

SOFTWARE SPECIFICATIONS
DSA 3000 SERIES MODULES

Version 3.15

0202

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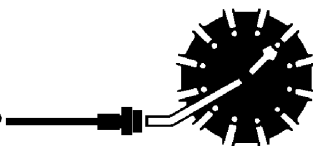


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DSA CONTROL AND CONFIGURATION

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

The section on DSA Commands lists each command and explains its function.

DSA COMMANDS

This section describes the commands used to control the DSA.

The DSA software must run as embedded software on the DSA 3017 pressure scanner hardware. It is to perform 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 from the Ethernet Link.
- 4) Allow the configuration to be saved through power down.
- 5) Output converted data, status, setup and calibration data over the Ethernet Link.
- 6) Set the DSA Physical Ethernet Address(MAC Address).
- 7) Protocol to be TCP/IP or User Defined Protocol.
- 8) Support the user in troubleshooting the DSA hardware and system.

When a DSA module is in a "not ready" mode, all commands are disabled except STATUS and STOP.

TCP/IP does not guarantee that packet boundaries will be maintained between a Host and a DSA module. Therefore, **ALL** commands from a Host **MUST** be terminated properly with one of four options. The DSA will detect and adjust to the termination option being used by a Host.

The four options are:

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

The current DSA RS232 interface includes error checking. A checksum byte is generated and added to the end of the serial data packet. It is assumed that data will be transmitted in ASCII format. Data may be transmitted in BINARY format. If data are to be transmitted in BINARY format, then page mode transmission must be disabled.

COMMAND LIST

COMMAND	CALIBRATE
COMMAND SYNTAX	CAL <press> [group]
ARGUMENTS	<press> - is a real number that represents the calibration pressure for this point. [group] - is a switch that determines the number of channels to calibrate. Group may be H, L or blank. L - Channels 0 - 7(ports 1-8)will be calibrated. H - Channels 8 - 15(ports 9-16) will be calibrated. Blank - Channels 0 - 15(ports 1-16) will be calibrated.
DESCRIPTION	Commands the DSA to perform the following: <ol style="list-style-type: none">1) Read one averaged frame of pressure and temperature counts.2) Return calibration information for all channels calibrated in the following format: INSERT <temp> <chan> <press> <press counts>/M NOTE: The DSA does not control the calibration. It will only read the information when commanded. The User must: <ol style="list-style-type: none">1) Apply the control pressures to switch the calibration valves to the CAL mode.2) Apply a known calibration pressure.3) Issue the CAL command when the calibration pressure is stable.
RETURNS	INSERT <temp><channel><press><press counts> M<n/> <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) <n/> - end of line
EXAMPLE	If a user wanted to calibrate ports 1 through 8 at 15 psi: Connect a pressure standard to the CAL input. Apply CTL1 and CTL2 Control pressures Enter the command: CAL 15 L<CR> The DSA will measure the counts for each channel and return the appropriate INSERT commands. If a user wanted to calibrate all ports at 15 psi: Connect a pressure standard to the CAL input. Apply CTL1 and CTL2 Control pressures Enter the command: CAL 15<CR> The DSA will measure the counts for each channel and return the appropriate INSERT commands.

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

CALIBRATE ZERO

CALZ

None

Commands the DSA to perform a quick zero calibration. This operation produces A/D count values for each pressure channel that is subtracted from the raw pressure counts before converting to the chosen pressure units. The data are stored in the ZERO(0-15) and DELTA(0-15) Configuration Variable Array. CALZ requires approximately 15 seconds to complete.

RETURNS

<n/>

<n/> - end of line

EXAMPLE

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

Enter the command:

CALZ

The DSA will measure the zero counts for each channel and update the Zero and Delta Arrays.

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

CLEAR

CLEAR

None

Commands the DSA to clear any errors that have occurred. The errors are sent to the client in an ASCII Packet. ASCII Packets are described in a subsequent sections.

RETURNS

<n/>

<n/> - 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
COMMAND SYNTAX
ARGUMENTS

DELETE

DELETE *<start temp><end temp>[<channel>]*

<start temp>- an integer from 0 to 59 that represents the low point of the temperature planes to be deleted.
<end temp> - an integer from 0 to 59 that represents the high point of the temperature planes to be deleted.
<channel> - optional, the channel to be deleted.

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 CAL command.

NOTE: See the description of the FILL command for more information.

RETURNS

<n/>

<n/> - end of line.

EXAMPLE

To delete the master points for all modules in a system using eight 32 channel modules, the following command would be issued:

```
DELETE 0 59<CR>
```

To delete the master points for channel 4, the following command would be issued:

```
DELETE 0 59 4<CR>
```

To delete the master points for channel 16, the following command would be issued:

```
DELETE 0 59 16<CR>
```

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

ERROR

ERROR

None

Lists the errors that are stored and listed after a CLEAR. Only the first 15 errors will be listed. If more than 15 errors have occurred, the message: "Greater than 15 errors occurred" will appear at the end of the list. An Error List may be found in Appendix D. The return format is:

```
ERROR: error
```

EXAMPLE

To read the contents of the Error Buffer:

```
Type: ERROR
```

The DSM will return the last 30 errors in the format::

```
ERROR: Port not found
```

```
ERROR: List MI no group number
```

```
ERROR: Group not between 1 and 8
```

If no errors have been logged, the DSM will return:

```
ERROR: No errors
```


COMMAND	FILL
COMMAND SYNTAX	FILL
ARGUMENTS	None
DESCRIPTION	<p>Fills the Conversion Table with calculated pressure points and temperature planes using the MASTER calibrated points as guides. These "filled" points are marked as CALIBRATED.</p> <p>The FILL command NEVER overwrites MASTER points. It does overwrite old points marked as CALIBRATED.</p> <p>NOTE: The DELETE command must be used to change points marked as MASTER to CALIBRATED before using the FILL command.</p>
RETURNS	<n/> <n/> - end of line.
EXAMPLE	<p>In this example, new MASTER points have been loaded and the coefficient table must be completed.</p> <p style="padding-left: 40px;">Type: FILL<CR></p>

COMMAND	INSERT
COMMAND SYNTAX	INSERT<temp><chan><press><press counts>[M]
ARGUMENTS	<p><temp> - an integer from 0 to 59 that represents the temperature in degrees Celsius.</p> <p><chan> - an integer from 0 to 15 identifying the channel.</p> <p><press> a real number that represents the calibration pressure point.</p> <p><press counts>- a signed integer from 32767 to -32768 that represents the current pressure counts from the sensor.</p> <p>[M] - optional switch that designates the entry as a master conversion point.</p>
DESCRIPTION	<p>Inserts one pressure-pressure counts entry into the Conversion Table. If the M option is used this point is entered as a MASTER point.</p> <p>The LIST MASTER and LIST ALL commands download the contents of the conversion table in the format required by this INSERT command.</p>
RETURNS	<n/> <n/> - End of line.
EXAMPLE	<p>Although INSERT commands are most often entered from a Module Profile File, they may be entered from a keyboard.</p> <p>The following command will insert a master point at 30°C for channel 1. The applied pressure is 11.9998 psi, the measured counts are 26376.</p> <p style="padding-left: 40px;">INSERT 30 1 11.9998 26376 M</p> <p>The following command will insert a master point at 48°C for channel 16. The applied pressure is 10.9998 psi, the measured counts are 20254.</p> <p style="padding-left: 40px;">INSERT 48 16 10.9998 20254 M</p>

COMMAND	LIST ALL
COMMAND SYNTAX	LIST A [<i><Start Temp><End Temp></i>]
ARGUMENTS	None
DESCRIPTION	Lists all of the master and calculated points in the temperature-pressure correction matrix. The return format is: INSERT <i><temp><chan><press><pressure counts><M or C></i> INSERT <i><temp><channel><press><press counts><M,C,l><n/></i> INSERT <i><temp><channel><press><press counts><M,C,l><n/></i> : : : : INSERT <i><temp><channel><press><press counts><M,C,l><n/></i> <i><temp></i> - the temperature plane <i><channel></i> - the channel in module-port notation <i><press></i> - the pressure in EU <i><press counts></i> - the A/D counts of pressure <i><n/></i> - end of line.
RETURNS	
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 17 20 1<CR> The DSM will return a list of INSERT commands showing the temperature, channel, applied pressure, counts and the type of plane. INSERT 17 1 -45.949100 -26184 M INSERT 17 1 -31.250000 -17763 C INSERT 17 1 -19.969601 -11302 M INSERT 17 1 -6.250000 -3425 C INSERT 17 1 0.000000 162 M INSERT 17 1 19.984600 11636 M INSERT 17 1 25.000000 14523 C INSERT 17 1 35.000000 20281 C INSERT 17 1 45.949100 26586 M :: : : : : : : INSERT 20 1 -45.949100 -26166 C INSERT 20 1 -31.250000 -17750 C INSERT 20 1 -19.969601 -11292 C INSERT 20 1-1 -6.250000 -3424 C INSERT 20 1-1 0.000000 160 C INSERT 20 1-1 19.984600 11629 C INSERT 20 1-1 25.000000 14514 C INSERT 20 1-1 35.000000 20267 C INSERT 20 1-1 45.949100 26567 C

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

EXAMPLE

LIST ALL RANGES (Model 3007 Only)

LIST B

None

Lists the 16 Absolute/Gauge Settings from the ABSn variable. This is active only when MODEL is set to 3007.

The DSA 3007 could contain 16 separate ranges. To read the full scale range of the installed transducers in a DSA with 4 - 5 psi, 6 - 15 psi and 6 - 50 psi transducers, Type:

LIST B<CR>

The DSA module will return the following

```
SET ABS0 5
SET ABS1 5
SET ABS2 5
SET ABS3 5
SET ABS4 15
SET ABS5 15
SET ABS6 15
SET ABS7 15
SET ABS8 15
SET ABS9 15
SET ABS10 50
SET ABS11 50
SET ABS12 50
SET ABS13 50
SET ABS14 50
SET ABS15 50
```

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION
EXAMPLE

LIST CALIBRATE

LIST C

None

Lists the CALIBRATION configuration variables.

To view the current conversion variable settings:

Type: LIST C<CR>

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

```
SET PMAXL 18.09
SET PMAXH 18.09
SET PMINL -18.09
SET PMINH -18.09
SET NEGPTSL 4
SET NEGPTSH 4
SET ABS 0
>
```

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

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION
EXAMPLE

LIST DEBUG

LIST X

None

Lists the DEBUG Configuration variables.

To view the current debug variable settings:

Type: LIST X<CR>

The DSA will return the current debug settings. They could appear as follows.

```
SET EDBXMT 0
SET EDBRCV 0
SET EDBPRMS 0
SET SIM 0
SET SIMPHI 300000
SET SIMLO -300000
SET SIMINC 100
SET SIMT 2500
```

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

LIST DELTA

LIST D

None

Lists the 16 delta zero correction values. These are used in the conversion of raw counts to Engineering Units(EU).

To view the current delta zero correction values:

Type: LIST D<CR>

The DSA will return the delta zero correction values. They could appear as follows.

```
SET DELTA0 0
SET DELTA1 1
SET DELTA2 0
SET DELTA3 1
SET DELTA4 0
SET DELTA5 1
SET DELTA6 0
SET DELTA7 0
SET DELTA8 1
SET DELTA9 0
SET DELTA10 1
SET DELTA11 0
SET DELTA12 1
SET DELTA13 0
SET DELTA14 1
SET DELTA15 0
```

NOTE

The delta values will vary as the module ages. These values are the difference between the current zero offset value obtained in the most recent CALZ and the zero value in the coefficient table.

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

LIST GAIN

LIST G

None

Lists the 16 temperature gains. These are used to convert temperature counts to degrees Celsius. This is the "M" term in the characterization equation:

$$^{\circ}\text{C} = \frac{\text{Counts} - \text{TempB}}{\text{TempM}}$$

EXAMPLE

To view the temperature gain settings:

Type: LIST G<CR>

The DSA will return the temperature gain settings. They could appear as follows.

```
SET TEMPM0 793.  
SET TEMPM1 432.  
SET TEMPM2 441.  
SET TEMPM3 429.  
SET TEMPM4 402.  
SET TEMPM5 400.  
SET TEMPM6 413.  
SET TEMPM7 400.  
SET TEMPM8 410.  
SET TEMPM9 412.  
SET TEMPM10 421.  
SET TEMPM11 430.  
SET TEMPM12 430.  
SET TEMPM13 412.  
SET TEMPM14 422.  
SET TEMPM15 432.
```

NOTE

The temperature gain settings are determined when the sensor is manufactured. They normally will not change after a calibration

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION
EXAMPLE

LIST IDENTIFICATION

LIST I

None

Lists the IDENTIFICATION configuration variables.
To verify the general module configuration settings:

Type: LIST i<CR>

The DSA will return:

```
SET MAC 000.096.093.018.000.102
SET BRDCST 0
SET VER 3.11
SET BASET 0
SET NETTYPE TCP
SET IPADD 200.30.5.102
SET LMETER 100
SET MODEL 3018
SET BAUD 1200
SET ARINC 0
SET ECHO 1
```

NOTE

A user must be very careful when modifying one of these variables. An incorrect value in one of these variables could have a detrimental affect on the operation of the module.

COMMAND	LIST MASTER
COMMAND SYNTAX	LIST M <Start Temp><End Temp>[<channel>]
ARGUMENTS	<Start Temp> - The lowest temp plane to be returned. <End Temp> - The highest temp plane to be returned. <channel> - optional, may be 0 through 15.
DESCRIPTION	Lists all of the MASTER POINTS in the temperature-pressure correction matrix. The return format is:
RETURNS	INSERT <temp><clear><pressure><pressure counts><M> INSERT <temp><channel><press><press counts>M<n/> : : : : INSERT <temp><channel><press><press counts> M<n/> <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 <n/> - end of line
EXAMPLE	To view the Master Points between 10°C and 40°C for channel 1 of the module: Type: List m 10 40 1<CR> The DSA will return: INSERT 14 1 -5.958100 -21594 M INSERT 14 1 -4.476100 -15127 M INSERT 14 1 -2.994200 -8646 M INSERT 14 1 -1.470100 -1973 M INSERT 14 1 0.000000 4467 M INSERT 14 1 1.470100 10917 M INSERT 14 1 2.994200 17594 M INSERT 14 1 4.476100 24098 M INSERT 14 1 5.958100 30603 M INSERT 23 1 -5.958100 -21601 M INSERT 23 1 -4.476100 -15161 M INSERT 23 1 -2.994300 -8714 M INSERT 23 1 -1.470100 -2077 M INSERT 23 1 0.000000 4332 M INSERT 23 1 1.470100 10746 M INSERT 23 1 2.994200 17397 M INSERT 23 1 4.476100 23863 M INSERT 23 1 5.958100 30333 M INSERT 32 1 -5.958100 -21636 M INSERT 32 1 -4.476100 -15214 M INSERT 32 1 -2.994200 -8784 M INSERT 32 1 -1.470100 -2162 M INSERT 32 1 0.000000 4228 M INSERT 32 1 1.470100 10615 M INSERT 32 1 2.994200 17246 M INSERT 32 1 4.476100 23691 M INSERT 32 1 5.958100 30136 M

COMMAND	LIST MAXn PRESSURES (Model 3007 Only)
COMMAND SYNTAX	LIST H
ARGUMENTS	None
DESCRIPTION	Lists the 16 maximum pressures stored in the MAXn Variable. This is active only when MODEL is set to 3007.
EXAMPLE	To view the maximum pressure settings for the module in the example of List Ranges type: LIST H<CR> The DSA will return the maximum pressure settings. They could appear as follows. <pre> SET MAX0 6 SET MAX1 6 SET MAX2 6 SET MAX3 6 SET MAX4 18 SET MAX5 18 SET MAX6 18 SET MAX7 18 SET MAX8 18 SET MAX9 18 SET MAX10 60 SET MAX11 60 SET MAX12 60 SET MAX13 60 SET MAX14 60 SET MAX15 60 </pre>
NOTE	Generally, the maximum pressure setting is 20% greater than the full scale of the sensor to allow a user some over range indication.

COMMAND	LIST MINn PRESSURES (Model 3007 Only)
COMMAND SYNTAX	LIST L
ARGUMENTS	None
DESCRIPTION	Lists the 16 maximum pressures stored in the MINn Variable. This is active only when MODEL is set to 3007.
EXAMPLE	To view the minimum pressure settings for the module in the example of List Ranges type: LIST L<CR> LIST L<CR> The DSA will return the minimum pressure settings. They could appear as follows. SET MIN0 -6 SET MIN1 -6 SET MIN2 -6 SET MIN3 -6 SET MIN4 -18 SET MIN5 -18 SET MIN6 -18 SET MIN7 -18 SET MIN8 -18 SET MIN9 -18 SET MIN10 -60 SET MIN11 -60 SET MIN12 -60 SET MIN13 -60 SET MIN14 -60 SET MIN15 -60
NOTE	Generally, the maximum pressure setting is 20% greater than the full scale of the sensor to allow a user some over range indication.

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

EXAMPLE

LIST NEGATIVE POINTS (Model 3007 Only)

LIST N

None

Lists the Negative Points settings for each of the 16 channels in a DSA3007. This is active only when MODEL is set to 3007.

To view the negative points set for the module in the example of List Ranges type:

```
LIST L<CR>
```

The DSA will return the negative points settings. They could appear as follows.

```
SET NEGPTS0 4  
SET NEGPTS1 4  
SET NEGPTS2 4  
SET NEGPTS3 4  
SET NEGPTS4 4  
SET NEGPTS5 4  
SET NEGPTS6 4  
SET NEGPTS7 4  
SET NEGPTS8 4  
SET NEGPTS9 4  
SET NEGPTS10 4  
SET NEGPTS11 4  
SET NEGPTS12 4  
SET NEGPTS13 4  
SET NEGPTS14 4  
SET NEGPTS15 4
```

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

LIST OFFSET

LIST O

None

Lists the 16 temperature offsets. These are used in the conversion of temperature counts to degrees Celsius. This is the "B" term in the correction equation:

$$^{\circ}\text{C} = \frac{\text{Counts} - \text{TempB}}{\text{TempM}}$$

EXAMPLE

To view the temperature offset settings:

Type: LIST O<CR>

The DSA will return the temperature offset settings. They could appear as follows.

```
SET TEMPB0 -14121.  
SET TEMPB1 -10631.  
SET TEMPB2 -7556.  
SET TEMPB3 -10576.  
SET TEMPB4 -5958.  
SET TEMPB5 -5133.  
SET TEMPB6 -8378.  
SET TEMPB7 -6851.  
SET TEMPB8 -9011.  
SET TEMPB9 -10288.  
SET TEMPB10 -7520.  
SET TEMPB11 -7400.  
SET TEMPB12 -9167.  
SET TEMPB13 -7015.  
SET TEMPB14 -6328.  
SET TEMPB15 -6156.
```

NOTE

The temperature offset settings are determined when the sensor is manufactured. They normally will not change after a calibration

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION
EXAMPLE

LIST SCAN

LIST S

None

Lists the SCAN configuration variables

This command is used to verify the general scan settings of the DSA

Type: LIST s<CR>

The DSA will return:

```
SET PERIOD 500
SET AVG 16
SET FPS 0
SET BIN 1
SET XSCANTRIG 0
SET EU 1
SET CVTUNIT 1.0
SET ZC 1
SET UNITSCAN PSI
SET QPKTS 1
SET PAGE 0
>
```

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

LIST ZERO

LIST Z

None

Lists the 16 zero correction values. These are used in the conversion of raw counts to zero corrected counts.

To view the current zero correction values:

Type: LIST Z<CR>

The DSA will return the zero correction values. They could appear as follows.

```
SET ZERO0 261
SET ZERO1 -86
SET ZERO2 -49
SET ZERO3 -6
SET ZERO4 -20
SET ZERO5 47
SET ZERO6 44
SET ZERO7 23
SET ZERO8 -51
SET ZERO9 47
SET ZERO10 6
SET ZERO11 26
SET ZERO12 53
SET ZERO13 37
SET ZERO14 -57
SET ZERO15 -20
```

NOTE

The zero values will be updated after a CALZ.

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

RETURNS

EXAMPLE

SAVE
SAVE
None
Commands the DSA to save the RAM image of NVM. Any change to a configuration variable must be followed by a SAVE command if the change is to be permanent.

<n/>
<n/> - End of line.
To save the current configuration variable settings and conversion coefficients,
Type: SAVE<CR>

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

EXAMPLE

SCAN
SCAN
None
Commands the DSA to scan the pressure sensors and send Scan packets to the client.
If a scan command is executed in a TelNet session, the data will be returned in a format similar to the following if EU is set to 1 and BIN is set to 0:

Frame # 0
0 -5.675253e-004 35
1 8.076633e-004 34
2 0. 34
3 -8.236485e-004 34
4 1.501046e-003 34
5 -7.407264e-004 34
6 6.982071e-004 34
7 1.403621e-003 34
8 -7.256249e-004 35
9 2.114903e-003 35
10 6.882086e-004 35
11 0. 35
12 7.777986e-004 35
13 0. 35
14 -7.957429e-004 35
15 -7.825614e-004 35

NOTE Each line of the frame is channel number, value, and sensor temperature(°C).

COMMAND
COMMAND SYNTAX
ARGUMENTS

DESCRIPTION

NOTE

SET
SET <name> <value>
<name> - the Configuration Variable to be set or modified.
<value> - the value of that Configuration Variable
Commands the DSA to set one of the many Configuration Variables. Configuration Variables are described in a subsequent section.
Listing the Configuration Variables with the LIST command outputs the data in the format required by the SET command. This enables the user to upload data from a file that has been created by a LIST download.

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION

EXAMPLE

STATUS

STATUS

None

Commands the DSA to send a Status Packet to the client. The Status Packet is described in a subsequent section.

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 DSA is not READY.

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

Module Name->DSA1

Status->READY

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

Module Name->DSA1

Status->DSA 1CALZ

COMMAND
COMMAND SYNTAX
ARGUMENTS
DESCRIPTION
RETURNS

EXAMPLE

STOP

STOP

None

Commands the DSA to abort the current operation.

<n/>

<n/> - end of line.

To abort any function or operation:

Type: STOP<CR>

CONFIGURATION VARIABLES

Configuration Variables control the way the DSA functions. The Variables are assigned to one of several groups: SCAN, CALIBRATION, IDENTIFICATION, PRESSURE, and DEBUG. Each variable is assigned a "data type" description.

SCAN VARIABLES

VARIABLE	AUTOSCAN
VALID VALUES	0, 1, or 2
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Determines how the DSA module will perform at power up. 0 = Normal Startup, the module will boot to the READY mode 1 = The module will perform a normal boot up and initiate a CALZ immediately. 2 = The module will perform a normal boot up and initiate a CALZ followed by a SCAN. The length of the SCAN function will be determined by the setting of FPS.

VARIABLE	AVG
VALID VALUES	1 to 32767
DEFAULT VALUE	16
DATA TYPE	integer
DESCRIPTION	This sets the number of raw samples to acquire before producing a filtered output.

VARIABLE	BIN
VALID VALUES	1 or 0
DEFAULT VALUE	1
DATA TYPE	integer
DESCRIPTION	Sets the format of the data packet output. 1 = Binary 0 = ASCII

VARIABLE	CVTUNIT
VALID VALUES	any real number
DEFAULT VALUE	1.0
DATA TYPE	float
DESCRIPTION	Unit conversion factor. This converts the calibrated units to the requested scan units. This value can be set directly or by setting the UNITSCAN variable to the desired unit. The following are the list of units supported

CVTUNIT will be set whenever UNITSCAN is set. It may be set independently without setting UNITSCAN. If a user wants to have CVTUNIT set to a different variable from UNITSCAN, UNITSCAN must be set first.

VARIABLE	EU
VALID VALUES	0 or 1
DEFAULT VALUE	1
DATA TYPE	string
DESCRIPTION	Sets the output format for temperature and pressure units. 0 = raw units 1 = Engineering units

VARIABLE	FPS
VALID VALUES	0 to 2147483648
DEFAULT VALUE	100
DATA TYPE	long integer
DESCRIPTION	Sets the number of averaged frames to send to the client. If a 0 is entered, the scan will continue until a STOP command is received.

VARIABLE	PAGE
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Enables or disables PageMode operation. 0 = sets the DSA in normal mode. The DSA will most often output 1 frame per packet. 1 = sets the DSA in PageMode. This will, most often, increase the number of frames per packet to 10.

Because of the TCP/IP protocol, there is no guarantee of the exact number of frames to be placed in a packet. A frame may be split between 2 packets.

VARIABLE	PERIOD
VALID VALUES	325 to 62500 μ sec
DEFAULT VALUE	500
DATA TYPE	integer
DESCRIPTION	Sets the interval between channel samples.

VARIABLE	QPKTS
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	This switch will control the action the DSA will take when the data buffer is full. 0 = frames will be discarded when the data buffer is full. The DSA will continue to scan. 1 = no frames will be lost. The DSA will stop scanning and log an error if the data buffer is filled.

VARIABLE
VALID VALUES
DEFAULT VALUE
DATA TYPE
DESCRIPTION

UNITSCAN

see list below

PSI

string

Unit scan factor. This sets the scan units for the DSA. 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

If a value other than those listed is entered, PSI will be used. It is best to use uppercase when entering these units.

VARIABLE
VALID VALUES
DEFAULT VALUE
DATA TYPE
DESCRIPTION

XSCANTRIG

0 or 1

0

integer

Sets the External Trigger as the Frame Trigger.

0 = the internal clock is the frame trigger

1 = the external trigger is the frame trigger

VARIABLE
VALID VALUES
DEFAULT VALUE
DATA TYPE
DESCRIPTION

ZC

0 or 1

1

integer

Sets zero correction on or off.

0 = no correction

1 = zero correction

CALIBRATION VARIABLES

VARIABLE	ABS
VALID VALUES	0 or 1
DEFAULT VALUE	determined by module type
DATA TYPE	integer
DESCRIPTION	Sets the mode of operation of the module for models 3017 and 3018. 0 = gauge or differential 1 = absolute.

VARIABLE	ABS_n	Where n = 0 - 15 for channels 1 - 16
VALID VALUES	0 or 1	
DEFAULT VALUE	determined by module type	
DATA TYPE	integer	
DESCRIPTION	Sets the mode of operation of the module for model 3007 only. 0 = gauge or differential 1 = absolute.	

VARIABLE	MAX_n	Where n = 0 - 15 for channels 1 - 16
VALID VALUES	0 through 500	
DEFAULT VALUE	15	
DATA TYPE	integer	
DESCRIPTION	Sets the maximum pressure for channel n. This variable is only used if MODEL is set to 3007. This must be set to zero or to a positive number if the module is an absolute module.	

VARIABLE	MIN_n	Where n = 0 - 15 for channels 1 - 16
VALID VALUES	0 through 500	
DEFAULT VALUE	0	
DATA TYPE	integer	
DESCRIPTION	Sets the maximum pressure for channel n. This variable is only used if MODEL is set to 3007. This must be set to zero or to a positive number if the module is an absolute module.	

VARIABLE	NEGPTS_n	Where n = 0 - 15 for channels 1 - 16
VALID VALUES	0 through 8	
DEFAULT VALUE	4	
DATA TYPE	integer	
DESCRIPTION	Sets the number of negative calibration points for channel n. This must be set to zero or to a positive number if the module is an absolute module. This variable is only used if MODEL is set to 3007	

VARIABLE	NEGPTSL
VALID VALUES	0 through 8
DEFAULT VALUE	4
DATA TYPE	integer
DESCRIPTION	Sets the number of negative calibration points for channels 1 - 8. This must be set to zero or to a positive number if the module is an absolute module.

VARIABLE	NEGPTSH
VALID VALUES	0 through 8
DEFAULT VALUE	4
DATA TYPE	integer
DESCRIPTION	Sets the number of negative calibration points for channels 9 - 16. This must be set to zero or to a positive number if the module is an absolute module.

VARIABLE	PMAXL
VALID VALUES	any real number
DEFAULT VALUE	determined by module type
DATA TYPE	float
DESCRIPTION	Sets the maximum pressure for channels 1 - 8.

VARIABLE	PMAXH
VALID VALUES	any real number
DEFAULT VALUE	determined by module type
DATA TYPE	float
DESCRIPTION	Sets the maximum pressure for channels 9 - 16.

VARIABLE	PMINL
VALID VALUES	any real number
DEFAULT VALUE	determined by module type
DATA TYPE	float
DESCRIPTION	Sets the minimum pressure for channels 1 - 8. This must be set to zero or to a positive number if the module is an absolute module.

VARIABLE	PMINH
VALID VALUES	any real number
DEFAULT VALUE	determined by module type
DATA TYPE	float
DESCRIPTION	Sets the minimum pressure for channels 9 - 16. This must be set to zero or to a positive number if the module is an absolute module.

IDENTIFICATION VARIABLES

VARIABLE	ARINC
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Determines the serial output format. Sets the output destination. When set to 1, the serial output will be in an ARINC 429 format. When set to 0, the serial output will be in an ASCII format. This variable is only active when EU is set to 1.
VARIABLE	BASET
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Determines the physical network type. 0 = the module is configured for 10Base-2. 1 = the module is configured for 10Base-T.
VARIABLE	BAUD
VALID VALUES	1200, 9600, 19200, 38400, 57600, or 115200
DEFAULT VALUE	1200
DATA TYPE	integer
DESCRIPTION	Sets the BAUD rate of the serial communication channel, if present. The serial communications is set up for 8 data bits, 1 stop bit, No parity. Power to the DSA must be recycled when this variable is modified in order for the change to be effective.
VARIABLE	BRDCST
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Determines the output destination. When set to 1, all outputs are broadcast over the network. When set to 0, the output is sent back to the host.
VARIABLE	ECHO
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	Determines if characters received from a serial host will be echoed back to the host. When set to 1, the DSA will echo characters back to the host. When set to 0, the DSA will not echo characters.

VARIABLE	IPADD
VALID VALUES	xxx.xxx.xxx.xxx
DEFAULT VALUE	191.030.005.SSN
DATA TYPE	string
DESCRIPTION	The IP Address of the DSA 3017. Any modification will not become effective until the power has been cycled. SSN is the last three digits of the module serial number.

VARIABLE	LMETER
VALID VALUES	0 to 32767
DEFAULT VALUE	100
DATA TYPE	Integer
DESCRIPTION	This is a timing variable which will adjust the timing of the DSA to a Host when LIST M and LIST A commands are being output to the host. The default value is equal to 310 ms. One count is equal to 3.1 ms

VARIABLE	MAC
VALID VALUES	000.096.093.xxx.xxx.xxx
DEFAULT VALUE	000.096.093.017.000.SSN
DATA TYPE	string
DESCRIPTION	The MAC 802.3 address of the DSA 3017. This address is registered with the IEEE. The numbers: 000.096.093. , must not be modified as they represent the "Organizationally Unique Identifier (OUI)" that has been assigned to Scanivalve Corp. The fourth octet describes the module type. The last 2 octets are reserved for the module serial number.

VARIABLE	MODEL
VALID VALUES	3007, 3017, or 3018
DEFAULT VALUE	3017
DATA TYPE	string
DESCRIPTION	Determines the module type. When set to 3007, special variables are enabled to permit up to eight(8) ranges in a module.

VARIABLE	NETTYPE
VALID VALUES	TCP or UDP
DEFAULT VALUE	TCP
DATA TYPE	string
DESCRIPTION	This variable determines the communication protocol of the DSA module. A customer may wish to use UDP to satisfy a requirement of a network or to speed data transfers. The fastest data transfers occur when in a UDP mode. Any modification will not become effective until the power has been cycled.

VARIABLE	VER
VALID VALUES	Not Applicable
DEFAULT VALUE	Current programmed version
DATA TYPE	string
DESCRIPTION	The software version of the DSA. This is a "read only" variable.

PRESSURE VARIABLES

VARIABLE	DELTA0 - DELTA15
VALID VALUES	-32768 to 32767
DEFAULT VALUE	none
DATA TYPE	integer
DESCRIPTION	Delta zero corrections for channels 1 - 16. These values are set when a CALZ is executed.

VARIABLE	TEMPB0 - TEMPB15
VALID VALUES	any real number
DEFAULT VALUE	none
DATA TYPE	float
DESCRIPTION	The "M" term in the conversion equation used to convert temperature counts to degrees Celsius. The conversion formula is:

$$^{\circ}\text{C} = \frac{\text{Counts} - \text{TempB}}{\text{TempM}}$$

VARIABLE	TEMPM0 - TEMPM15
VALID VALUES	any real number
DEFAULT VALUE	none
DATA TYPE	float
DESCRIPTION	The "M" term in the conversion equation used to convert temperature counts to degrees Celsius. The conversion formula is:

$$^{\circ}\text{C} = \frac{\text{Counts} - \text{TempB}}{\text{TempM}}$$

VARIABLE	ZERO0 - ZERO15
VALID VALUES	-32768 to 32767
DEFAULT VALUE	none
DATA TYPE	integer
DESCRIPTION	The zero correction for channels 0 - 15. These values are set during the original calibration and fill.

DEBUG VARIABLES

VARIABLE	EDBXMT
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	A flag, that when set, will output certain debug messages to the DSA RS232 port. This is normally used only during the manufacturing process.
VARIABLE	EDBRCV
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	A flag, that when set, will output all commands from the host to the DSA RS232 port. This is normally used only during the manufacturing process.
VARIABLE	EDBPRMS
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	This sets the Ethernet chip to receive any transmission on the network. This is normally referred to as "promiscuous mode". This can be a dangerous mode and should only be used if absolutely necessary.
VARIABLE	SIM
VALID VALUES	0 or 1
DEFAULT VALUE	0
DATA TYPE	integer
DESCRIPTION	When set to 1, the simulator is enabled.
VARIABLE	SIMPHI
VALID VALUES	-32768 to 32767
DEFAULT VALUE	30000
DATA TYPE	integer
DESCRIPTION	High pressure counts. When this value is reached, the simulated counts will be set to the value of the SIMPLO variable.
VARIABLE	SIMPINC
VALID VALUES	0 to 100
DEFAULT VALUE	100
DATA TYPE	integer
DESCRIPTION	The counts value to be added to SIMPHI or SIMPLO every average frame.

VARIABLE	SIMPLO
VALID VALUES	-32768 to 32767
DEFAULT VALUE	-30000
DATA TYPE	integer
DESCRIPTION	Low pressure counts. The value counts will be set to when the value of SIMPHI is reached during a simulation.

VARIABLE	SIMT
VALID VALUES	0 to 5000
DEFAULT VALUE	2500
DATA TYPE	integer
DESCRIPTION	Temperature counts.

DSA PACKET DEFINITIONS

When requested the DSA sends an application packet to the client. Each packet sent to the client starts with a Packet Type Word. This word defines the packet type.

PACKET TYPE TABLE

PACKET NAME	PACKET ID	BYTES	NOTES
Scan	1Hex	304	Binary Scan Packet (NOT USED)
Stat	2Hex	22	Status Packet (FOR FUTURE USE)
Status	3Hex	176	Long Status Packet
Scan Raw	4Hex	70	Transmits Pressure and Temperature data in binary, raw counts.
Scan EU	5Hex	104	Transmits Pressure and Temperature data in binary, engineering units.
Scan Raw - Pressure Only	6Hex	38	Transmits Pressure data in binary, raw counts. (FOR FUTURE USE)
Scan EU - Pressure Only	7Hex	72	Transmits Pressure and Temperature data in binary, engineering units. (FOR FUTURE USE)
ASCII	20Hex	Variable	Text Packet NOTE: When the first integer of the packet is 20Hex or greater, the packet is assumed to be in ASCII FORMAT.

HOST to DSA

Command Packet

FUNCTION DESCRIPTION	BYTES	DATA TYPE	VALUES
ASCII Command Data (Refer to the Command Section of this manual for more information)	1 to 512	String	Unique to Packet Each line must be terminated with a CR, LF, CR-LF or LF-CR.

DSA to HOST Scan Packet

(Not Used)

FUNCTION DESCRIPTION	BYTES	DATA TYPE	VALUE/NOTES
Packet Type	2	Integer	1Hex
Pad bytes (Forces quad byte alignment)	2	Integer	undefined
Module Name	20	char[20]	(not used)
Channels 1 thru 8 - Minimum Pressure	4	Float	(not used)
Channels 9 thru 16 - Minimum Pressure	4	Float	(not used)
Channels 1 through 8 - Maximum Pressure	4	Float	(not used)
Channels 9 through 16 - Maximum Pressure	4	Float	(not used)
Pressure Type	12	char[12]	Type of scan
Pressure Units	12	char[12]	Scan units
Temperature Type	12	char[12]	Temperature units
Status	20	char[20]	Current DSA status
Error	60	char[60]	Current DSA errors
Period	2	Integer	
Skip Frames	2	Integer	
Average	2	Integer	
Year	2	Integer	
Month	2	Integer	
Day	2	Integer	
Hour	2	Integer	
Minute	2	Integer	
Second	2	Integer	
Millisecond	2	Integer	
Channels 1 through 16 Pressure	64	Float	4 bytes per channel
Channels 1 through 16 Temperature	64	Integer	Degrees C 4 bytes per channel

Long Status Packet

FUNCTION DESCRIPTION	BYTES	DATA TYPE	VALUE/NOTES
Packet Type	2	Integer	3Hex
Pad bytes (Forces quad byte alignment)	2	Integer	undefined
Module Name	20	char[20]	(not used)
Channels 1 thru 8 - Minimum Pressure	4	Float	(not used)
Channels 9 thru 16 - Minimum Pressure	4	Float	(not used)
Channels 1 through 8 - Maximum Pressure	4	Float	(not used)
Channels 9 through 16 - Maximum Pressure	4	Float	(not used)
Pressure Type	12	char[12]	Type of scan (not used)
Pressure Units	12	char[12]	Scan units (not used)
Temperature Type	12	char[12]	Temperature units (not used)
Status	20	char[20]	Current DSA status
Error	60	char[60]	Current DSA errors (not used)
Period	2	Integer	(not used)
Skip Frames	2	Integer	(not used)
Average	2	Integer	(not used)
Year	2	Integer	(not used)
Month	2	Integer	(not used)
Day	2	Integer	(not used)
Hour	2	Integer	(not used)
Minute	2	Integer	(not used)
Second	2	Integer	(not used)
Millisecond	2	Integer	(not used)

Status Packet

FUNCTION DESCRIPTION	BYTES	DATA TYPE	VALUE/NOTES
Packet ID	2	Integer	2Hex
Status	20	char[20]	Unique to Packet

Scan Raw Packet

FUNCTION DESCRIPTION	BYTES	DATA TYPE	VALUE/NOTES
Packet Type	2	Integer	4Hex
Frame Number	4	Integer	Current Frame Number
Channels 1 through 16 - Pressure	32	Integer	2 bytes per channel
Channels 1 through 16 - Temperature	32	Integer	2 bytes per channel

Scan EU Packet

FUNCTION DESCRIPTION	BYTES	DATA TYPE	VALUE/NOTES
Packet Type	2	Integer	5Hex
Pad bytes (Forces quad byte alignment)	2	Integer	undefined
Frame Number	4	Integer	Current Frame Number
Channels 1 through 16 - Pressure	64	Float	4 bytes per channel
Channels 1 through 16 - Temperature	32	Integer	Degrees C 2 bytes per channel

Scan Raw - Pressure Only Packet

FUNCTION DESCRIPTION	BYTES	DATA TYPE	VALUE/NOTES
Packet Type	2	Integer	6Hex
Frame Number	4	Integer	Current Frame Number
Channels 1 through 16 - Pressure	32	Integer	2 bytes per channel

Scan EU - Pressure Only Packet

FUNCTION DESCRIPTION	BYTES	DATA TYPE	VALUE/NOTES
Packet Type	2	Integer	7Hex
Pad bytes (Forces quad byte alignment)	2	Integer	undefined
Frame Number	4	Integer	Current Frame Number
Channels 1 through 16 - Pressure	64	Float	4 bytes per channel

ASCII Packet

This packet will be transmitted when the host issues one of the following commands:

- 1) SCAN with BIN set to 0
- 2) LIST n
- 3) ERROR

FUNCTION DESCRIPTION	BYTES	DATA TYPE	VALUE
ASCII Data (The first two bytes must NOT be 1Hex through 1FHex). Refer to the Command Section of this manual for the proper Command return formats.	1 to 1492	String	Unique to Packet. Each line is terminated with a CR, LF, CR-LF, or LF-CR.

EXAMPLES:

The following shows the format of the ASCII DATA portion of the List Packet in response to a LIST MASTER:

```

INSERT <temp> <chan> <press> <press counts> /M
INSERT <temp> <chan> <press> <press counts> /M
      :           :           :           :
INSERT <temp> <chan> <press> <press counts> /M
    
```

When a LIST ALL is commanded, Master and Calculated planes are listed. The Master items will have a /M suffix while the Calculated items will have a /C. The following is an example of a LIST ALL command:

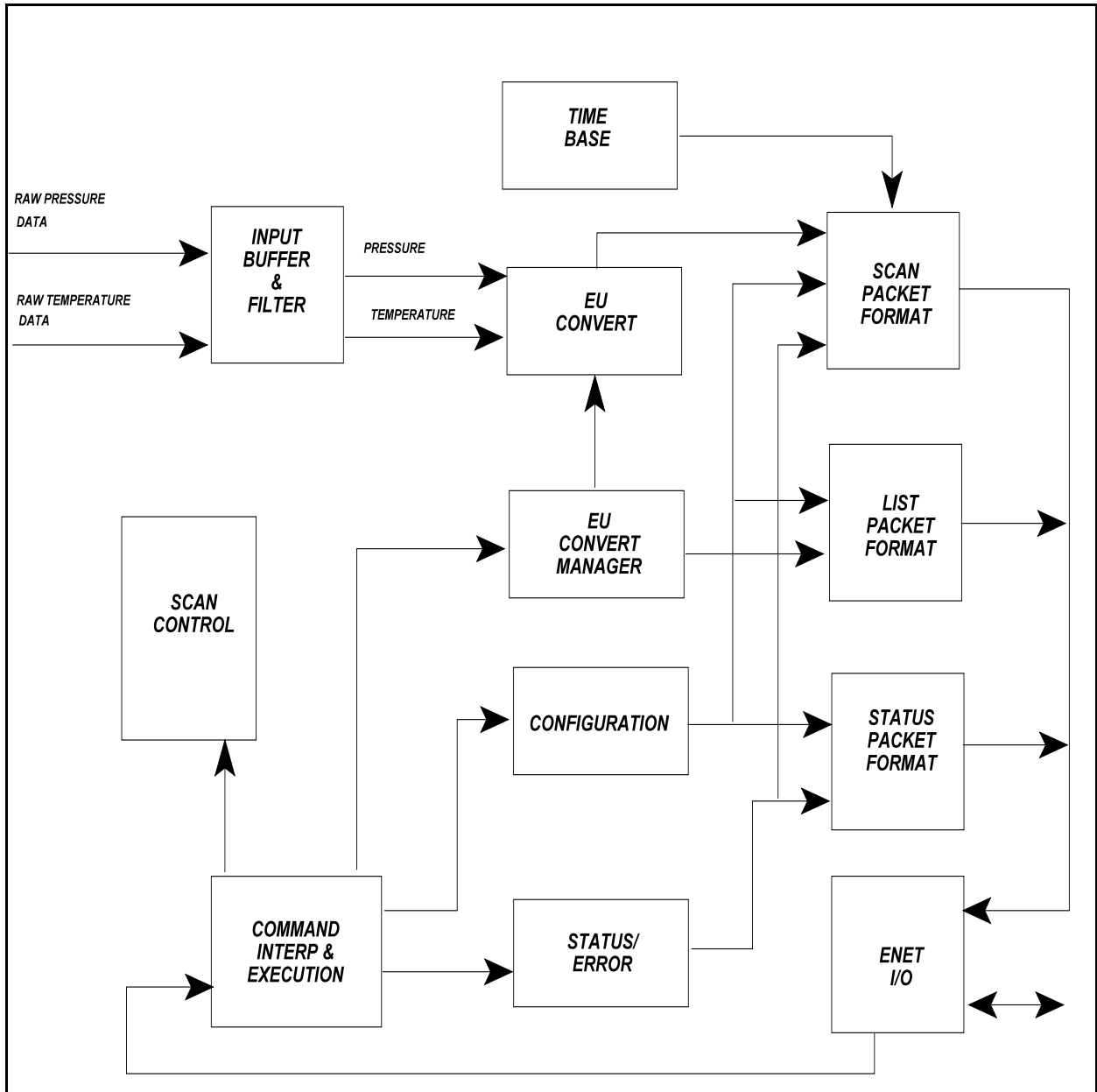
```

INSERT <temp> <chan> <press> <press counts>/M
INSERT <temp> <chan> <press> <press counts>/C
      :           :           :           :
INSERT <temp> <chan> <press> <press counts>/M
    
```

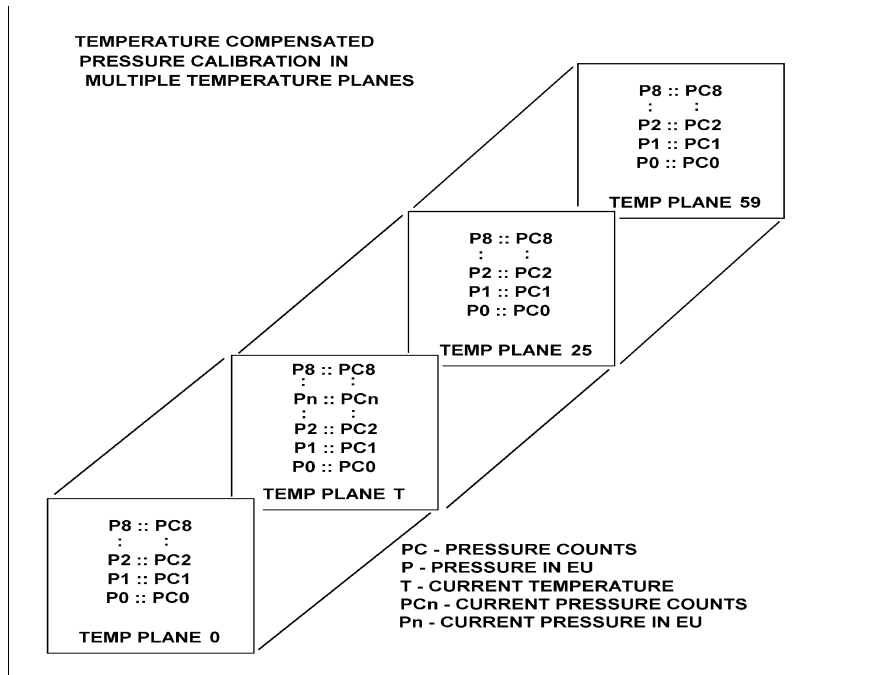
NETWORK PROTOCOLS SUPPORTED

Physical Layer :	10Base-2 or 10Base-T IEEE 802.3
Link Layer:	INTERNET Protocol (IP)
Transport Layer:	Transmission Control Protocol (TCP) User Datagram Protocol (UDP)

APPENDIX A - DSA DATA FLOW



APPENDIX B - 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 C - 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 ₂ O	0.014223 psi
DECIBAR	Decibar	0.68947 db	1.4504 psi
FTH2O	Foot of Water	2.3067 ftH ₂ O	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 ₂ O	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 ₂ O	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 D - ERROR LIST

ERROR:	DivZero
DESCRIPTION:	Divide by Zero error.
ERROR:	SMC 91C92 not present
DESCRIPTION:	Software could not find the Ethernet controller chip.
ERROR:	Receiver overrun on memory allocation
DESCRIPTION:	DSA was not able to accept all of the transmitted commands.
ERROR:	Received frame had align error
DESCRIPTION:	The received packet was misaligned.
ERROR:	Received frame had bad CRC
DESCRIPTION:	The received packet did not have the proper CRC bytes.
ERROR:	Could not allocate SMC memory for xmit
DESCRIPTION:	The Ethernet controller chip has failed.(V3.00 or earlier versions only)..
ERROR:	Cannot set time base
DESCRIPTION:	The value entered for period is out of range.
ERROR:	Tag bit set on High Pressure Byte
DESCRIPTION:	Data alignment error on the A/D Sampling.
ERROR:	Tag bit set on Low Pressure Byte
DESCRIPTION:	Data alignment error on the A/D Sampling.
ERROR:	Tag bit clear on Temp Chan Byte
DESCRIPTION:	Data alignment error on the A/D Sampling.
ERROR:	Tag bit clear on Low Temp Byte
DESCRIPTION:	Data alignment error on the A/D Sampling.
ERROR:	Tag bit clear on High Temp Byte
DESCRIPTION:	Data alignment error on the A/D Sampling.
ERROR:	Data buffer overflow
DESCRIPTION:	The data was not read from the DSA properly. This indicates that the DSA may be set to scan too fast or the host cannot accept the data. This should never occur when QPKTS is set to 0.
ERROR:	Invalid command received from host
DESCRIPTION:	The command received from the host is not in the DSA command list.
ERROR:	Invalid command for current mode
DESCRIPTION:	The command received cannot be executed in the current DSA operational mode. A command other than STOP or STATUS was received while the DSA was not in the ready mode.
ERROR:	List invalid category
DESCRIPTION:	The argument to the LIST command entered is not a valid argument.

ERROR: NVM write error on Config Vars
 DESCRIPTION: This indicates a failure in the Non Volatile Memory or associated hardware.

ERROR: NVM write error on PT support tables
 DESCRIPTION: This indicates a failure in the Non Volatile Memory or associated hardware.

ERROR: NVM write error on PT correction tables
 DESCRIPTION: This indicates a failure in the Non Volatile Memory or associated hardware.

ERROR: Insert channel not between 0 and 15
 DESCRIPTION: The channel argument of the INSERT command must be between 0 and 15.

ERROR: Insert temp not between 0 and 59
 DESCRIPTION: The temperature argument of the INSERT command must be between 0 and 59.

ERROR: Insert low bank pressure too low
 DESCRIPTION: The pressure argument of the pressure command was less than the PMINL value.

ERROR: Insert low bank pressure too high
 DESCRIPTION: The pressure argument of the pressure command was greater than the PMAXL value.

ERROR: Insert high bank pressure too low
 DESCRIPTION: The pressure argument of the pressure command was less than the PMINH value.

ERROR: Insert high bank pressure too high
 DESCRIPTION: The pressure argument of the pressure command was greater than the PMAXH value.

ERROR: Insert type must be M
 DESCRIPTION: The type argument to the INSERT command was not a MASTER point.

ERROR: Delete low temp too high
 DESCRIPTION: The low temperature argument to the DELETE command was greater than 59.

ERROR: Delete low temp too low
 DESCRIPTION: The low temperature argument to the DELETE command was less than 0.

ERROR: Delete high temp too low
 DESCRIPTION: The high temperature argument to the DELETE command was less than 0.

ERROR: Delete high temp too high
 DESCRIPTION: The high temperature argument to the DELETE command was greater than 59.

ERROR: Convert high temp calculated
 DESCRIPTION: A pressure conversion occurred with the temperature above 59 degrees.

ERROR: Convert low temp calculated
 DESCRIPTION: A pressure conversion occurred with the temperature below 0 degrees.

ERROR: NVM PT not initialized
DESCRIPTION: The pressure/temperature tables cannot be found in memory. This indicates a failure in the Non Volatile Memory or associated hardware during normal operation. This error could also occur during an initial power up.

ERROR: NVM CV not initialized
DESCRIPTION: The configuration variable tables cannot be found in memory. This indicates a failure in the Non Volatile Memory or associated hardware during normal operation. This error could also occur during an initial power up.

APPENDIX E - CHANGE LOG

Version 2.01

First Release

Version 2.02

Added the variables: UNITSCAN and CVTUNITS. This permitted the output of engineering units other than PSI.

Version 2.09

Several bug fixes.

Version 2.12

Increased size of internal data buffer from 128kb to 256kb.

Version 2.24

Reduced size of internal data buffer from 256kb to 128kb.
Added RAW and EU SCAN packets.

Version 2.25

Added support for 10Base-T.

Version 3.00

Added TCP/IP support

Version 3.02

Bug fixes to version 3.00.

Version 3.08

Added ability to change a single channel
Several bug fixes from version 3.02.

Version 3.09

Added support of EOL terminators so TELNET can be used for communications.

Version 3.10

Added the ability to support a DSA 3007. Each sensor has its own unique MIN and MAX settings.
Added BAUD settings: 1200, 9600, 19200, 38400, 57600, 115200.
Added ARINC 429 output capabilities.

Version 3.11

Corrected bug when external trigger is used.

Version 3.13

Corrected a bug in the EU conversion when absolute sensors are installed.

Version 3.14

Added a checksum to the RS232 output.

Version 3.15 February 2002

Deleted the variable SC
Added variable AUTOSCAN