DSM3400 SERIES
SOFTWARE REQUIREMENTS SPECIFICATION

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DSM3400 CONTROL AND CONFIGURATION

The operation of each DSM3400 is controlled by sending commands to selected units via the network. The DSM3400 returns data or information over the same network to the requesting client/host.

DSM3400 COMMANDS

This section describes the commands used to control the DSM3400. The DSM3400 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 DSM3400 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 DSM3400 is ready to accept a command.

TCP/IP does not guarantee that packet boundaries will be maintained between a Host and a DSM3400. 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 DSM3400 program must be restarted, preferably with the **RESTART** command, in order for the changes to take effect.

DSM3400 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 RADBASE, 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 RADBASE, 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 RADBASE, 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 RADBASE 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 DSM3400 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 RADBASE, 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 RADBASE 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 DSM3400 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 DSM3400. 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 **BANK A MODE**
SYNTAX **BANKA <CR>**

ARGUMENTS None

DESCRIPTION Commands the DSM3400 to switch the DOUTS set in the configuration variable: BANKA. This command is intended for use in any situation where DOUT settings must be changed quickly.

RETURNS <*nl*>
nl - end of line

EXAMPLE To switch the DOUTS to the condition set in the Digital Variable BANKA:
Enter the command:

BANKA

The DSM3400 will switch the outputs based on the setting of the configuration variable: BANKA. This command assumes that the configuration variable is set correctly.

COMMAND **BANK B MODE**
SYNTAX **BANKB <CR>**

ARGUMENTS None

DESCRIPTION Commands the DSM3400 to switch the DOUTS set in the configuration variable: BANKB. This command is intended for use in any situation where DOUT settings must be changed quickly.

RETURNS <*nl*>
nl - end of line

EXAMPLE To switch the DOUTS to the condition set in the Digital Variable BANKB:
Enter the command:

BANKB

The DSM3400 will switch the outputs based on the setting of the configuration variable: BANKB. This command assumes that the configuration variable is set correctly

COMMAND **BANK USER MODE**
SYNTAX **BANKUSR <CR>**

ARGUMENTS None

DESCRIPTION Commands the DSM3400 to switch the DOUTS set in the configuration variable: BANKUSR. This command is intended for use in any situation where DOUT settings must be changed quickly.

RETURNS <*nl*>
nl - end of line

EXAMPLE To switch the DOUTS to the condition set in the Digital Variable BANKUSR:
Enter the command:

BANKUSR

The DSM3400 will switch the outputs based on the setting of the configuration variable: BANKUSR. This command assumes that the configuration variable is set correctly

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 DSM3400 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 DSM3400 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 SYNTAX **CALIBRATE INSERT**
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 DSM3400 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 DSM3400 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 DSM3400 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 DSM3400 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. 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 DSM3400 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 DSM3400 software will measure the zero counts for each channel and update the Zero and Delta Arrays. The DSM3400 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 DSM3400 and ZOC modules have stabilized.
2. Power Cycle — A CALZ should be executed if power is cycled, or if a RESTART or RELOAD command is executed.
3. RESTART — A CALZ should be executed after a RESTART command.
4. RELOAD — A CALZ should be executed after a RELOAD command.
5. 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.
6. 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 DSM3400 is powered down or when a RESTART or RELOAD 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 DSM3400. 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 <*scan group*>** <CR>

ARGUMENTS <*scan group*> - a number, 1 to 8, that represents the scan group number.

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

RETURNS CHAN: <group><sequence><mod><*port*><lpress> <hpress><numchan><eu><*nll*>

group	- the scan group, 1 to 8
sequence	- the scan port number
mod	- the module number
port	- the port number in the module
lpress	- the minimum pressure value
hpress	- the maximum pressure value
numchan	- the number of channels in the scan group
eu	- the eu conversion setting, 0 = raw counts, 1 = EU
nl	- end of line

EXAMPLE To verify the which channels have been assigned to SCAN GROUP 1:

Type:

CHAN 1 <CR>

If 2 modules are configured in the scan group, The DSM3400 will return:

```
CHAN: 1 1 1 1 -15.000000 15.000000 32 1
CHAN: 1 2 1 2 -15.000000 15.000000 32 1
CHAN: 1 3 1 3 -15.000000 15.000000 32 1
CHAN: 1 4 1 4 -15.000000 15.000000 32 1
CHAN: 1 5 1 5 -15.000000 15.000000 32 1
CHAN: 1 6 1 6 -15.000000 15.000000 32 1
CHAN: 1 7 1 7 -15.000000 15.000000 32 1
CHAN: 1 8 1 8 -15.000000 15.000000 32 1
CHAN: 1 9 1 9 -15.000000 15.000000 32 1
CHAN: 1 10 1 10 -15.000000 15.000000 32 1
 ::  ::   :  :  :   :  :   ::   ::    ::   ::   :  :
CHAN: 1 31 2 15 -15.000000 15.000000 32 1
CHAN: 1 32 2 16 -15.000000 15.000000 32 1
>
```

This shows that all 16 ports of two 16 channel modules have been assigned in sequence to Scan Group 1 for a total of 32 channels in the scan group. 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 DSM3400 to clear any errors that have occurred. The errors are sent to the client in response to a 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 **CLOSE SCAN FILE**

SYNTAX **CLOSE**<CR>

ARGUMENTS None

DESCRIPTION Commands the DSM3400 to close the current open scan file created when CONOUT is set to 3 and a SCAN command is issued. The CLOSE command will close the file and set file counter so the next SCAN command will open a new scan file. The scan files are automatically named scanxxx.dat. The scan file counter is reset when the program is exited.

NOTE: If a CLOSE command is not issued to close an open scan file, the data collected from the next SCAN command will be appended to the open file. If a CLOSE command is not issued before the DSM3400.exe program is shut down, all data from the open file will be lost.

RETURNS <*nl*>
nl - end of line.

EXAMPLE Data collection has commenced. CONOUT is set to 3 and a SCAN command has been issued. A scan file named: scan000.dat is opened. When the SCAN function is complete,

Type: CLOSE

This will close the file: scan000.dat.

When the next SCAN command is issued, a new file named: scandat001 is opened. When this scan is complete,

Type: CLOSE

This will close the file: scan001.dat

When the DSM3400.exe program is exited, the counter used to increment the file name is reset. When the DSM3400.exe program is re-started, the first file name will be scan000.dat

COMMAND	**CONTROL PRESSURE RESET**
SYNTAX	**DOUTPU**<CR>
ARGUMENTS	*none*.
DESCRIPTION	Resets the control pressures to the power up condition. This will reset control pressures if the BANKA, BANKB, and BANKUSR commands are used to modify control pressure settings from 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 **CREATE SENSOR PROFILE FILE**

SYNTAX **CREATESPF <*sensor serial number*> <*channel number*>** <CR>

ARGUMENTS
sensor serial number - the serial number of the replacement sensor
channel number - the location of the new sensor in position-port format

DESCRIPTION
Commands the DSM3400 to copy the coefficients from the specified channel to a Sensor Profile File so the sensor can be used as a replacement sensor. Generally this would only be used at the Scanivalve Factory, but it could be used by an end user to move a sensor from one module to another.
The command may be entered from the local input or a host computer. The DSM3400 must be in the READY mode to accept the command.
This command **DOES NOT** modify the tables in the DSM3400 system computer memory.
The Sensor Profile File will be stored in the DSM3400 Folder. The file may be transferred to a host computer using a file transfer.

RETURNS
A file named: Tnnnnnnn.spf or Snnnnnnn.spf where T or S indicates the type of sensor and nnnnnnn indicates the sensor serial number. The file contains
LPRESS <Maximum Low Pressure>
HPRESS <Maximum High Pressure>
NEGPTS <Number of Negative Points>
<temp index> <pressure> <pressure counts>
<temp index> <pressure> <pressure counts>
:: :: :: :: :: :: :: ::
<temp index> <pressure> <pressure counts>
<*nl*>

temp index - The temperature in °C multiplied by four.
pressure - The applied pressure
pressure counts - The measured pressure counts
nl - End of line.

EXAMPLE
Replacement sensors have been calibrated in a module. The data must be moved to Sensor Profile Files. The DSM3400 must be powered up and the sensor data must be in memory for this command to function correctly. The file containing the data will be named Tnnnnnnn.spf or Snnnnnnn.spf, where T indicates a replacement sensor for DSA3016 and S indicates a replacement sensor for a ZOC22, ZOC23, or ZOC33. The serial number of the sensor is indicated by nnnnnnn.

To create a Sensor Profile File for sensor T355 in port 8 of a module installed in position 3 of a DSM3400 :

Type: CREATESPF t355 3-8<CR>

The file: T355.spf will be created and written to the ENCL Folder in the DSM3400

To create a Sensor Profile File for sensor S42778 in port 21 of a module installed in position 7 of a DSM3400 :

Type: CREATESPF s42778 7-21<CR>

The file:S42778.spf will be created and written to the ENCL Folder in the DSM3400.

COMMAND **DELETE**

SYNTAX **DELETE <*start temp*><*end temp*>[<*channels*>]**<CR>

ARGUMENTS

<start temp> - an integer from 0 to 69 that represents the low point of the temperature planes to be deleted.

<end temp> - an integer from 0 to 69 that represents 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

Converts all pressure points within temperature planes between the low and high temperature range, inclusive, to "calculated". 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 **DELFILE <*filename*>**<CR>

ARGUMENTS <*filename*> - the file to be deleted in the format: scanxxx.dat

DESCRIPTION Deletes data files from the DSM folder on the DSM3400 hard disk drive.

RETURNS <*nl*>
nl - end of line.

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

Type: DELFILE SCAN002.dat

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

COMMAND SYNTAX **DELETE ERROR LOG FILE**
DELETELOGFILE <CR>

ARGUMENTS *None*

DESCRIPTION Deletes the Error Log file from the DSM3400 hard disk drive. The error log file in the DSM folder is a log of major activity in the DSM3400. All major activity will be appended to this file from the time it is created until the file is deleted. This file can aid a user in troubleshooting a problem. The file is created during the initial installation of the DSM3400 software. The DSM3400 software will re-create the file after it has been deleted.

NOTE: The DSM3400 has limited disk storage space. It is recommended that this file not be allowed to exceed 5 megabytes. When the file size reaches 5242880 Bytes, an error will be logged.

If IFUSER is set to 1, the error will be displayed immediately and logged in the Error log file.
If IFUSER is set to 0, the error will only be logged in the Error log file and in the error buffer.

RETURNS <*nl*>
nl - end of line.

EXAMPLE To delete the file, ERROR.TXT from the DSM folder on the DSM3400 hard drive:

Type: DELETELOGFILE

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 DSM3400 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 DSM3400 and DSA3016 modules have been allowed to stabilize after power up. Also a CALZ should be executed if power is cycled, or if a RESTARTor RELOAD command is executed.

The Zero and Delta Arrays are cleared when the DSM3400 is powered down or when a RESTART or RELOAD 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.

COMMAND **DIN**

SYNTAX **DIN** <CR>

ARGUMENTS *none*

DESCRIPTION Reads the status word from the lattice chip.

RETURNS A sixteen bit status word. For more information , refer to the Status Word Format Table in this document.
<*nl*>
nl - end of line.

EXAMPLE When this command is entered, the value of the status word is returned in hexadecimal notation. The value returned depends upon the status of the DSM3400.

Type: DIN<CR>

The DSM3400 will return the value: 2, If no frames are available, there are no digital inputs, no A/D errors have occurred, and the FIFO's are empty.

COMMAND **DISCONNECT FROM HOST**

SYNTAX **DISCONNECT**<CR>

ARGUMENTS *none*.

DESCRIPTION Disconnects the DSM3400 from the Host computer. Once this command is issued the Ethernet connection between the Host and the DSM3400 will be cleanly disconnected. The Host may re-connect to the DSM3400 by a normal TCP/IP connection method.

RETURNS <*nl*>
nl - end of line.

EXAMPLE To disconnect a DSM3400 from a Host ,Type:

DISCONNECT <Enter>

COMMAND	**DOUT**
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>
NOTE	Version 3.27 and higher can support 16 Digital Output Channels if a second RDS3200 is iinstalled.

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 DSM3400 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 DSM3400 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 **FILE**

SYNTAX **FILE *<filename>*** <CR>

ARGUMENTS *<filename>* - The file to be opened. If the file is not in the DSM Folder, then a path must be specified.

DESCRIPTION Opens the named file. It is assumed that this file will be a command or a series of commands. If the file is a calibration file, the **INSERT** commands will be executed. It is imperative that a **DELETE** command be executed prior to opening a calibration coefficient file to prevent Master Point Overwrite Errors. This command will not support commands such as CALZ unless it is the only command in the file. The FILE command is not a Macro function, that is, it will execute each command in the file in order without waiting for each command to be completed.

RETURNS *<nl>*
nl - end of line.

EXAMPLE A startup command list may be sent to the DSM3400. A file: scan.cmd may contain the commands:

```
SET FPS1 1
SCAN
```

This file should be located in the DSM Folder. If not, a path must be specified.

Example 1

The file: scan.cmd is located in the DSM folder. To execute the file,
Type: FILE scan.cmd<CR>

Example 2

The file: scan.cmd is located in the DSM3400CMD folder. To execute the file,
Type: FILE C:\DSM3400CMD\scan.cmd<CR>

COMMAND **FILL**

SYNTAX **FILL** <CR>

ARGUMENTS None

DESCRIPTION Fills the Conversion Table with calculated pressure points and temperature planes using the MASTER (M) calibrated points as guides. These "filled" points are marked as CALCULATED(C).
The FILL command **NEVER** overwrites MASTER(M) points. It does overwrite old points marked as CALCULATED(C) or INVALID(I).
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 **INSERT**

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

ARGUMENTS

<temp> - an integer from 0 to 69 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, calculated and invalid points in the temperature-pressure correction matrix. This command places the DSM3400 in the LIST mode until the command is completed or a STOP command is issued.

RETURNS

INSERT <*temp*><*channel*><*press*><*press counts*><M, C, or I><*nl*>
INSERT <*temp*><*channel*><*press*><*press counts*><M, C, or I><*nl*>
: : : :
INSERT <*temp*><*channel*><*press*><*press counts*><M, C, or I><*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
C	- a Calculated Plane generated during a FILL
I	- an Invalid Plane, the value cannot be accurately calculated
nl	- end of line.

EXAMPLE To list all of the coefficients from 16°C to 20°C for channel 1 in a module calibrated from 17°C to 40°C

Type: LIST a 16 20 1-1<CR>

The DSM3400 will return a list of INSERT commands showing the temperature, channel, applied pressure, counts and the type of plane.

```
INSERT 16.00 1-1 0.000000 0 I
INSERT 16.00 1-1 19.000000 0 I
INSERT 16.00 1-1 25.000000 0 I
:: :: :: :: :: :: :: : :
INSERT 17.00 1-1 -45.949100 -26184 M
INSERT 17.00 1-1 -31.250000 -17763 C
INSERT 17.00 1-1 -19.969601 -11302 M
INSERT 17.00 1-1 -6.250000 -3425 C
INSERT 17.00 1-1 0.000000 162 M
INSERT 17.00 1-1 19.984600 11636 M
INSERT 17.00 1-1 25.000000 14523 C
INSERT 17.00 1-1 35.000000 20281 C
INSERT 17.00 1-1 45.949100 26586 M
:: :: :: :: :: :: :: :: ::
INSERT 20.00 1-1 -45.949100 -26166 C
INSERT 20.00 1-1 -31.250000 -17750 C
INSERT 20.00 1-1 -19.969601 -11292 C
INSERT 20.00 1-1 -6.250000 -3424 C
INSERT 20.00 1-1 0.000000 160 C
INSERT 20.00 1-1 19.984600 11629 C
INSERT 20.00 1-1 25.000000 14514 C
INSERT 20.00 1-1 35.000000 20267 C
```

COMMAND SYNTAX **LIST A/D CORRECTION TABLE (NON-TEMPERATURE COMPENSATED)**
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 RADBASE 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 DSM3400 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 RADBASE 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 DSM3400 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 ARINC OUTPUT VARIABLES**
SYNTAX **LIST AR** <CR>

ARGUMENTS None

DESCRIPTION Lists the ARINC outputs with their scaling factor.

RETURNS SET ARINCn <*scangroup*> <*scaling*> <*nl*>
SET ARINCn <*scangroup*> <*scaling*> <*nl*>
: : : :
SET ARINCn <*scangroup*> <*scaling*> <*nl*>

n - the ARINC output channel, 1 through 8
scangroup - the scan group number 0 through 8, where 0 disables the output
scaling - any valid number, default is 20 for psi engineering unit scaling
nl - end of line.

NOTE These variables are only active when HAVEARINC is set to 1.

EXAMPLE To list the ARINC output channels that are enabled,
Type: LIST AR

If all ARINC output channels are enabled, the DSM will return:

SET ARINCOUT1 1 20
SET ARINCOUT2 2 20
SET ARINCOUT3 3 20
SET ARINCOUT4 4 20
SET ARINCOUT5 5 20
SET ARINCOUT6 6 20
SET ARINCOUT7 7 20
SET ARINCOUT8 8 20

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 DSM3400 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 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 DSM3400 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 8
SET DLYPGSEQ 1
SET DLYPG 10
SET DOUTREADY 4
SET BANKA 0
SET BANKB 0
SET BANKUSR 0

NOTE Digital Outputs in Version 3.27 and higher can support 16 Digital Outputs if a second RDS3200 is installed.

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

ARGUMENTS None

DESCRIPTION Lists the data files stored In the DSM folder on the DSM3400 hard disk drive. Filenames are in the format: scanxxx.dat, where xxx is automatically incremented whenever a new scan file is created.

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

filename - The data file name
nl - end of line.

EXAMPLE To list all data files stored In the DSM folder on the DSM3400 hard disk drive:

Type: DIRFILE<CR>

The DSM3400 will return a file list

FILE: SCAN000.DAT
FILE: SCAN001.DAT
FILE: SCAN002.DAT
FILE: SCAN003.DAT
FILE: End of Files

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 DSM3400 will return:

SET TEMPM253 0.0228

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 DSM3400 will return:

SET TEMPM6 0.0228

The temperature gain settings may be verified for all modules installed in the DSM3400.

Type: LIST g<CR>

The DSM3400 may return:

SET TEMPM1 0.0228
SET TEMPM2 0.0228
SET TEMPM3 0.0228
SET TEMPM4 0.0228
SET TEMPM5 0.0228
SET TEMPM6 0.0228
SET TEMPM7 0.0228
SET TEMPM8 0.0228
>

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 = ZOC module
D = Digital Module (RDS)

<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 = ZOC module
D = Digital Module (RDS)

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 DSM3400 with 2 A/D modules, an RDS, and a DSA3016 installed in position 1:

Type: LIST ID<CR>

The DSM3400 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 DSM3400 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 DSM3400 may return:

7 2 A E 14e9251e0100001c None

EXAMPLE 4 To View the ID information of a typical DSM3400

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, 0 to 16	
<site>	-	the location type, Where:	A = A/D module
			M = ZOC module
			D = Digital Module (RDS)
<device>	-	the device type, always E for EPROM	
<mem>	-	the memory type, Where	E = EPROM
			P = PROM

DESCRIPTION Lists the ID chip settings. ZOC 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. 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, 0 to 16	
site	-	the location type, Where:	A = A/D module
			M = ZOC module
			D = Digital Module (RDS)
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 DSM3400 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 all of the ID chip information of the chip in the DSM3400 module in position 1:

Type: LIST IDP 1 M<CR>

The DSM3400 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
```

EXAMPLE 2

To view all of the ID chip information of the chip in the RADBASE A/D module(position 0):

Type: LIST IDP 0 A<CR>

The DSM3400 may return:

```
SET IDP 0 A E P DFC 0
SET IDP 0 A E P DMC 0
SET IDP 0 A E P SN 25
SET IDP 0 A E P REV A
SET IDP 0 A E P MDATE 10/24/2003
SET IDP 0 A E E ADCA 0.000000
SET IDP 0 A E E ADCB 1.002526
SET IDP 0 A E E ADCC 14.007034
SET IDP 0 A E E RV 5.002700
SET IDP 0 A E E ACDATE 10/24/2003
SET IDP 0 A E E SN 126
SET IDP 0 A E E APPTYPE 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 DSM3400 may return:

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

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 DSM3400 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 DSM3400 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 DSM3400 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 DSM3400 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 DSM3400 will return:

SET TEMPB253 -192.9757

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 DSM3400 will return:

SET TEMPB6 -192.9757

The temperature offset settings may be verified for all modules installed in the DSM3400.

Type: LIST o<CR>

The DSM3400 may return:

SET TEMPB1 -192.9757
SET TEMPB2 -192.9757
SET TEMPB3 -192.9757
SET TEMPB4 -192.9757
SET TEMPB5 -192.9757
SET TEMPB6 -192.9757
SET TEMPB7 -192.9757
SET TEMPB8 -192.9757
>

COMMAND **LIST PROFILE LIST SETTINGS**
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 DSM3400 is first booted up, or when a RESTART, or 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 DSM3400SN <*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 DSM3400 may return:

```
SET DSM3400SN 18
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 DSM3400

Type: LIST s<CR>

The DSM3400 will return:

SET PERIOD 500
SET ADTRIG 0
SET SCANTRIG 0
SET PAGE 0
SET QPKTS 0
SET SIMMODE 0
SET BINADDR 0 0.0.0.0
SET IFC 62 0
SET TIMESTAMP 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 DSM3400 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 64 channel modules are assigned to Scan Group 1, the SET CHAN variable will be:1-1..3-64. If the module assignment is changed to 2 64 channel modules and the channel assignment is not set to 0 before the new assignment: 1-1..2-64 is added, the channel assignment will appear as follows:
SET CHAN1 1-1..3 -64
SET CHAN1 1-1..2.-64
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 64 channel module assigned and it is re-assigned by an initialization program, the channel assignments will appear as follows:
SET CHAN1 1-1..1-64
SET CHAN1 1-1..1-64

COMMAND **LIST SYSTEM COMPONENTS**
SYNTAX **LIST SYS [<U>]** <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.

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
DSM3400 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. Positions 9 is reserved for RDS modules. All positions do not have to be filled. The positions are identified by the setting of the dip switches on the A/D and RDS modules. A standard DSM3400 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 DSM3400 is available with 8 A/D modules. The RDS module is always identified as position 9.

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 DSM3400 could return:

DSM3400 Serial Number 103

LOC	A2DSN	-MODEL-	-SN-	CHAN	VALVE	-NPR1-	-NPR2-	XDUCER	-CAL-DATE-
1	111	ZOC33	300	64	IP	15.00	15.00	DIF	3/16/2005
2	110	ZOC33	311	64	IP	5.00	5.00	DIF	3/18/2005
3	121								
4	122								
5	123								
6	127								
7	128								
8	131								

LOC	-MODEL-	-SN-	CHAN	DESCRIPTION
9	RDS	103	8	REMOTE DIGITAL SWITCH [DOUT 1-8]
10				
11				
12				
13				
14				
15				
16				

The RADBASE 3200 is Serial number 103. It has eight A/D modules connected.

A/D 3200 Sn 111 is installed in Location 1, ZOC33 module 300 will be scanned by this A/D module.
A/D 3200 Sn 110 is installed in location 2. ZOC33 module 311 will be scanned by this A/D module.

RDS3200 Sn 103 is installed in location 9.

ZOC33 SN300 has 64 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.
ZOC33 SN311 has 64 channels. The Full Scale pressure range of the module is 5 psi. The module is set up as a normal Differential Pressure Module. It was last calibrated March 18, 2005.

COMMAND **MERGE SENSOR PROFILE FILE**

SYNTAX **MERGESPF <*sensor profile file*> <*module profile file*> <*port number*>** <CR>

ARGUMENTS

sensor profile file	- the file containing the replacement sensor data
module profile file	- the file where the sensor data will be added
port number	- the location of the new sensor

DESCRIPTION

Commands the DSM3400 to merge the coefficients for a replacement sensor from a Sensor Profile File into a Module Profile File.
The Sensor Profile File must reside in the same directory as the Module Profile File. In a DSM3400, this will be the DSM Folder. For more information on file transfers, please refer to the file transfer procedures in this manual.
The command may be entered from the system computer or a host computer. The DSM3400 must be in the READY mode to accept the command.
This command **DOES NOT** modify the tables in the DSM3400 system computer memory. The new coefficients will not be effective until the program is restarted.

RETURNS

<*nl*>
nl - End of line.

EXAMPLE

Replacement sensor data will be provided on a floppy disk. The file containing the data will be named Tnnnnnnn.spf or Snnnnnnn.spf, where T indicates a replacement sensor for DSA3016 and S indicates a replacement sensor for a ZOC22, ZOC23, or ZOC33. The serial number of the sensor is indicated by nnnnnnn.

When the SPF file has been installed on the DSM3400, the sensor data may be added to the MPF file.

To install the coefficients from sensor T355 in port 8 of module serial number 150 :

Type: MERGESPF t355.spf m150.mpf 8<CR>

NOTE

The DSM3400 program must be restarted for the new coefficients to be effective. The program may be restarted by the **RESTART** command or by cycling power.

COMMAND **PURGE**
SYNTAX **PURGE** <CR>

ARGUMENTS None

DESCRIPTION Commands the DSM3400 to initiate a purge sequence. This command may be initiated by entering the command from the local system computer or a host computer. The DSM3400 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 DSM3400 returns to the READY mode.

When a purge is initiated by a digital input, the DSM3400 may be in the READY mode or in the SCAN mode. The purge sequence is the same as above unless the DSM3400 is in the SCAN mode. If the DSM3400 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>

COMMAND	**QUIT**
SYNTAX	**QUIT** <CR>
ARGUMENTS	None
DESCRIPTION	Commands the DSM3400 software to quit the execution of the DSM3400.exe program.
RETURNS	<*nl*> nl - End of line.
NOTE	This command should only be used in the local mode. Once the program is quit, it cannot be restarted from the ETHERNET interface.
EXAMPLE	To quit the program, Type: QUIT<CR>

COMMAND	**RESTART**
SYNTAX	**RESTART** <CR>
ARGUMENTS	None
DESCRIPTION	Commands the DSM3400 software to restart the DSM3400.exe program.
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 DSM34003200.

DESCRIPTION Commands the DSM3400 to save the configuration variables, and correction tables to disk. 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 will be saved by any variation of this command.

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 may require as much as 30 seconds to complete, depending on the configuration. **DO NOT** issue a RESTART command, or cycle power during this time. The time delay is caused by the drivers internal to the Compact Flash. When operating in a Console or Network mode, a caret will be returned immediately after a SAVE command is issued. This only indicates that the operating system has passed the information to be saved to the Compact Flash internal buffer. There is no positive indication that the SAVE function has been completed in the Compact Flash.

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

ARGUMENTS None

DESCRIPTION Commands the DSM3400 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 DSM3400 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 DSM3400, 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 DSM3400 will enter the SCAN mode and wait for a hardware or software trigger. When a trigger is received, the DSM3400 will acquire and output one averaged frame of data and re-enter the SCAN mode. Data will be acquired at the rate determined by the settings of PERIOD, AVGn and the Number of Channels. In a DSM3400 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 DSM3400 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. The DSM3400.exe console window will display up to 512 channels from a Scan Group.
4. 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 **SET**

SYNTAX **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 DSM3400 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 2 from module 2, channels 1 through 16, to module 1, channels 1 through 16:
Type: SET CHAN2 0<CR>
SET CHAN2 1-1..1-16<CR>

COMMAND	**SHUTDOWN**
SYNTAX	**SHUTDOWN** <CR>
ARGUMENTS	none
DESCRIPTION	This command calls the program: shutdown.exe which first exits the DSM3400.exe console program and then exits Windows. The AC power may be turned off after approximately 45 seconds. The use of this command will shorten the boot up time of the DSM3400 by about one-half. This command can be issued from DSMLink or TelNet while a Host computer is connected to the DSM3400.
RETURNS	nothing
NOTES	The program: shutdown.exe, must be in the ENCL folder for this command to function correctly. This command is designed for use when the DSM3400 does not have a local keyboard, monitor and mouse connected. If the DSM3400 has a keyboard, monitor and mouse connected, normal Windows shutdown procedures should be followed It should also be noted that this program uses a Microsoft function that is not guaranteed by Microsoft to properly close all applications. If a DSM3400 that has been shutdown using shutdown.exe does not respond to a host computer after a reasonable length of time is used, the AC power should be cycled to cause a cold boot of the DSM3400.

COMMAND **SLOTS**

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

ARGUMENTS <channel> - The channel in module-port format

DESCRIPTION Queries the DSM3400 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 DSM3400 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 DSM3400 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 DSM3400 to return the current status.

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

Current status - one of the following:

- READY - The module is ready to accept any command.
- SCAN - The module is in the SCAN mode. The only commands that will be accepted are STATUS or STOP.
- CALZ - The module is executing a CALIBRATE ZERO command. The only commands that will be accepted are STATUS or STOP.
- LIST - The module is outputting a list. The only commands that will be accepted are STATUS or STOP.
- 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 DSM3400 is not READY.

If the STATUS command is entered while the DSM3400 is on, but inactive, the DSM3400 will return:

STATUS: READY

If the STATUS command is entered while the DSM3400 is executing a Calibrate Zero command, the DSM3400 will return:

STATUS: CALZ

COMMAND **STOP**
SYNTAX **STOP** <CR>

ARGUMENTS None

DESCRIPTION Commands the DSM3400 to abort the current operation and return to the READY mode.

RETURNS <*nl*>
nl - end of line.

EXAMPLE To abort any function or operation:
Type: STOP<CR>

COMMAND **TEMPERATURE**

SYNTAX **TEMP <*units*>**<CR>

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

RAW - Returns the temperature in raw counts.

EU - Returns the temperature in Engineering Units

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 DSM3400

Type: TEMP EU<CR>

The DSM3400 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 DSM3400 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 SYNTAX **TEMPERATURE GRADIENT COMPENSATION**
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 RADBASE.

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

Location	- A/D Location, 1 through 8
RADBase Temp	- Measured Temperature of the RADBASE in degrees C
A/D Temp	- Measured Temperature of the RAD 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 DSM3400 software can only read the temperature of the RADBASE when in the scan mode. The temperature of the A/D modules connected to the RADBASE can be estimated based on the gradient calculation derived from the table generated by this command.

EXAMPLE A DSM33400 has eight A/D modules installed To calculate and store the temperature differential for these modules, Type:

TGRAD<enter>

The DSM3400 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
Loc 3 Base 33.187500 Temp 0.000000 Delta -33.187500
Loc 4 Base 33.187500 Temp 0.000000 Delta -33.187500
Loc 5 Base 33.187500 Temp 0.000000 Delta -33.187500
Loc 6 Base 33.187500 Temp 0.000000 Delta -33.187500
Loc 7 Base 33.187500 Temp 0.000000 Delta -33.187500
Loc 8 Base 33.187500 Temp 0.000000 Delta -33.187500

COMMAND	**VERSION**
SYNTAX	**VER** <CR>
ARGUMENTS	none
DESCRIPTION	Requests the version number of the DSM3400.EXE file.
RETURNS	VERSION: <*version string*> <*nl*>
EXAMPLE	To determine the version of DSM3400.exe software in use: Type: VER<CR> The DSM3400 will return: VERSION: 3.30

COMMAND **WRITE ID CHIP VARIABLES**

SYNTAX **IDPWRITE <*location*> <*site*> <*device*> <*memory*>** <CR>

ARGUMENTS

location - 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.

memory- 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 <*location*> <*site*> <*device*> <*memory*> <*name*> <*value*>

location - The location of the device. Valid values are 0 through 8, Where 0 can only be the RADBASE 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.

memory - 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 DSM3400 software must be set up to write to the EPROM. The following command is entered:

```
IDPWRITE 1 M E E
```

The DSM3400 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 <*module*>**<CR>

ARGUMENTS <*module*> -the module position 1 through 8 or the serial number.

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. If a module number is not entered, the ZERO values for all modules are listed.

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 DSM3400 could 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: 1-58 150
ZERO: 1-59 156
ZERO: 1-60 96
ZERO: 1-61 19
ZERO: 1-62 134
ZERO: 1-63 132
ZERO: 1-64 238

NOTE If a module number is not entered, the zero values for all enabled modules will be returned.

DSM3400 CONFIGURATION VARIABLES

GENERAL SCAN VARIABLES (Group S)

VARIABLE	**ADTRIG <*code*>**
VALID VALUES	0, 1, or 2
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 DSM3400 enters a WAIT state until a trigger pulse is received. At that time, the DSM3400 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. 2 - Sets the Tag Bit Function. This function is only available if SCANTRIG is set to 0. This function allows a user to apply a voltage to the Trigger Input and have that digital state recorded in the data stream. The status of the Tag Bit is placed in bit 7 of the enabled Scan Group(s) in the Binary Packet. Scan Groups are identified in byte 1 of the Scan Packets. The status of the Tag Bit is also shown on the formatted screen of the Console.
NOTE	If ADTRIG is set to 1, SCANTRIG must be set to 0. If ADTRIG is set to 1, The hardware trigger input must be DIN 1. If ADTRIG is set to 2, SCANTRIG must be set to 0.

VARIABLE	**BINADDR <*port*> <*IP address*>**
VALID VALUES	port - 1 to 5000 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 1 to 5000, data are sent over that port to the IP address identified in a UDP format.

VARIABLE	**FM <*code*>**
VALID VALUES	1 to 20
DEFAULT VALUE	1
DATA TYPE	integer
DESCRIPTION	The DSM3400 Frame Multiplier. This variable determines the number of averaged frames sampled before they are sent to the host. The Frame Multiplier concept is explained in the DSM3400 Frame Multiplier section of this manual.

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	25 to 65535
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:

$$DataRate = \frac{1}{Period X Number of Channels X AVG)}$$

Data Rate is expressed in Hertz per channel
Period is in microseconds
Channels is always 64 in a standard DSM3400
AVG is the average term for that scan group

NOTE:	Channels will always equal the module with the greatest channel count in a DSM3400.
EXAMPLE	If a DSM3400 has a ZOC22 and a ZOC33 connected, the value of channels will be 64.

VARIABLE	**QPKTS *<enable>***
VALID VALUES	0, 1, or 2
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Sets the action the DSM3400 will take when the output data buffer is full. 0 - Frames are discarded and the DSM3400 will continue scanning. 1 - No frames are lost, the DSM3400 stops scanning, and an error is logged. 2 - The output data buffer is not used.

VARIABLE	**SCANTRIG <*code*>**
VALID VALUES	0, or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Controls scan initiation. 0 - Scanning is initiated by the SCAN command. 1 - Scanning is initiated by an external hardware trigger. When SCANTRIG is enabled, a scan will be initiated whenever a hardware trigger input is received. The hardware trigger is a hard wired input to the power cable. The scan function will continue until the Frames per Scan variable is satisfied or a STOP command is received. Multiple trigger pulses received during a scan will be ignored.
NOTES	If SCANTRIG is set to 1, ADTRIG must be set to 0. If SCANTRIG is set to 1, the hardware trigger must be DIN 1. A Software Trigger will not initiate the SCAN function.

VARIABLE	**TEMPPOLL <*code*>**
VALID VALUES	0 or 1
DEFAULT VALUE	1
DATA TYPE	integer
DESCRIPTION	This variable controls the Temperature Polling function. When this variable is enabled, the temperature of the A/D modules are read at a 5 second period.. 0 - Temperature polling is disabled. 1 - Temperature polling is enabled.

VARIABLE	**TIMESTAMP <*code*>**
VALID VALUES	0 or 1
DEFAULT VALUE	1
DATA TYPE	integer
DESCRIPTION	This variable sets the time stamp units. The Time Stamp is the elapsed time from the start of the scan function. The first time stamp will always be zero. 0 - Time is in microseconds 1 - Time is in milliseconds

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

VARIABLE	**BIN <*code*>**
VALID VALUES	0, 1, or 2
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 2 - Output is in binary format with module-port information

VARIABLE	**CALAVG <*sample average*>**
VALID VALUES	1 to 256
DEFAULT VALUE	64
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	50 to 5000
DEFAULT VALUE	500
DATA TYPE	integer
DESCRIPTION	Sets the period, in microseconds, of the DSM3400 calibration data acquisition. This is the same as PERIOD in the SCAN Group This value should be set to insure that a sufficient settling time exists so that the channel samples are stable.

VARIABLE	**CALZDLY <*delay*>**
VALID VALUES	5 to 128
DEFAULT VALUE	15
DATA TYPE	integer
DESCRIPTION	Sets the delay time, in seconds, before the DSM3400 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 DSM3400 will output the values set in **MAXEU** and **MINEU** to indicate that a conversion error may exist. The DSM3400 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 DSM3400 will output 9999 or whatever has been entered as the MAXEU value to indicate that a conversion error may exist. The DSM3400 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 DSM3400 will output -9999 or whatever has been entered as the MINEU value to indicate that a conversion error may exist. The DSM3400 will also output these values when the maximum or minimum master conversion planes are exceeded.

VARIABLE	**MPBS <*number of planes*>**
VALID VALUES	0 to 140
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 When set to 1, causes the DSM3400 to execute a CALZ at startup. The DSM3400 does not save zeros at power down. If the DSM3400 is set to start scanning immediately or if it is difficult to input commands to the DSM3400 once it is powered up, then this variable should be set to 1. The DSM3400 will then execute a CALZ at the end of the initialization sequence.

VARIABLE **UNITSCAN <*units*>**
VALID VALUES see list below
DEFAULT VALUE PSI
DATA TYPE string
DESCRIPTION This sets the output engineering units for the DSM3400. Setting this value will also set CVTUNITS. CVTUNITS may be set to a different value, however UNITSCAN must be set first. The following are the list of units supported:

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 DSM3400 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 I/O CONFIGURATION VARIABLES (Group D)

VARIABLE	**DINCALZ <*value*>**
VALID VALUES	0, 2, 4, 8, 10, 20, 40, 80 Hexadecimal
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Determines which bit of the Digital Input word is used to initiate a **CALZ.** Input 1 is the least significant binary bit. Input 1 may not be used for Digital Inputs, only the external Frame or Scan Trigger. Input 8 is the most significant binary bit

VARIABLE	**DINPG <*value*>**
VALID VALUES	0, 2, 4, 8, 10, 20, 40, 80 Hexadecimal
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Determines which bit of the Digital Input word is used to initiate or abort a **PURGE** sequence. Input 1 is the least significant binary bit. Input 1 may not be used for Digital Inputs, only the external Frame or Scan Trigger. Input 8 is the most significant binary bit

VARIABLE	**DINSCAN <*value*>**
VALID VALUES	0, 2, 4, 8, 10, 20, 40, 80 Hexadecimal
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Determines which bit of the Digital Input word is used to start or stop a **SCAN**. Input 1 is the least significant binary bit. Input 1 may not be used for Digital Inputs, only the external Frame or Scan Trigger. Input 8 is the most significant binary bit.

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 FFFF Hexadecimal
DEFAULT VALUE	0
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 FFFF 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 FFFF 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 FFFF 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 FFFF Hexadecimal
DEFAULT VALUE	20
DATA TYPE	integer
DESCRIPTION	Enables the digital outputs to indicate that the DSM3400 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 FFFF Hexadecimal
DEFAULT VALUE	40
DATA TYPE	integer
DESCRIPTION	Enables the digital outputs to indicate that the DSM3400 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 to FFFF Hexadecimal
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Enables the digital outputs to be set to mode other than defined in one of the standard DOUT variables. 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	**BANKB <*value*>**
VALID VALUES	0 to FFFF Hexadecimal
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Enables the digital outputs to be set to mode other than defined in one of the standard DOUT variables 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	**BANKUSR <*value*>**
VALID VALUES	0 to FFFF Hexadecimal
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Enables the digital outputs to be set to mode other than defined in one of the standard DOUT variables. Output 1 is the least significant binary bit. Output 8 is the most significant binary bit. The command is entered as 2 hexadecimal digits.

SCAN GROUP CONFIGURATION VARIABLES (Group G1 through G8)

VARIABLE	**AVGn <*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 n. Refer to the CHANn variable for information on averaging of modules with a dissimilar number of channels.
NOTE:	If the largest enabled module is **16** channels, AVG **must** be set to **2** or more.

VARIABLE	**CHANn <*channels*>** Where n = the scan group number
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	1-1..1-64
DATA TYPE	string
DESCRIPTION	Sets the channel assignments in scan group n. 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 SGn 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 CHAN<scan group>0<enter> will clear a scan group

VARIABLE **FPSn <*frames*>** Where n = the scan group number
VALID VALUES 0 - 2147483648
DEFAULT VALUE 0
DATA TYPE long integer
DESCRIPTION Frames per Scan. Sets the number of averaged frames for Scan Group n 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

VARIABLE **SGENABLEn <*code*>** Where n = the scan group number
VALID VALUES 0, 1
DEFAULT VALUE 0
DATA TYPE integer
DESCRIPTION Defines if the scan group n is enabled:
0 - Disabled
1 - Enabled

NOTE A DSM3400 may be set up for “Fast Mode” scanning. In this mode of operation, the system will scan the first 16 or 32 channels in a module, or group of modules. This will effectively increase the sampling rate. “Fast Mode” Scanning may be enabled for Scan Group 1 only. When “fast mode” scanning is enabled, all other scan groups must be disabled. For more information, refer to the DSM3400 Fast Mode Scanning section in this manual.

For Scan Group 1, SGENABLE1 has four valid values:

VARIABLE **SGENABLE1 <*code*>**
VALID VALUES 0, 1, 16, 32
DEFAULT VALUE 0
DATA TYPE integer
DESCRIPTION Defines the scan mode for Scan Group 1
0 - Disabled
1 - Normal Scan Mode Enabled
16 - Fast Mode 16 Channel Scan Mode Enabled
32 - Fast Mode 32 Channel Scan Mode Enabled

MODULEn CONFIGURATION VARIABLES (M1 through M8)

VARIABLE	**ENABLEn <*enable*>**	Where n = the module position number
VALID VALUES	0, 1	
DEFAULT VALUE	0	
DATA TYPE	integer	
DESCRIPTION	Defines if the module n is enabled: 0 - Disabled 1 - Enabled	

VARIABLE	**HPRESSn <*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..64 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..64 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..64 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 64

DATA TYPE integer

DESCRIPTION Defines the number of ports for the module n.

NOTE: If the largest enabled module is **16** channels, **AVGn** must be set to **2** or more. If **AVGn** is set to **1**, the largest module cannot be **16** channels.

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	**DSMSN <*serial number*>**
VALID VALUES	Any valid integer up to 4 digits
DEFAULT VALUE	0000
DATA TYPE	Integer
DESCRIPTION	The serial number of the DSM3400.

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 -
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
	3 -	An external device is connected to COM3
	4 -	An external device is connected to COM4
BAUD	This sets the BAUD rate of the serial communications channel. Valid values are: 110, 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200.	
Terminator code	0 - null terminator	
	1 - CR	
	2 - CR LF	
	3 - LF CR	
	4 - LF	

NOTE A DSM3400 can only communicate with an Auxiliary device if a Comport is initialized for an auxiliary device and SEROUT is set to 0 and HAVESER is set to 0.

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 500 to 100,000 milliseconds, 0 disables this function.	

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
3 - A Calibrator is connected to COM3
4 - A Calibrator is connected to COM4
BAUD This sets the BAUD rate of the serial communications channel. Valid values are: 110, 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200.
NOTE A DSM3400 can only communicate with a Calibrator if a Comport is initialized for a calibrator and both SEROUT and HAVESER are set to 0.
The only valid BAUD rate for a calibrator manufactured by Scanivalve Corp is 9600.

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 command.
Internal interval time The valid range is 500 to 100,000 milliseconds, 0 disables this function.

VARIABLE **CONOUT <*code*>**
VALID VALUES 1, 2, or 3
DEFAULT VALUE 2
DATA TYPE integer
DESCRIPTION Determines if output data are to be sent to the console.
1 - Output to the Console
2 - Output data to the Console if comment was input from the keyboard.
3 - Output data to disk file: scanxxx.dat, no display of data
NOTES If CONOUT is set to 3, the following rules apply:
The first SCAN command will open the file: scan000.dat. This file will remain open until a CLOSE command is issued. If the file is not closed, subsequent SCAN commands will append data to that file.
When the first file is closed, the next SCAN command will open a new file: scan001.dat. The file name will increment each time a file is closed and a new SCAN command issued.
The counter used to increment the file name is not reset when the DSM3400.exe program is exited.
Data are written to the file in the format defined by the variable BIN. If BIN is 0, data are written in ASCII format. If BIN is 1 or 2, data are written in Binary format.
If the DSM3400.exe program is quit before a CLOSE command is received the data buffered for the current open file will be lost.

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 scrolled with a prompt between frames

VARIABLE **HAVEARINC <*code*>**
VALID VALUES 0, 1 or 2
DEFAULT VALUE 0
DATA TYPE Integer
DESCRIPTION Determines if ARINC is configured.
0 - No ARINC is configured
1 - ARINC is configured with the eight channel ARINC card, Condor Engineering CEI 420A-88, parity is not enabled
2 - ARINC is configured with the eight channel ARINC card, Condor Engineering CEI 420A-88, odd parity is enabled
NOTES When HAVEARINC is set to 1 or 2, the variable ARINCOUT is active..
When the setting of HAVEARINC is changed, a SAVE must be executed followed by a RESTART, or Power Cycle. The RESTART command, or Power Cycle **MUST NOT** be executed less than 30 seconds after the SAVE command is issued

VARIABLE **HAVENET <*code*>**
VALID VALUES 0 or 1
DEFAULT VALUE 1
DATA TYPE Integer
DESCRIPTION Determines if a network is configured.
0 - No network is configured
1 - Network is configured

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	0 or 1
DEFAULT VALUE	1
DATA TYPE	Integer
DESCRIPTION	Determines if network inputs are to be acknowledged. 0 - ignore network input 1 - acknowledge network input

VARIABLE	**NETOUT <*code*>**
VALID VALUES	0, 1, or 2
DEFAULT VALUE	2
DATA TYPE	Integer
DESCRIPTION	Determines if data are to be output to a network . 0 - never output data to the network 1 - always output data to the network 2 - output data to the network if command is initiated from the network

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, 1, or 2
DEFAULT VALUE	1
DATA TYPE	integer
DESCRIPTION	Determines the action the DSM3400 will take to recover from a USB disconnect during a SCAN. 0 - No restart of SCAN. 1 - SCAN will restart with the last good frame number. 2 - SCAN will restart with the frame number reset to zero.

VARIABLE	**TWOAD <*code*>**
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Determines mode of operation for the software. This variable must always be set to 8 in a DSM3400.

ARINC OUTPUT VARIABLES (Group AR)

VARIABLE	**ARINCOUTn** ***<scan group> <scaling>***		
VALID VALUES	n	-	the ARINC Output channel, 1 through 8.
	scan group	-	the scan group assigned to this output channel, must match the ARINC channel number 1 through 8. 0 disables the output.
	scaling	-	any valid number, default is 20 for psi engineering unit scaling
DEFAULT VALUE	n	-	1 through 8
	scan group	-	0
	scaling	-	20
DATA TYPE	varies		
DESCRIPTION	This group of variables assigns scan groups and scaling for each of the eight ARINC outputs for the Condor Engineering CEI-420A-88 ARINC card.		
NOTE	These variables are only active when HAVEARINC is set to 1.		

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 Calibration 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 -192.9757
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 0.0228

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:

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

Some ZOC modules use different RTD's for temperature measurement. The values of TEMPBx and TEMPMx may have to be modified by the user when a different RTD is used. The following table lists the other RTD's that could be installed and the values of TEMPB and TEMPM for each one.

RTD	TEMPB	TEMPM	MODULES
Nickel- Iron 604 Ω at 0°C	-192.9757	0.0228	ZOC16TC (Std.) ZOC22B (Standard) ZOC23B (Standard) DSA3016 (Std.) DSA3216 (Std.)
Platinum 100 Ω at 0°C	-259.7403	0.1853	ZOC22B (Special) ZOC23B (Special) ZOC33 (Special)
Platinum 500 Ω at 0°C	-259.7403	0.0371	ZOC33 (Standard)
Platinum 1000 Ω at 0°C	-259.7403	0.0185	ZOC22B (Special) ZOC23B (Special) ZOC33 (Special)

Error and Event Log File (ERRLOG.TXT)

All events and errors are logged to this file. The file will be created by the software if it does not exist. All events and errors are appended to the file as they occur. The file will be opened each time the DSM3400 software is started and closed when the DSM3400 software is shutdown. This file will not be automatically erased, but the file may be deleted manually. Old errors and events may be deleted from the file using a text editor. The file is in the DSM Folder. An example of entries showing the startup of the DSM3400 software with some errors and events concluded by a normal shutdown is shown below.

---------- ERRLOG Opened at Date:3/15/2005 Time:0:2:40.766
DSM3400 Ver 1.00 Copyright (c) Scanivalve Corp. 2002 - 2005 at Date:3/15/2005 Time:0:2:40.766
EVENT: Scan started at Date:3/15/2005 Time:1:21:6.292
EVENT: Scan stopped, stop received Scangroup 0 Frame 16 at Date:3/15/2005 Time:1:21:11.449
EVENT: Calz started at Date:3/15/2005 Time:1:21:15.966
ERROR: CalZ temp or module out of range at Date:3/15/2005 Time:1:21:23.667
EVENT: Calz finished at Date:3/15/2005 Time:1:21:23.687
EVENT: Scan started at Date:3/15/2005 Time:1:21:50.405
ERROR: Invalid command at Date:3/15/2005 Time:1:23:27.875
EVENT: Scan stopped, stop received Scangroup 0 Frame 7 at Date:3/15/2005 Time:1:21:53.99
EVENT: Scan started at Date:3/15/2005 Time:4:54:54.798
EVENT: Scan stopped, stop received Scangroup 0 Frame 15 at Date:3/15/2005 Time:4:54:59.535
EVENT: Scan started at Date:3/15/2005 Time:4:55:14.787
EVENT: Scan stopped, stop received Scangroup 0 Frame 107 at Date:3/15/2005 Time:4:55:43.258
EVENT: Scan started at Date:3/15/2005 Time:4:55:58.750
EVENT: Scan stopped, stop received Scangroup 0 Frame 49 at Date:3/15/2005 Time:4:56:12.149
---------- ERRLOG Closed at Date:3/15/2005 Time:7:46:0 145

DSM3400 ID Chip Data Format

The DSM3400 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	

DSM3400 Scan Function

When a SCAN function is initiated, the DSM3400 will scan all of the channels in the modules enabled in the software. 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 DSM3400 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 DSM3400 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 DSM3400 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 DSM3400 will enter the WTRIG mode and wait for a hardware or software trigger. When a trigger is received, the DSM3400 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 DSM3400 Trigger Input connector. The Hardware Trigger must be connected to DIN 1.

Software Trigger

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

DSM3400 Fast Mode Scanning

Overview

The speed limitation of a DSM in “normal mode” is largely governed by the shortest time that a ZOC module can switch between channels and still provide accurate pressure data. For a ZOC33, with 64 channels, this time is nominally 25us yielding a per-channel scan rate of 625 Hz. For a ZOC22, with 32 channels, this time is nominally 50us yielding a per-channel scan rate of 625 Hz, but with half the channel count compared to a ZOC33.

“Fast mode” can increase the per-channel scan rate by not scanning the module’s high numbered channels and re-sampling the module’s lower number channels. The split between low and high channels may be configured by the fast mode maximum port value.

The range of ports, in a module, to be sampled always starts at one. The maximum port, to be sampled, is determined by the value of SGENABLE1.

Ports greater than the fast mode maximum port, are never sampled. Once the fast mode maximum port has been sampled, the RAD resets its port address selection lines and starts sampling at port one again. This cycle continues through the scan process.

Configuring Fast Mode

Fast Mode scanning may only be set up for Scan Group 1. None of the other Scan Groups will function in this mode. All other scan groups **MUST** be disabled when fast mode scanning is enabled. The configuration variable SGENABLE1 allows the user to disable the scan group, scan in normal mode, or scan in fast mode. When the SGENABLE1 modifying parameter is 16 or 32, fast mode is enabled.

SGENABLE1 Settings

SGENABLE1	Description	Ports Sampled 32 Ch Module	Ports Sampled 64 Ch Module
0	Scan group disabled	-	-
1	Scan group enabled, normal mode	32	64
16	Scan group enabled, fast mode	First 16	First 16
32	Scan group enabled, fast mode	First 32	First 32

An error is generated if a channel in the channel list would not be sampled because of the fast mode setting.

Example

This example shows how the frame number, sampled ports and scan rate are affected by fast mode. The example system consists of one ZOC22 module in position one, with the following settings:

PERIOD 50
CHAN1 1-1..1-32

The table below shows the data rate when SGENABLE1 is set to 1 or 16.

Mode	SGENABLE1	PERIOD (µs)	Rate Calculation	Rate
Normal Mode	1	50	1/(50 µs x 32 chan)	625 Hz
Fast Mode	16	50	1/(50 µs x 16 chan)	1250 Hz

This table shows the effect of changing the value of SGENABLE1 from 1 to 16.

Elapsed Time µS	Normal Mode SGENABLE1 1		Fast Mode SGENABLE1 16	
	Port#	Frame#	Port#	Frame#
0	1	1	1	1
50	2	1	2	1
100	3	1	3	1
150	4	1	4	1
200	5	1	5	1
250	6	1	6	1
300	7	1	7	1
350	8	1	8	1
400	9	1	9	1
450	10	1	10	1
500	11	1	11	1
550	12	1	12	1
600	13	1	13	1
650	14	1	14	1
700	15	1	15	1
750	16	1	16	1
800	17	1	1	2
850	18	1	2	2
900	19	1	3	2
950	20	1	4	2
1000	21	1	5	2
1050	22	1	6	2
1100	23	1	7	2
1150	24	1	8	2
1200	25	1	9	2
1250	26	1	10	2
1300	27	1	11	2
1350	28	1	12	2
1400	29	1	13	2
1450	30	1	14	2
1500	31	1	15	2
1550	32	1	16	2
1600	1	2	1	3
1650	2	2	2	3
1700	3	2	3	3
1750	4	2	4	3
1800	5	2	5	3
1850	6	2	6	3
1900	7	2	7	3
1950	8	2	8	3
2000	9	2	9	3
2050	10	2	10	3
2100	11	2	11	3
2150	12	2	12	3
2200	13	2	13	3
2250	14	2	14	3
2300	15	2	15	3
2350	16	2	16	3
2400	17	2	1	4
2450	18	2	2	4
2500	19	2	3	4
2550	20	2	4	4
2600	21	2	5	4
2650	22	2	6	4
::::	::::	::::	::::	::::

DSM3400 Frame Multiplier

The RADBASE must transfer large blocks of data on the USB link to the DSM3400 processor in order to support high speed operation. For this section, a large block of data is defined as a data block greater than one averaged frame. In this case, problems may occur when scanning at slow speeds, scanning with an external trigger, or when minimum data latencies are required.

The FM configuration variable is used to prevent the problems that might occur in the conditions described in the paragraph above. The FM variable has an influence on the number of averaged frames sampled before they are sent to the Host Computer. The software calculates a term called FMmax. FMmax may be equal to 1 or could be some number greater than one depending on the setting of FM, ADTRIG, and FPS. FMmax is calculated by the formula:

$$FM\max = \frac{32768}{(ModulePorts*9*AVGn)}$$

FMmax will be an integer value, truncated to the closest whole number. This will be the number of averaged frames transmitted in each block. The block sizes may become very large as FMmax increases. A user must insure that the Host Computer has sufficient RAM to accept very large blocks of data.

When FM is set to 1, no latencies occur because only one averaged frame of data will be transferred in each block. Tests have proved this to be a slow method of data transfer.

When FM is set to a number greater than 1, to the maximum allowable, data transfer speeds will be much faster. With this method, data latencies will occur because data are accumulated before they are made available to the Host Computer.

Mode	FM	ADTRIG	FPS	Actual FM	Notes
Minimum Latency	1	1	X	1	Assumes Minimum Latency
Minimum Latency	1	0	X	1	Provides Minimum Latency
Manual	>1	0	X	FM to FMmax	May Oversample at end
Manual	>1	1	0	FM to FMmax	FPS must be set to a multiple of FM for all data to be flushed.
Maximum Speed	1	0	0	FMmax	Maximum Speed - Will oversample at end
Maximum Speed	1	0	>1	FPS to FMmax	May oversample at end if FPS is greater than FM Max

FM Notes

Generally, if an external trigger is used. FM should be set to 1. If FM is set to numbers greater than one when external triggers are used, multiple triggers will have to be issued for each data block output.

When slow internal triggers are used, FM should be set to 1.

FM should only be set to values greater than one when fast throughput is required. The setting of FM should then be as small as possible to get the required speed.

Maximum Value of FM

The maximum setting of FM is 20. The setting of FM must be selected by determining the speed requirements and comparing this to the available memory in the host computer. The amount of input buffer memory required is determined by the formula:

Memory = ModulePorts*9*AVGn*FM Where: ModulePorts is the number of channels in the largest module.
AVGn is average setting for the largest scan group.
FM is the setting of FM.

For example: If FM is set to 2, the largest module is a ZOC33, and the scan group average is 8, the memory required will be:

Memory = 64*9*8*2 = 9216 bytes

If FM is set to 5, the memory required will be:

Memory = 64*9*8*5 = 23040 bytes

If the software cannot allocate sufficient memory, an error will be generated:

ERROR: Cannot allocate <n> bytes of memory for input buffer

Ethernet Connections

All DSM3400 modules are equipped with an Ethernet port. The Ethernet speed is 100Base-T connections. No variables need to be modified to use this connection.

IP Address

All DSM3400 modules have a preset IP address that can be modified by a user, if desired. The preset IP address is 191.30.34.xxx where xxx is the serial number of the unit.

Multiple Ethernet Connections

The DSM3400 will not support multiple Ethernet connections. However, if a second Ethernet connection is made to a DSM3400 3200, the current connection will be dropped for the new connection. The DSM3400 will output the following message when a command is entered from the new connection:

RCV Error Code 10053

DSM3400 Profile File

When the DSM3400.EXE program is started, including a RELOAD or RESTART, a Profile file will be generated. This file is named DSMSNnnn.DPF, where nnn is the serial number of the DSM3400. This file is an ASCII text file and contains the following information:

DSMSN 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 DSMSNnnn.DPF file exists when the DSM3400.EXE 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 DSM3400. These files are read when the DSM3400.EXE program is started, including RELOAD and RESTART.

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

ARINC Operation

A DSM3400 with a Condor Engineering CEI-420a-88 ARINC card installed will be set up to output data on the ARINC bus. The following configuration variable settings are critical to proper operation.

SET HAVENET 1	This establishes the network connection
SET HAVEARINC 1	This enables the ARINC card and variables
SET CONOUT 2	This allows communications from a local console
SET NETOUT 0	This directs the data output to the ARINC card
SET DINSCAN 2	Digital Input 2 will start and stop the SCAN function. The digital input must be a minimum of 9 Vdc and amaximum of 15 Vdc.
SET DINCALZ 4	Digital Input 3 will start the CALZ function. The digital input must be a minimum of 9 Vdc and amaximum of 15 Vdc.
SET STARTCALZ 1	The DSM will execute a CALZ function at startup and when the power is cycled.
SET ARINCOUT1 1 20	This enables ARINC channel 1 to output the channels assigned to Scan Group 1.
SET ARINCOUT2 2 20	This enables ARINC channel 2 to output the channels assigned to Scan Group 2.
SET ARINCOUT3 3 20	This enables ARINC channel 3 to output the channels assigned to Scan Group 3.
SET ARINCOUT4 4 20	This enables ARINC channel 4 to output the channels assigned to Scan Group 4.
SET ARINCOUT5 5 20	This enables ARINC channel 5 to output the channels assigned to Scan Group 5.
SET ARINCOUT6 6 20	This enables ARINC channel 6 to output the channels assigned to Scan Group 6.
SET ARINCOUT7 7 20	This enables ARINC channel 7 to output the channels assigned to Scan Group 7.
SET ARINCOUT8 8 20	This enables ARINC channel 8 to output the channels assigned to Scan Group 8.

1. Commands may be issued to the DSM3400 by the Ethernet connection or a local keyboard, monitor and mouse connected to the DSM3400. In this mode, data may be output to the local screen and the ARINC ports simultaneously.
2. Commands issued by the Ethernet connection, will be received and executed by the DSM3400, but nothing will be returned on the Ethernet port if NETOUT is set to 0.
3. The Ethernet port may be used to test configurations by setting NETOUT to 1. When this variable is set to 1, data will not be output to the ARINC card, but will be output to the Ethernet port and displayed on the host computer.
4. If less than 8 modules are connected, the unused scan groups and ARINC channels should be disabled.
5. If the ethernet connection is used for configuration and to start or stop the SCAN function, NETOUT must be set to 0.
6. The SCAN function may be started and stopped by using DINSCAN. When this function is enabled, an input pulse will start the SCAN function. The next input pulse will stop the SCAN function.

When a DSM3400 with an ARINC card installed is shipped, the following configuration variables will be set to these values if 8 modules are connected:

```
SET HAVENET 1
SET HAVEARINC 1
SET CONOUT 2
SET NETOUT1
SET ARINCOUT1 1 20
SET ARINCOUT2 2 20
SET ARINCOUT3 3 20
SET ARINCOUT4 4 20
SET ARINCOUT5 5 20
SET ARINCOUT6 6 20
SET ARINCOUT7 7 20
SET ARINCOUT8 8 20
SET DINSCAN 2
SET DINCALZ 4
SET STARTCALZ 1
```

To acquire data during flight:

1. Connect a source of a trigger pulse to Digital input 2 for SCAN control. This is pins 3 and 4 on the Digital Input connector. This should be a momentary switch. The voltage must not be less than 9 Vdc and not more than 15 Vdc. The voltage source must be capable of sourcing 6.5 ma.
2. Connect a source of a trigger pulse to Digital input 3 for CALZ control. This is pins 5 and 6 on the Digital Input connector. This should be a momentary switch. The voltage must not be less than 9 Vdc and not more than 15 Vdc. The voltage source must be capable of sourcing 6.5 ma.
3. Set NETOUT to 0. Commands may still be sent to the DSM from a host computer on the Ethernet connection, but no response will be received. The DSM will respond to all commands in this mode.
4. If a host computer will not be used to start and stop the SCAN function, and control the CALZ function, the momentary switches for SCAN and CALZ must be used. The SCAN function will start when the Scan trigger button is pushed, and stop the next time the button is pushed. The DSM will execute a CALZ when the CALZ trigger is pushed. If the CALZ button is pushed while the DSM is in the SCAN mode, the DSM will suspend the SCAN function, complete the CALZ function and then resume the SCAN function.

ARINC Data Word Format

Bit Number	Function	Number of Bits	Value	Notes
31	Parity	1	0 or 1	Odd Parity is required/ Parity bit will be set as required to maintain odd parity. Parity is enabled by the setting of HAVEARINC.
29, 30	SSM	2	00, or 11	SSM bits will be set to 11 if the pressure data are valid. SSM bits will be set to 00 if the pressure data are not valid.
28	Sign	1	0 or 1	0 = pos 1 = neg
10 - 27	Scaled Pressure	18	Varies	See Note 1
8,9	Mode	2	00 - 11	00 = STOP 01 = CALZ 10 = SCAN 11 = PURGE
0 - 7	Label	8	Varies	When Mode = 10, the Channel sequence number (max 256) will be output. For all other conditions of Mode, the output will be 0000 0000

Note 1: When the Mode bits are set to 10(SCAN), scaled data are output. To determine pressure in PSI, isolate bits 10 through 28, shift right 10 bit positions and sign extended value. Conversion to pressure in psi for a 20 psi full scale module is calculated as follows:

$$EUPressure = \frac{Scaledpressure * 20}{262144}$$

When the Mode bits are set to 00, 01, OR 11(PURGE, CALZ, or STOP), a single ARINC word will be output to indicate that scanning and, consequently data transmission, has stopped. Bits 28 through 10 will be set to 1. The data are:

111 1111 1111 1111 1111

ARINC Channel Assignment

A DSM with the Condor Engineering CEI-420A-88 ARINC card has 8 ARINC Channels. Each of these ARINC Channels can be user configured to output data from the corresponding Scan Group. ARINCOUT1 is assigned to Scan Group 1, ARINCOUT2 is assigned to Scan Group 2, etc.

ARINCOUT1
ARINCOUT2
ARINCOUT3
ARINCOUT4
ARINCOUT5
ARINCOUT6
ARINCOUT7
ARINCOUT8

The ARINC label will be the sequence number of the module-port list generated by the CHANNELS command.

ARINC Throughput

Throughput rate for one ARINC transmit line is calculated given as follows. Note that each DSM will have two transmit lines. There are two transmit lines for the entire system.

ARINC limit = 100K BITS / sec
ARINC word size = 36 bits (32 data bits plus 4 spacing bits)
One channel = one ARINC word (formatted as above)
Max channels = 256 channels

$$Rate = \frac{100000 bits/sec}{36 bits/channel * (256 channels/frame)} = 10.8 Hz$$

The calculation is based on a worst case of 256 channels, which is the maximum for one ARINC channel. Faster throughputs could be obtained with fewer pressure channels per ARINC channel. The number of pressure channels per ARINC channel is user configurable within the constraints listed under ARINC Options.

NOTE: It should not be assumed that ARINC transmissions can be achieved at the same speeds as are available in Ethernet. ARINC transmissions are serial and limited to 100,000 bits per second which is approximately equal to an RS232 transmission at 11100 BAUD. The actual throughput will be determined by the number of channels being scanned, the scan period, the scan average, and the number of ARINC output channels being used. A user should test a setup configuration to determine the actual throughput available prior to attempting to collect critical data.

ARINC Options

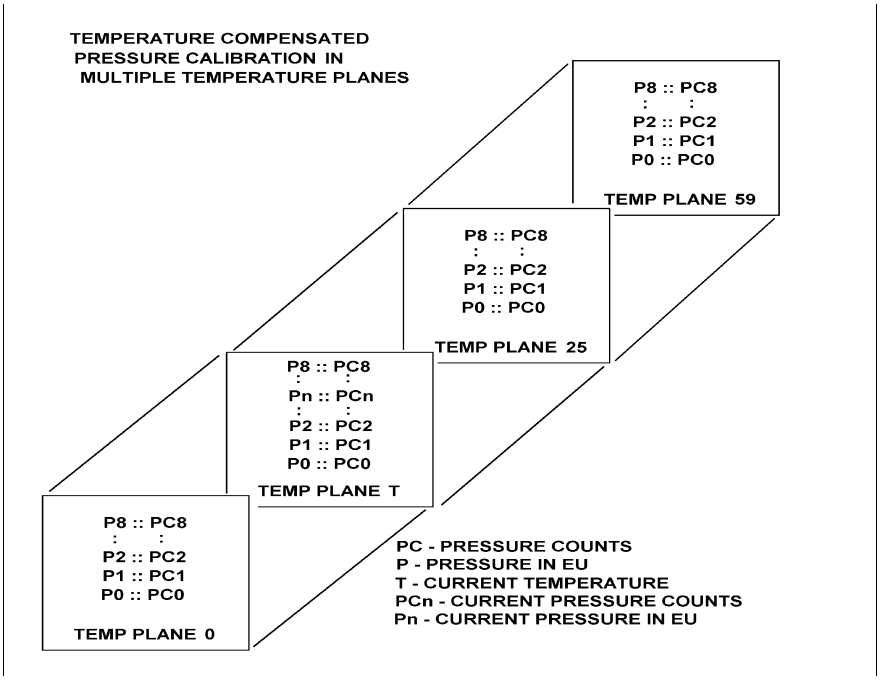
1. Setting of spacing bits depends upon the ARINC board supplier. Some ARINC Boards do not permit modification of the spacing bits.

2. Configuration of the ARINC word format is fixed.

3. When a Condor Engineering CEI-420a-88 ARINC card is installed, the ARINC Channels are enabled by the ARINCOUTn configuration variables.

Refer to the DSM Software Command and Configuration Variable Documents for more information on Scan Groups.

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 - DSM3400 Error List

A/D Correction value A invalid, turn A2DCOR off
A/D Correction value B invalid, turn A2DCOR off
A/D Correction value C invalid, turn A2DCOR off
One of the coefficients stored as the calibration correction for one of the eight A/D modules is not valid. A2DCOR must be turned off to continue testing, or the DSM must be returned for repair.

A2DCAL INDEX value not found
A2DCAL INDEX value not valid
The A2DCAL index(calibration point) was negative, not entered, greater than 15, or not numeric.

A2DCAL MODULE value not between 0 and 8
A2DCAL MODULE value not valid
The value entered was negative, not entered, greater than 8, or not numeric.

A2DCAL VOLTS value not found
A2DCAL VOLTS value not valid
The value was not entered, or not numeric.

A2DCALC MODULE value not between 0 and 8
A2DCALC MODULE value not found
A2DCALC MODULE value not valid
The value entered was negative, not entered, greater than 8, or not numeric

A2DCALC number of points value not valid
The value entered was negative, not entered, or not numeric.

A2DCOR not 0, or 1
The value entered was less than 0, greater than 1, or not numeric.

A2DCOR value invalid
A2DCOR value not found
The value entered was negative, not entered, or not numeric

A2DTCAL INDEX value not between 0 and 15
A2DTCAL INDEX value not found
The value entered was negative, not entered, greater than 15, or not numeric

A2DTCAL MODULE value not between 0 and 8
A2DTCAL MODULE value not found
A2DTCAL MODULE value not valid
The value entered was negative, not entered, greater than 8, or not numeric

A2DTCAL TEMP INDEX value not between 0 and 7
A2DTCAL TEMP INDEX value not valid
The value entered was negative, not entered, greater than 7, or not numeric

A2DTCAL VOLTS value not found
A2DTCAL VOLTS value not valid
The value was, not entered, or not numeric

A2DTCALC MODULE value not between -1 and 8");
A2DTCALC MODULE value not found
A2DTCALC MODULE value not valid
The value entered was negative, not entered, greater than 8, or not numeric

A2DTCALC number of temperature points not valid
The value was not entered or not numeric

A2DTCALC number of voltage points not valid
The value was not entered or not numeric

A2DTCALC temp not between 2 and 16
The voltage index value was not within range

A2DTCALC temp not between 2 and 8
The temperature index value entered was out of range.

A2DTCOR Temp index value not between 0 and 7
The value entered was negative, not entered, greater than 7, or not numeric
AD Trigger not 0, 1 or 2
AD Trigger value not found
ADTrig value not found
The value entered was negative, not entered, greater than 2, or not numeric
Arinc Channel not between 1 and 8
The value entered was negative, not entered, greater than 8, or not numeric
Arinc Transmit buffer overflow
Fatal Error
Aux command not found
AUXCMD must be followed by a valid command string
Aux not 0, 1,2,3 or 4
Aux value not found
The COM port value must be 0, 1, 2, 3, or 4.
AuxSched enable value not found
AuxSched not 0, or 1
The enable value must be entered as 0 or 1 only
AuxSched time not 0 or between 500 and 100000
AuxSched time value not found
the valid time interval range is 500 to 100000 milliseconds
AuxSched value not found
The command string must be a valid command string
Avg not between 1 and 256
Avg value not found
The value entered was 0, negative, not entered, greater than 256 or not numeric
BANKA invalid
BANKA value not found
The value was not entered, or not Hexadecimal
BANKB invalid
BANKB value not found
The value was not entered, or not Hexadecimal
BANKUSR invalid
BANKUSR value not found
The value was not entered, or not Hexadecimal
Base A/D Correction value A invalid, turn A2DCOR off
Base A/D Correction value B invalid, turn A2DCOR off
Base A/D Correction value C invalid, turn A2DCOR off
Fatal Error in the ID chip one wire circuit
Base ID
Fatal Error in the ID chip one wire circuit
BAUD value for Aux not found
BAUD value for Aux not valid value
The value was not entered or not a supported BAUD rate.
BAUD value for Cal not found
BAUD value for Cal not valid value
The value was not entered or not a supported BAUD rate
BinAddress value not found
The UDP binary address must be a valid IP address.
Bin value not found
Binary not 0, 1 or 2
Binary value invalid
The value was not entered, not within range, or not numeric

Bind error
Fatal Error
Binport not between 0 and 5000
The value entered must be a valid binary port number
BinPort value not found
The value was not entered or not numeric
Bulk read code %d
Bulk read overlapped result code %d
Fatal USB error - may be caused by scanning too fast.
Cal get one frame failed
Fatal USB Hardware error
Cal not 0, 1,2,3 or 4
The value entered was negative, not entered, greater than 4, or not numeric
Cal schedule command not found
The command must be a valid ASCII string
CALAVG not between 1 and 256
CALAVG value invalid
CALAVG value not found
The value entered was less than 1, not entered, greater than 256, or not numeric
Cal-Channel not found
The CAL command must include a channel, or range of channels.
Cal-Invalid module serial number or position
The serial number or position entered was not a valid number
Cal-Module or port not found
Cal-Module Port combo invalid
The module or module-port entered was not a valid number.
CALPER not between 50 and 5000
CALPER value invalid
CALPER value not found
The value entered was less than 50, not entered, greater than 5000, or not numeric
Cal-Pressure and channels not found
Cal-Pressure value not found
The CAL command was entered with no modifiers.
Cal-Range for module or port not found
The range must be entered as module-port..module-port.
CalSched enable value not found
CalSched not 0, or 1
The value was not entered or not 0 or 1
CalSched time not 0 or between 500 and 100000
CalSched time value not found
The value was not entered, not 0, or out of the valid range.
Calz delay not between 5 and 128
Calz delay value invalid
Calz delay value not found
The value was not entered, out of range, or not numeric
CALZ failed with lack of data
Fatal Error - no data returned from the modules.
CalZ temp or module out of range
One or more modules returned a temperature less than 0, or more than 69.
Can not enable module when num ports set to 16 and avg set to 1
Can not enable scan group when avg set to 1 and num ports set to 16
Can not set avg to 1 when num ports set to 16
Can not set num ports to 16 and avg set to 1

Can not set two A/D with num ports set to 16 and avg set to 1
Average cannot be set to 1 if NUMPORTS is 16
Cannot set ADTrig when ScanTrig is set
Cannot set ScanTrig when ADTrig is set
Only one of these functions may be enabled at a time.
CHAN Group not between 1 and 8
CHAN no group number
The CHAN Group number was not entered, or out of range.
Chan value not found
Channel not found
The value for channel(s) was not entered
CONOUT not 1, 2 or 3
CONOUT value not found
The value was not entered , or nor in the valid range.
Convert Unit value invalid
The value entered was not found on the list of valid Units.
Could not create MTEMP.MPF file
The SPF command cannot complete the sensor merge
Could not find %s file
The Merge SPF command could not find the spf file.
Could not open %s file
Could not find file %s
The SN.gpf file could not be found
Could not read file %s
The A2DTCOR file cannot be found
Could not load ARINC board Code %d
Fatal Error - The ARINC Board driver is missing
Could not open CONVERT.TAB file
Could not open file CV.GPF
Could not open file SN.GPF
Could not open FPGA file %s
Could not open to ERRLOG.TXT file
Could not open to SCANxxx.DAT file
Fatal Errors - Generally caused by improper paths, or missing files
Could not read ZERO.CFG file, using defaults
The file does not exist, is corrupted, or cannot be found
Could not set socket buffer size to 30000
Could not set two A/D
Could not start hw
Could not start set Average
Could not start set Channels
Could not start set period
Could not stop hw 1
Could not stop hw 2
Could not stop scan init
Could not stop USB
Fatal errors - module must be returned for repair
Could not write to %s file
Could not write to CONVERT.TAB file
Could not write to file %s
Could not write to SCAN.DAT file
Could not write to ZERO.CFG file
Cannot complete a SAVE command. Hard Disk is full

CREATESPF Channel not found
The value was omitted, is not a valid channel number or not numeric
CREATESPF File name not found
The SPF file named does not exist
CvtUnit value not found
The value was not entered, or not numeric
Delete end temp value not found
Delete start temp value not found
The value was not entered
Delete-Channel not found
The value was not entered
Delete-End port out of range
The value entered was greater than MAXPORTS
Delete-End temp too high
The value entered was greater than 69
Delete-End temp too low
The value entered was less than 0
Delete-Invalid module serial number or position
The serial number or position entered was not a valid number
Delete-Module or port not found
The Module or Port value was omitted
Delete-Port out of range
The port value entered was greater than MAXPORTS
Delete-Start port out of range
The port value entered was greater than MAXPORTS
Delete-Start temp too high
The value entered was greater than 69
Delete-Start temp too low
The value entered was less than 0
Delete-Start temp value not found
The value was not entered
DelFile-File name not of the form SCANxxx.DAT
This format is the only format supported by this command
DelFile-File not present
The file name entered cannot be found
Delta-Module not between 1 and 8
The module number entered was out of range
Delta-Module value not valid
The value entered was less than 1 or greater than 8
DINADTRIG invalid
DINADTRIG value not found
The value was not entered, or not a supported value.
DINCALZ invalid
DINCALZ value not found
The value was not entered , or not a supported value
DINCALZ zero bit must not be a one
The zero bit can only be 0
DINPG invalid
DINPG value not found
The value was not entered , or not a supported value
DINPG zero bit must not be a one
The zero bit can only be 0

DINSCAN invalid
DINSCAN value not found
The value was not entered , or not a supported value
DINSCAN zero bit must not be a one
The zero bit can only be 0
DINSTRIG invalid
DINSTRIG value not found
The value was not entered , or not a supported value
DISPIN not 0, or 1
DispIn value not found
The value was not entered , or not a supported value
DLYPG invalid
DLYPG value not found
The value was not entered , or not a supported value
DLYPGSEQ invalid
DLYPGSEQ value not found
The value was not entered , or not a supported value
Dout writing to USB
USB Fatal Error
DOUTCALZ invalid
DOUTCALZ value not found
The value was not entered , or not a supported value
Dout-Channel not between 1 and 64
Dout-Channel value not present
Dout-Channel value not valid
The value was not entered , or not a supported value
Dout-No Rds at address %d
RDS modules must have an address of 9 through 16 only
Dout-On/Off not 1 or 0
Dout-On/Off value not present
Dout-On/Off value not valid
The value was not entered , or not a supported value
DOUTPG invalid
DOUTPG value not found
The value was not entered , or not a supported value
DOUTPGSEQ invalid
DOUTPGSEQ value not found
The value was not entered , or not a supported value
DOUTPU invalid
DOUTPU value not found
The value was not entered , or not a supported value
DOUTREADY invalid
DOUTREADY value not found
The value was not entered , or not a supported value
DOUTSCAN invalid
DOUTSCAN value not found
The value was not entered , or not a supported value
Downloading intel hex loader
Fatal USB error
Duplicate is greater than 16
Duplicate is greater than 9
Duplicate not 1 or 16
Indicates a problem in the ID chip reporting - may be a hardware problem

Duplicate not 1,4 or 9
Duplicate module-port entry
Indicates a problem in the ID chip reporting - may be a hardware problem
During bulk write FPGA
During Fpga download
During Start FPGA
During stop FPGA
Fatal USB error -
ECHO not 0, or 1
ECHO value not found
The value was not entered , or not a supported value
End module not serial number or position
The end module value in the CHAN command was entered incorrectly.
EU not 0, or 1
EU value invalid
EU value not found
The value was not entered , or not a supported value
Exceeded retries for get one frame
Failed to Open Driver
Fatal USB Hardware error
FillOne not 0 or 1
FillOne value invalid
FillOne value not found
The value was not entered , or not a supported value
FlushCOM writing to USB
Fatal USB Hardware error
FM not between 1 and 20
FM value not found
The value was not entered , or not a supported value
FORMAT not 0,1 or 2
FORMAT value not found
The value was not entered , or not a supported value
FPGA binary file name not found
FPGA file %s exceeded %d bytes
The FPGA file cannot be found, or is corrupted
Fps value not found
The value was not entered
Gain value not found
The value was not entered
Group not between 1 and 8
Group not found
Group value not found
The value was not entered , or not a supported value
H/W FIFO Full
The Ethernet connection to the host may be broken, or the scan rate is too fast for the data transfer method
HAVEARINC value not found
The value was not entered , or not a supported value
HAVENET not 0, or 1
HAVENET value not found
The value was not entered , or not a supported value

HAVESER BAUD not valid value
HAVESER BAUD value not found
The value was not entered , or not a supported value
HAVESER not 0, 1,2,3 or 4
HAVESER value not found
The value was not entered , or not a supported value
HWDout-Channel not between 1 and 8
The DOUT channel entered was less than 0, greater than 8, or not numeric.
ID mod %d temp gain %f does not match MPF file gain %f
ID mod %d temp offset %f does not match MPF file offset %f
The values stored in the ID chip do not match the values in the MPF file.
IFC1 value not found
The value was not entered, or not a valid ASCII character. If the IFC1 character is not used, a 0 must be entered
IFC2 value not found
The value was not entered, or not a valid ASCII character. If the IFC1 character is not used, a 0 must be entered
IFUSER not 0, or 1
IFUSER value not found
The value was not entered , or not a supported value
Insert-Module not between 1 and 8
Insert-Port not between 1 and 64
Insert-Invalid Module or Port
The value was not entered , or not a valid module-port number
Insert-Pressure counts too high
The value was not entered , or not a supported value
Insert-Pressure counts too low
The value was not entered , or not a supported value
Insert-Pressure counts value not found
The value was not entered , or not a supported value
Insert-Pressure too high
The value was not entered , or not a supported value
Insert-Pressure too low
The value was not entered , or not a supported value
Insert-Pressure value not found
The value was not entered , or not numeric
Insert-Temp not between 0 and max temp
Insert-Temp value not found
The value was not entered, less than 0, greater than 69, or not numeric
Insert-Type must be M
Insert-Type not found
The value entered was not M or not entered
Invalid .SPF file
The file was not in the correct format, or not a SPF file
Invalid command
The command entered was not a valid DSM command
Invalid command for mode
The command entered was not a valid command for the current DSM mode of operation.
Invalid command in MPF or DPF file
The command line is not a valid DSM command
Invalid INSERT command line
The INSERT line is not in the proper format

Invalid module end value
Invalid module type entered for a modified SAVE command
Invalid module position or serial number
The value entered was not a valid module or port number
Invalid module start value
Invalid module value
The value entered was not between 1 and 8.
Invalid MPF name format %s
The MPF file name is not in the Mxxxx.mpf format
Invalid MPF serial number %s
The serial number was not entered or not numeric
Invalid port number
The port number entered was not between 1 and NUMPORTS
Invalid scaling value
The MODTEMP scaling factor is not valid
Invalid ZERO.CFG file
The file is not complete or corrupted
List A2DCOR module not valid
List A2DCOR module value not found
The module number was not between 1 and 8, or not entered
List A2DTCOR module not valid
List A2DTCOR module value not found
The module number was not between 1 and 8, or not entered
List A2DTCOR temp value not found
The value was not entered, or is not numeric
List argument invalid
List argument not found
The LIST argument entered was not a supported entry.
List end temp value not found
The value was not entered or not numeric
List MI invalid group number
List MI no group number
The group number was not between 1 and 8, or not entered
List MI not valid module number
The module number was not between 1 and 8, or not entered
List start temp value not found
The value was not entered or not numeric
List value not found
The value was not entered
List-End temp not between 0 and max
List-End temp value not found
The value was not entered or not between 0 and 69 degrees C
List-Invalid Module or Port
List-Module not between 1 and 8
The module number was not between 1 and 8, or not entered
List-Port not between 1 and max port
The value entered was not between 1 and NUMPORTS
List-Start temp not between 0 and max
List-Start temp value not found
The value was not entered or not between 0 and 69 degrees C
List-Type not A or M
List-Type value not found
The modifier A or M was omitted from the LIST command

Master reset writing to USB
Fatal USB hardware error
Max errors exceeded%s
There are more than 15 errors listed in the Error Buffer
MAXEU value not found
The value was not entered or not numeric
Memory not E or P
The memory location type was not entered or an incorrect designator
Memory type not found
The memory location type was not entered or an incorrect designator
MERGESPF Module File name not found
The file name or file path is not valid
MERGESPF Port not found
The value was not entered or not within range
MERGESPF Sensor File name not found
The file name or file path is not valid
MINEU value not found
The value was not entered or not numeric
Misalignment encountered code %d
USB error - may be scanning too fast
Module %d not between 1 and 8
The module number was not between 1 and 8, or not entered
Module %d not enabled
Module %s invalid
Module enable value not found
The value was not entered or not numeric
Module hpress value not found
The value was not entered or not numeric
Module in SET CHAN not enabled
The module in the position entered is not enabled.
Module lpress value not found
The value was not entered or not numeric
Module ModTemp value not found
The value was not entered or not numeric
Module negpts value not found
The value was not entered or not numeric
Module not between 1 and 8
The module number was not between 1 and 8, or not entered
Module not serial number or position
The value entered was not valid or not numeric.
Module NumPorts value not found
The value was not entered or not numeric
Module or Port not found
The value was not entered, or was in the wrong format.
Module SN invalid
The value entered was not in the correct format
Module SN value not found
The value was not entered or not numeric
Module type not between 0 and 4
The module number was not between 1 and 8, or not entered
Module type value not found
The value was not entered, or not numeric

MPBS not between 0 and 139
MPBS value invalid
MPBS value not found
The value was not entered or not numeric
NETIN not 0, or 1
NETIN value not found
The value was not entered or not numeric
NETOUT not 0, 1 or 2
NETOUT value not found
The value was not entered or not numeric
NewLine value not found
NL not 0, or 1
NL value not found
The value was not entered or not numeric
No #1 base temp chip found. Cannot do temp poll
No #2 base temp chip's found with wrong #1 chip. Cannot do temp poll
No A/D temp chip found, cannot do Temp Poll
No base temp chip found. Cannot do temp poll
USB one wire error. Reboot required. If problem persists, the module requires repairs
NPR not found
The value was not entered or not numeric
NPR string too long
The maximum string length is 4 digits
Number of ports not 16, 32 or 64
Theses are the only port values supported
NUMCHAN Group not between 1 and 8
NUMCHAN no group number
The value was not entered , not within range, or not numeric
OWALock device not found
OWAPGMD device index not found
OWAREAD device index not found
OWARead device not found
OWAWRITE data value not found
OWAWRITE device index not found
OWAWrite device not found
OWMCopy device not found
OWMREAD device index not found
OWMWrite device not found
OWProgrammed device not found
OWSREAD device index not found
OWStart writing to USB
OWSWRITE data value not found
OWSWRITE device index not found
OWSWrite device not found
OWTREAD device index not found
OWTRead device not found
Fatal error in the ID chip circuits. Module requires repairs
Period value above range
The maximum value is 65535 microseconds
Period value not found
The value was not entered or not numeric
Port in channel list exceeds fast channel limit
The max port value in fast mode is 16 or 32

Port not between 0 and 64
The value was not entered, out of range, or not numeric
Port not between 1 and max port
The value entered was out of range
Port not found
The value was not entered or not numeric
PT A2DCAL value not between 0 and 15
The value was not entered, out of range or not numeric
PT A2DCALC value not between 0 and 15
The value was not entered, out of range or not numeric
Qpkts not 0, 1, or 2
Qpkts value not found
The value was not entered, out of range or not numeric
RAD SN value not found
The value was not entered or not numeric
READCOM reading data from USB
READCOM reading status from USB
Fatal USB error
Remark line number not between 1 and 4
Remark line number not found
Remark line number required
The value was not entered, out of range or not numeric
Remark module not found
Remark module not between 1 and 8
The module number was not between 1 and 8, or not entered
Remark required
The value was not entered
RESACN not 0, 1 or 2
RESCAN value not found
The value was not entered, out of range or not numeric
Reset failed
Reset pipe failed error is %d
Reset port failed
Reset port ok
ResetParentPort call failed
ResetParentPort call OK
USB errors
Scaling value not found
The scaling factor was omitted from the SET ARINC command
Scan Trig not 0, or 1
Scan Trigger value not found
ScanTrig value not found
The value was not entered, out of range or not numeric
Second master point found when filling for one at m%d p%d t%d pr%d",m,p,t,r
The MPF file is corrupted
Serial Aux Clear error failed
Serial Aux ReadFile failed code %d
Serial Aux ReadFile timeout
Serial Aux Reported serial errors %x
Serial Aux WriteFile failed code %d
Serial Aux WriteFile timeout
Serial AUX hardware error

Serial Aux-Attempted output to disabled com port
Serial Aux-Attempted scheduled output to disabled com port
The Serial AUX COM port is not enabled
Serial Aux-Cannot get comm state
Serial Aux-Cannot open, code %d
Fatal hardware error
Serial Aux-Command line
The command was not entered or not recognized
Serial Cal Attempted output to disabled com port
Serial Cal-Attempted scheduled output to disabled com port
The Serial CAL COM port is not enabled
Serial Cal Clear error failed
Serial Cal Reported serial errors %x
Serial Cal-Cannot open, code %d
Serial Cal-Cannot set comm timeouts
Serial Cal-Command line
SERIAL must enable serial
Fatal hardware errors
SERIN not 0, or 1
SERIN value not found
The value was not entered, out of range or not numeric
SEROUT not 0, 1 or 2
SEROUT value not found
The value was not entered, out of range or not numeric
Set A/D mask writing to USB
Fatal USB hardware error
Set argument invalid
Set argument not found
The value was not entered or not a valid format for the configuration variable
SET CHAN Port not between 1 and fast channel limit
The end port was beyond the “fast scan mode” channel limit
SET CHAN Port not between 1 and max port
The value was not entered, out of range or not numeric
SetModule Address writing to USB
SetSubModule Address writing to USB
Setting USB to hold
Setting USB to run
Fatal USB hardware error
SGEnable value not 0, 1
SGEnable value not found
The value was not entered, out of range or not numeric
SGEnable1 fast channel value not 16 or 32
Fast Scan mode can only be set to 16 or 32 in Scan Group 1
Slots channel value not found
Slots-Invalid Module or Port
The value was not entered,, not a valid module position, or not a valid port position. The correct syntax is module-port
Slots-Invalid Module serial number or position
The value was not entered, not a valid module serial number or position. The correct syntax is module-port
Socket failed
Fatal hardware error

Start Bulk Read code %d bytes read %ld Handle %d Event %d %d
Start Bulk Read Data ready too early
Start Bulk Read Failed
Start scan writing to USB
Fatal USB hardware error
StartCalZ not 0, or 1
StartCalZ value invalid
StartCalZ value not found
The value was not entered, out of range or not numeric
Tcp/ip send could not send data
cp/lp send could not send data %d
Tcp/ip send timed out
Network failure - check Ethernet cable connection
TCPIP must enable Tcp/lp
Network access is not enabled
Temp argument not EU or RAW
The argument value was omitted
Temp gain channel not between 1 and 8
The value was not entered, out of range or not numeric
Temp offset module not between 1 and 8
The value was not entered, out of range or not numeric
Terminator code not 0, 1,2,3 or 4
Terminator code not found
The value was not entered, out of range or not numeric
Time stamp not 0 or 1
Time stamp value not found
The value was not entered, out of range or not numeric
TWOAD not 0, or 1
TWOAD value not found
The value was not entered, out of range or not numeric. TWOAD must be set to 0 in a DSM
UDP Binary socket failed
Fatal hardware failure
Unit Scan value invalid
UnitScan value not found
The value was not entered or not a supported value
USB cannot turn base switch off
USB cannot turn base switch on
USB device NOT attached for abort pipe
USB device NOT attached for bulk write
USB device NOT attached for read GPIF
USB device NOT attached for reset pipe
USB device NOT attached for reset port
USB device NOT attached for write GPIF %d %d
USB not ready
USB read GPIF with error code %ld
USB write GPIF with error code %ld
Fatal USB hardware failure
Vendor request
Hardware error - FPGA download failed
WriteCOM writing to USB
Fatal USB hardware failure

Zero Correct value invalid

Zero Correct value not found

The value was not entered, out of range or not numeric

Zero is invalid module position or serial number

A module position or serial number cannot be 0

Zero-Module not between 1 and 8

Zero-Module value not valid

The value was not entered, out of range or not numeric

Zerro Correct not 0, or 1

The value was not entered, out of range or not numeric

APPENDIX D - CHANGE LIST

General Information

This section contains change information to assist a user in determining the differences between different versions of RAD.exe software. All versions through version 3.02 were designed to operate all RAD variations. In April 2005, the RAD software was divided into four (4) versions.

RAD.exe	Version 2.10 designed to operate a stand alone RAD system with a dedicated system computer.
DSAENCL.exe	Version 3.12 designed to operate a Two or Eight A/D DSA3200 Enclosure only.
DSM3400.exe	Version 3.12 designed to operate a eight channel DSM3400 only
SPCENCL.exe	Version 1.00 designed to operate a SPCENCL3200 only.

The current released version of any of the software versions will be the last one listed in each version list.

DSM3400.exe Versions

Version 3.12 - Released October 2005

Version 3.20 - Released December 2007
Added support for ARINC 429

Version 3.21 - Not Released

Version 3.22 - Released March 2008
Added an error message when the largest enabled module is 16 channels and AVGn is set to 1.

Version 3.23 - Released April 2008
Added a retry if the DSM does not detect modules at bootup. If retry fails, an error will be generated.

Version 3.24 - Released April 2008
Modified one wire ID analysis to better detect the correct configuration.

Version 3.25 - Released January 2009
Added “Fast Scan” mode to Scan Group 1.

Version 3.26 - Released September 2009
Improved the boot time
Modified the “One Wire” ID chip polling
No changes to Commands or Configuration Variables

Version 3.27 - Released February 2010

Version 3.28 - Released August 2010
Added support for a second RDS - Digital Outputs 9 -16 enabled. These are only usable with DSM3400 modules that have an extra RDS module installed.

Version 3.29 - Not Released

Version 3.30 - Released December 2010

Removed the RELOAD Command

Added caution notes to the SAVE command and the HAVEARINC variable.

Added the Parity function to the ARINC output. The parity function can be enabled or disabled through the HAVEARINC variable.

If HAVEARINC is set to 1, ARINC output is enabled without parity.

If HAVEARINC is set to 2, ARINC output is enabled with odd parity.

Corrected the setting of the ARINC SSM bits to conform with the ARINC specification.

These bits had been fixed at 0. They will be set to 1 if the pressure data are valid, or 0 if the pressure data are not valid.