendar-Van Dusen equation.
RCORB	RTD Correction B	B term for Callendar-Van Dusen equation.
RCDATE	RTD Calibration Date	MM/DD/YYYY
PCDATE	Pressure Sensor Cal Date	MM/DD/YYYY
NPR1	Nominal Pressure Range 1	Value must be in PSI
NPR2	Nominal Pressure Range 2	Value must be in PSI
VALVE	Pressure Valve Arrangement	0 – No Valve 1 – X1 2 – X2 3 – NPx (Normal Px Mode) 4 – NO (Normal Open) 5 – IP
XDUCER	Transducer Type	0 – Differential 1 – Delta 2 – Absolute

Memory Device Type E (EEPROM) - Family Codes 3, 4, and 5

No programmable Values

TEMPERATURE OFFSET VARIABLES (Group O)

VARIABLE	**TEMPBn <*value*>**	Where n = the module position number
VALID VALUES	any real number	
DEFAULT VALUE	-198.514371	
DATA TYPE	float	
DESCRIPTION	The "B" term in the conversion equation used to convert temperature counts to degrees Celsius. If a module number is not specified, all modules will be displayed. This value is for a Nickel Iron RTD(604Ω at 0°). The conversion formula is:	

$$°C = TempM \times (Counts) + TempB$$

TEMPERATURE GAIN VARIABLES (Group G)

VARIABLE	**TEMPMn <*value*>**	Where n = the module position number
VALID VALUES	any real number	
DEFAULT VALUE	0.023559	
DATA TYPE	float	
DESCRIPTION	The "M" term in the conversion equation used to convert temperature counts to degrees Celsius. If a module number is not specified, all modules will be displayed. This value is for a Nickel Iron RTD(604Ω at 0°). The conversion formula is:	

$$°C = TempM \times (Counts) + TempB$$

The values listed for gain and offset are used for all ZOC16TC, DSA3016 and DSA3216 series modules.

DSAENCL ID Chip Data Format

The RAD system uses the Dallas DS2430A EEPROM chip for storing information about various system components. The information travels with the hardware, allowing the system to configure itself after power-up. The DS2430A has two memory areas; a 64 bit permanent memory that is written once during the manufacturing, and a 256 bit area that can be written multiple times.

The permanent memory area will contain information necessary to identify the device in a format that is consistent over all of our device types. The 256 bit memory area will have a device dependent format.

Permanent Memory Data Format

The permanent memory area contains a Device Family Code, a Device Model Code, a Serial Number, a Revision Code, and a Manufacture Date.

Permanent Memory 64 Bits			
Bits	Name	Description	Assigned Values
4	DFC	Device Family Code	0 = RAD Temperature A/D Board 1 = RAD Pressure A/D Board 2 = Pressure Scanner Module 3 = RAD Digital I/O Device 4 = Test Fixture 5 = Voltage Scanner Module
4	DMC	Device Model Code	Family Code = 0 0 = 16 Bit 100 KHz, 5V Ref., Gain = 2.852 Family Code = 1 0 = 16 Bit 100 KHz Family Code = 2 0 = ZOC 3016 1 = ZOC 17 2 = ZOC 22 3 = ZOC 23 4 = ZOC 33 Family Code = 3 0 = RDS Remote Digital Switch, 8 Channels Family Code = 4 0 = BASM3200 Family Code = 5 0 = ZOC16EIM 1 = ZOCEIM16 2 = ZOCEIM32
12	SN	Serial Number	Binary Number 0 – 4096
4	REV	Revision	Letter Code A – P
16	MDATE	Manufacture Date	DDDDDMMMMYYYYYYY DDDDD = Day (1 – 31) MMMM = Month (1 – 12) YYYYYYY = Years Past 2000 (0 – 128)
24		Spare	

EEPROM Memory Data Format

The EEPROM data format is device dependent. The five device families are listed in the following tables.

RAD Temperature A/D Board (Device Family = 0) EEPROM Memory 256 Bits			
Bits	Name	Description	Assigned Values
32	ADCA	A/D Correction Coefficient A	The A coefficient of $Ax^2 + Bx + C$. 32 bit floating point coefficients.
32	ADCB	A/D Correction Coefficient B	The B coefficient of $Ax^2 + Bx + C$. 32 bit floating point coefficients.
32	ADCC	A/D Correction Coefficient C	The C coefficient of $Ax^2 + Bx + C$. 32 bit floating point coefficients.
32	RV	Reference Voltage	32 bit floating point number equals measured output of voltage reference.
16	ACDATE	A/D Calibration Date	DDDDDMMMMYYYYYYY DDDDD = Day (1 – 31) MMMM = Month (1 – 12) YYYYYYY = Years Past 2000 (0 – 128)
12	SN	RAD Serial Number	Binary Number 0 – 4096
8	APPTYPE	RAD Application	Integer, Binary Number 0 - 255 0 = Standalone, (Default) 1 = Enclosure ENCL3200
92		Spare	

RAD Pressure A/D Board (Device Family = 1) EEPROM Memory 256 Bits			
Bits	Name	Description	Assigned Values
32	ADCA	A/D Correction Coefficient A	The A coefficient of $Ax^2 + Bx + C$. 32 bit floating point coefficients.
32	ADCB	A/D Correction Coefficient B	The B coefficient of $Ax^2 + Bx + C$. 32 bit floating point coefficients.
32	ADCC	A/D Correction Coefficient C	The C coefficient of $Ax^2 + Bx + C$. 32 bit floating point coefficients.
32	ECC	Excitation Current Correction	32 bit floating point number equals deviation from 1.5 mA ideal with exact 5 V reference.
16	ACDATE	A/D Calibration Date	DDDDDMMMMYYYYYYY DDDDD = Day (1 – 31) MMMM = Month (1 – 12) YYYYYYY = Years Past 2000 (0 – 128)
8	GAIN	Gain Code	0 = 2.852 Gain
104		Spare	

Pressure Scanner Module (Device Family = 2) EEPROM Memory 256 Bits			
Bits	Name	Description	Assigned Values
8	RTYPE	RTD Type Code	0 = Platinum 385 1= Nickel-Iron
8	RVALUE	RTD Value Code	RTD Type Code = 0 0 = 100 Ohm 1 = 500 Ohm 2 = 1000 Ohm RTD Type Code = 1 0 = 604 Ohm
32	RCORA	RTD Correction A	A term for Callendar-Van Dusen equation. Two 32 bit floating point numbers.
32	RCORB	RTD Correction B	A and B terms for Callendar-Van Dusen equation. Two 32 bit floating point numbers.
16	RCDATE	RTD Calibration Date	DDDDDMMMMYYYYYYY DDDDD = Day (1 – 31) MMMM = Month (1 – 12) YYYYYYY = Years Past 2000 (0 – 128)
16	PCDATE	Pressure Sensor Calibration Date	DDDDDMMMMYYYYYYY DDDDD = Day (1 – 31) MMMM = Month (1 – 12) YYYYYYY = Years Past 2000 (0 – 128)
32	NPR1	Nominal Pressure Range 1	32 Bit Floating Point Number, units of PSI
32	NPR2	Nominal Pressure Range 2	32 Bit Floating Point Number, units of PSI
8	VALVE	Pressure Valve Arrangement	0 = None 1 = X1 2 = X2 3 = NPX 4 = NO 5 = IP
8	XDUCER	Transducer Type	0 = Differential 1 = Delta 2 = Absolute 3 = True Delta P 4 = EIM
64		Spare	

RAD Digital I/O Device (Device Family = 3) EEPROM Memory 256 Bits			
Bits	Name	Description	Assigned Values
256		Not Used	

Test Fixture (Device Family = 4) EEPROM Memory 256 Bits			
Bits	Name	Description	Assigned Values
256		Not Used	

Voltage Scanner (Device Family = 5) EEPROM Memory 256 Bits			
Bits	Name	Description	Assigned Values
256		Not Used	

Scanivalve DSP Boot Loader

The Scanivalve DSP Boot Loader's main function is to allow the user to easily upload the Enclosure 4000 application via FTP. The boot loader runs the FTP server. It has been tested on Fire Fox FTP and Internet Explorer drag and drop.

Any additional file transfer protocols or additional FTP client support modification will be made solely to the application.

FTP

The FTP server supports the following FTP commands prior to login:

USER	Allows the user to enter the user's name. Anonymous is allowed.
PASS	Allows the user to enter the password.
QUIT	Disconnects from the FTP server.

The FTP server supports the following FTP commands prior to login after login:

RETR	Initiates a file transfer from the enclosure to the host.
STOR	Initiates a file transfer from the host to the enclosure.
PASV	Sets up data port so client can connect to server's port.
LIST	Returns a directory listing of the files stored on the enclosure
SIZE	Returns the size in bytes of the file.
DELE	Deletes the file.
NOOP	No operation. Mostly used by the client as an "are you still there" command.

Only ASCII type of transfer is supported. Only passive data connection is supported. This allows data to be transferred without the server initiating a connection to the client. This could cause firewall problems.

Boot Loader and Application File System

Filenames are limited to the 8.3 format with no spaces allowed. Only one drive is supported.

Because the Enclosure does not have a time and date clock all files created by the enclosure will have a date of Aug 8, 2008

No subdirectories are supported, however, if a file path is included in the file specification only the file name portion is used. The file is written in the root directory of the drive.

Up to 1024 files are allowed or 2GB of data.

DIP Switch Settings

The processor board has 4 DIP switches that affect the operation of the software. These switches are only read at power up. Changes to the dip switches are not effective until the power is cycled.

SW1 When this switch is on automatically boots the application on power up.

SW2 When this switch is on the boot loader will run in the debug mode. Debug output is directed to the COM2 serial port.

SW3 When this switch is on the boot loader and application uses the COM2 serial port for communication to other devices. When this switch is off the COM2 serial port is used as host communication. COM1 is only used for device communication. COM1 is the top serial connection.

SW4 Spare

Host Communication

Commands are issued to the enclosure and response is returned from the enclosure via either the COM1 serial port or the Ethernet connector. The boot loader returns the command information to the host that it received its command. That is, when the command is received from the network it is returned to the network. When it is received from the COM1 serial port it is returned to COM1 serial port.

The network supports TCP/IP connection using Telnet or HyperTerminal

Commands

When a command is completed the prompt character, the greater than character ">", is output proceeded by a carriage return and line feed.
The commands listed below are supported by the boot loader and the executable program, unless otherwise noted. They may be viewed and modified in the ENCL4000 executable program.

VER	Returns the version of the Boot Loader **NOTE**: This command is available in the boot loader only. It must not be confused with the VER command in the application
FORMAT	Formats the SD Flash to all 0's **NOTE**: This command is available in the boot loader only.
LIST IP	Returns the configuration variable settings of the IP group
SET <parameter>	Sets the indicated parameter
IPADD <IP address>	Sets the IP address of the enclosure. If IPADD is changed, the power must be cycled to take effect.
SUBNET <mask>	Sets the subnet address of the enclosure. If SUBNET is changed, the power must be cycled to take effect.
MAC <MAC address>	Sets the MAC address for the enclosure. If MAC is changed, the power must be cycled to take effect. **NOTE :** This variable should not be modified
LOGIN <user name>	Sets the user name for FTP login.
PASSWORD <password>	Sets the password associated for LOGIN

LOGIN1 <user name>	Sets the user name 1 for FTP login.
PASSWORD1 <password>	Sets the password associated for LOGIN name1
LOGINNAS <name>	Sets the name for login to the NAS. The boot loader does not access the NAS (Network Attached Storage) device. This is place in this group for compatibility with the IP group in the application.
PASSWORDNAS <password>	Sets the password associated with LOGINNAS name
IPADDNAS <IP address>	Sets the IP address of the NAS
APP <application file name>	Sets the file name of the application to run. This is the file name that is used when automatically running the application from the boot loader. It is also the file name used when using the RUN command. When this file is not found the application does not run and an error is returned.
SAVE [<file name>]	Saves the configuration variables to the working directory. When an optional file name is entered, it saves the IP group settings to that file name.
TYPE <file name>	Lists the contents of the named file.
LOAD <file name>	Loads the named file into the LIST IP configuration variables. **NOTE:** This command is a debug command.
DIR	Lists the files on the SD card.
DEL<file name>	Deletes the file name
DIP	Reads and shows the settings of the DIP switch. The following is returned: DIP settings Auto Run Application 0 Debug 0 No Serial Host 0 Spare 0 1 indicates on, 0 indicates off **NOTE**: This command is available in the boot loader only.
RUN	Runs the application named in the SET APP setting. **NOTE**: This command is available in the boot loader only.

DSAENCL Scan Function

When a SCAN function is initiated, the DSAENCL will scan all of the channels in the modules enabled in the software. A/D1 scans modules 1 to 4, and A/D2 scans modules 5 - 8. Each channel in a module will be accessed at the rate set in the configuration variable, PERIOD. Data from each channel are accumulated in a buffer until the AVG term is met. The data from each channel are averaged and then output as a FRAME. This process will continue until the number of frames set in the variable, FPS, have been output, or a STOP command is received.. When FPS has been met, or a STOP command received, the Scan function will stop and the DSAENCL will return to the READY mode. If FPS is set to 0(zero), the SCAN function will continue indefinitely until a STOP command is received. A STOP Command may be entered by typing STOP from the Local or remote keyboard, or by pressing the Escape Key on either input.

Two configuration variables, ADTRIG and SCANTRIG, determine how the SCAN function will be implemented.

Internal Trigger

When these variables are set to 0 (disabled), the SCAN function will be controlled by an internal clock trigger. The SCAN function will be initiated by a SCAN command issued from the DSAENCL computer or an external Host computer. Scanning will commence approximately 5 milliseconds after the SCAN command is received. Each Frame will be acquired as soon as the previous Frame acquisition is complete. The SCAN function will remain active until FPS is met or a STOP Command is received.

External Trigger

The DSAENCL SCAN function may be controlled with external triggers. The settings of SCANTRIG and ADTRIG determine how the SCAN function will be initiated and how each Frame will be acquired. ADTRIG and SCANTRIG cannot be enabled at the same time.

When SCANTRIG is set to 1(enabled), the SCAN function will be initiated by an external hardware trigger. Frame triggering will be controlled by an internal clock trigger. Scanning will commence approximately 5 milliseconds after the hardware trigger is received. Each Frame will be acquired as soon as the previous Frame acquisition is complete. The SCAN function will remain active until FPS is met or a STOP Command is received. Multiple trigger pulses received while the SCAN function is active will be ignored. When the SCAN function is complete, another trigger will repeat the process.

When ADTRIG is set to 1(enabled), the SCAN function will be initiated by the SCAN command. The DSAENCL will enter the WTRIG mode and wait for a hardware or software trigger. When a trigger is received, the DSAENCL will acquire and output one averaged Frame of data and re-enter the WTRIG mode. Multiple trigger pulses received during a Frame Scan will be ignored. When a frame has been output, the next trigger will repeat the process. This will continue until the Frames per Scan Variable has been satisfied or a STOP command is received.

Hardware Trigger

The Hardware Trigger input is optically isolated to prevent grounding problems. It is a TTL level, edge sensing device. It requires a minimum signal of 9 Vdc @ 6.5 mA. It may accept voltages as high as 15 Vdc. The external trigger input is on pins A and B of the DSAENCL Digital Input connector.

Software Trigger

The Software Trigger is a <TAB> character, or Ctrl I.

DSAENCL Profile File

When the ENCL4000.hex program is started, including a REBOOT, a Serial Number Profile file will be generated. This file is named SN.GPF. This file is an ASCII text file and contains the following information:

DSAENCL Serial Number: <serial number><CR><LF>
Module Serial Number in Position 1: <module serial number><CR><LF>
Module Serial Number in Position 2 <module serial number><CR><LF>
Module Serial Number in Position 3: <module serial number><CR><LF>
Module Serial Number in Position 4: <module serial number><CR><LF>
Module Serial Number in Position 5: <module serial number><CR><LF>
Module Serial Number in Position 6: <module serial number><CR><LF>
Module Serial Number in Position 7: <module serial number><CR><LF>
Module Serial Number in Position 8: <module serial number><CR><LF>

If a SN.GPF file exists when the ENCL4000.hex program starts up, it will be overwritten by the information obtained from the polling of the ID chips.

Module Profile File

Each module has a unique Module Profile File which is created during the initial calibration of the module. This file is updated each time a SAVE command is executed by the DSAENCL. These files are read when the ENCL4000.hex program is started, including REBOOT.

The information contained in the Module Profile File is:

REMn 1 <comment><CR><LF>
REMn 2 <comment><CR><LF>
REMn 3 <comment><CR><LF>
REMn 4 <comment><CR><LF>
SET TYPEn <module type><CR><LF>
SET NUMPORTSn <number of ports><CR><LF>
SET NPRn <Nominal Full Scale Pressure Value><CR><LF>
SET TEMPMn <temperature gain factor><CR><LF>
SET TEMPBn <temperature offset factor><CR><LF>
SET LPRESSn <channels> <pressure><CR><LF>
SET HPRESSn <channels> <pressure><CR><LF>
SET NEGPTSn <channels> <number of negative points><CR><LF>
INSERT <temperature> <channels> <pressure> <pressure counts> M<CR><LF>
INSERT <temperature> <channels> <pressure> <pressure counts> M<CR><LF>
: : : : : : : : : : : : : : : : : : :
INSERT <temperature> <channels> <pressure> <pressure counts> M<CR><LF>

Binary Scan Packets

Packets without Module-Port Information

Byte	Name	Value
0	Binary ID	1 = EU (EU =1) 2 = Raw (EU = 0)
1	Group ID	1 to 8 If Tag Bit is set, 80 Hex will be merged with the Scan Group Number. (81 to 88)
2 and 3	Number of Channels	0 to 512
4 through7	Frame Number	1 to 2^{32}
8 through 11	Time in milliseconds	0 to 2^{32}
12 through 15	Channel 1 Data	4 bytes per channel
16 through19	Channel 2 Data *	4 bytes per channel
: : : : : :	: : : :	: : : :
(4n + 8) through (4n + 11)	Channel n Data *	4 bytes per channel

* Optional based on Number of Channels setting.

Packets with Module-Port Information

Byte	Name	Value
0	Binary ID	3 = EU with channels (EU =1) 4 = Raw with channels (EU = 0)
1	Group ID	1 to 8 If Tag Bit is set, 80 Hex will be merged with the Scan Group Number. (81 to 88)
2 and 3	Number of Channels	0 to 512 (Byte 2 is LSB)
4 through7	Frame Number	1 to 2^{32}
8 through 11	Time in milliseconds	0 to 2^{32}
12 through 19	Channel 1 Data	Data (4 bytes), Module (2 bytes), Port (2 bytes)
20 through 27	Channel 2 Data *	Data (4 bytes), Module (2 bytes), Port (2 bytes)
: : : : : :	: : : :	: : : :
(8n + 4) through (8n + 11)	Channel n Data *	Data (4 bytes), Module (2 bytes), Port (2 bytes)

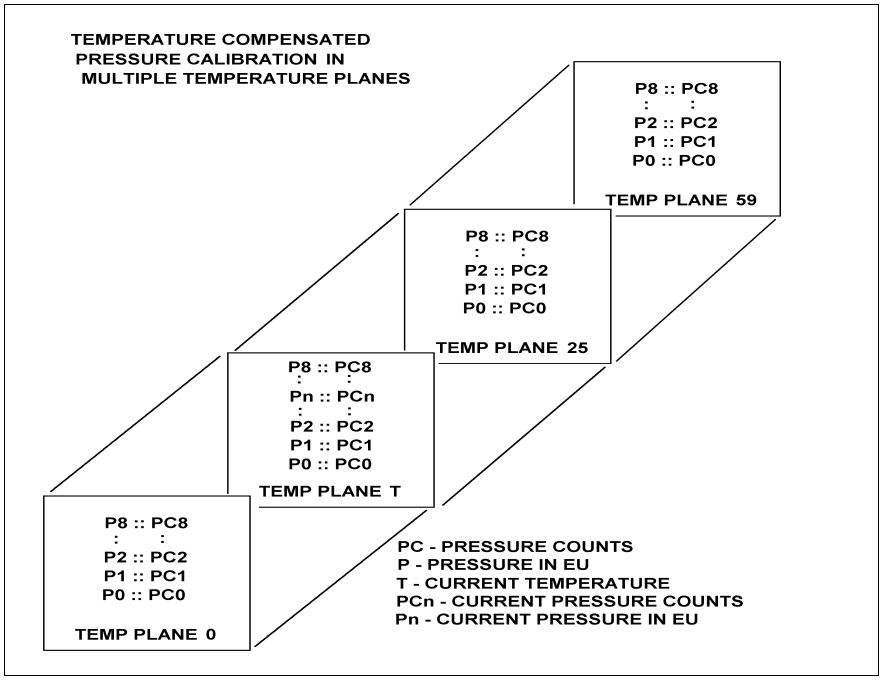
* Optional based on Number of Channels setting.

When BIN is set to 1 and the BINADDR is set to a value other than zero, the data from the AUX or CAL commands are converted to a BINARY format and output over the UDP binary port specified in the BINADDR variable. The data format is:

<ID byte> - 1 byte, the value will be 1 if the data are from a calibrator or 2 if the data are from an auxiliary unit.

<pressure> - 4 bytes of floating point binary pressure data

APPENDIX A - TEMPERATURE COMPENSATED PRESSURE CONVERSION



FORMULAS:

Pressure interpolation within current temperature plane:

$$P_{n_t} = \frac{1}{PC_{1_t} - PC_{0_t}}((PC_{1_t} - PC_{n_t})P_{0_t} - (PC_{0_t} - PC_{n_t})P_{1_t})$$

Calculation of entries in current temperature plane:

$$P_{n_t} = \frac{1}{PC_{1_t} - PC_{0_t}}((PC_{1_t} - PC_{n_t})P_{0_t} - (PC_{0_t} - PC_{n_t})P_{1_t})$$

Calculation of entries in current temperature plane:

$$P_t = \frac{1}{T_{25} - T_0}((T_{25} - T)P_{0_0} - (T_0 - T)P_{0_{25}})$$

APPENDIX B - ENGINEERING UNIT CONVERSION CONSTANTS

UNITSCAN Setting	Engineering Unit	PSI to EU 1 psi =	EU to PSI 1 EU =
ATM	Atmospheres	0.068046 A	14.6960 psi
BAR	Bars	0.068947 b	14.5039 psi
CMHG	Centimeter of Mercury	5.17149 cmHg	0.193368 psi
CMH2O	Centimeter of Water	70.308 cmH_2O	0.014223 psi
DECIBAR	Decibar	0.68947 db	1.4504 psi
FTH2O	Foot of Water	2.3067 ftH_2O	0.43352 psi
GCM2	Gram per square Centimeter	70.306 g/cm^2	0.014224 psi
INHG	Inch of Mercury @ 0°C	2.0360 inHg	0.491159 psi
INH2O	Inch of Water @ 4°C	27.680 inH_2O	0.036127 psi
KGCM2	Kilogram per square Centimeter	0.0703070 kg/cm^2	14.2235 psi
KGM2	Kilogram per square Meter	703.069 kg/m^2	0.0014223 psi
KIPIN2	kips per square inch(ksi)	0.001 kip/in^2	1000.0 psi
KNM2	Kilonewton per square Meter	6.89476 kN/m^2	0.145038 psi
KPA	Kilopascal	6.89476 kPa	0.145038 psi
MBAR	Millibar	68.947 mb	0.014504 psi
MH2O	Meter of Water	0.70309 mH_2O	1.42229 psi
MMHG	Millimeter of Mercury	51.7149 mmHg	0.0193368 psi
MPA	Megapascal	0.00689476 Mpa	145.038 psi
NCM2	Newton per square Centimeter	0.689476 N/cm^2	1.45038 psi
NM2	Newton per square Meter	6894.76 N/m^2	0.000145038 psi
OZFT2	Ounce per square Foot	2304.00 oz/ft^2	0.000434028 psi
OZIN2	Ounce per square Inch	16.00 in/ft^2	0.062500 psi
PA	Pascal	6894.76 Pa	0.000145038 psi
PSF	Pound per square Foot	144.00 lb/ft^2	0.00694444 psi
TORR	Torr	51.7149 T	0.0193368 psi

APPENDIX C - CHANGE LIST

Version 1.00 - Not Released

Version 1.01 - Not Released

Version 1.02 - Not Released

Version 1.03 - Released September 2009
First Release

Version 1.04 - Released December 2009
Added support of A2DCAL
Set the Serial Port - COM2 - as a data destination
Removed NOID support
Added stop SCAN to TCP connect and disconnect
UDP port range extended from 0 to 65535
Corrected a bug in the DELETE command
Corrected a bug in the TYPE command
Added SAVE to the STATUS command
Added RESTART command

Version 1.05 - Released December 2009
Corrected a bug in the PURGE and CALZ timers
Increased the maximum value of PERIOD to 4294967295
Adjusted CALPER settings. CALPER will be set by the software to the value of PERIOD if PERIOD is equal to or less than 500 microseconds. When PERIOD is set to values greater than 500 microseconds, CALPER will be set to 500 microseconds.

Version 1.06 - Not Released

Version 1.07 - Not Released

Version 1.08 - Released February 2010
Corrected a major bug in the File Management system that prevented the software from recognizing files past a deleted file. Any enclosure with a version older than this version must be upgraded.
Corrected a bug in the Serial mode that did not return a carriage return after an escape character was used to stop a scan.
Corrected a bug that caused the software to not indicate -9999 when a negative full scale value was exceeded.
Corrected a minor bug in the handling of ID and non ID enabled modules.
Corrected a bug that enabled DOUT 4 at all times.
Activated TGRAD
Corrected minor bugs in IDP commands

Version 5.00 - Released March 2010
Modified the Ethernet connection so a second connection will override an existing connection.
Changed version number to 5.00 to differentiate it from other Enclosure Software versions.

Version 5.01 - Released March 2010
Corrected a bug in the UDP Port assignment
Corrected problems in AUXSCHED and CALSCHED.

Version 5.02 - Released June 2010

- Changed default setting of SGENABLE1 to 0
- Changed default setting of PERIOD to 500
- Changed default setting of CALZDLY to 5
- Changed default setting of AVG1 to 16
- Changed default setting of BINADDR to 0 0.0.0.0
- Changed default setting of CALAVG to 32