GEOTECH INSTRUMENTS, LLC

SMART-24 SERIES
COMMAND & SETUP PROTOCOL

Interface Control Document

Version 2.1

MANUAL SUBJECT TO CHANGE WITHOUT NOTICE

March, 2012

For information relating to other Geotech Instruments products and manuals, inquires may be addressed to:

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Revision History

Date	By	Change Description
September 12, 2003	P. Akers	Version 1.0 initial release.
March 10, 2004	P. Akers	Version 1.1 release. Changes: • Modified prompts in section 3.3. • Added support for up to 5 serial ports [port] in the serial port related commands (3.6.1.2). • Changed [mode] values for SPM command (3.6.1.2.2). • Changed [protocol] values for SPP command (3.6.1.2.3). • Added new SPC command (3.6.1.2.4). • Renamed the following commands: o EIA to IPA (3.6.1.3.1) o EIM to IPM (3.6.1.3.2) o EIG to IPG (3.6.1.3.3) o EIH to IPH (3.6.1.3.4) o EID to IPD (3.6.1.3.5) o EIN to IPN (3.6.1.3.6) o ECM to IDM (3.6.1.3.7) • Added support for up to 7 TCP/IP ports [port] in the TCP/IP related commands (3.6.1.3). • Removed the [port] parameter from the IPH command (3.6.1.3.4). The Smart24 only uses one global host name for all TCP/IP connections. • Added IPE command (3.6.1.3.8) • Added ISA command (3.6.1.3.9) • Added ISM command (3.6.1.3.10) • Added ICA command (3.6.1.3.11) • Renamed commands ECE to CCE and ECD to CCD, then moved them to the CD 1.1 related command section (3.6.1.4) at sections 3.6.1.4.13 and 3.6.1.4.14 respectively. • Added the CD 1.1 profile parameter [profile] to each CD 1.1 related command in section 3.6.1.4. • Removed the internal IP port [port] parameter from the CDA (3.6.1.4.11) and CCP (3.6.1.4.12) commands. • Added CDE command (3.6.1.4.15).

		• Added CRT command (3.6.1.4.16). • Added CIP command (3.6.1.4.17). • Added CRR command (3.6.1.4.18). • Added USR command (3.6.4.2.3). • Added SUN command (3.6.4.2.4). • Added SCP command (3.6.4.2.5). • Added SCU command (3.6.4.2.6). • Get State of Health (3.6.4.5.2) changed DSP_FLASH to DSP_+3.3V, DSP_PSEUDO to DSP_GND and DSP_SDRAM to DSP_+5V. • Added section 3.6.4.6, LOG System Commands. • Added LGE command (3.6.4.6.1). • Added LGD command (3.6.4.6.2). • Added LGT command (3.6.4.6.3).
April 1, 2004	P. Akers	Version 1.2 release. Changes: • Changed channel gain values in section 3.6.1.1.5. • Changed data mode values in section 3.6.1.2.2. • Changed protocol values in section 3.6.1.2.3. • Changed character mode values in section 3.6.1.2.4. • Changed data type values to numerical values in section 3.6.1.4.4. • Added mode parameter to all calibration commands in section 3.6.2.1. • Added GPS Slave mode to TSM command (3.6.3.1.1). • Changed channel parameter of the OSC command (3.6.4.3.1) to board number. • Added HLP command (3.6.4.1.8). • Added LGO command (3.6.4.1.9). • Added SFD command (3.6.4.1.10). • Moved SCG command from Table 4 to Table 3. • Removed the port parameter from the IPS command (3.6.4.5.4).
June 1, 2004	P. Akers	Version 1.3 release. Changes:

		• Updated Table 2 • Added "A for all" to the [profile] parameters of the CD 1.1 commands in section 3.6.1.4. • Added CNC command (3.6.1.4.19). • Added CNS command (3.6.1.4.20). • Added LGL command (3.6.4.6.4). • Added sections 3.7 & 3.8 - SMART-24R/A Additional Recorder Commands
June 8, 2004	P. Akers	Version 1.4 release. Changes: • Added sensor types 5 & 6 to CST command in section 3.6.1.4.5. • Added FLT, FLN, FAL, FFC, FCM & FGO commands in section 3.8.1.5. • Added section 3.8.1.5 – Drive status command DRV. • Updated Table 6 with the new commands. • Added more information in section 3.1.
June 28, 2004	P. Akers	Version 1.5 release. Changes: • Modified the CLN command to allow for a unique location name for each channel in section 3.6.1.4.2. (This will affect the output of the GET command to display a LOC name for each channel in each CD profile.) • Appendix A example GET command updated with a full SMART-24R example showing all current commands.
August 16, 2004	P. Akers	Version 1.6 release. Changes: • Modified the THP command (section 3.8.1.3.2) to allow for a value of 0 to be entered to disable the filter. • Modified the TLP command (section 3.8.1.3.3) to allow for a value of 0 to be entered to disable the filter. • Modified the TSC command (section 3.8.1.3.5) to allow for fractional second values to be entered. • Modified the TLC command (section 3.8.1.3.6) to allow for fractional second values to be entered. • Modified the DRV command (section 3.8.1.6.1) to correct misspelling (DRIVE_A_VOL_LABLE to DRIVE_A_VOL_LABEL, etc.). • Added new Autozero commands in section 3.6.4.7 (Sensor Autozero Commands – AZN, AZE, AZS, AZI, AZR, AZC and AZG).

		• Added new calibration signal types to the CAO command (section 3.6.2.1.1). • Modified the digital calibration control modes of the CAC command (section 3.6.2.1.7). • Modified the continuous recording modes of the CRM command (section 3.8.1.1.1) to support a ring buffer mode and a fill all mode only. • Added new SOH recording commands in section 3.8.1.7 (STD & SGO) for future reference. • Added new LOG recording commands in section 3.8.1.8 (LTD & FGG). • Updated tables to reflect new commands.
October 26, 2004	P. Akers	Version 1.7 release. Changes: • Updated the secondary sample rate command SRS (section 3.6.1.1.2) to show the available secondary sample rates. • Updated LOG System Commands (section 3.6.4.6) with a note on usage. • Updated LGE command (section 3.6.4.6.1) to add all LOG message types available. • Updated LGD command (section 3.6.4.6.2) to add all LOG message types available. • Updated LGL command (section 3.6.4.6.4) to give the meaning of each debug log level. LGL is now saved in FLASH setup and returned in the GET response. • Added section 3.8.1.9 Miscellaneous Commands. • Added new command, USB Hardware Enable/Disable (section 3.8.1.9.1). • Updated Table 7 with new USB command and notes.
December 23, 2004	P. Akers	Version 1.8 release. Changes: • Updated allowed values and factory defaults to all relevant commands. • Added new command, SFG, Set Front-End Gain Value (section 3.6.1.1.6). • Added new command, SSS, Set Sensor Sensitivity Value (section 3.6.1.1.7). • Added new command, ANO, Anonymous FTP Access Enable/Disable (section 3.6.1.3.12). • Added new command, DMF, Set Data Move Percent Full Trigger Limit (section 3.8.1.9.2). • Added new command, DMI, Start Data File Move

		Immediately Command (section 3.8.1.9.3). • Added new command, DMT, Set Data Move Time Interval Trigger Limit (section 3.8.1.9.4). • Added new command, NPD, No Power Down Drive Mode Enable/Disable (section 3.8.1.9.5).
December 05, 2005	P. Akers	Version 1.9 release. Changes: • Added new command, SFT, Set ADC FIR Filter Type (section 3.6.1.1.8). • Added new command, SSD, Enable/Disable ADC Time Sync Delay Correction (section 3.6.1.1.9). • Added new command, URT, Set USGS RTD Format (section 3.6.1.2.5). • Added new command, CDS, Set CD 1.1 Data Frame Save Size (section 3.6.1.4.21). • Added new command, CSS, Set CD 1.1 SOH Frame Save Size (section 3.6.1.4.22). • Added new command, DDC, Set LCD Data Display Control (section 3.6.4.1.11). • Added new command, GCS, Get Data Channel Statistics (section 3.6.4.5.6). • Added new command, GPC, Set GPS Configuration (section 3.6.3.2.2). • Added new command, GPT, Get GPS Satellite Tracking Status (section 3.6.4.5.7). • Updated the LGL command, Set LOG Debug Message Level (section 3.6.4.6.4). • Added new command, CBF, Enable/Disable CD Backfill Mode (section 3.6.1.4.23). • Added new command, AGK, Generate New DSA Key Pair (section 3.6.4.8.1). • Added new command, ARK, Start/Abort A Pending DSA Key Pair (section 3.6.4.8.2). • Added new command, ASK, Start/Abort A Pending DSA Key Pair (section 3.6.4.8.3). • Added new command, AUG, Set User DSA G Values (section 3.6.4.8.4). • Added new command, AUP, Set User DSA P Values (section 3.6.4.8.5). • Added new command, AUQ, Set User DSA Q Values (section 3.6.4.8.6). • Added new command, PCS, Get PCMCIA PC Card Status

		(section 3.6.4.5.8). • Added new command, FZS, Get Fortezza Card Status (section 3.6.4.5.9).
August 26, 2010		Version 2.0 release. Changes: • Added new command, RST, Hardware Reset (section 3.6.4.1.7). • Added new command, GTS, Get Time Synchronization Status (section 3.6.4.5.10). • Added new command, AZW, Set Autozero Pulse Width (section 3.6.4.7.8). • Added new command, OSR, Set Offset to Remove from AUX & Mass Position Channels (section 3.6.4.3.2). • Added new command, DRT, Display IP Routing Table Status (section 3.6.4.5.11). • Added new command, IPP, Set Primary IP Port (section 3.6.1.3.13). • Added new command, SPH, Set PPP Connection Handshake Mode (section 3.6.1.3.14). • Updated commands CTD (section 3.8.1.1.3), ETD (section 3.8.1.2.2), LTD (section 3.8.1.8.1) and STD (section 3.8.1.7.1) to add support for USB Drive Extended Partition. • Added new command, CTM, Enable/Disable CD Send Triggered Data (section 3.6.1.4.25). • Added new commands, EWE, Enable/Disable Earthworm Profile (section 3.6.1.5.1), EWI, Set Earthworm Installation ID (section 3.6.1.5.2) and EWM, Set Earthworm Module ID (section 3.6.1.5.3). • Added new command, GOS, Set GPS Local Time Offset (section 3.6.3.2.3). • Added new command, CBM, Set CD Backfill Mode (section 3.6.1.4.24).
March, 2012		Version 2.1 release. Changes: • Added new command, EWS, Set Earthworm Client/Server Mode (section 3.6.1.5.4).

Table of Contents

List of Tables

SMART Series Command & Setup Protocol ICD

1 GENERAL

1.1 INTRODUCTION

This interface control document (ICD) defines the ASCII Command and Setup Protocol (CSP) used to provide the user command and setup interface to Geotech's SMART Series instruments. It covers the communication protocol and the format of messages that flow between a SMART Series instrument and a host computer.

2 BACKGROUND

The SMART Series of instruments include a wide range of seismic data acquisition products. The set of electronic cards that make up the SMART Series can be combined to form remote digitizers, loggers and strong motion recorders. Commands can be sent to and responses received from a SMART Series instrument to configure, control and monitor its operation. This is the user interface. Data and State of Health information from a SMART Series instrument is generally collected either as a real time data stream or off-line as data files. This is the data interface.

The CSP user interface described in this document is a simple human readable ASCII protocol. This interface can be accessed in one of three ways:

- Directly via a serial port running in a terminal mode and using a program such as HyperTerminal on a PC to manually enter commands and receive responses and status.

- Telnet over a TCP/IP connection (serial PPP and ethernet) to a host computer to manually enter commands and receive responses and status.

- Wrapped in CD 1.1 protocol command and response frames.

The data interface uses the CD 1.1 protocol data and alert frames to transmit data and state of health information in real time to a host computer. Please refer to the CD 1.1 documentation for details on this format and protocol specification. Data can also be retrieved off line from some SMART Series instruments as CD1.1 formatted data files. Please refer to the SMART-24 User's Manual for specifics of this file format.

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3 CSP SPECIFICATIONS

3.1 CSP PROTOCOL

The SMART Series CSP protocol is a simple clear ASCII command and response format. It uses three letter commands with optional parameters to command and control a SMART Series instrument. Some commands execute immediately, while others require a system reboot. In any case, after all parameters have been set as desired, the ASR command should be issued the save the parameters into FLASH. This command will decide whether a system reboot is required or not.

The following are the factory default username and password to access the CSP, Telnet and FTP:

Factory default username: smart24
Factory default password: changeme

The following sections describe the CSP protocol in detail.

3.2 NOTATIONAL CONVENTIONS

The following notational conventions are used in the specification:

_	- The underscore represents required spaces.
,	- Commas are required where shown.
<ENTER>	- Enter key on the PC or a Carriage Return (CR) byte 0x0d
<CR>	- Carriage Return (CR) byte 0x0d
<LF>	- Line Feed (LF) byte 0x0a

3.3 DIRECT SERIAL OR TELNET USAGE NOTES

The SMART Series CSP protocol can be used directly via a serial port running in a terminal mode. Using a program such as HyperTerminal on a PC, the user can manually enter commands and receive responses and status from a SMART Series instrument. In a networked environment, Telnet can also be used to directly access the CSP interface over a TCP/IP connection (serial PPP and ethernet).

When using a direct connection, prompts are used to indicate commands and responses as follows:

>	Waiting for a command input from the user.

A response may be; OK indicating success, ERROR indicating an error occurred or the requested information.

The following is an example of a successful command:

```
> IPA_1P,192.168.0.1<ENTER>
OK<CR><LF>
> [Waiting for next command]
```

The following is an example of a command error:

```
> IPA_1P,1920.168.0.1<ENTER>
Invalid Parameters!<CR><LF>
> [Waiting for next command]
```

The following is an example of a command query:

```
> IPA_1P,?<ENTER>
IPA_1P,192.168.0.1<CR><LF>
> [Waiting for next command]
```

The following is an example of getting command help:

```
> IPA_/?<ENTER>
      IPA [port],[IP address]<CR>
          [port] - 1E,2E,1S,2S,3S,4S,5S
          [IP address] - IP address, XXX.XXX.XXX.XXX
> [Waiting for next command]
```

The following is an example of a status command:

```
> SOH<ENTER>
SOH START<CR><LF>
TIME: 21:58:35,06/04/2004
[other SOH]
SOH END<CR><LF>
> [Waiting for next command]
```

If a username and password have been set to control access to the instrument, the username and password must be given using the USR and PSW commands before any other commands will be processed.

3.4 CD 1.1 USAGE NOTES

The CSP protocol can be used wrapped in CD 1.1 command request and response frames. Commands are embedded in the command message field of the CD 1.1 command request frame. Single commands may be sent (one per command request frame) as well as multiple commands in one frame. Command response frames will report back OK if all commands were processed without error, ERROR if an error occurred or with any

requested status information. The prompts shown in section 3.3 are not used when the CSP is wrapped inside CD 1.1 frames.

If the username and password has been set to control access to the instrument, they must be given using the USR & PSW commands before any other commands will be processed. If the TCP/IP connection is lost or dropped, the password must be given again to gain access.

Other CD 1.1 usage notes:

- Start most command requests (except queries below) with:

  "USR smart24\r\n"
  "PSW changeme\r\n"

  where "smart24" and "changeme" are the current username and password to ensure access. The username/password access times out after 10 minutes on no activity.

- The following commands should always be used alone (USR & PSW before them are OK) as they return a large amount of data:

  GET
  HLP
  HWS
  IPS
  GPS
  SOH

- Queries can only be used when issued as a single command (not even USR & PSW can be used in the same frame). Example:

  "SPB 1,?\r\n"

  returns: "SPB 1,115200\r\n"

- When multiple commands are issued in one frame, the following will be returned when all were processed OK (if there where 105 commands in the request frame):

  "COMMAND_MULTIPLE_COMMANDS_PROCESSED_OK 105\r\n"

- Note if any one command in a multiple command request fails, processing is stopped and any commands already processed are aborted if possible.

- Possible error messages that could be returned:

"COMMAND_MEMORY_ALLOCATION_ERROR\r\n" - Internal memory allocation error. (BAD!)

"COMMAND_FORMAT_ERROR\r\n" - Command was understood but parameters where bad, if you issue a USR or PSW with the wrong username or password you will get this message.

"COMMAND_INVALID_ERROR\r\n" - Did not recognize a command at all. Not in my lookup list.

"COMMAND_ACCESS_DENIED_ERROR\r\n" - Command was issued with giving the correct USR & PSW first.

"COMMAND_UNKNOWN_ERROR\r\n" - Unknown error.

"COMMAND_INPUT_ERROR\r\n" - Command string in the request frame was not properly formatted or was trash.

"COMMAND_NO_LINES_ERROR\r\n" - Could not find any properly formatted command lines in the request string.

- Really bad connection or framing/CRC errors will cause the socket connection to be dropped without any returned response frame. Also, the socket connection will be dropped after a timeout period of 10 minutes of no activity.

Table 1 shows the SMART Series data channels that are available to be enabled or disabled in the CD 1.1 output data stream:

Table 1. SMART Series Available CD 1.1 Data Channels

Channel	Designation
Channel 1 Primary	1P
Channel 2 Primary	2P
Channel 3 Primary	3P
Channel 4 Primary	4P
Channel 5 Primary	5P
Channel 6 Primary	6P
Channel 1 Secondary	1S
Channel 2 Secondary	2S
Channel 3 Secondary	3S
Channel 4 Secondary	4S
Channel 5 Secondary	5S
Channel 6 Secondary	6S
I/O 1 Aux Input	1A

I/O 2 Aux Input	2A
Channel 1 Mass Position	1M
Channel 2 Mass Position	2M
Channel 3 Mass Position	3M
Channel 4 Mass Position	4M
Channel 5 Mass Position	5M
Channel 6 Mass Position	6M

3.5 COMMON CSP COMMAND SUMMARY

3.5.1 Alphabetical

The following table gives an alphabetical listing of the available common CSP commands available in all SMART-24 instruments.

Table 2. Alphabetical Common CSP Command Summary

Command	Function	Note	Section
ABT	Abort setup	I	3.6.4.1.1
AGK	Generate New DSA Key Pair	I	3.6.4.8.1
ANO	Anonymous FTP Access Enable/Disable	I	3.6.1.3.12
ARK	Return DSA Public Key	I	3.6.4.8.2
ASK	Start/Abort A Pending DSA Key Pair	I	3.6.4.8.3
ASR	Accept new setup parameters & reboot	I	3.6.4.1.2
AUG	Set User DSA G Values	I	3.6.4.8.4
AUP	Set User DSA PValues	I	3.6.4.8.5
AUQ	Set User DSA QValues	I	3.6.4.8.6
AZC	Set Scheduled Autozero Channels	A	3.6.4.7.6
AZE	Set Scheduled Autozero Enable/Disable	A	3.6.4.7.2
AZG	Save & Start Using New Scheduled Autozero Parameters	A	3.6.4.7.7
AZI	Set Scheduled Autozero Interval	A	3.6.4.7.4
AZN	Immediate Autozero Command	I	3.6.4.7.1
AZR	Set Scheduled Autozero Repetitions	A	3.6.4.7.5
AZS	Set Scheduled Autozero Start Time	A	3.6.4.7.3
AZW	Set Autozero Pulse Width	A	3.6.4.7.8
BTL	Reboot into the boot loader mode	I	3.6.4.1.3
CAA	Set calibration amplitude	C	3.6.2.1.2
CAC	Set calibration digital control on/off	C	3.6.2.1.7
CAD	Set calibration duration	C	3.6.2.1.5
CAF	Set calibration frequency	C	3.6.2.1.3
CAG	Calibration go command	I	3.6.4.4.1
CAH	Calibration halt command	I	3.6.4.4.2
CAI	Set calibration interval	C	3.6.2.1.8
CAM	Set CD 1.1 authentication mode	R	3.6.1.4.7
CAO	Set calibration output signal	C	3.6.2.1.1
CAR	Set calibration repetitions	C	3.6.2.1.9

CAS	Set calibration output relay state	C	3.6.2.1.6
CAT	Set calibration start time	C	3.6.2.1.10
CAW	Set calibration pulse or bit width	C	3.6.2.1.4
CBF	Enable/Disable CD 1.1 Backfill Mode	I	3.6.1.4.23
CBM	Set CD 1.1 Backfill Mode	I	3.6.1.4.24
CCD	Set CD 1.1 data channel output disables	R	3.6.1.3.9
CCE	Set CD 1.1 data channel output enables	R	3.6.1.3.8
CCL	Set CD 1.1 calib/calper mode & values	I	3.6.1.4.8
CCM	Set CD 1.1 compression mode	I	3.6.1.4.6
CCN	Set CD 1.1 channel name	R	3.6.1.4.3
CCP	Set CD 1.1 connection request remote port	I	3.6.1.4.12
CDA	Set CD 1.1 destination IP address	I	3.6.1.4.11
CDE	Enable/disable CD 1.1 profile	R	3.6.1.4.15
CDF	Set CD 1.1 data frame size	R	3.6.1.4.9
CDS	Set CD 1.1 data frame save size	I	3.6.1.4.21
CDT	Set CD 1.1 data type	I	3.6.1.4.4
CIP	Set CD 1.1 command input port	I	3.6.1.4.17
CLN	Set CD 1.1 location name	R	3.6.1.4.2
CNC	Set CD 1.1 Creator Name	I	3.6.1.4.19
CNS	Set CD 1.1 Station Name	R	3.6.1.4.20
CRR	Set CD 1.1 connection request retry	I	3.6.1.4.18
CRT	Set CD 1.1 connection request timeout	I	3.6.1.4.16
CSF	Set CD 1.1 SOH alert frame output frequency	R	3.6.1.4.10
CSN	Set CD 1.1 site name	R	3.6.1.4.1
CSS	Set CD 1.1 SOH frame save size	I	3.6.1.4.22
CST	Set CD 1.1 sensor type	I	3.6.1.4.5
CTM	Enable/Disable CD 1.1 Send Triggered Data	R	3.6.1.4.25
DDC	Set LCD Data Display Control	I	3.6.4.1.11
DRT	Get IP routing table status	I	3.6.4.5.11
EWE	Enable/Disable Earthworm Profile	R	3.6.1.5.1
EWI	Set Earthworm Installation ID	R	3.6.1.5.2
EWM	Set Earthworm Module ID	R	3.6.1.5.3
EWS	Set Earthworm Client/Server Mode	R	3.6.1.5.4
FZS	Get Fortezza Card Status	I	3.6.4.5.9
GCD	Global ADC channel disables	R	3.6.1.1.4
GCE	Global ADC channel enables	R	3.6.1.1.3
GCS	Get Data Channel Statistics	I	3.6.4.5.6
GCT	Set GPS cycle time	I	3.6.4.2.1
GET	Get all setup parameters	I	3.6.4.1.4
GOS	Set GPS Local Time Offset	I	3.6.3.2.3
GPC	Set GPS Configuration	I	3.6.3.2.2
GPS	Get GPS status	I	3.6.4.5.3
GPT	Get GPS Satellite Tracking Status	I	3.6.4.5.7
GTS	Get Time Synchronization Status	I	3.6.4.5.10
HLP	Get Command Help	I	3.6.4.1.8
HWS	Get hardware status	I	3.6.4.5.5
ICA	Set IP port PPP client IP address	R	3.6.1.3.11
IDM	Set IP mode	R	3.6.1.3.7
IPA	Set IP address	R	3.6.1.3.1

IPD	Set IP domain name	R	3.6.1.3.5
IPE	Set IP port enable/disable	R	3.6.1.3.8
IPG	Set IP gateway address	R	3.6.1.3.3
IPH	Set IP host name	R	3.6.1.3.4
IPM	Set IP address mask	R	3.6.1.3.2
IPN	Set IP DNS server address	R	3.6.1.3.6
IPP	Set primary IP port	R	3.6.1.3.13
IPS	Get TCP/IP status	I	3.6.4.5.4
ISA	Set IP port PPP server IP address	R	3.6.1.3.9
ISM	Set IP port PPP server IP mask	R	3.6.1.3.10
JST	Set jamset threshold	I	3.6.3.1.2
LGD	Disable LOG messages	I	3.6.4.6.2
LGE	Enable LOG messages	I	3.6.4.6.1
LGL	Set Log Level on/off	I	3.6.4.6.4
LGO	Logout this Connection	I	3.6.4.1.9
LGT	Enable/Disable long time in LOG messages	I	3.6.4.6.3
OFF	Power off	I	3.6.4.1.5
OSC	Perform an ADC offset calibration	I	3.6.4.3.1
OSR	Set Offset to Remove from AUX & MP Channels	I	3.6.4.3.2
PCS	Get PCMCIA PC Card Status	I	3.6.4.5.8
PSW	Enter password	I	3.6.4.2.1
RBT	Reboot	I	3.6.4.1.6
RCL	Set ADC input relay state	I	3.6.4.3.3
RST	Hardware reset	I	3.6.4.1.7
SCG	Set channel gain	I	3.6.1.1.5
SCP	Set client password	I	3.6.4.2.5
SCU	Set client username	I	3.6.4.2.6
SET	Set current time.	I	3.6.3.3.1
SFD	Set Factory Defaults	I	3.6.4.1.10
SFG	Set Front End Gain	I	3.6.1.1.6
SFT	Set ADC FIR Filter Type	R	3.6.1.1.8
SOH	Get state of health parameters	I	3.6.4.5.2
SPB	Set serial port baud rate	R	3.6.1.2.1
SPC	Set serial port character mode	R	3.6.1.2.4
SPH	Set PPP connection handshake mode	R	3.6.1.3.14
SPM	Set serial port communications mode	R	3.6.1.2.2
SPP	Set serial port communication protocol	R	3.6.1.2.3
SPW	Set password	I	3.6.4.2.2
SRP	Set primary sample rate	R	3.6.1.1.1
SRS	Set secondary sample rate	R	3.6.1.1.2
SSD	Enable/Disable ADC Time Sync Delay Correction	R	3.6.1.1.9
SSS	Set Sensor Sensitivity	I	3.6.1.1.7
SUN	Set system username	I	3.6.4.2.4
TSM	Set time synchronization mode	I	3.6.3.1.1
TYP	Get Smart Series type	I	3.6.4.5.1
URT	Set USGS RTD Format	R	3.6.1.2.5
USR	Enter system username	I	3.6.4.2.3

Notes: I) Immediate Commands
R) Setup commands that require an ASR command to save new configuration parameters and reboot the system.
C) Calibration commands that require a CAG command to set.
A) Autozero commands that require a AZG command to set.

3.5.2 Functional

The following tables give a summary of the common CSP commands grouped by function.

Table 3 shows command functions that executed immediately.

Table 3. Common CSP Command Functions

Command	Function	Note	Section
ABT	Abort setup	I	3.6.4.1.1
AGK	Generate New DSA Key Pair	I	3.6.4.8.1
ANO	Anonymous FTP Access Enable/Disable	I	3.6.1.3.12
ARK	Return DSA Public Key	I	3.6.4.8.2
ASK	Start/Abort A Pending DSA Key Pair	I	3.6.4.8.3
ASR	Accept new setup parameters & reboot	I	3.6.4.1.2
AUG	Set User DSA G Values	I	3.6.4.8.4
AUP	Set User DSA PValues	I	3.6.4.8.5
AUQ	Set User DSA QValues	I	3.6.4.8.6
AZN	Immediate Autozero Command	I	3.6.4.7.1
BTL	Reboot into the boot loader mode	I	3.6.4.1.3
CAG	Calibration go command	I	3.6.4.4.1
CAH	Calibration halt command	I	3.6.4.4.2
CBF	Enable/Disable CD 1.1 Backfill Mode	I	3.6.1.4.23
CBM	Set CD 1.1 Backfill Mode	I	3.6.1.4.24
CCL	Set CD 1.1 calib/calper mode & values	I	3.6.1.4.8
CCM	Set CD 1.1 compression mode	I	3.6.1.4.6
CCP	Set CD 1.1 connection request remote port	I	3.6.1.4.12
CDA	Set CD 1.1 destination IP address	I	3.6.1.4.11
CDS	Set CD 1.1 data frame save size	I	3.6.1.4.21
CDT	Set CD 1.1 data type	I	3.6.1.4.4
CIP	Set CD 1.1 command input port	I	3.6.1.4.17
CNC	Set CD 1.1 Creator Name	I	3.6.1.4.19
CRR	Set CD 1.1 connection request retry	I	3.6.1.4.18
CRT	Set CD 1.1 connection request timeout	I	3.6.1.4.16
CSS	Set CD 1.1 SOH frame save size	I	3.6.1.4.22
CST	Set CD 1.1 sensor type	I	3.6.1.4.5
DDC	Set LCD Data Display Control	I	3.6.4.1.11
DRT	Get IP routing table status	I	3.6.4.5.11
FZS	Get Fortezza Card Status	I	3.6.4.5.9
GCS	Get Data Channel Statistics	I	3.6.4.5.6

GCT	Set GPS cycle time	I	3.6.4.2.1
GET	Get all setup parameters	I	3.6.4.1.4
GOS	Set GPS Local Time Offset	I	3.6.3.2.3
GPC	Set GPS Configuration	I	3.6.3.2.2
GPS	Get GPS status	I	3.6.4.5.3
GPT	Get GPS Satellite Tracking Status	I	3.6.4.5.7
GTS	Get Time Synchronization Status	I	3.6.4.5.10
HLP	Get Command Help	I	3.6.4.1.8
HWS	Get hardware status	I	3.6.4.5.5
IPS	Get TCP/IP status	I	3.6.4.5.4
JST	Set jamset threshold	I	3.6.3.1.2
LGD	Disable LOG messages	I	3.6.4.6.2
LGE	Enable LOG messages	I	3.6.4.6.1
LGL	Set Log Level on/off	I	3.6.4.6.4
LGO	Logout this Connection	I	3.6.4.1.9
LGT	Enable/Disable long time in LOG messages	I	3.6.4.6.3
OFF	Power off	I	3.6.4.1.5
OSC	Perform an ADC offset calibration	I	3.6.4.3.1
OSR	Set Offset to Remove from AUX & MP Channels	I	3.6.4.3.2
PCS	Get PCMCIA PC Card Status	I	3.6.4.5.8
PSW	Enter password	I	3.6.4.2.1
RBT	Reboot	I	3.6.4.1.6
RCL	Set ADC input relay state	I	3.6.4.3.3
RST	Hardware reset	I	3.6.4.1.7
SCG	Set channel gain	I	3.6.1.1.5
SCP	Set client password	I	3.6.4.2.5
SCU	Set client username	I	3.6.4.2.6
SET	Set current time.	I	3.6.3.3.1
SFD	Set Factory Defaults	I	3.6.4.1.10
SFG	Set Front End Gain	I	3.6.1.1.6
SOH	Get state of health parameters	I	3.6.4.5.2
SPW	Set password	I	3.6.4.2.2
SSS	Set Sensor Sensitivity	I	3.6.1.1.7
SUN	Set system username	I	3.6.4.2.4
TSM	Set time synchronization mode	I	3.6.3.1.1
TYP	Get Smart Series type	I	3.6.4.5.1
USR	Enter system username	I	3.6.4.2.3

Table 4 shows setup functions that must followed by an ASR command to take effect.

Table 4. Common CSP Setup Functions

Command	Function	Note	Section
CAM	Set CD 1.1 authentication mode	R	3.6.1.4.7
CCD	Set CD 1.1 data channel output disables	R	3.6.1.3.9
CCE	Set CD 1.1 data channel output enables	R	3.6.1.3.8
CCN	Set CD 1.1 channel name	R	3.6.1.4.3
CDE	Enable/disable CD 1.1 profile	R	3.6.1.4.15

CDF	Set CD 1.1 data frame size	R	3.6.1.4.9
CLN	Set CD 1.1 location name	R	3.6.1.4.2
CNS	Set CD 1.1 Station Name	R	3.6.1.4.20
CSF	Set CD 1.1 SOH alert frame output frequency	R	3.6.1.4.10
CSN	Set CD 1.1 site name	R	3.6.1.4.1
CTM	Enable/Disable CD 1.1 Send Triggered Data	R	3.6.1.4.25
EWE	Enable/Disable Earthworm Profile	R	3.6.1.5.1
EWI	Set Earthworm Installation ID	R	3.6.1.5.2
EWM	Set Earthworm Module ID	R	3.6.1.5.3
EWS	Set Earthworm Client/Server Mode	R	3.6.1.5.3
GCD	Global ADC channel disables	R	3.6.1.1.4
GCE	Global ADC channel enables	R	3.6.1.1.3
ICA	Set IP port PPP client IP address	R	3.6.1.3.11
IDM	Set IP mode	R	3.6.1.3.7
IPA	Set IP address	R	3.6.1.3.1
IPD	Set IP domain name	R	3.6.1.3.5
IPE	Set IP port enable/disable	R	3.6.1.3.8
IPG	Set IP gateway address	R	3.6.1.3.3
IPH	Set IP host name	R	3.6.1.3.4
IPM	Set IP address mask	R	3.6.1.3.2
IPN	Set IP DNS server address	R	3.6.1.3.6
IPP	Set primary IP port	R	3.6.1.3.13
ISA	Set IP port PPP server IP address	R	3.6.1.3.9
ISM	Set IP port PPP server IP mask	R	3.6.1.3.10
SFT	Set ADC FIR Filter Type	R	3.6.1.1.8
SPB	Set serial port baud rate	R	3.6.1.2.1
SPC	Set serial port character mode	R	3.6.1.2.4
SPH	Set PPP connection handshake mode	R	3.6.1.3.14
SPM	Set serial port communications mode	R	3.6.1.2.2
SPP	Set serial port communication protocol	R	3.6.1.2.3
SRP	Set primary sample rate	R	3.6.1.1.1
SRS	Set secondary sample rate	R	3.6.1.1.2
SSD	Enable/Disable ADC Time Sync Delay	R	3.6.1.1.9
URT	Set USGS RTD Format	R	3.6.1.2.5

Table 5 shows calibration functions the must followed by a CAG command to take effect.

Table 5. Common CSP Calibration Functions

Command	Function	Note	Section
CAA	Set calibration amplitude	C	3.6.2.1.2
CAC	Set calibration digital control on/off	C	3.6.2.1.7
CAD	Set calibration duration	C	3.6.2.1.5
CAF	Set calibration frequency	C	3.6.2.1.3
CAI	Set calibration interval	C	3.6.2.1.8
CAO	Set calibration output signal	C	3.6.2.1.1
CAR	Set calibration repetitions	C	3.6.2.1.9
CAS	Set calibration output relay state	C	3.6.2.1.6

CAT	Set calibration start time	C	3.6.2.1.10
CAW	Set calibration pulse or bit width	C	3.6.2.1.4

Table 6 shows autozero functions the must followed by an AZG command to take effect.

Table 6. Common CSP Autozero Functions

Command	Function	Note	Section
AZC	Set Scheduled Autozero Channels	A	3.6.4.7.6
AZE	Set Scheduled Autozero Enable/Disable	A	3.6.4.7.2
AZG	Save & Start Using New Scheduled Autozero Parameters	A	3.6.4.7.7
AZI	Set Scheduled Autozero Interval	A	3.6.4.7.4
AZR	Set Scheduled Autozero Repetitions	A	3.6.4.7.5
AZS	Set Scheduled Autozero Start Time	A	3.6.4.7.3
AZW	Set Autozero Pulse Width	A	3.6.4.7.8

3.6 COMMON CSP COMMAND DESCRIPTIONS

3.6.1 Setup Parameters

Note that setup parameters are not accepted and enabled until an Accept Setup and Reboot (ASR) command is issued. All parameters should be first setup as necessary and then one ASR command issued.

3.6.1.1 ADC Related Parameters

3.6.1.1.1 SRP - Set Primary Sample Rates

SRP - Sets the primary sample rate for each ADC board in the system. All three channels on an ADC board will run at the same sample rate.

SRP_[board],[sample rate]<ENTER>

Where:

[board] – ADC board number 1 (channels 1- 3) or 2 (channels 4 – 6).
[sample rate] – Primary ADC sample rate; 2000, 1000, 500, 250, 200, 125, 100, 50, 40, 25, 20, 10, 5, 1 or 0 to disable **(Factory default is 50 sps for all primary channels.)**
[? will return the current value]

Example:

SRP_1,200<ENTER>

SRP_1,?<ENTER> Query
SRP_1,200<CR><LF> Returned string.

3.6.1.1.2 SRS - Set Secondary Sample Rates

SRS - Sets the secondary sample rate for each ADC board in the system. All three channels on an ADC board will run at the same sample rate.

SRS_[board],[sample rate]<ENTER>

Where:

[board] – ADC board number 1 (channels 1- 3) or 2 (channels 4 – 6).
[sample rate] – Secondary ADC sample rate (see below) or 0 to disable
(Factory default is 0 to disable all secondary sample rates.)
[? will return the current value]

The secondary sample rates available are related to the primary sample rate as follows:

Primary Sample Rate	Available Secondary Sample Rates
2000	1000, 500, 400, 250, 200, 100
1000	500, 250, 200, 125, 100, 50
500	250, 125, 100, 50, 25
250	125, 50, 25
200	100, 50, 40, 25, 20, 10
125	25
100	50, 25, 20, 10, 5
50	25, 10, 5
40	20, 10, 8, 5, 4, 2
25	5
20	10, 5, 4, 2, 1
10	5, 2, 1

5	1
1	None

If the user tries to enter an invalid secondary sample rate for a given primary sample rate, an error message will result.

Example:

SRS_2,20<ENTER>

SRS_2,?<ENTER>	Query
SRS_2,20<CR><LF>	Returned string.

3.6.1.1.3 GCE – Set Global Channel Enables

GCE – Enable ADC channels, both primary and secondary data streams.

GCE_[channel],[channel]…<ENTER>

Where:

[channel] – Channel number to enable; 1, 2, 3, 4, 5 or 6. Special case: 0 will enable all channels. **(The factory default will enable any channels found in the unit.)** [? will return the current value]

Example:

GCE_1,2,3<ENTER>	Enable channels 1, 2 and 3.
GCE_0<ENTER>	Enable all channels.

3.6.1.1.4 GCD – Set Global Channel Disables

GCD – Disables ADC channels, both primary and secondary data streams.

GCD_[channel],[channel]…<ENTER>

Where:

[channel] – Channel number to enable; 1, 2, 3, 4, 5 or 6. Special case: 0 will disable all channels.

Example:

GCD_4,5,6<ENTER>	Disable channels 4, 5 and 6.

GCD_0<ENTER> Disable all channels.

3.6.1.1.5 SCG – Set Channel Gain

SCG – Set the programmable gain for each channel.

SCG_[channel],[gain]<ENTER>

Where:

[channel] – Channel number to set; 1, 2, 3, 4, 5 or 6
[gain] – Channel gain; 1, 2, 4, 8, 16, 32, or 64
(Factory default is 1 for all channels.)
[? will return the current value]

Example:

SCG_1,10<ENTER>

SCG_1,?<ENTER> Query
SCG_1,10<CR><LF> Returned string

3.6.1.1.6 SFG – Set Front-End Gain

SFG – Set the analog front-end gain for each channel relative to 5-volt peak-to-peak full-scale. Note that this command is only used to reflect the analog front-end configuration used so that the software can correctly report the LSB bit weight value. It does not actually change the gain of the analog front-end.

SFG_[channel],[gain]<ENTER>

Where:

[channel] – Channel number to set; 1, 2, 3, 4, 5 or 6
[gain] – Channel analog front-end gain; 1.0 to 16.0
1.0 = 5Vpp full-scale input
4.0 = 20Vpp full-scale input (Factory default)
8.0 = 40Vpp full-scale input
[? will return the current value]

Example:

SFG_1,4.0<ENTER>

SFG_1,?<ENTER> Query
SFG_1,4.0<CR><LF> Returned string

3.6.1.1.7 SSS – Set Sensor Sensitivity Value

SSS – Set sensor sensitivity value for each channel. Note that this value is saved and used for reporting purposes only and must be manually set to match the attached sensor. Its units are user defined.

SSS_[channel],[sensitivity]<ENTER>

Where:

[channel] – Channel number to set; 1, 2, 3, 4, 5 or 6
[sensitivity] – Channel sensor sensitivity; >= 0.0 **(Factory default is 0.0)**
[? will return the current value]

Example:

SSS_1,1.123456<ENTER>

SSS_1,?<ENTER> Query
SSS_1,1.123456<CR><LF> Returned string

3.6.1.1.8 SFT – Set ADC FIR Filter Type

SFT - Sets the ADC FIR filter type, either linear phase (default) or minimum phase. All three channels on an ADC board will run with the same FIR filter type.

SFT_[board],[filter type]<ENTER>

Where:

[board] – ADC board number 1 (channels 1- 3) or 2 (channels 4 – 6).
[filter type] – 0 = Linear phase FIR filter
1 = Minimum phase FIR filter
(Factory default is 0 - linear phase FIR filters.)
[? will return the current value]

Example:

SFT_1,1<ENTER>

SFT_1,?<ENTER> Query
SFT_1,1<CR><LF> Returned string.

3.6.1.1.9 SSD – Enable/Disable ADC Time Sync Delay Correction

SSD– Enable or disable ADC time synchronization delay correction.

SSD_[enable/disable]<ENTER>

Where:

[enable/disable] – Enable/Disable; 0 = disabled, 1 = enabled.
(Factory default is 1, enabled.)
[? will return the current value]

Example:

SSD_0<ENTER>

SSD_?<ENTER>	Query
SSD_0<CR><LF>	Returned string

3.6.1.2 Serial Port Related Parameters

3.6.1.2.1 SPB – Set Baud Rate

SPB – Sets the baud rate of serial ports 1 and 2. The serial ports will always be set to 8 bits, 1 stop bit and no parity.

SPB_[port],[baud]<ENTER>

Where:

[port] – Serial port 1 (I/O 1), 2 (I/O 2), 3 (debug), 4 (IRDA) or 5 (PCMCIA).
[baud] – Baud rate; 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200 **(Factory default is 115200 for all ports.)**
[? will return the current value]

Example:

SPB_1,115200<ENTER>

SPB_1,?<ENTER>	Query
SPB_1,115200<CR><LF>	Returned string

3.6.1.2.2 SPM – Set Data Mode

SPM – Sets the serial port data mode

SPM_[port],[mode]<ENTER>

Where:

[port] – Serial port 1 (I/O 1), 2 (I/O 2), 3 (debug), 4 (IRDA) or 5 (PCMCIA).
[mode] – Mode; 1 = ASCII, 2 = HLCP, 3 = CD 1.1, 4 = USGS RTD, 5 = Simulator, 6 = Test RTD, 0 = Disabled.
(Factory default is 0, disabled, for all ports.)
[? will return the current value]

Example:

SPM_1,2<ENTER>

SPM_1,?<ENTER> Query
SPM_1,2<CR><LF> Returned string

3.6.1.2.3 SPP – Set Communications Protocol

SPP – Sets the serial port communication protocol.

SPP_[port],[protocol]<ENTER>

Where:

[port] – Serial port 1 (I/O 1), 2 (I/O 2), 3 (debug), 4 (IRDA) or 5 (PCMCIA).
[protocol] – Protocol; 1 = Character (ASCII), 2 = PPP Client, 3 = PPP Server, 0 = Disabled.
(Factory defaults: Serial Port 1 = 3, PPP Server Mode
Serial Port 2 = 1, Character Mode
Serial Port 3 = 1, Character Mode
Serial Port 4 = 0, Disabled
Serial Port 5 = 0, Disabled)
[? will return the current value]

Example:

SPP_1,1<ENTER>

SPP_1,?<ENTER> Query
SPP_1,1<CR><LF> Returned string

3.6.1.2.4 SPC – Set Character Mode

SPC – Sets the serial port character mode when the serial port is in the character communication protocol.

SPC_[port],[mode]<ENTER>

Where:

[port] – Serial port 1 (I/O 1), 2 (I/O 2), 3 (debug), 4 (IRDA) or 5 (PCMCIA).

[mode] – Character Mode; 1 = LOG Mode, 2 = Command Mode, 3 = Data Mode, 0 = Disabled.
(Factory defaults: Serial Port 1 = 2, Command Mode
Serial Port 2 = 2, Command Mode
Serial Port 3 = 2, Command Mode
Serial Port 4 = 0, Disabled
Serial Port 5 = 0, Disabled)
[? will return the current value]

Example:

SPC_1,1<ENTER>

SPC_1,?<ENTER>	Query
SPC_1,1<CR><LF>	Returned string

3.6.1.2.5 URT – Set USGS RTD Format

URT - Sets the sample rate and formatting for USGS RTD serial real time 16-bit data output stream. See notes on USGS RTD operation that follow.

URT_[sample rate],[sync char],[data format],[byte order],[aux type],
[aux parity],[aux timing],[aux char],[decimation type]<ENTER>

Where:

[sample rate] - Sample rate: 200, 100, 50 (and 40, 25 & 10) for simple decimation mode. **(Factory default is 50)**

[sync char] - SYNC byte character entered as a two digit HEX value. **(Factory default is 0D hex)**

[data format] - Data format: 0 = 16-bit 2's complement (32767 to –32768)
1 = 16-bit offset binary (65535 to 0)
(Factory default is 0 – 2's complement)

[byte order] - Byte order: 0 = MSB/LSB, 1 = LSB/MSB
(Factory default is 0 – MSB/LSB)

[aux type] - Auxiliary byte type: 0 = parity/timing byte
1 = End of Block (EOB) character
(Factory default is 0 – parity/timing byte)

[aux parity] - Auxiliary byte parity type: 0 = even, 1 = odd
(Factory default is 0 – even parity)

[aux timing] - Auxiliary byte timing mode:
0 = 1 second pulse on bit 7 only
1 = 1 second pulse on bit 7 plus 1 hour pulse on bit 06
2 = 1 second pulse on bit 7 plus 32-bit time code on bit 06
(Factory default is 0 – 1 second pulse on bit 7 only)

[aux char] - Auxiliary EOB character entered as a two digit HEX value.
(Factory default is 0A hex)

[decimation type] - Decimation type when decimating data to lower sample rates: 0 = FIR filter decimation, 1 = Simple divide by N decimation. **(Factory default is 0 – FIR filter decimation)**

or
[? will return the current value]

Example:

URT_50,0D,0,0,0,0,0,0A,0<ENTER>

URT_?<ENTER>	Query
URT_50,0D,0,0,0,0,0,0A,0<CR><LF>	Returned string.

Notes on USGS RTD serial real time 16-bit data output stream operation.

The USGS RTD data stream output provides digitized three channel (channels 1, 2 & 3 only, even on a six channel unit) 16-bit data at 200, 100, 50, 40, 25 or 10 samples per second at baud rates of 115200 to 1200 baud. The data is output in eight byte blocks immediately upon completion of a sample conversion (and filtering if necessary) of all three data channels.

The USGS RTD data stream can be enabled on either of the SMART-24's I/O 1 or I/O 2 serial ports (or both at the same time). The following commands would be needed to set serial port 2 to output the USGS RTD stream:

SPB 2,4800	[sets the baud rate, see below for limitations]
SPP 2,1	[set the protocol to character]
SPC 2,3	[set the character mode to data]
SPM 2,4	[sets the data mode to USGS RTD output]
URT 50,0D,0,0,0,0,0,0A,0	[sets the RTD sample rate and format]
ASR	[to save and restart the unit with the new setup]

Note that the USGS RTD stream will only be output if enabled as above and the primary sample rate of ADC board 1 (channels 1, 2 & 3) is set to 200 sps. Also the serial format is always 8-bits, no parity and 1 stop bit. The default byte format is shown in Table 7.

Table 7. USGS RTD Output Data Format

BYTE	DESCRIPTION	DEFAULT
1	Sync character (user programmable)	0D hex (CR)
2	MSB Ch. 1 (16-bit 2's comp. data)	
3	LSB Ch. 1 (16-bit 2's comp. data)	
4	MSB Ch. 2 (16-bit 2's comp. data)	
5	LSB Ch. 2 (16-bit 2's comp. data)	
6	MSB Ch. 3 (16-bit 2's comp. data)	
7	LSB Ch. 3 (16-bit 2's comp. data)	
8	Auxiliary byte (user programmable)	Parity/Timing Byte

The following RTD parameters are user programmable through the URT command:

1) **Output Sample Rate** - The USGS RTD can output at 200, 100, 50, 40, 25 or 10 samples per second. The default is 50 sps. Note that the lower data rates are derived from decimation of the main 200 sps data (the 200 sps data is passed through to the serial port directly with no further filtering needed). Using the FIR filter decimation mode, only 200, 100 and 50 sps rates can be used. All sample rates can be used with the simple divide by N decimation mode. This mode does not provide any anti-alias protection though. Also note that the sample rates have minimum baud rate requirements. For each sample rate there is a minimum baud rate requirement as shown below.

200 sps	19200 baud
100 sps	9600 baud
50 & 40 sps	4800 baud
25 sps	2400 baud
10 sps	1200 baud

When a sample rate selection is made, if the current selected baud rate is set to a lower value than the minimum required baud rate, the USGS RTD will be automatically disabled.

2) **Sync Character** - The USGS RTD sync character (the first byte of the data block) is user selectable in the range 00 to FF hex. The default is a carriage return (CR) - 0D hex.

3) **Output Data Format** - The USGS RTD can output data in either 16-bit 2's complement or offset binary formats as shown below. The default is 16-bit 2's complement.

2's Complement Format

+Full Scale -	0111 1111 1111 1111	(7FFFh)	(32767)
+1 bit -	0000 0000 0000 0001	(0001h)	(1)
0 -	0000 0000 0000 0000	(0000h)	(0)
-1 bit -	1111 1111 1111 1111	(FFFFh)	(-1)
-Full Scale -	1000 0000 0000 0000	(0000h)	(-32768)

Offset Binary Format

+Full Scale -	1111 1111 1111 1111	(FFFFh)	(65535)
0 -	1000 0000 0000 0000	(8000h)	(32768)
-Full Scale -	0000 0000 0000 0000	(0000h)	(0)

Note that the SMART-24 is a 24-bit instrument. The unit internally compensates and scales the data to 16-bits for this output in such a way as to correct for internal calibration data, gain, etc. to utilize the full 16-bit dynamic range. So for a +/-2g accelerometer, the full scale will be a true 16-bit full scale value (+2g = 32767, -2g = -32768).

4) **Output Data Byte Order** - The USGS RTD can output each 16-bit data word in either MSB/LSB or LSB/MSB byte orders. The default is MSB/LSB.

5) **Auxiliary Byte Type** - The USGS RTD auxiliary byte (the last byte of the data block) is a dual-purpose byte that can be programmed to be a simple End of Block (EOB) character (similar to the sync character) or a Parity/Timing check byte. The default is the Parity/Timing byte type.

As a Timing/Parity check byte, the auxiliary byte contains parity check bits (programmable for even or odd parity) in data bits 0 to 5 for the six data bytes (bytes 2 to 7 respectively). Bit 6 and Bit 7 are used for timing information as described below.

As an EOB character, the auxiliary byte character is user selectable in the range 00 to FF hex.

6) **Auxiliary Byte Parity Mode** - If the Auxiliary Byte Type is set to the Timing/Parity type, this parameter sets the parity type used for bits 0 to 5. Even or odd parity can be selected. The default is even parity.

7) **Auxiliary Byte Timing Mode** - If the Auxiliary Byte Type is set to the Timing/Parity type, this parameter sets the timing used for bits 6 & 7 as follows:

   - Mode 0 – Bit 7 is set to a 1 for the sample block that represents the first sample of a second. At all other times it will be a 0. Bit 6 is not used and set to 0.

   - Mode 1 - Bit 7 is set to a 1 for the sample block that represents the first sample of a second. At all other times it will be a 0. Bit 6 is set to a 1 for the sample block that represents the first sample of the hour. At all other times it will be a 0. On the first sample of the first second of the hour, both bits 6 & 7 will be a 1 at the same time.

   - Mode 2 - Bit 7 is set to a 1 for the sample block that represents the first sample of a second. At all other times it will be a 0. Bit 6 is used to transmit a 32-bit unsigned integer value representing the number of seconds since January 1, 1970. When bit 7 is set a 1, bit 6 will be data bit 0 (LSB) of this 32-bit value. Then for the next 31 sample blocks, bit 6 will contain the value of data bits 1 to 31 of the time code. For the remainder of the sample blocks, this bit will be a 0. Note that this mode should not be used for sample rates lower than 40 sps.

8) **Auxiliary Byte Character** - If the Auxiliary Byte Type is set to the EOB Character type, this parameter sets the Auxiliary Byte Character and is user selectable in the range 00 to FF hex. The default is a line feed (LF) - 0A hex.

9) **Sample Rate Decimation Mode** – To generate the USGS RTD data, the samples must be decimated (except for 200 sps output). This parameter allows the user to select either FIR filter decimation or simple divide by N decimation.

   With FIR filter decimation, full anti-aliasing protection is provided, but with a time delay of 495mS for 100 sps and 830mS for 50 sps from real time. Also only 100 sps and 50 sps can be generated with the current FIR decimation filter.

   With the simple divide by N decimation, all output sample rates can be used down to 10 sps with a fixed time delay of 175mS for each. However no anti-aliasing protection is provided for frequencies below 80 Hz.

3.6.1.3 TCP/IP Related Parameters

3.6.1.3.1 IPA – Set IP Address

IPA – Set a port's IP address when used in TCP/IP mode.

IPA_[port],[IP address]<ENTER>

Where:

[port] – TCP/IP port; 1E = Ethernet port 1, 2E = Ethernet port 2,
1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2),
3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.

[IP Address] – IP address; xxx.xxx.xxx.xxx
(Factory defaults: 1E = 192.168.0.1
2E = 192.168.0.2
1S = 192.168.0.3
2S = 192.168.0.4
3S = 192.168.0.5
4S = 192.168.0.6
5S = 192.168.0.7)
[? will return the current value]

Example:

IPA_1E,192.168.0.1<ENTER>

IPA_1E,?<ENTER>	Query
IPA_1E,192.168.0.1<CR><LF>	Returned string

3.6.1.3.2 IPM – Set IP Mask

IPM – Set a port's IP address mask when used in TCP/IP mode.

IPM_[port],[IP mask]<ENTER>

Where:

[port] – TCP/IP port; 1E = Ethernet port 1, 2E = Ethernet port 2,
1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2),
3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.

[IP mask] – IP address mask; xxx.xxx.xxx.xxx
(Factory default is 255.255.255.0 for all ports.)
[? will return the current value]

Example:

IPM_1E,255.255.255.0<ENTER>

IPM_1E,?<ENTER>	Query
IPM_1E,255.255.255.0<CR><LF>	Returned string

3.6.1.3.3 IPG – Set IP Gateway

IPG – Set a port's IP gateway address when used in TCP/IP mode.

IPG_[port],[IP gateway]<ENTER>

Where:

[port] – TCP/IP port; 1E = Ethernet port 1, 2E = Ethernet port 2,
1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2),
3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.
[IP gateway] – IP gateway address; xxx.xxx.xxx.xxx
(Factory default is 192.168.0.255 for all ports.)
[? will return the current value]

Example:

IPG_1E,192.168.0.254<ENTER>

IPG_1E,?<ENTER>	Query
IPG_1E,192.168.0.254<CR><LF>	Returned string

3.6.1.3.4 IPH – Set IP Host Name

IPH – Set the global IP Host Name when used in TCP/IP mode. The same host name is used for all TCP/IP connections.

IPH_[IP host name]<ENTER>

Where:

[IP host name] – IP host name; "sd24sn1099"
maximum length is 63 characters
(Factory default is 'sT24snXXXX', where:
T = type {d = digitizer, r = recorder, a = accelerometer and b = borehole}
XXXX = unit serial number)
[? will return the current value]

Example:

IPH_sd24sn1099<ENTER>

IPH_?<ENTER> Query
IPH_ sd24sn1099<CR><LF> Returned string

3.6.1.3.5 IPD – Set IP Domain Name

IPD – Set a port's IP Domain name when used in TCP/IP mode.

IPD_[port],[IP domain name]<ENTER>

Where:

[port] – TCP/IP port; 1E = Ethernet port 1, 2E = Ethernet port 2,
1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2),
3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.
[IP domain name] – IP Domain name; smart24.net
maximum length is 63 characters
(Factory default is 'smart24.net' for all ports.)
[? will return the current value]

Example:

IPD_1E,smart.domain <ENTER>

IPD_1E,?<ENTER> Query
IPD_1E,smart.domain<CR><LF> Returned string

3.6.1.3.6 IPN – Set IP DNS Server

IPN – Set a port's IP DNS sever address when used in TCP/IP mode. Note that DNS services are not currently used.

IPN_[port],[IP DNS sever]<ENTER>

Where:

[port] – TCP/IP port; 1E = Ethernet port 1, 2E = Ethernet port 2,
1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2),
3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.
[IP DNS sever] – IP DNS sever address; xxx.xxx.xxx.xxx
(Factory default is 0.0.0.0 for all ports.)
[? will return the current value]

Example:

IPN_1E,245.134.1.254<ENTER>

IPN_1E,?<ENTER> Query
IPN_1E,245.134.1.254<CR><LF> Returned string

3.6.1.3.7 IDM – Set IP Data Mode

IDM – Set a port's IP data mode to enable or disable the CD 1.1 data stream.

IDM_[port],[IP mode]<ENTER>

Where:

[port] – TCP/IP port; 1E = Ethernet port 1, 2E = Ethernet port 2,
1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2),
3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.
[IP mode] – IP transmission mode; 0 = CD 1.1 disabled, 1 = CD 1.1 enabled.
(Factory default is 1, enabled, for all ports.)
[? will return the current value]

Example:

IDM_1E,1<ENTER>

IDM_1E,?<ENTER> Query
IDM_1E,1<CR><LF> Returned string

3.6.1.3.8 IPE – Set IP Port Enabled/Disabled

IPE– Enable or disable a TCP/IP port.

IPE_[port],[enable/disable]<ENTER>

Where:

[port] – TCP/IP port; 1E = Ethernet port 1, 2E = Ethernet port 2,
1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2),
3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.
[enable/disable] – Enable/Disable; 0 = disabled, 1 = enabled.
(Factory default is 1, enabled, for all ports.)
[? will return the current value]

Example:

IPE_1E,1<ENTER>

IPE_1E,?<ENTER> Query
IPE_1E,1<CR><LF> Returned string

3.6.1.3.9 ISA – Set IP Port PPP Server IP Address

ISA– Set a TCP/IP port PPP server IP address. Note this is only valid for TCP/IP over a serial port.

ISA _[port],[IP Address]<ENTER>

Where:

[port] – TCP/IP port; 1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2), 3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.
[IP Address] – IP address; xxx.xxx.xxx.xxx
(Factory defaults: 1S = 192.168.0.30
2S = 192.168.0.40
3S = 192.168.0.50
4S = 192.168.0.60
5S = 192.168.0.70)
[? will return the current value]

Example:

ISA_1S,192.168.0.1<ENTER>

ISA_1S,?<ENTER> Query
ISA_1S,192.168.0.1<CR><LF> Returned string

3.6.1.3.10 ISM – Set IP Port PPP Server IP Mask

ISM– Set a TCP/IP port PPP server IP mask. Note this is only valid for TCP/IP over a serial port.

ISM _[port],[IP Mask]<ENTER>

Where:

[port] – TCP/IP port; 1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2), 3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.
[IP Mask] – IP mask; xxx.xxx.xxx.xxx
(Factory default is 255.255.255.0 for all ports.)
[? will return the current value]

Example:

ISM_1S,255.255.255.0<ENTER>

ISM_1S,?<ENTER> Query
ISM_1S, 255.255.255.0<CR><LF> Returned string

3.6.1.3.11 ICA – Set IP Port PPP Server Remote Client IP Address

ICA– Set a TCP/IP port PPP server remote client IP address. Note this is only valid for TCP/IP over a serial port and is the IP address given to a connecting remote PPP client.

ICA _[port],[IP Address]<ENTER>

Where:

[port] – TCP/IP port; 1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2), 3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.
[IP Address] – IP address; xxx.xxx.xxx.xxx
(Factory defaults: 1S = 192.168.0.31
2S = 192.168.0.41
3S = 192.168.0.51
4S = 192.168.0.61
5S = 192.168.0.71)
[? will return the current value]

Example:

ICA_1S,192.168.0.2<ENTER>

ICA_1S,?<ENTER> Query
ICA_1S,192.168.0.2<CR><LF> Returned string

3.6.1.3.12 ANO – Anonymous FTP Access Enable/Disable

ANO– Enable or disable anonymous FTP server access.

ANO_[enable/disable]<ENTER>

Where:

[enable/disable] – Enable/Disable; 0 = disabled, 1 = enabled.
(Factory default is 0, disabled.)
[? will return the current value]

Example:

ANO_1<ENTER>

ANO_?<ENTER>	Query
ANO_1<CR><LF>	Returned string

3.6.1.3.13 IPP – Set Primary IP Port

IPP – Set the Primary IP Port that will allow the SMART-24 to connect to distant IP subnets or to the Internet.

IPP_[port]<ENTER>

Where:

[port] – TCP/IP port; 1E = Ethernet port 1, 2E = Ethernet port 2,
1S = Serial port 1 (I/O 1), 2S = Serial port 2 (I/O 2),
3S = Debug port, 4S = IRDA port or 5S = PCMCIA serial port.
(Factory default is 1E)
[? will return the current value]

Example:

IPP_1SENTER>

IPP_?<ENTER>	Query
IPP_1S<CR><LF>	Returned string

3.6.1.3.14 SPH – Set PPP Connection Handshake Mode

SPH – Sets the PPP Connection Handshake Mode. On PPP startup, some PPP connections require special handshaking to start the connection. The SMART-24 now supports Microsoft PPP handshaking and Lantronix SCS handshaking.

SPH_[port],[mode]<ENTER>

Where:

[port] – Serial port 1 (I/O 1), 2 (I/O 2), 3 (debug), 4 (IRDA) or
5 (PCMCIA).
[mode] – 0 = Microsoft PPP Handshake Mode
1 = Lantronix SCS PPP Handshake Mode
(Factory default is 0 = Microsoft PPP Handshake Mode for all ports.)
[? will return the current value]

Example:

SPH_1,1<ENTER>

SPH_1,?<ENTER> Query
SPH_1,1<CR><LF> Returned string

3.6.1.4 CD 1.1 Related Parameters

NOTE: The Smart24 provides four CD 1.1 profiles that can be configured and enabled to send data to four different destinations.

3.6.1.4.1 CSN - Set CD Site Name

CSN - Set the CD 1.1 site name. This is at the same time the station name in the Earthworm data packet when sending Earthworm data is enabled.

CSN_[profile],[site name]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[site name] – CD 1.1 site name (5 characters maximum); "S1000"
(Factory default is 'SXXXX' where XXXX is the unit's serial number.)
[? will return the current value]

Example:

CSN_1,SITE1<ENTER>

CSN_1,?<ENTER> Query
CSN_1,SITE1<CR><LF> Returned string

3.6.1.4.2 CLN - Set CD Location Name

CLN - Set the CD 1.1 location name for each channel. This is at the same time the location name in the Earthworm data packet when sending Earthworm data is enabled.

CLN_[profile],[channel],[location name]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[channel] – Channel number; 1P, 2P, 3P, 4P, 5P or 6P (primary data streams); 1S, 2S, 3S, 4S, 5S or 6S (secondary data streams); 1A or 2A (I/O Aux input streams); 1M, 2M, 3M, 4M, 5M or 6M (mass position streams).
[location name] – CD 1.1 location name (2 characters maximum); "01"
(Factory defaults: ?P, ?A & ?M = '01'

?S = '02')
[? will return the current value]

Example:

CLN_1,1P,01<ENTER>

CLN_1,1P,?<ENTER>	Query
CLN_1,1P,01<CR><LF>	Returned string

3.6.1.4.3 CCN - Set CD Channel Name

CCN - Set the CD 1.1 channel name for each data channel. This is at the same time the component name in the Earthworm data packet when sending Earthworm data is enabled.

CCN_[profile],[channel],[channel name]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[channel] – Channel number; 1P, 2P, 3P, 4P, 5P or 6P (primary data streams); 1S, 2S, 3S, 4S, 5S or 6S (secondary data streams); 1A or 2A (I/O Aux input streams); 1M, 2M, 3M, 4M, 5M or 6M (mass position streams).
[channel name] – CD 1.1 channel name (3 characters maximum); "ch1"
(Factory defaults:
1P = 'c1p', 2P = 'c2p', 3P = 'c3p'
4P = 'c4p', 5P = 'c5p', 6P = 'c6p'
1S = 'c1s', 2S = 'c2s', 3S = 'c3s'
4S = 'c4s', 5S = 'c5s', 6S = 'c6s'
1A = 'c1a', 2A = 'c2a'
1M = 'c1m', 2M = 'c2m', 3M = 'c3m'
4M = 'c4m', 5M = 'c5m', 6M = 'c6m')
[? will return the current value]

Example:

CCN_1,1P,C1P<ENTER>

CCN_1,?<ENTER>	Query
CCN_1,C1P<CR><LF>	Returned string

3.6.1.4.4 CDT - Set CD Data Type

CDT - Set the CD 1.1 data type.

CDT_[profile],[channel],[data type]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[channel] – Channel number; 1P, 2P, 3P, 4P, 5P or 6P (primary data streams); 1S, 2S, 3S, 4S, 5S or 6S (secondary data streams); 1A or 2A (I/O Aux input streams); 1M, 2M, 3M, 4M, 5M or 6M (mass position streams).
[data type] – CD 1.1 data type;
0 = "s4" – Sun Micro IEEE integer (4 bytes)
1 = "s3" – Sun Micro IEEE integer, packed (3 bytes)
2 = "s2" – Sun Micro IEEE short integer (2 bytes)
3 = "i4" – 4-byte integer
4 = "i2" – 2-byte integer
(Factory default is 0, "S4" for all channels, other data types are not currently implemented and should not be used.)
[? will return the current value]

Example:

CDT_1,1P,0<ENTER>

CDT_1,1P,?<ENTER> Query
CDT_1,1P,0<CR><LF> Returned string

3.6.1.4.5 CST - Set CD Sensor Type

CST - Set the CD 1.1 sensor type.

CST_[profile],[channel],[sensor type]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[channel] – Channel number; 1P, 2P, 3P, 4P, 5P or 6P (primary data streams); 1S, 2S, 3S, 4S, 5S or 6S (secondary data streams); 1A or 2A (I/O Aux input streams); 1M, 2M, 3M, 4M, 5M or 6M (mass position streams).
[sensor type] – CD 1.1 sensor type;
0 – Seismic
1 – hydroacoustic
2 – infrasonic
3 – weather
4 – other
5 – velocity
6 – acceleration

>6 – TBD
(Factory defaults: ?P & ?S = 0, seismic
?A & ?M = 4, other)
[? will return the current value]

Example:

CST_1,2P,2<ENTER>

CST_1,2P,?<ENTER>	Query
CST_1,2P,2<CR><LF>	Returned string

3.6.1.4.6 CCM - Set CD Compression

CCM - Set the CD 1.1 compression mode.

CCM_[profile],[mode]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[mode] – CD 1.1 compression mode:
0 – None
1 – Canadian before signature
2 – Canadian after signature (Not Currently Supported)
3 – Steim before signature (Not Currently Supported)
4 – Steim after signature (Not Currently Supported)
(Factory default is 0, none, for all CD profiles.)
[? will return the current value]

Example:

CCM_1,1<ENTER>

CCM_1,?<ENTER>	Query
CCM_1,1<CR><LF>	Returned string

3.6.1.4.7 CAM - Set CD Authentication

CAM - Set the CD 1.1 authentication mode.

CAM_[profile],[mode]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.

[mode] – CD 1.1 authentication mode; 0 = OFF, 1 = ON
(Factory default is 0, OFF, for all CD profiles.)
[? will return the current value]

Example:

CAM_1,1<ENTER>

CAM_1,?<ENTER> Query
CAM_1,1<CR><LF> Returned string

3.6.1.4.8 CCL - Set CD Calib/Calper

CCL - Set the CD 1.1 calib/calper values.

CCL_[profile],[channel],[mode],[calib],[calper]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[channel] – Channel number; 1P, 2P, 3P, 4P, 5P or 6P (primary data streams); 1S, 2S, 3S, 4S, 5S or 6S (secondary data streams); 1A or 2A (I/O Aux input streams); 1M, 2M, 3M, 4M, 5M or 6M (mass position streams).
[mode] – CD 1.1 calib/calper mode; 0 = OFF, 1 = ON
(Factory default is 0, OFF, for all CD profiles & channels.)
[? will return the current values]
[calib] – CD 1.1 calib value
(Factory default is 0.0 for all CD profiles & channels.)
[calper]- CD 1.1 calper value
(Factory default is 1.0 for all CD profiles & channels.)

Example:

CCL_1,2P,1,1.0000,2.0000<ENTER>

CCL_1,2P,?<ENTER> Query
CCL_1,2P,1,1.0000,2.0000<CR><LF> Returned string

3.6.1.4.9 CDF - Set CD Data Frame Size

CDF - Set the CD 1.1 data frame size.

CDF_[profile],[size]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[size] – CD 1.1 data frame size in seconds (1 to 300 seconds).
(Factory default is 10 seconds for all CD profiles.)
[? will return the current value]

Example:

CDF_1,30<ENTER>

CDF_1,?<ENTER> Query
CDF_1,30<CR><LF> Returned string

3.6.1.4.10 CSF - Set CD SOH Alert Frequency

CSF - Set the CD 1.1 SOH alert frame output frequency.

CSF_[profile],[frequency]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[frequency] – CD 1.1 SOH alert frame output frequency in seconds (1 to 86400 seconds).
(Factory default is 1 second for all CD profiles.)
[? will return the current value]

Example:

CSF_1,1<ENTER>

CSF_1,?<ENTER> Query
CSF_1,1<CR><LF> Returned string

3.6.1.4.11 CDA - Set CD Destination IP Address

CDA - Set the CD 1.1 destination IP address for a port.

CDA_[profile],[IP address]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[IP Address] – IP address; xxx.xxx.xxx.xxx
(Factory default is 192.168.0.201 for all CD profiles.)
[? will return the current value]

Example:

CDA_1,192.168.0.1<ENTER>

CDA_1,?<ENTER>	Query
CDA_1,192.168.0.1<CR><LF>	Returned string

3.6.1.4.12 CCP - Set CD Connection Request Remote Port

CCP - Set the CD 1.1 initial connection request remote port number.

CCP_[profile],[remote port]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[remote port] – Remote port to connect to, 0 – 65536
(Factory default is 9000 for all CD profiles.)
[? will return the current value]

Example:

CCP_1,9000<ENTER>

CCP_1,?<ENTER>	Query
CCP_1,9000<CR><LF>	Returned string

3.6.1.4.13 CCE – Set Data Channel Enables

CCE – Enable ADC channels for transmission from the selected CD 1.1 profile.

CCE_[profile],[channel],[channel]…<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[channel] – Channel number to enable; 1P, 2P, 3P, 4P, 5P or 6P (primary data streams); 1S, 2S, 3S, 4S, 5S or 6S (secondary data streams); 1A or 2A (I/O Aux input streams); 1M, 2M, 3M, 4M, 5M or 6M (mass position streams). Special cases: 0P will enable all primary data streams, 0S will enable all secondary data streams, 0A will enable all aux data streams and 0M will enable all mass position data streams.
(Factory defaults: ?S, ?A & ?M are all disabled
?P are enabled if installed in the unit)

[? will return the current value]

Example:

CCE_1,1P,2P,3P,1S,2S,3S<ENTER>	Enable channels 1, 2 and 3 (primary and secondary).
CCE_1,0P,0S,0A,0M<ENTER>	Enable all channels.

CCE_1,?<ENTER>	Query
CCE_1,1P,2P,3P,4P,5P,6P,1S,2S,3S,4S,5S,6S <CR><LF>	Returned string

3.6.1.4.14 CCD – Set Data Channel Disables

CCD – Disable ADC channels for transmission from the selected CD 1.1 profile.

CCD_[profile],[channel],[channel]…<ENTER>

Where:

[profile] –	CD 1.1 profile to reference (1 to 4) or A for all.
[channel] –	Channel number to disable; 1P, 2P, 3P, 4P, 5P or 6P (primary data streams); 1S, 2S, 3S, 4S, 5S or 6S (secondary data streams); 1A or 2A (I/O Aux input streams); 1M, 2M, 3M, 4M, 5M or 6M (mass position streams). Special cases: 0P will disable all primary data streams, 0S will disable all secondary data streams, 0A will disable all aux data streams and 0M will disable all mass position data streams.

Example:

CCD_1,4P,5P,6P,4S,5S,6S<ENTER>	Disable channels 4, 5 and 6 (primary and secondary).
CCD_1,0P,0S,0A,0M<ENTER>	Disable all channels.

3.6.1.4.15 CDE – Enable/Disable CD Profile

CDE – Enable or disable a CD 1.1 profile.

CDE_[profile],[enable/disable]<ENTER>

Where:

[profile] –	CD 1.1 profile to reference (1 to 4) or A for all.
[enable/disable] –	Enable/Disable; 0 = Disable, 1 = Enable **(Factory default is 1, enabled, for CD profile 1 and 0, disabled, for CD profiles 2, 3 & 4.)**

[? will return the current value]

Example:

CDE_1,1<ENTER>

CDE_1,?<ENTER>	Query
CDE_1,1<CR><LF>	Returned string

3.6.1.4.16 CRT – Set CD Connection Request Timeout

CRT – Set this profile's CD 1.1 connection request timeout in minutes.

CRT_[profile],[timeout]<ENTER>

Where:

[profile] –	CD 1.1 profile to reference (1 to 4) or A for all.
[timeout] –	Connect Request Timeout (1 to 65535 minutes) **(Factory default is 2 minutes for all CD profiles.)** [? will return the current value]

Example:

CRT_1,10<ENTER>

CRT_1,?<ENTER>	Query
CRT_1,10<CR><LF>	Returned string

3.6.1.4.17 CIP – Set CD Command Input Port

CIP – Set this profile's CD 1.1 command input port. Note that only the value set for CD profile 1 is used. All others are ignored.

CIP_[profile],[port]<ENTER>

Where:

[profile] –	CD 1.1 profile to reference (1 to 4) or A for all.
[remote port] –	Port to listen to for CD commands, 0 – 65536 **(Factory default is 8000 for all CD profiles.)** [? will return the current value]

Example:

CIP_1,9010<ENTER>

CIP_1,?<ENTER>	Query
CIP_1,9010<CR><LF>	Returned string

3.6.1.4.18 CRR – Set CD Connection Request Retry

CRR – Set this profile's CD 1.1 connection request retry period in minutes.

CRR_[profile],[retry]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[retry] – Connect Request Retry (1 to 65535 minutes)
(Factory default is 2 minutes for all CD profiles.)
[? will return the current value]

Example:

CRR_1,10<ENTER>

CRR_1,?<ENTER>	Query
CRR_1,10<CR><LF>	Returned string

3.6.1.4.19 CNC – Set CD Creator Name

CNC – Set this profile's CD 1.1 creator name.

CNC_[profile],[creator name]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[creator name] - Creator Name (up to 8 characters); "S1000"
(Factory default is 'SXXXX' where XXXX is the unit's serial number for all CD profiles.)
[? will return the current value]

Example:

CNC_1,SMART24<ENTER>

CNC_1,?<ENTER>	Query
CNC_1,SMART24<CR><LF>	Returned string

3.6.1.4.20 CNS – Set CD Station Name

CNS – Set this profile's CD 1.1 station name. This is at the same time the network name in the Earthworm data packet when sending Earthworm data is enabled.

CNS_[profile],[station name]<ENTER>

Where:

[profile] –	CD 1.1 profile to reference (1 to 4) or A for all.
[station name] -	Station Name (up to 8 characters); "S1000" **(Factory default is 'SXXXX' where XXXX is the unit's serial number for all CD profiles.)** [? will return the current value]

Example:

CNS_1,SMART24<ENTER>

CNS_1,?<ENTER>	Query
CNS_1,SMART24<CR><LF>	Returned string

3.6.1.4.21 CDS – Set CD Data Frame Save Size

CDS – Set this profile's CD 1.1 data frame save size. This will be the number of data frames to save and restore for retransmitting in case of a connection drop. **[NOTE: This command is intended for debugging purposes and should only be used at the direction of Geotech technical support.]**

CDS_[profile],[size]<ENTER>

Where:

[profile] –	CD 1.1 profile to reference (1 to 4) or A for all.
[size] –	Number of data frames to save and restore. (1 to 600 frames) **(Factory default is 5 frames for all CD profiles.)** [? will return the current value]

Example:

CDS_1,10<ENTER>

CDS_1,?<ENTER>	Query
CDS_1,10<CR><LF>	Returned string

3.6.1.4.22 CSS – Set CD SOH Frame Save Size

CSS – Set this profile's CD 1.1 SOH frame save size. This will be the number of SOH frames to save and restore for retransmitting in case of a connection drop. **[NOTE: This command is intended for debugging purposes and should only be used at the direction of Geotech technical support.]**

CSS_[profile],[size]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[size] – Number of SOH frames to save and restore. (1 to 600 frames)
(Factory default is 5 frames for all CD profiles.)
[? will return the current value]

Example:

CSS_1,10<ENTER>

CSS_1,?<ENTER> Query
CSS_1,10<CR><LF> Returned string

3.6.1.4.23 CBF – Enable/Disable CD Backfill Mode

CBF – Enable/disable the CD 1.1 backfill mode.

CBF_[profile],[enable/disable]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[enable/disable] – Enable/disable CD 1.1 backfill mode:
0 – Backfill (normal CD 1.1 LIFO or FIFO)
1 – No backfill (old data is flushed on a new connection)
(Factory default is 0, backfill mode, for all CD profiles.)
[? will return the current value]

Example:

CBF_1,1<ENTER>

CBF_1,?<ENTER> Query
CBF_1,1<CR><LF> Returned string

3.6.1.4.24 CBM – Set CD Backfill Mode

CBM - Set the CD 1.1 backfill mode as normal CD 1.1 LIFO or FIFO.

CBM_[profile],[mode]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[mode] – CD 1.1 backfill mode:
0 – Normal CD 1.1 LIFO backfill mode
1 – FIFO backfill mode
(Factory default is 0, normal CD 1.1 LIFO backfill mode, for all CD profiles.)
[? will return the current value]

Example:

CBM_1,1<ENTER>

CBM_1,?<ENTER> Query
CBM_1,1<CR><LF> Returned string

3.6.1.4.25 CTM – Enable/Disable CD Send Triggered Data

CTM – Enable/disable CD 1.1 send triggered data on primary channels. When this option is enabled, primary channels are sent as triggered data, and secondary channels as continuous data. Triggered data is sent out during event recording, set up as given in sections 3.8.1.2 and 3.8.1.3. By default this option is disabled on all CD1.1 profiles, i.e. all primary and secondary channels are sent as continuous data.

CTM_[profile],[enable/disable]<ENTER>

Where:

[profile] – CD 1.1 profile to reference (1 to 4) or A for all.
[enable/disable] – Enable/Disable; 0 = Disable, 1 = Enable
(Factory default is disabled, for all CD profiles.)
[? will return the current value]

Example:

CTM_1,1<ENTER>

CTM_1,?<ENTER> Query
CTM_1,1<CR><LF> Returned string

3.6.1.5 Earthworm Related Parameters

NOTE: The Smart24 provides four CD 1.1 profiles that can be configured and enabled to send data to four different destinations. First profile can be configured to send data to a Earthworm destination, using the Earthworm export protocol (instead of CD1.1).

3.6.1.5.1 EWE – Enable/Disable Earthworm Profile

EWE – Enable or disable an Earthworm profile. **[Note:This command only works for CD Profile 1 at this time.]**

EWE_[profile],[enable/disable]<ENTER>

Where:

[profile] –	Earthworm profile to reference (1 to 4) or A for all. **Currently only profile 1 can be Earthworm enabled.**
[enable/disable] –	Enable/Disable; 0 = Disable, 1 = Enable **(Factory default is 0, disabled, for CD profile 1)** [? will return the current value]

Example:

EWE_1,1<ENTER>

EWE_1,?<ENTER>	Query
EWE_1,1,1<CR><LF>	Returned string

3.6.1.5.2 EWI – Set Earthworm Installation ID

EWI – Set this profile's Earthworm installation ID. **[Note:This command only works for CD Profile 1 at this time.]**

EWI_[profile],[inst_id]<ENTER>

Where:

[profile] –	Earthworm profile to reference (1 to 4) or A for all.
[inst_id] -	Earthworm installation ID, 0-255 **(Factory default is '255'.)** [? will return the current value]

Example:

EWI_1,0<ENTER>

EWI_1,?<ENTER>	Query
EWI_1,0<CR><LF>	Returned string

3.6.1.5.3 EWM – Set Earthworm Module ID

EWM – Set this profile's Earthworm module ID. **[Note:This command only works for CD Profile 1 at this time.]**

EWM_[profile],[module_id]<ENTER>

Where:

[profile] –	Earthworm profile to reference (1 to 4) or A for all.
[module_id] -	Earthworm module ID, 0-255 **(Factory default is '0'.)** [? will return the current value]

Example:

EWM_1,100<ENTER>

EWM_1,?<ENTER>	Query
EWM_1,100<CR><LF>	Returned string

3.6.1.5.4 EWS – Set Earthworm Client/Server Mode

EWS – Set either an Earthworm Client Mode where the SMART-24 will try to establish the data connection, or a Server Mode where the SMART-24 will open a port to listen on and wait for an incoming Earthworm connection. **[Note:This command only works for CD Profile 1 at this time.]**

EWS_[profile],[mode]<ENTER>

Where:

[profile] –	Earthworm profile to reference (1 to 4) or A for all.
[mode] –	Client/Server mode; 0 = Client Mode, 1=Server Mode **(Factory default is '0', Client Mode)** [? will return the current value]

Example:

EWS_1,1<ENTER>

EWM_1,?<ENTER>	Query
EWM_1,1<CR><LF>	Returned string

3.6.2 Calibration Parameters

Note that the calibration parameters are not accepted and enabled until a Calibration Go (CAG) command is issued. All parameters should be first setup as necessary and then one CAG command issued.

3.6.2.1 Calibration Related Parameters

3.6.2.1.1 CAO – Set Calibration Output Signal

CAO – Set the calibration output signal type. Required for both immediate and scheduled calibrations.

CAO_[mode] ,[type]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled
[type] – Calibration signal type:
0 – Sine wave
1 – Noise
2 – Pulse
3 – Pseudo random binary
4 – Time Pulse (5 sec pulse every minute, 15 sec pulse every 10 minutes)
5 – One Pulse Per Second (PPS), 50% duty cycle
6 – One Pulse Per Minute (PPM), 50% duty cycle
7 – One Pulse Per Hour (PPH), 50% duty cycle
8 – None (Disabled)
(Factory default is 0, sine wave.)
[? will return the current value]

Example:

CAO_I,0<ENTER>

CAO_I,?<ENTER> Query
CAO_I,0<CR><LF> Returned string

3.6.2.1.2 CAA – Set Calibration Amplitude

CAA – Set the calibration amplitude in volts. Required for both immediate and scheduled calibrations.

CAA_[mode],[amplitude]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled
[amplitude] – Calibration amplitude in volts (zero to peak, -5.000000 to +5.000000 volts).
(Factory default is +1.0 volts.)
[? will return the current value]

Example:

CAA_S,2.500<ENTER>

CAA_S,?<ENTER>	Query
CAA_S,2.500<CR><LF>	Returned string

3.6.2.1.3 CAF – Set Calibration Frequency

CAF – Set the calibration frequency in hertz. Required for both immediate and scheduled calibrations. (Used for sine wave output only.)

CAF_[mode],[frequency]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled
[frequency] – Calibration frequency in hertz (0.001 to 100.0 hertz).
(Factory default is 1.000 hertz.)
[? will return the current value]

Example:

CAF_I,1.000<ENTER>

CAF_I,?<ENTER>	Query
CAF_I,1.000<CR><LF>	Returned string

3.6.2.1.4 CAW – Set Calibration Pulse or Bit Width

CAW – Set the calibration pulse or pseudo random binary bit width in seconds. Required for both immediate and scheduled calibrations. (Used for pulse or pseudo random binary outputs only.)

CAW_[mode],[width]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled
[width] – Calibration pulse or pseudo random binary bit width in seconds (value must be greater than 0.0 seconds and is limited to 4294.0 seconds).
(Factory default is 1.000 second.)
[? will return the current value]

Example:

CAW_I,0.025<ENTER>

CAW_I,?<ENTER> Query
CAW_I,0.025<CR><LF> Returned string

3.6.2.1.5 CAD – Set Calibration Duration

CAD – Set the calibration duration in seconds. Required for both immediate and scheduled calibrations.

CAD_[mode],[duration]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled
[duration] – Calibration duration in seconds (value must be greater than 0 seconds).
(Factory default is 10 seconds.)
[? will return the current value]

Example:

CAD_S,60<ENTER>

CAD_S,?<ENTER> Query
CAD_S,60<CR><LF> Returned string

3.6.2.1.6 CAS – Set Calibration Relay State

CAS – Set each channel's calibration output relay state. Required for both immediate and scheduled calibrations.

CAS_[mode],[channel],[state]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled
[channel] – Channel number; 1, 2, 3, 4, 5 or 6.
[state] – Calibration relay state:
0 – Disabled
1 – Loopback
2 – Sensor
(Factory default is 0, disabled, for all channels.)
[? will return the current value]

Example:

CAS_I,1,2<ENTER>

CAS_I,1,?<ENTER> Query
CAS_I,1,2<CR><LF> Returned string

3.6.2.1.7 CAC – Set Calibration Digital Control Enable

CAC – Set the calibration digital control mode on or off. Required for both immediate and scheduled calibrations.

CAC_[mode],[control]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled
[control] – Calibration digital control:
0 – Analog Mode (Analog output on all enabled channels)
1 – Standard Analog with Digital Control Mode (Analog output on channel 1 (3) with digital control signals).
2 – KS-2000 Analog with Digital Control Mode
(Factory default is 0, analog mode.)
[? will return the current value]

Example:

CAC_I,1<ENTER>

CAC_I,?<ENTER> Query
CAC_I,1<CR><LF> Returned string

3.6.2.1.8 CAI – Set Calibration Interval

CAI – Set the calibration interval between scheduled calibrations in seconds. Required for scheduled calibrations only. Note that the interval must be larger than the duration.

CAI_[mode],[interval]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled
[interval] – Calibration interval between scheduled calibrations in seconds (value must be greater than 0 seconds and larger than the duration). **(Factory default is 3600 seconds.)**
[? will return the current value]

Example:

CAI_S,86400<ENTER>

CAI_S,?<ENTER> Query
CAI_S,86400<CR><LF> Returned string

3.6.2.1.9 CAR – Set Calibration Repetitions

CAR – Set the number of calibration repetitions. Required for scheduled calibrations only.

CAR_[mode],[repetitions]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled
[interval] – Number of calibration repetitions (value must be greater than 0). **(Factory default is 1 repetition.)**
[? will return the current value]

Example:

CAR_S,365<ENTER>

CAR_S,?<ENTER> Query
CAR_S,365<CR><LF> Returned string

3.6.2.1.10 CAT – Set Calibration Start Time

CAT – Set the calibration start time. Required for scheduled calibrations only.

CAT_[mode],[time]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled
[time] – Calibration start time; HH:MM:SS,MM/DD/YYYY
(Factory default is 00:00:00,01/01/1970.)
[? will return the current value]

Example:

CAT_S,00:00:00,02/19/2003<ENTER>

CAT_S,?<ENTER>	Query
CAT_S,00:00:00,02/19/2003<CR><LF>	Returned string

3.6.3 Time and Synchronization Parameters

Note that the time and synchronization parameters are accepted immediately and a reboot is not required.

3.6.3.1 Synchronization Related Commands

3.6.3.1.1 TSM – Set Time Synchronization Mode

TSM – Sets the time synchronization mode.

TSM_[mode]<ENTER>

Where:

[mode] – Time synchronization mode; 0 = None, 1 = External 1PPS,
2 = GPS Master, 3 = GPS Slave
(Factory default is 2, GPS master.)
[? will return the current value]

Example:

TSM_2<ENTER>

TSM_?<ENTER>	Query
TSM_2<CR><LF>	Returned string

3.6.3.1.2 JST – Set Jamset Threshold

JST – Sets the Jamset threshold in milliseconds.

JST_[milliseconds]<ENTER>

Where:

[milliseconds] – Jamset threshold in milliseconds (1 to 999 mS).
(Factory default is 10 mS.)
[? will return the current value]

Example:

JST_10<ENTER>

JST _?<ENTER> Query
JST _10<CR><LF> Returned string

3.6.3.2 GPS Related Commands

3.6.3.2.1 GCT – Set GPS Cycle Time

GCT – If in the GPS mode, this sets the off time of the GPS between GPS synchronization attempts. If set to 0, the GPS will stay on all the time.

GCT_[seconds]<ENTER>

Where:

[seconds] – Number of seconds to turn the GPS off between synchronizations.
0 will cause the GPS to be turned on all the time.
(Factory default is 7200 seconds.)
[? will return the current value]

Example:

GCT_7200<ENTER>

GCT_?<ENTER> Query
GCT_7200<CR><LF> Returned string

3.6.3.2.2 GPC – Set GPS Configuration

GPC – Set the GPS receiver configuration. **[NOTE: This command should only be used under the supervision of Geotech technical support to fine tune the GPS configuration for a particular site. The default setting should work well in most situations.]**

GPC_[PPSPolarity],[PPSOutput],[SelfSurvey],[OpDimension],[DynCode],
[ElevMask],[AMUMask],[PDOPMask],[PDOPSwitch]<ENTER>

Where:

[PPSPolarity]	- PPS Polarity (**0 = Positive**, 1 = Negative)
[PPSOutput]	- PPS Output Mode (**2 = Always**, 3 = At Least 1SV, 4 = At Least 3SV
[SelfSurvey]	- Self Survey Enable (**0 = Disabled**, 1 = Enables)
[OpDimension]	- Operating Dimension (**0 = Auto**, 1 = Time Only, 2 = 2D, 3 = 3D, 5 = DGPS, 6 = 2D Clock Hold, 7 = Overdetermined Clock)
[DynCode]	- Dynamics Code (**1 = Land**, 2 = Sea, 3 = Air, 4 = Static)
[ElevMask]	- Elevation Mask (0 to 15 corresponding to 0 to 75 degrees in 5 degree increments, **default is 2** = 10 degrees)
[AMUMask]	- AMU Mask (0 to 15 dB, **default is 3dB**)
[PDOPMask]	- PDOP Mask (0 to 15 dB, **default is 14dB**)
[PDOPSwitch]	- PDOP Switch (0 to 15 dB, **default is 10dB**)
	[? will return the current value]

Example:

GPC_0,2,0,0,1,2,3,14,10<ENTER>

GPC_?<ENTER>	Query
GPC_0,2,0,0,1,2,3,14,10<CR><LF>	Returned string

3.6.3.2.3 GOS – Set GPS Local Time Offset

GOS – If in the GPS mode, this sets the local time offset from UTC. If set to 0 (default) the SMART-24 will run on UTC time, otherwise on local time with the specified time offset from UTC. **[Note: The GOS command does not cause a restart, and will take effect at the next GPS lock.]**

GOS_[seconds]<ENTER>

Where:

[seconds] –	Number of seconds representing the local time offset from UTC, +/-43200 seconds (+/-12 hours). **(Factory default is 0 seconds, for UTC.)** [? will return the current value]

Example:

GOS_18000<ENTER>

GOS_?<ENTER>	Query
GOS_18000<CR><LF>	Returned string

3.6.3.3 Time Related Commands

3.6.3.3.1 SET – Set Time

SET – Sets the current time.

SET_[time]<ENTER>

Where:

[time] – Time to set on the next 1PPS mark; HH:MM:SS,MM/DD/YYYY
[? will return the current value]

Example:

SET_15:45:30,02/19/2003<ENTER>

SET _?<ENTER>	Query
SET_15:45:35,02/19/2003<CR><LF>	Returned string

3.6.4 Commands

3.6.4.1 Setup and Boot Commands

3.6.4.1.1 ABT – Abort Setup

ABT – Abort and discard any new setup parameters that have been loaded.

ABT<ENTER>

3.6.4.1.2 ASR – Accept Setup and Reboot

ASR – Accept new setup parameters and reboot.

ASR<ENTER>

3.6.4.1.3 BTL – Boot into the Boot Loader

BTL – Reboot into the boot loader mode.

BTL<ENTER>

3.6.4.1.4 GET – Get Setup

GET – Dump all current setup parameters. All parameters will be dumped as if their query command had been given. Order is NOT guaranteed, so the receiving software must interpret the full returned string. Any command or parameter that has a query option will be returned using this command. An end string of "END<CR><LF>" will terminate the output. A full GET output example with factory defaults is given in Appendix A.

Example:

GET<ENTER>

Example Output:

GET START<CR><LF>
TIME: 16:45:20,04/01/2004
SRP_1,200<CR><LF>
SRS_2,20<CR><LF>
.
.
.
CAR_365<CR><LF>
CAT_00:00:00,02/19/2003<CR><LF>
GET END<CR><LF>

3.6.4.1.5 OFF – Power Off

OFF – Turn power off.

OFF<ENTER>

3.6.4.1.6 RBT – Reboot

RBT – Reboot with current setup.

RBT<ENTER>

3.6.4.1.7 RST – Generate a Harware Reset

RST – Causes the unit to generate a watchdog timer hardware reset to restart the unit. This will clear all hardware just as if the unit were powering up. This is different from an ASR or RBT command which only does a software reset and restart.

RST HARDWARE<ENTER> Command

3.6.4.1.8 HLP – Help

HLP – Dumps a help listing of commands.

HLP<ENTER>

3.6.4.1.9 LGO – Logout

LGO – Logs out of the current username and password.

LGO<ENTER>

3.6.4.1.10 SFD – Set Factory Defaults

SFD – Clears the unit setup back to factory defaults. Must be followed by an ASR command to accept and reboot the unit.

SFD<ENTER>

3.6.4.1.11 DDC – Set LCD Data Display Control

DDC – Set the LCD data display control mode.

DDC_[enable/disable],[fill],[stats]<ENTER>

Where:

[enable/disable]	- 0 = Disable LCD Data Waveform Display **1 = Enable LCD Data Waveform Display (Default)**
[fill]	- 0 = Disable LCD Data Waveform Fill Mode (Dot mode) **1 = Enable LCD Data Waveform Fill Mode (Default)**
[stats]	- 0 = Disable LCD Data Statistics Display **1 = Enable LCD Data Statistics Display (Default)** [? will return the current value]

Example:

DDC_1,1,1<ENTER>

DDC_?<ENTER>	Query
DDC_1,1,1<CR><LF>	Returned string

3.6.4.2 Password Commands

The Smart24 uses two sets of usernames and passwords. The system username and password is used for direct connect, modem, HTTP, Telnet and FTP access to the unit.

The client username and password are use when a serial port is being used to connect to a PPP server as a remote client.

3.6.4.2.1 PSW – Enter System Password

PSW – Enter a password to access the system.

PSW_[password]<ENTER>

Where:

[password] – Password, 31 characters maximum.
(Factory default is 'changeme'.)

Example:

PSW_changeme<ENTER>

3.6.4.2.2 SPW – Set System Password

SPW – Set (or clear) a new password.

SPW_[password]<ENTER>

Where:

[password] – Password, 31 characters maximum.

Example:

SPW_bullwinkle<ENTER>

3.6.4.2.3 USR – Enter System Username

USR – Enter a username to access the system.

USR_[username]<ENTER>

Where:

[username] – User name, 31 characters maximum.
(Factory default is 'smart24'.)

Example:

USR_smart24<ENTER>

3.6.4.2.4 SUN – Set System Username

SUN – Set (or clear) a new username.

SUN_[username] <ENTER>

Where:

[username] – User name, 31 characters maximum.

Example:

SUN_rocky<ENTER>

3.6.4.2.5 SCP – Set Client Password

SCP – Set (or clear) a new client password.

SCP_[password]<ENTER>

Where:

[password] – Password, 31 characters maximum.
(Factory default is 'changeme'.)

Example:

SCP_changeme<ENTER>

3.6.4.2.6 SCU – Set Client Username

SCU – Set (or clear) a new client username.

SCU_[username]<ENTER>

Where:

[username] – User name, 31 characters maximum.
(Factory default is 'smart24'.)

Example:

SCU_smart24<ENTER>

3.6.4.3 ADC Commands

3.6.4.3.1 OSC – Start ADC Offset Calibration

OSC – Perform an offset calibration on an ADC channel.

OSC_[board]<ENTER>

Where:

[board] – Board number; 1 or 2.

Example:

OSC_2<ENTER>

3.6.4.3.2 OSR – Set Offset Value to Remove from AUX & Mass Position Channels

OSR – Set an offset value (in counts) to remove from an AUX or Mass Position Channel in the real time CD 1.1 data streams and data recording file. This value is subtracted from the channel data such that if a channel has an offset of 24 counts, an offset value of 24 would be entered to remove it to 0.

OSR_[channel],[offset]<ENTER>

Where:

[channel] - Channel to set. 1A or 2A (I/O Aux input streams); 1M, 2M, 3M, 4M, 5M or 6M (mass position streams).
[offset] - Offset value to subtract (+2048 to –2047).
[? will return the current value]
(Factory default: 0)

Example:

OSR_2M,24<ENTER>	Subtract 24 counts from Mass Position channel 1.
OSR_2M,?<ENTER>	Query
OSR_2M,24<CR><LF>	Returned string

3.6.4.3.3 RCL – ADC Relay Control

RCL – Sets the state of the ADC input relay.

RCL_[channel],[state]<ENTER>

Where:

[channel] – Channel number; 1, 2, 3, 4, 5 or 6.
[state] – Relay state; 0 = Signal input, 1 = Short to ground.
(Factory default is 0, signal input.)
[? will return the current value]

Example:

RCL_1,1<ENTER>

RCL_1,?<ENTER> Query
RCL_1,1<CR><LF> Returned string

3.6.4.4 Calibration Commands

3.6.4.4.1 CAG – Calibration Go

CAG – Start a calibration command. Note: All of the parameters for a calibration must be set first before issuing this command. For the immediate mode, the calibration will start on the next 1PPS mark after receiving this command. For the scheduled mode, the calibration will start on the next scheduled start time.

CAG_[mode]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled

Example:

CAG_I<ENTER>

3.6.4.4.2 CAH – Calibration Halt

CAH – Stop a calibration command. For the immediate mode, the calibration will be terminated on the next 1PPS mark after receiving this command. For the scheduled mode, the calibration will be terminated on the next 1PPS mark after receiving this command if in progress and any further schedule calibrations will be disabled.

CAH_[mode]<ENTER>

Where:

[mode] – Calibration mode; I = Immediate, S = Scheduled

Example:

CAH_I<ENTER>

3.6.4.5 Status Commands

3.6.4.5.1 TYP – Get Smart-24 Type

TYP – Returns the Smart Series Instrument type.

"SMART-24D" – Simple Digitizer
"SMART-24R" – Recorder
"SMART-24A" – Accelerometer
"SMART-24BH" – Borehole Digitizer

Example:

TYP<ENTER> Command

Example Output:

TYP_SMART-24D<CR><LF> Returned string

3.6.4.5.2 SOH – Get State of Health

SOH – Returns the Smart Series Instrument state of health parameters.

Example:

SOH<ENTER> Command

Example Output:

```
SOH START
TIME: 23:09:25,01/05/2005
PWR_VSW: +11.629 Volts
PWR_+5V: +5.025 Volts
PWR_+3.3V: +3.259 Volts
PWR_+1.8V: +1.783 Volts
PWR_+3.3VA: +3.269 Volts
PWR_-3.3VA: -3.330 Volts
PWR_AUX1: +0.921 Volts
PWR_AUX2: +0.965 Volts
PWR_TEMP: +27.166 Degree C
PWR_VIN: +11.846 Volts
PWR_SENSOR1: +11.530 Volts
PWR_SENSOR2: +11.530 Volts
PWR_FIREWIRE: +0.000 Volts
PWR_GPS: +11.214 Volts
PWR_USB_HOST: +4.988 Volts
PWR_USB: +0.000 Volts
```

```
DSP_VCTCXO: +0.003 Volts
DSP_+3.3V: +3.278 Volts
DSP_GND: +0.000 Volts
DSP_+5V: +5.073 Volts
DSP_+5VA: +0.003 Volts
DSP_+2.5VREF: +2.514 Volts
DSP_+3.6VBAT: +3.660 Volts
DSP_+1.8V: +1.730 Volts
DSP_TEMP: +24.889 Degree C
DSP_DIG_IN_1: CLOSED
DSP_DIG_IN_2: CLOSED
DSP_DIG_IN_3: CLOSED
DSP_DIG_IN_4: OPEN
DSP_DIG_IN_5: OPEN
DSP_DIG_IN_6: OPEN
ADC1_CH1_MP: +0.926 Volts
ADC1_CH2_MP: +0.975 Volts
ADC1_CH3_MP: +1.010 Volts
ADC1_+3VA: +2.993 Volts
ADC1_-3VA: -2.986 Volts
ADC1_+3V: +2.983 Volts
ADC1_GND: +0.000 Volts
ADC1_TEMP: +25.096 Degree C
ETH1_+3.3V: +3.273 Volts
ETH1_TEMP: +27.373 Degree C
CLK_STATUS: LOCKED
CLK_LAST_LOCK: 23:09:24,01/05/2005
CLK_EXT_1PPS: YES
CLK_DIFFERENCE: +0.000000183 Seconds
CLK_INIT_DIFFERENCE: -0.186812407 Seconds
CLK_TEMP: +24.889 Degree C
CLK_DAC_VALUE: 2105
GPS_POWER: ON
GPS_INITIALIZED: YES
GPS_STATUS: LOCKED
GPS_LAST_LOCK: 22:57:12,01/05/2005
GPS_STATE: 1
GPS_HEALTH_STATUS: 0x00
GPS_HEALTH_ERROR: 0x01
GPS_MACHINE_ID: 0x61
GPS_MACHINE_STATUS1: 0x00
GPS_MACHINE_STATUS2: 0x01
GPS_NAV_SW_VER: 2.2
GPS_NAV_SW_DATE: 10/05/2000
GPS_SIG_SW_VER: 10.2
GPS_SIG_SW_DATE: 08/23/1999
GPS_LAST_FIX_TYPE: 0x19
GPS_LAST_FIX_SV: 6
GPS_LAST_FIX_UTC_OS: 0
GPS_RECVR_STATUS: 0
GPS_UTC_FLAGS: 0x01
GPS_MINOR_ALARMS: 0x0060
GPS_RECVR_MODE: 0x04
GPS_SURVEY_PROGRESS: 37
GPS_DECODE_STATUS: 0x00
GPS_1PPS_OUTPUT: YES
GPS_LATITUDE: +32.895913 Degrees
GPS_LONGITUDE: -96.694238 Degrees
GPS_ALTITUDE: +164.177370 Meters
SOH END
```

Note: Other entries may be added as needed.

3.6.4.5.3 GPS– Get GPS Status

GPS– Returns the Smart Series Instrument GPS status parameters.

Example:

GPS<ENTER> Command

Example Output:

```
GPS START
TIME: 23:29:29,01/05/2005
CLK_STATUS: LOCKED
CLK_LAST_LOCK: 23:29:28,01/05/2005
CLK_EXT_1PPS: YES
CLK_DIFFERENCE: +0.000000213 Seconds
CLK_INIT_DIFFERENCE: -0.186812407 Seconds
CLK_TEMP: +25.096 Degree C
CLK_DAC_VALUE: 2100
GPS_POWER: ON
GPS_INITIALIZED: YES
GPS_STATUS: LOCKED
GPS_LAST_LOCK: 22:57:12,01/05/2005
GPS_STATE: 1
GPS_HEALTH_STATUS: 0x00
GPS_HEALTH_ERROR: 0x01
GPS_MACHINE_ID: 0x61
GPS_MACHINE_STATUS1: 0x00
GPS_MACHINE_STATUS2: 0x01
GPS_NAV_SW_VER: 2.2
GPS_NAV_SW_DATE: 10/05/2000
GPS_SIG_SW_VER: 10.2
GPS_SIG_SW_DATE: 08/23/1999
GPS_LAST_FIX_TYPE: 0x19
GPS_LAST_FIX_SV: 7
GPS_LAST_FIX_UTC_OS: 0
GPS_RECVR_STATUS: 0
GPS_UTC_FLAGS: 0x01
GPS_MINOR_ALARMS: 0x0060
GPS_RECVR_MODE: 0x04
GPS_SURVEY_PROGRESS: 97
GPS_DECODE_STATUS: 0x00
GPS_1PPS_OUTPUT: YES
GPS_LATITUDE: +32.895908 Degrees
GPS_LONGITUDE: -96.694245 Degrees
GPS_ALTITUDE: +162.966687 Meters
GPS END
```

Note: Other entries may be added as needed.

3.6.4.5.4 IPS– Get IP Status

IPS– Returns the Smart Series Instrument TCP/IP status parameters.

IPS<ENTER> Command

Example:

IPS<ENTER>

Example Output:

```
IPS START
TIME: 21:54:38,06/04/2004
Total           = 0000000002
Odropped        = 0000000000
Badsum          = 0000000000
Badhlen         = 0000000000
Badlen          = 0000000000
Badoptions      = 0000000000
Badvers         = 0000000000
Forward         = 0000000000
Noproto         = 0000000000
Delivered       = 0000000002
Cantforward     = 0000000002
CantforwardBA   = 0000000000
Expired         = 0000000000
Redirectsent    = 0000000000
Localout        = 0000000003
Localnoroute    = 0000000000
CacheHit        = 0000000001
CacheMiss       = 0000000002
Fragments       = 0000000000
Fragdropped     = 0000000000
Fragtimeout     = 0000000000
Reassembled     = 0000000000
Ofragments      = 0000000000
Fragmented      = 0000000000
Cantfrag        = 0000000000
Filtered        = 0000000000
TCP Statistics:
RcvTotal        = 0000000000
RcvShort        = 0000000000
RcvHdrSize      = 0000000000
RcvBadSum       = 0000000000
RcvAfterClose   = 0000000000
RcvDupAck       = 0000000000
RcvPack         = 0000000000
RcvByte         = 0000000000
RcvAckPack      = 0000000000
RcvAckByte      = 0000000000
RcvDupPack      = 0000000000
RcvDupByte      = 0000000000
RcvPartDupPack  = 0000000000
RcvPartDupByte  = 0000000000
RcvAfterWinPack = 0000000000
```

```
RcvAfterWinByte = 0000000000
RcvOOPack       = 0000000000
RcvOOByte       = 0000000000
RcvWinUpd       = 0000000000
RcvWinProbe     = 0000000000
RcvAckTooMuch   = 0000000000
SndNoBufs       = 0000000000
SndTotal        = 0000000003
SndProbe        = 0000000000
SndPack (data)  = 0000000000
SndByte (data)  = 0000000000
SndRexmitPack   = 0000000000
SndRexmitByte   = 0000000000
SndAcks         = 0000000002
SndCtrl         = 0000000001
SndUrg          = 0000000000
SndWinUp        = 0000000000
SegsTimed       = 0000000001
RttUpdated      = 0000000000
Connects        = 0000000000
ConnAttempt     = 0000000001
Drops           = 0000000000
ConnDrops       = 0000000000
Accepts         = 0000000000
TimeoutDrops    = 0000000000
KeepDrops       = 0000000000
DelAck          = 0000000000
KeepProbe       = 0000000000
PersistTimeout  = 0000000000
KeepTimeout     = 0000000000
RexmtTimeout    = 0000000002
IPS END
```

Note: Other entries may be added as needed.

3.6.4.5.5 HWS– Get Hardware Status

HWS– Returns the Smart Series Instrument hardware status and configuration parameters.

HWS<ENTER> Command

Example Output:

```
HWS START
TIME: 23:30:42,01/05/2005
SERIAL_NUM: 1056
SMART_TYPE: SMART-24R
CURRENT_APP_VER: 1.18
CURRENT_APP_DATE: 12/14/2004
BL_FIRMWARE_TYPE: SMART-24BOOT
BL_FIRMWARE_VER: 1.07
BL_FIRMWARE_DATE: 06/17/2004
BANK1_APP_TYPE: SMART-24R
BANK1_APP_VER: 1.16
BANK1_APP_DATE: 10/27/2004
```

```
BANK2_APP_TYPE: SMART-24R
BANK2_APP_VER: 1.17
BANK2_APP_DATE: 11/19/2004
BANK3_APP_TYPE: SMART-24R
BANK3_APP_VER: 1.18
BANK3_APP_DATE: 12/14/2004
DSP_BOARD_TYPE: DSP
DSP_PART_NUM: 990-60566-0101
DSP_VER_NUM: 01
DSP_ASSY_REV: A
DSP_SERIAL_NUM: 1031
DSP_MAN_DATE: 07/14/2004
DSP_FIRMWARE_VER: 1.09
PWR_BOARD_TYPE: POWER
PWR_PART_NUM: 990-60567-0101
PWR_VER_NUM: 01
PWR_ASSY_REV: A
PWR_SERIAL_NUM: 1056
PWR_MAN_DATE: 11/10/2004
PWR_FIRMWARE_VER: 1.01
ADC1_BOARD_TYPE: 24-BIT ADC
ADC1_PART_NUM: 990-60568-0103
ADC1_VER_NUM: 03
ADC1_ASSY_REV: A
ADC1_SERIAL_NUM: 1101
ADC1_MAN_DATE: 11/18/2004
ADC1_FIRMWARE_VER: 1.03
ADC1_5VPP_CHANNEL_1_LSB: 0.414490 uVolts
ADC1_5VPP_CHANNEL_2_LSB: 0.413006 uVolts
ADC1_5VPP_CHANNEL_3_LSB: 0.413007 uVolts
ADC1_TOTAL_CHANNEL_1_LSB: 1.657960 uVolts
ADC1_TOTAL_CHANNEL_2_LSB: 1.652024 uVolts
ADC1_TOTAL_CHANNEL_3_LSB: 1.652028 uVolts
ADC2_BOARD_TYPE: NA
ADC2_PART_NUM: NA
ADC2_VER_NUM: NA
ADC2_ASSY_REV: NA
ADC2_SERIAL_NUM: NA
ADC2_MAN_DATE: NA
ADC2_FIRMWARE_VER: NA
ADC2_5VPP_CHANNEL_1_LSB: NA
ADC2_5VPP_CHANNEL_2_LSB: NA
ADC2_5VPP_CHANNEL_3_LSB: NA
ADC2_TOTAL_CHANNEL_1_LSB: NA
ADC2_TOTAL_CHANNEL_2_LSB: NA
ADC2_TOTAL_CHANNEL_3_LSB: NA
IO1_BOARD_TYPE: ETHERNET I/O
IO1_PART_NUM: 990-60573-0101
IO1_VER_NUM: 01
IO1_ASSY_REV: A
IO1_SERIAL_NUM: 1039
IO1_MAN_DATE: 07/07/2004
IO1_FIRMWARE_VER: 1.01
IO1_ETH_MAC_ADDR: 00-50-C2-31-F0-24
IO2_BOARD_TYPE: NA
IO2_PART_NUM: NA
IO2_VER_NUM: NA
IO2_ASSY_REV: NA
IO2_SERIAL_NUM: NA
IO2_MAN_DATE: NA
```

```
IO2_FIRMWARE_VER: NA
PCM_BOARD_TYPE: NA
PCM_PART_NUM: NA
PCM_VER_NUM: NA
PCM_ASSY_REV: NA
PCM_SERIAL_NUM: NA
PCM_MAN_DATE: NA
PCM_FIRMWARE_VER: NA
PCM_CARD_IN_SLOT_1: NA
PCM_CARD_IN_SLOT_2: NA
HWS END
```

Note: Other entries may be added as needed.

3.6.4.5.6 GCS - Get DATA Channel Statistics

GCS – Returns the data channel calculated statistics.

GCS<ENTER> Command

Example Output:

```
CHANNEL STATISTICS START
TIME: 22:25:04,04/29/2005
CH_123_STATS_TIME: 22:25:00,04/29/2005
CH_1_MAX_COUNTS: -6225052
CH_1_MIN_COUNTS: -6225079
CH_1_AVE_COUNTS: -6225058
CH_1_AVE_VOLTS_: -10.030761
CH_2_MAX_COUNTS: +3
CH_2_MIN_COUNTS: -1
CH_2_AVE_COUNTS: +0
CH_2_AVE_VOLTS_: +00.000000
CH_3_MAX_COUNTS: -6
CH_3_MIN_COUNTS: -10
CH_3_AVE_COUNTS: -7
CH_3_AVE_VOLTS_: -00.000011
CH_456_STATS_TIME: 22:25:00,04/29/2005
CH_4_MAX_COUNTS: +2
CH_4_MIN_COUNTS: -5
CH_4_AVE_COUNTS: -1
CH_4_AVE_VOLTS_: -00.000001
CH_5_MAX_COUNTS: +1
CH_5_MIN_COUNTS: -6
CH_5_AVE_COUNTS: -2
CH_5_AVE_VOLTS_: -00.000003
CH_6_MAX_COUNTS: +1
CH_6_MIN_COUNTS: -6
CH_6_AVE_COUNTS: -2
CH_6_AVE_VOLTS_: -00.000003
CHANNEL STATISTICS END
```

Note: Other entries may be added as needed.

3.6.4.5.7 GPT - Get GPS Satellite Tracking Status

GPT – Returns the GPS satellite tracking and signal level report.

GPT<ENTER> Command

Example Output:

```
GPS SATELLITE STATUS START
TIME: 22:17:20,04/29/2005
GPS_SAT_STATUS_TIME: 22:17:15,04/29/2005
GPS_POWER: ON
GPS_SS_VALID: YES
GPS_SS_MODE: 3D
GPS_SS_MODE_TYPE: AUTOMATIC
GPS_SS_NUM_OF_SV: 4
GPS_SS_PDOP: +4.866131
GPS_SS_SV_PRN_1: 15
GPS_SS_SV_PRN_2: 22
GPS_SS_SV_PRN_3: 18
GPS_SS_SV_PRN_4: 09
GPS_SS_SV_PRN_5: 00
GPS_SS_SV_PRN_6: 00
GPS_SS_SV_PRN_7: 00
GPS_SS_SV_PRN_8: 00
GPS_ST_CH_1_VALID: YES
GPS_ST_CH_1_SV_PRN: 14
GPS_ST_CH_1_ACQ_FLAG: 2
GPS_ST_CH_1_EPH_FLAG: 0
GPS_ST_CH_1_SIG_LEVEL: +1.375000
GPS_ST_CH_2_VALID: YES
GPS_ST_CH_2_SV_PRN: 25
GPS_ST_CH_2_ACQ_FLAG: 2
GPS_ST_CH_2_EPH_FLAG: 0
GPS_ST_CH_2_SIG_LEVEL: +1.099999
GPS_ST_CH_3_VALID: YES
GPS_ST_CH_3_SV_PRN: 21
GPS_ST_CH_3_ACQ_FLAG: 1
GPS_ST_CH_3_EPH_FLAG: 2
GPS_ST_CH_3_SIG_LEVEL: +2.475000
GPS_ST_CH_4_VALID: YES
GPS_ST_CH_4_SV_PRN: 01
GPS_ST_CH_4_ACQ_FLAG: 2
GPS_ST_CH_4_EPH_FLAG: 0
GPS_ST_CH_4_SIG_LEVEL: +1.650000
GPS_ST_CH_5_VALID: YES
GPS_ST_CH_5_SV_PRN: 15
GPS_ST_CH_5_ACQ_FLAG: 1
GPS_ST_CH_5_EPH_FLAG: 2
GPS_ST_CH_5_SIG_LEVEL: +5.225000
GPS_ST_CH_6_VALID: YES
GPS_ST_CH_6_SV_PRN: 22
GPS_ST_CH_6_ACQ_FLAG: 1
GPS_ST_CH_6_EPH_FLAG: 2
GPS_ST_CH_6_SIG_LEVEL: +13.200000
GPS_ST_CH_7_VALID: YES
GPS_ST_CH_7_SV_PRN: 18
```

```
GPS_ST_CH_7_ACQ_FLAG: 1
GPS_ST_CH_7_EPH_FLAG: 2
GPS_ST_CH_7_SIG_LEVEL: +3.300000
GPS_ST_CH_8_VALID: YES
GPS_ST_CH_8_SV_PRN: 09
GPS_ST_CH_8_ACQ_FLAG: 1
GPS_ST_CH_8_EPH_FLAG: 2
GPS_ST_CH_8_SIG_LEVEL: +6.325000
GPS SATELLITE STATUS END
```

Note: Other entries may be added as needed.

3.6.4.5.8 PCS – Get PCMCIA PC Card Status

PCS – Returns the status and CIS information of any PCMCIA PC Cards installed in the system.

PCS<ENTER> Command

Example Output:

```
PCS START
TIME: 20:04:10,07/28/2005
PCMCIA_INTERFACE_INSTALLED: YES
PCMCIA_S1_CARD_INSTALLED: YES
PCMCIA_S1_CARD_TYPE: Fortezza Crypto Card
PCMCIA_S1_CARD_POWER_ON: YES
PCMCIA_S1_CIS_DEVICE_TYPE: 13
PCMCIA_S1_CIS_DEVICE_SIZE: 65536
PCMCIA_S1_CIS_VERS_1_MAJOR: 4
PCMCIA_S1_CIS_VERS_1_MINOR: 1
PCMCIA_S1_CIS_VERS_1_INFO_LINE_1: SPYRUS
PCMCIA_S1_CIS_VERS_1_INFO_LINE_2: Lynks Privacy Crypto Card
PCMCIA_S1_CIS_VERS_1_INFO_LINE_3: Processor=MYK82
PCMCIA_S1_CIS_VERS_1_INFO_LINE_4: Certificates=49
PCMCIA_S1_CIS_VERS_1_INFO_LINE_5: Key Registers=20
PCMCIA_S1_CIS_VERS_1_INFO_LINE_6: Multiple Mailboxes=No
PCMCIA_S1_CIS_VERS_1_INFO_LINE_7: Mailbox Start Address=0000
PCMCIA_S1_CIS_VERS_1_INFO_LINE_8: Timeout=60000
PCMCIA_S1_CIS_VERS_1_INFO_LINE_9: ICD=P1.5
PCMCIA_S1_CIS_CONFIG_SIZE: 3
PCMCIA_S1_CIS_CONFIG_LAST: 0
PCMCIA_S1_CIS_CONFIG_RADR: 1024
PCMCIA_S1_CIS_CONFIG_RMSK: 0
PCMCIA_S1_CIS_CONFIG_TBL_0_INDEX: 32
PCMCIA_S1_CIS_CONFIG_TBL_0_IOADR: 0
PCMCIA_S1_CIS_CONFIG_TBL_1_INDEX: 0
PCMCIA_S1_CIS_CONFIG_TBL_1_IOADR: 0
PCMCIA_S1_CIS_MANF_ID: 580
PCMCIA_S1_CIS_CARD_ID: 768
PCMCIA_S1_CIS_FUNCT_ID: 9
PCMCIA_S1_CIS_SYS_INIT: 0
PCMCIA_S1_CIS_FUNCE_TYPE: 0
PCMCIA_S1_CIS_FUNCE_DATA: 0
PCMCIA_S1_CIS_VERS_2_FIRST_BYTE: 0
PCMCIA_S1_CIS_VERS_2_VSPEC8: 25
```

```
PCMCIA_S1_CIS_VERS_2_VSPEC9: 32
PCMCIA_S1_CIS_VERS_2_NHDR: 1
PCMCIA_S1_CIS_VERS_2_INFO_LINE_1: SPYRUS
PCMCIA_S1_CIS_VERS_2_INFO_LINE_2: FORTEZZA Crypto Card
PCMCIA_S2_CARD_INSTALLED: YES
PCMCIA_S2_CARD_TYPE: ATA Hard Drive Card
PCMCIA_S2_CARD_POWER_ON: NO
PCMCIA_S2_CIS_DEVICE_TYPE: 13
PCMCIA_S2_CIS_DEVICE_SIZE: 2048
PCMCIA_S2_CIS_VERS_1_MAJOR: 4
PCMCIA_S2_CIS_VERS_1_MINOR: 1
PCMCIA_S2_CIS_VERS_1_INFO_LINE_1: SunDisk
PCMCIA_S2_CIS_VERS_1_INFO_LINE_2: SDP
PCMCIA_S2_CIS_VERS_1_INFO_LINE_3: 5/3 0.6
PCMCIA_S2_CIS_CONFIG_SIZE: 1
PCMCIA_S2_CIS_CONFIG_LAST: 7
PCMCIA_S2_CIS_CONFIG_RADR: 512
PCMCIA_S2_CIS_CONFIG_RMSK: 15
PCMCIA_S2_CIS_CONFIG_TBL_0_INDEX: 0
PCMCIA_S2_CIS_CONFIG_TBL_0_IOADR: 0
PCMCIA_S2_CIS_CONFIG_TBL_1_INDEX: 0
PCMCIA_S2_CIS_CONFIG_TBL_1_IOADR: 0
PCMCIA_S2_CIS_MANF_ID: 69
PCMCIA_S2_CIS_CARD_ID: 1025
PCMCIA_S2_CIS_FUNCT_ID: 4
PCMCIA_S2_CIS_SYS_INIT: 1
PCMCIA_S2_CIS_FUNCE_TYPE: 1
PCMCIA_S2_CIS_FUNCE_DATA: 1
PCMCIA_S2_CIS_VERS_2_FIRST_BYTE: 0
PCMCIA_S2_CIS_VERS_2_VSPEC8: 0
PCMCIA_S2_CIS_VERS_2_VSPEC9: 0
PCMCIA_S2_CIS_VERS_2_NHDR: 0
PCS END
```

Note: Other entries may be added as needed.

3.6.4.5.9 FZS – Get Fortezza Card Status

FZS – Returns the status of the Fortezza card if installed in the system.

FZS<ENTER> Command

Example Output:

```
FZS START
TIME: 20:00:19,07/28/2005
FORTEZZA_CARD_INSTALLED: YES
FORTEZZA_PCMCIA_SOCKET: 0
FORTEZZA_CARD_OK: YES
FORTEZZA_CARD_INITIALIZED: YES
FORTEZZA_USER_LOGGED_IN: YES
FORTEZZA_CURRENT_PERSONALITY: 2
FORTEZZA_CURRENT_STATE: Ready
FORTEZZA_NUM_OF_CERT: 49
FORTEZZA_MAILBOX_START_ADDR: 0x0000
FORTEZZA_COMMAND_TIMEOUT: 60000 Milliseconds
FORTEZZA_PERSONALITY_RETRIEVED: YES
FORTEZZA_PERSONALITY_SIZE: 1800
FORTEZZA_PERSONALITY_LIST_0_NAME: root
FORTEZZA_PERSONALITY_LIST_1_NAME: DR_CERT_1
```

```
FORTEZZA_PERSONALITY_LIST_2_NAME: DR_CERT_2
FORTEZZA_MAX_HASH_DATA_SIZE: 32768
FORTEZZA_CAPSTONE_SERIAL_NUMBER: 0xD1F35AFA
FORTEZZA_LAST_COMMAND: 0x00000057
FORTEZZA_LAST_ERROR: 0x00000000
FORTEZZA_KEY_CHANGE_COUNT: 6
FORTEZZA_KEY_CHANGE_KEY_ID: 101
FORTEZZA_NEW_KEY_READY: NO
FORTEZZA_NEW_KEY_PERSONALITY: 0
FORTEZZA_NEW_KEY_SCHEDULED: NO
FORTEZZA_NEW_KEY_SCHEDULED_TIME: 00:00:00,01/01/1970
FORTEZZA_CERT_1_VALID: YES
FORTEZZA_CERT_1_KEY_ID: 100
FORTEZZA_CERT_1_LABEL: DR_CERT_1
FORTEZZA_CERT_1_LENGTH: 1148
FORTEZZA_CERT_1_P_LENGTH: 128
FORTEZZA_CERT_1_P_VALUE_1: A3 E4 7D 7A EC 74 9A 12 95 0C FA 00 21 74 B9 C7
FORTEZZA_CERT_1_P_VALUE_2: 21 79 75 F6 73 F1 CD BC F2 11 14 44 B7 A7 AD 82
FORTEZZA_CERT_1_P_VALUE_3: 9F 8A B4 6B D4 5C C0 33 B0 F4 49 62 71 28 0B FD
FORTEZZA_CERT_1_P_VALUE_4: 9B 93 F8 5E FA 30 88 5A 1F 6D DE 22 83 3D 1E 7A
FORTEZZA_CERT_1_P_VALUE_5: A5 64 49 E1 F1 DE 44 E6 65 8C 99 1E 06 43 05 51
FORTEZZA_CERT_1_P_VALUE_6: 45 D8 AA 14 BE 17 8F 3B 17 32 3A A0 03 2C 68 05
FORTEZZA_CERT_1_P_VALUE_7: 67 3D 8C 2C 2C 00 A1 50 7A 69 6B EE FA 6A 93 F3
FORTEZZA_CERT_1_P_VALUE_8: 96 C2 D3 9C 3F EF 9A B4 FF 98 51 2C 2D CD 0A 73
FORTEZZA_CERT_1_Q_LENGTH: 20
FORTEZZA_CERT_1_Q_VALUE_1: 9B 0F 6C FD 37 4A 9E 11 76 8E
FORTEZZA_CERT_1_Q_VALUE_2: AB 9B E0 15 8F 9C 8C E2 C2 BD
FORTEZZA_CERT_1_G_LENGTH: 128
FORTEZZA_CERT_1_G_VALUE_1: 23 DC 0A 98 C9 F2 FB E4 2A E6 42 BC DB E6 6B 5E
FORTEZZA_CERT_1_G_VALUE_2: 60 22 55 EE 08 F1 7D 05 6B 78 CD AF 8D 42 86 C8
FORTEZZA_CERT_1_G_VALUE_3: 5D AA 0B A2 00 33 7A FD 61 11 58 DC DA D4 7A 84
FORTEZZA_CERT_1_G_VALUE_4: 5D 78 A5 FB 28 52 E6 ED 3D 7F 53 AB 8F 96 F2 E4
FORTEZZA_CERT_1_G_VALUE_5: 21 9F E3 58 6E 5F 6C C8 50 25 38 E2 EB 00 58 7D
FORTEZZA_CERT_1_G_VALUE_6: EA C0 26 67 A0 FE D7 BF E3 73 85 70 DC D8 A3 11
FORTEZZA_CERT_1_G_VALUE_7: F4 B5 2D 82 17 01 38 29 1B 50 EB C8 2E BB 0A 65
FORTEZZA_CERT_1_G_VALUE_8: C4 24 7F C5 9F 2D 05 5A 00 1B 07 7D 06 00 13 56
FORTEZZA_CERT_1_Y_LENGTH: 128
FORTEZZA_CERT_1_Y_VALUE_1: 18 68 A8 3F BB 66 8B B9 8C 4C 72 8A 1E 29 22 E9
FORTEZZA_CERT_1_Y_VALUE_2: B5 56 82 A9 D7 C8 A5 F7 28 0B 26 56 8B A8 79 ED
FORTEZZA_CERT_1_Y_VALUE_3: A3 F7 48 7F 13 7D B9 C2 B2 DF 3A CB ED FD F4 A5
FORTEZZA_CERT_1_Y_VALUE_4: EA FD C9 A9 0C 68 0A 2B 02 30 4F C8 BF CF 01 EA
FORTEZZA_CERT_1_Y_VALUE_5: 47 80 9C 61 46 36 33 00 04 D4 30 AC C2 D7 23 DD
FORTEZZA_CERT_1_Y_VALUE_6: 77 5C 5C 8F F3 78 43 EA D1 84 66 BA 28 FF 12 23
FORTEZZA_CERT_1_Y_VALUE_7: FD 87 FC 91 8D 81 F7 1F 62 23 1B E0 34 B8 AA 31
FORTEZZA_CERT_1_Y_VALUE_8: 5C D9 F4 E6 C1 77 15 39 7E CF AA 4B 9C B8 96 2A
FORTEZZA_CERT_2_VALID: YES
FORTEZZA_CERT_2_KEY_ID: 101
FORTEZZA_CERT_2_LABEL: DR_CERT_2
FORTEZZA_CERT_2_LENGTH: 1148
FORTEZZA_CERT_2_P_LENGTH: 128
FORTEZZA_CERT_2_P_VALUE_1: A3 E4 7D 7A EC 74 9A 12 95 0C FA 00 21 74 B9 C7
FORTEZZA_CERT_2_P_VALUE_2: 21 79 75 F6 73 F1 CD BC F2 11 14 44 B7 A7 AD 82
FORTEZZA_CERT_2_P_VALUE_3: 9F 8A B4 6B D4 5C C0 33 B0 F4 49 62 71 28 0B FD
FORTEZZA_CERT_2_P_VALUE_4: 9B 93 F8 5E FA 30 88 5A 1F 6D DE 22 83 3D 1E 7A
FORTEZZA_CERT_2_P_VALUE_5: A5 64 49 E1 F1 DE 44 E6 65 8C 99 1E 06 43 05 51
FORTEZZA_CERT_2_P_VALUE_6: 45 D8 AA 14 BE 17 8F 3B 17 32 3A A0 03 2C 68 05
FORTEZZA_CERT_2_P_VALUE_7: 67 3D 8C 2C 2C 00 A1 50 7A 69 6B EE FA 6A 93 F3
FORTEZZA_CERT_2_P_VALUE_8: 96 C2 D3 9C 3F EF 9A B4 FF 98 51 2C 2D CD 0A 73
FORTEZZA_CERT_2_Q_LENGTH: 20
FORTEZZA_CERT_2_Q_VALUE_1: 9B 0F 6C FD 37 4A 9E 11 76 8E
FORTEZZA_CERT_2_Q_VALUE_2: AB 9B E0 15 8F 9C 8C E2 C2 BD
FORTEZZA_CERT_2_G_LENGTH: 128
FORTEZZA_CERT_2_G_VALUE_1: 23 DC 0A 98 C9 F2 FB E4 2A E6 42 BC DB E6 6B 5E
FORTEZZA_CERT_2_G_VALUE_2: 60 22 55 EE 08 F1 7D 05 6B 78 CD AF 8D 42 86 C8
FORTEZZA_CERT_2_G_VALUE_3: 5D AA 0B A2 00 33 7A FD 61 11 58 DC DA D4 7A 84
FORTEZZA_CERT_2_G_VALUE_4: 5D 78 A5 FB 28 52 E6 ED 3D 7F 53 AB 8F 96 F2 E4
FORTEZZA_CERT_2_G_VALUE_5: 21 9F E3 58 6E 5F 6C C8 50 25 38 E2 EB 00 58 7D
FORTEZZA_CERT_2_G_VALUE_6: EA C0 26 67 A0 FE D7 BF E3 73 85 70 DC D8 A3 11
FORTEZZA_CERT_2_G_VALUE_7: F4 B5 2D 82 17 01 38 29 1B 50 EB C8 2E BB 0A 65
FORTEZZA_CERT_2_G_VALUE_8: C4 24 7F C5 9F 2D 05 5A 00 1B 07 7D 06 00 13 56
FORTEZZA_CERT_2_Y_LENGTH: 128
FORTEZZA_CERT_2_Y_VALUE_1: 26 A7 89 70 2D 6B B4 B1 00 43 5D 40 29 1C 06 1E
FORTEZZA_CERT_2_Y_VALUE_2: 05 5B 4E 25 3D 3E 65 C9 27 E4 4C D6 2F 78 43 02
FORTEZZA_CERT_2_Y_VALUE_3: 0E 58 E2 D3 06 2B E1 AE 70 56 15 5C A7 AD 06 F2
FORTEZZA_CERT_2_Y_VALUE_4: 17 C2 4C 12 3D E3 3D 3F E7 77 72 2D 64 AC E8 73
```

```
FORTEZZA_CERT_2_Y_VALUE_5: F6 59 11 09 12 42 80 1B 9A 93 53 08 69 2D 4E 03
FORTEZZA_CERT_2_Y_VALUE_6: B9 53 54 2B 0A 15 97 97 51 A3 B9 88 14 B6 FA 3F
FORTEZZA_CERT_2_Y_VALUE_7: 97 B5 77 E8 5B 83 77 2B 8B DC 0E 43 E7 E7 E7 48
FORTEZZA_CERT_2_Y_VALUE_8: 50 A1 F6 6F 9B 20 EF 57 37 CF 90 6F ED 49 D8 32
FZS END
```

Note: Other entries may be added as needed.

3.6.4.5.10 GTS – Get Time Synchronization Status

GTS – Returns the time synchronization status.

GTS<ENTER> Command

Example Output:

```
TIME SYNC STATUS START
TIME: 22:15:46,02/28/2006
TS_STATUS_TIME: 22:15:23,02/28/2006
TS_HEARTBEAT: 66
TS_MODE: 2
TS_LED_STATE: GRN
TS_JAMSET_THRESHOLD: 10
TS_JAMSET_THRESHOLD_POS: +327680
TS_JAMSET_THRESHOLD_NEG: -327680
TS_GPS_LOCK: LOCKED
TS_EXT_PPS_PRESENT: YES
TS_JAMSET: NO
TS_CLK_LOCK: LOCKED
TS_FIRST_SYNC: 0
TS_LOCK_COUNT: 4
TS_TIME_DIFF-2: +10
TS_TIME_DIFF-1: +11
TS_TIME_DIFF-0: +13
TS_FREQ_ERROR: -1
TS_BASE_ADJUST_VALUE: +0
TS_BIAS: +1
TS_DAC_ADJUST_VALUE: -1
TS_DAC_VALUE: 1774
TS_TEMP: +30.271 Degree C
TS_LAST_FIRST_LOCK_TIME: 21:47:53,02/28/2006
TS_VCO_SPAN_VALUE: 20000
TIME SYNC STATUS END
```

3.6.4.5.11 DRT – Display the IP Routing Table Status

DRT – Displays the current IP Routing Table status.

DRT<ENTER>

Example:

DRT<ENTER>

Example Output:

```
Address          Subnet Mask      Flags   Gateway
---------------  ---------------  ------  -----------------
192.168.100.0    255.255.255.0    U   C   if-1
192.168.100.1    255.255.255.255  U H     00:A0:C8:09:86:8D
192.168.100.52   255.255.255.255  U H  L  local (if-1)
192.168.100.102  255.255.255.255  U H     00:04:76:37:98:C5
```

3.6.4.6 LOG System Commands

Note: The GET command returns only a 32-bit unsigned integer number for the LGE and LGL commands. Each bit of this returned number corresponds to a LOG message type or LOG message level that is enabled (1) or disabled (0) as defined in the following sections. The query command form of the LGE and LGD commands (LGE ?<ENTER> or LGD ?<ENTER>) will return a full ASCII list of the LOG message types enabled or disabled. The LGL query form is as described in section 3.6.4.6.4.

3.6.4.6.1 LGE – Enable Specific LOG Messages

LGE – Enables specific or all LOG message types.

LGE_[type]<ENTER>

Where:

[type] – LOG message type to enable:

ALL	= All log messages enabled
STARTUP	= Bit 00 - Display Startup LOG Messages
IPSTACK	= Bit 01 - Display TCP/IP Stack LOG Messages
SER1	= Bit 02 - Display Serial Port 1 LOG Messages
SER2	= Bit 03 - Display Serial Port 2 LOG Messages
SERDB	= Bit 04 - Display Debug Serial Port LOG Messages
SERIR	= Bit 05 - Display IRDA Serial Port LOG Messages
SERPC	= Bit 06 - Display PCMCIA (Modem) Serial Port LOG Messages
CMDOK	= Bit 07 - Display Command Executed OK LOG Messages
CMDERROR	= Bit 08 - Display Command Executed Error LOG Messages
CMDINVALID	= Bit 09 - Display Command Invalid LOG Messages
TELNET	= Bit 10 - Display Telnet Task LOG Messages
USBHOST	= Bit 11 - Display USB Host LOG Messages
ADCCTRL	= Bit 12 - Display ADC Control Task LOG Messages
SPIBUS	= Bit 13 - Display SPI Bus LOG Messages
CDDATASRV1	= Bit 14 - Display CD Data Server 1 Task LOG Messages
CDDATASRV2	= Bit 15 - Display CD Data Server 2 Task LOG Messages
CDDATASRV3	= Bit 16 - Display CD Data Server 3 Task LOG Messages
CDDATASRV4	= Bit 17 - Display CD Data Server 4 Task LOG Messages
CDDATADISP	= Bit 18 - Display CD Data Dispatcher Task LOG Messages
CDCMDSRVR	= Bit 19 - Display CD Command Server Task LOG Messages

RTFS	= Bit 20 - Display Real Time File System (RTFS) LOG Messages
FTP	= Bit 21 - Display FTP Server Task LOG Messages
CONTREC	= Bit 22 - Display Continuous Recording Task LOG Messages
DETECTOR	= Bit 23 - Display Event Detector Task LOG Messages
EVENTREC	= Bit 24 - Display Event Recording Task LOG Messages
LOGREC	= Bit 25 - Display LOG File Recording Task LOG Messages
CALREC	= Bit 26 - Display Calibration Recording Task LOG Messages
PPS	= Bit 27 - Display 1PPS System Task LOG Messages
DISKSUPER	= Bit 28 - Display Disk Supervisor Task LOG Messages
MOVE	= Bit 29 - Display Move Recorded Data Files Task LOG Messages
DECIMATOR	= Bit 30 - Display Decimator (Secondary Rates) Task LOG Messages
SOH	= Bit 31 - Display State of Health LOG Messages

(Factory default is all enabled.)
[? will return the current enabled values]

Example:

LGE_ALL<ENTER>	Enable all log messages.
LGE_?<ENTER>	Query
LGE_STARTUP<CR><LF>	Returned string(s)
LGE_IPSTACK<CR><LF>	
LGE_SER1<CR><LF>	
LGE_SER2<CR><LF>	
LGE_SERDB<CR><LF>	
LGE_SERIR<CR><LF>	
LGE_SERPC<CR><LF>	
LGE_CMDOK<CR><LF>	
LGE_CMDERROR<CR><LF>	
LGE_CMDINVALID<CR><LF>	
LGE_TELNET<CR><LF>	
LGE_USBHOST<CR><LF>	
LGE_ADCCTRL<CR><LF>	
LGE_SPIBUS<CR><LF>	
LGE_CDDATASRV1<CR><LF>	
LGE_CDDATASRV2<CR><LF>	
LGE_CDDATASRV3<CR><LF>	
LGE_CDDATASRV4<CR><LF>	
LGE_CDDATADISP<CR><LF>	
LGE_CDCMDSRVR<CR><LF>	
LGE_RTFS<CR><LF>	
LGE_FTP<CR><LF>	
LGE_CONTREC<CR><LF>	
LGE_DETECTOR<CR><LF>	
LGE_EVENTREC<CR><LF>	
LGE_LOGREC<CR><LF>	
LGE_CALREC<CR><LF>	

LGE_PPS<CR><LF>
LGE_DISKSUPER<CR><LF>
LGE_MOVE<CR><LF>
LGE_DECIMATOR<CR><LF>
LGE_SOH<CR><LF>

3.6.4.6.2 LGD – Disable Specific LOG Messages

LGD – Disables specific or all LOG messages.

LGD_[type]<ENTER>

Where:

[type] – LOG message type to Disable:

ALL	= All log messages disabled
STARTUP	= Bit 00 - Disable Startup LOG Messages
IPSTACK	= Bit 01 - Disable TCP/IP Stack LOG Messages
SER1	= Bit 02 - Disable Serial Port 1 LOG Messages
SER2	= Bit 03 - Disable Serial Port 2 LOG Messages
SERDB	= Bit 04 - Disable Debug Serial Port LOG Messages
SERIR	= Bit 05 - Disable IRDA Serial Port LOG Messages
SERPC	= Bit 06 - Disable PCMCIA (Modem) Serial Port LOG Messages
CMDOK	= Bit 07 - Disable Command Executed OK LOG Messages
CMDERROR	= Bit 08 - Disable Command Executed Error LOG Messages
CMDINVALID	= Bit 09 - Disable Command Invalid LOG Messages
TELNET	= Bit 10 - Disable Telnet Task LOG Messages
USBHOST	= Bit 11 - Disable USB Host LOG Messages
ADCCTRL	= Bit 12 - Disable ADC Control Task LOG Messages
SPIBUS	= Bit 13 - Disable SPI Bus LOG Messages
CDDATASRV1	= Bit 14 - Disable CD Data Server 1 Task LOG Messages
CDDATASRV2	= Bit 15 - Disable CD Data Server 2 Task LOG Messages
CDDATASRV3	= Bit 16 - Disable CD Data Server 3 Task LOG Messages
CDDATASRV4	= Bit 17 - Disable CD Data Server 4 Task LOG Messages
CDDATADISP	= Bit 18 - Disable CD Data Dispatcher Task LOG Messages
CDCMDSRVR	= Bit 19 - Disable CD Command Server Task LOG Messages
RTFS	= Bit 20 - Disable Real Time File System (RTFS) LOG Messages
FTP	= Bit 21 - Disable FTP Server Task LOG Messages
CONTREC	= Bit 22 - Disable Continuous Recording Task LOG Messages
DETECTOR	= Bit 23 - Disable Event Detector Task LOG Messages
EVENTREC	= Bit 24 - Disable Event Recording Task LOG Messages
LOGREC	= Bit 25 - Disable LOG File Recording Task LOG Messages
CALREC	= Bit 26 - Disable Calibration Recording Task LOG Messages
PPS	= Bit 27 - Disable 1PPS System Task LOG Messages
DISKSUPER	= Bit 28 - Disable Disk Supervisor Task LOG Messages
MOVE	= Bit 29 - Disable Move Recorded Data Files Task LOG Messages
DECIMATOR	= Bit 30 - Disable Decimator (Secondary Rates) Task LOG Messages
SOH	= Bit 31 - Display State of Health LOG Messages

(Factory default is all enabled.)
[? will return the current disabled values]

Example:

LGD_ALL<ENTER>

LGD_?<ENTER>	Query
LGD<CR><LF>	Returned string(s)

3.6.4.6.3 LGT – Enable/Disable Long Time in LOG Messages

LGT – Enables or disables the display of the long time (seconds since 1970) in LOG messages.

LGT_[enable/disable]<ENTER>

Where:

[enable/disable] – Enable/Disable: 0 = disable, 1 = enable
(Factory default is 0, disabled.)
[? will return the current value]

Example:

LGT_0<ENTER>

3.6.4.6.4 LGL – Set LOG Debug Message Level Enable/Disable

LGL – Enables or disables different levels of debug logging messages. Note that these messages are intended for debug purposes only and are not saved in the setup parameters. Except where noted, the factory default is DISABLED.

LGL _[log level],[enable/disable]<ENTER>

Where:

[log level] – Log level (0 to 31):

0 = Reserved for future use
1 = ADC Data Task Debug Messages
2 = CD Data Dispatcher Debug Messages
3 = CD Data Server Debug Messages
4 = CD Command Server Command Execution Messages
5 = USB Low Level Driver Debug Messages
6 = Decimator Engine Debug Messages
7 = Detector/Voter Debug Messages

8 = File Recording Debug Messages
9 = ADC Data Gaps & Fill Debug Messages
10 = ADC Data Debug Messages
11 = Serial Port 1 Command Execution Messages (ENABLED)
12 = Serial Port 2 Command Execution Messages (ENABLED)
13 = Debug Serial Port Command Execution Messages (ENABLED)
14 = Compression Status Messages
15 = File Statistic Messages
16 = Serial Port 1 PPP Control Messages
17 = Serial Port 1 PPP Packet Messages
18 = Serial Port 2 PPP Control Messages
19 = Serial Port 2 PPP Packet Messages
20 = CD Data Frame Make Messages
21 = CD Channel Subframe Make Messages
22 = CD Compression Internal Messages
23 = CD SOH Data Frame Make Messages
24 = Fortezza Card Standard Messages (ENABLED)
25 = Fortezza Card Debug Messages
26 = Reserved for future use
27 = Reserved for future use
28 = Reserved for future use
29 = Reserved for future use
30 = Reserved for future use
31 = Reserved for future use

[enable/disable] – Enable/Disable: 0 = disable, 1 = enable
(Factory default is levels 11, 12, 13 & 24 enabled, all others disabled.)
[? will return the current value]

Example:

LGL_1,1<ENTER>

LGL_1,?<ENTER>	Query
LGL_1,1<CR><LF>	Returned string

3.6.4.7 Sensor Autozero Commands

3.6.4.7.1 AZN – Immediate Autozero Command

IMMEDIATE AUTOZERO COMMAND – Does not require an ASR command and does not reboot the system.

AZN – Generate an immediate autozero command pulse on the selected primary ADC channels.

AZN_[channel],[channel]…<ENTER>

Where:

[channel] – Channel number to select; 1, 2, 3, 4, 5 or 6. Special case:
0 will select all channels.

Example:

AZN_1,2,3<ENTER>	Autozero channels 1, 2 and 3.
AZN_0<ENTER>	Autozero all channels.

3.6.4.7.2 AZE – Set Scheduled Autozero Enable/Disable

SCHEDULED AUTOZERO COMMAND – These are required to be followed by the AZG "go" command to make them effective. If these are to be permanently saved to the configuration an ASR must then be issued. These will not cause the unit to reboot.

AZE– Enable or disable the scheduled autozero mode.

AZE_[enable/disable]<ENTER>

Where:

[enable/disable] – Enable/Disable; 0 = disabled, 1 = enabled.
(Factory default is 0, disabled.)
[? will return the current value]

Example:

AZE_1<ENTER>

AZE_?<ENTER>	Query
AZE_1<CR><LF>	Returned string

3.6.4.7.3 AZS – Set Scheduled Autozero Start Time

SCHEDULED AUTOZERO COMMAND – These are required to be followed by the AZG "go" command to make them effective. If these are to be permanently saved to the configuration an ASR must then be issued. These will not cause the unit to reboot.

AZS – Sets the start time for the scheduled autozero mode.

AZS_[time]<ENTER>

Where:

[time] – Start time; HH:MM:SS,MM/DD/YYYY

(Factory default is 00:00:00,01/01/1970.)
[? will return the current value]

Example:

AZS_00:00:00,02/19/2003<ENTER>

AZS_?<ENTER>	Query
AZS_00:00:00,02/19/2003<CR><LF>	Returned string

3.6.4.7.4 AZI – Set Scheduled Autozero Interval

SCHEDULED AUTOZERO COMMAND – These are required to be followed by the AZG "go" command to make them effective. If these are to be permanently saved to the configuration an ASR must then be issued. These will not cause the unit to reboot.

AZI – Sets the scheduled autozero interval (start time to next start time). For the scheduled autozero to work, the interval must be larger than 0.

AZI_[seconds]<ENTER>

Where:

[seconds] – Interval in seconds (>= 0 seconds).
(Factory default is 0 seconds.)
[? will return the current value]

Example:

AZI_86400<ENTER>

AZI_?<ENTER>	Query
AZI_86400<CR><LF>	Returned string

3.6.4.7.5 AZR – Set Scheduled Autozero Repetitions

SCHEDULED AUTOZERO COMMAND – These are required to be followed by the AZG "go" command to make them effective. If these are to be permanently saved to the configuration an ASR must then be issued. These will not cause the unit to reboot.

AZR – Sets the scheduled autozero number of repetitions to perform. For the scheduled autozero to work, repetitions must be larger than 0.

AZR_[repetitions]<ENTER>

Where:

[repetitions] – Repetitions (>= 0 repetitions).
(Factory default is 0 repetitions.)
[? will return the current value]

Example:

AZR_365<ENTER>

AZR_?<ENTER>	Query
AZR_365<CR><LF>	Returned string

3.6.4.7.6 AZC – Set Scheduled Autozero Channels

SCHEDULED AUTOZERO COMMAND – These are required to be followed by the AZG "go" command to make them effective. If these are to be permanently saved to the configuration an ASR must then be issued. These will not cause the unit to reboot.

AZC – Select the primary ADC channels to perform the scheduled autozero on.

AZC_[channel],[channel]…<ENTER>

Where:

[channel] – Channel number to select; 1, 2, 3, 4, 5 or 6. Special case: 0 will enable all channels.
(Factory default is all disabled.)
[? will return the current value]

Example:

AZC_1,2,3<ENTER>	Autozero channels 1, 2 and 3.
AZC_0<ENTER>	Autozero all channels.
AZC_?<ENTER>	Query
AZC_1,2,3<CR><LF>	Returned string

3.6.4.7.7 AZG – Save & Start Using New Scheduled Autozero Parameters

SCHEDULED AUTOZERO COMMAND – These are required to be followed by the AZG "go" command to make them effective. If these are to be permanently saved to the configuration an ASR must then be issued. These will not cause the unit to reboot.

AZG – Saves any new scheduled autozero parameters and causes the unit to start using them for scheduled autozero. Must be followed by an ASR command to make permanent.

AZG <ENTER>

3.6.4.7.8 AZW – Autozero Pulse Width

AZW – Sets the Autozero Pulse Width in Milliseconds. This applies to both immediate and scheduled autozero commands.

AZW_[width]<ENTER>

Where:

[width] - Autozero Pulse Width in Milliseconds, up to 86400000 ms (1 day). The resolution of the pulse width is 250 ms.
[? will return the current value]
(Factory default: 250 milliseconds)

Example:

AZW_1000<ENTER>	Sets Autozero Pulse Width to 1 second.
AZW_?<ENTER>	Query
AZW_1000<CR><LF>	Returned string

3.6.4.8 Fortezza (Authentication) Card Commands

3.6.4.8.1 AGK – Generate New DSA Key Pair

AGK – Generate a new DSA private and public key pair using the selected DSA PQG values. Note that this command just generates a new DSA key pair. The user must then use the ARK command to retrieve the new public key value and then use the ASK command to schedule the new key start time (or immediate).

AGK_[pqg_type],[key_id]<ENTER>

Where:

[pqg_type] - 0 = Use internal hardcoded DSA PQG values.
1 = Use the current DSA PQG values (those of the current key pair stored in the Fortezza card).
2 = Use the user supplied DSA PQG values entered using the AUP, AUQ and AUG commands.

[key_id] - The Key ID to associate with the new DSA key pair to be generated. This value is an unsigned 32-bit integer value from 1 to 4294967295.

Example:

AGK_2,1000<ENTER>

3.6.4.8.2 ARK – Return DSA Public Key

ARK – Return a DSA public key Y (plus its Key ID number and DSA PQG values). The user can select to return either the current effective public key or a pending public key if a new one was previously generated using the AGK command and has not yet become the effective key. In either case, in the returned message, the binary image of the public key Y value is signed with the current effective key and the signature is returned as well.

ARK_[return_type]<ENTER>

Where:

[return_type] - 0 = Return the current effective public key.
1 = Return a pending public key if there is one.

Example (current key):

ARK_0<ENTER>

Example Output (current key):

```
ARK START
TIME: 19:39:54,07/28/2005
ARK_KEY_TYPE: Current
ARK_KEY_ID: 100
ARK_P_LENGTH: 128
ARK_P_VALUE_1: A3 E4 7D 7A EC 74 9A 12 95 0C FA 00 21 74 B9 C7
ARK_P_VALUE_2: 21 79 75 F6 73 F1 CD BC F2 11 14 44 B7 A7 AD 82
ARK_P_VALUE_3: 9F 8A B4 6B D4 5C C0 33 B0 F4 49 62 71 28 0B FD
ARK_P_VALUE_4: 9B 93 F8 5E FA 30 88 5A 1F 6D DE 22 83 3D 1E 7A
ARK_P_VALUE_5: A5 64 49 E1 F1 DE 44 E6 65 8C 99 1E 06 43 05 51
ARK_P_VALUE_6: 45 D8 AA 14 BE 17 8F 3B 17 32 3A A0 03 2C 68 05
ARK_P_VALUE_7: 67 3D 8C 2C 2C 00 A1 50 7A 69 6B EE FA 6A 93 F3
ARK_P_VALUE_8: 96 C2 D3 9C 3F EF 9A B4 FF 98 51 2C 2D CD 0A 73
ARK_Q_LENGTH: 20
ARK_Q_VALUE_1: 9B 0F 6C FD 37 4A 9E 11 76 8E
ARK_Q_VALUE_2: AB 9B E0 15 8F 9C 8C E2 C2 BD
ARK_G_LENGTH: 128
ARK_G_VALUE_1: 23 DC 0A 98 C9 F2 FB E4 2A E6 42 BC DB E6 6B 5E
ARK_G_VALUE_2: 60 22 55 EE 08 F1 7D 05 6B 78 CD AF 8D 42 86 C8
ARK_G_VALUE_3: 5D AA 0B A2 00 33 7A FD 61 11 58 DC DA D4 7A 84
ARK_G_VALUE_4: 5D 78 A5 FB 28 52 E6 ED 3D 7F 53 AB 8F 96 F2 E4
ARK_G_VALUE_5: 21 9F E3 58 6E 5F 6C C8 50 25 38 E2 EB 00 58 7D
ARK_G_VALUE_6: EA C0 26 67 A0 FE D7 BF E3 73 85 70 DC D8 A3 11
ARK_G_VALUE_7: F4 B5 2D 82 17 01 38 29 1B 50 EB C8 2E BB 0A 65
ARK_G_VALUE_8: C4 24 7F C5 9F 2D 05 5A 00 1B 07 7D 06 00 13 56
ARK_Y_LENGTH: 128
ARK_Y_VALUE_1: 18 68 A8 3F BB 66 8B B9 8C 4C 72 8A 1E 29 22 E9
ARK_Y_VALUE_2: B5 56 82 A9 D7 C8 A5 F7 28 0B 26 56 8B A8 79 ED
ARK_Y_VALUE_3: A3 F7 48 7F 13 7D B9 C2 B2 DF 3A CB ED FD F4 A5
ARK_Y_VALUE_4: EA FD C9 A9 0C 68 0A 2B 02 30 4F C8 BF CF 01 EA
ARK_Y_VALUE_5: 47 80 9C 61 46 36 33 00 04 D4 30 AC C2 D7 23 DD
ARK_Y_VALUE_6: 77 5C 5C 8F F3 78 43 EA D1 84 66 BA 28 FF 12 23
ARK_Y_VALUE_7: FD 87 FC 91 8D 81 F7 1F 62 23 1B E0 34 B8 AA 31
ARK_Y_VALUE_8: 5C D9 F4 E6 C1 77 15 39 7E CF AA 4B 9C B8 96 2A
ARK_S_LENGTH: 40
```

```
ARK_S_VALUE_1: 89 2C 6A BE 3F 5F D5 07 E1 16
ARK_S_VALUE_2: 57 38 E8 FB 29 63 B6 6D 17 00
ARK_S_VALUE_3: 8A F8 02 CA A5 E6 55 B7 6A 7D
ARK_S_VALUE_4: 80 07 8C 7A 6B 29 FE 0B E1 FB
ARK END
```

Example (pending key):

ARK_1<ENTER>

Example Output (pending key):

```
ARK START
TIME: 19:40:19,07/28/2005
ARK_KEY_TYPE: Pending
ARK_KEY_ID: 101
ARK_P_LENGTH: 128
ARK_P_VALUE_1: A3 E4 7D 7A EC 74 9A 12 95 0C FA 00 21 74 B9 C7
ARK_P_VALUE_2: 21 79 75 F6 73 F1 CD BC F2 11 14 44 B7 A7 AD 82
ARK_P_VALUE_3: 9F 8A B4 6B D4 5C C0 33 B0 F4 49 62 71 28 0B FD
ARK_P_VALUE_4: 9B 93 F8 5E FA 30 88 5A 1F 6D DE 22 83 3D 1E 7A
ARK_P_VALUE_5: A5 64 49 E1 F1 DE 44 E6 65 8C 99 1E 06 43 05 51
ARK_P_VALUE_6: 45 D8 AA 14 BE 17 8F 3B 17 32 3A A0 03 2C 68 05
ARK_P_VALUE_7: 67 3D 8C 2C 2C 00 A1 50 7A 69 6B EE FA 6A 93 F3
ARK_P_VALUE_8: 96 C2 D3 9C 3F EF 9A B4 FF 98 51 2C 2D CD 0A 73
ARK_Q_LENGTH: 20
ARK_Q_VALUE_1: 9B 0F 6C FD 37 4A 9E 11 76 8E
ARK_Q_VALUE_2: AB 9B E0 15 8F 9C 8C E2 C2 BD
ARK_G_LENGTH: 128
ARK_G_VALUE_1: 23 DC 0A 98 C9 F2 FB E4 2A E6 42 BC DB E6 6B 5E
ARK_G_VALUE_2: 60 22 55 EE 08 F1 7D 05 6B 78 CD AF 8D 42 86 C8
ARK_G_VALUE_3: 5D AA 0B A2 00 33 7A FD 61 11 58 DC DA D4 7A 84
ARK_G_VALUE_4: 5D 78 A5 FB 28 52 E6 ED 3D 7F 53 AB 8F 96 F2 E4
ARK_G_VALUE_5: 21 9F E3 58 6E 5F 6C C8 50 25 38 E2 EB 00 58 7D
ARK_G_VALUE_6: EA C0 26 67 A0 FE D7 BF E3 73 85 70 DC D8 A3 11
ARK_G_VALUE_7: F4 B5 2D 82 17 01 38 29 1B 50 EB C8 2E BB 0A 65
ARK_G_VALUE_8: C4 24 7F C5 9F 2D 05 5A 00 1B 07 7D 06 00 13 56
ARK_Y_LENGTH: 128
ARK_Y_VALUE_1: 26 A7 89 70 2D 6B B4 B1 00 43 5D 40 29 1C 06 1E
ARK_Y_VALUE_2: 05 5B 4E 25 3D 3E 65 C9 27 E4 4C D6 2F 78 43 02
ARK_Y_VALUE_3: 0E 58 E2 D3 06 2B E1 AE 70 56 15 5C A7 AD 06 F2
ARK_Y_VALUE_4: 17 C2 4C 12 3D E3 3D 3F E7 77 72 2D 64 AC E8 73
ARK_Y_VALUE_5: F6 59 11 09 12 42 80 1B 9A 93 53 08 69 2D 4E 03
ARK_Y_VALUE_6: B9 53 54 2B 0A 15 97 97 51 A3 B9 88 14 B6 FA 3F
ARK_Y_VALUE_7: 97 B5 77 E8 5B 83 77 2B 8B DC 0E 43 E7 E7 E7 48
ARK_Y_VALUE_8: 50 A1 F6 6F 9B 20 EF 57 37 CF 90 6F ED 49 D8 32
ARK_S_LENGTH: 40
ARK_S_VALUE_1: 68 14 67 D6 C5 49 3C 25 56 60
ARK_S_VALUE_2: F9 94 45 31 2C EB 72 B0 DC 5C
ARK_S_VALUE_3: 6B E5 EA 36 C3 CC C6 86 1A 9A
ARK_S_VALUE_4: 0B 63 4E AF 8E EC A2 1F 4E 5E
ARK END
```

Example (no pending key):

ARK_1<ENTER>

Example Output (no pending key):

```
ARK No Pending Key ERROR!
```

3.6.4.8.3 ASK – Start/Abort A Pending DSA Key Pair

ASK – Start or abort a pending DSA private and public key pair. There must be a pending key pair already available (using the AGK command) prior to issuing this command or an error message will be generated.

ASK_[type],[time]<ENTER>

Where:

[type] - 0 = Abort any pending key pair.
1 = Start a pending key pair immediately.
2 = Start a pending key pair at a scheduled time.
[time] – Scheduled start time; HH:MM:SS,MM/DD/YYYY
(only required for type = 2)

Examples:

ASK_1<ENTER>

ASK_2,12:00:00,09/01/2005<ENTER>

3.6.4.8.4 AUG – Set User DSA G Values

AUG – Set user DSA G parameter values. Values are entered one line (16 bytes) at a time for eight lines totaling 128 bytes. This command can also display an individual line or all lines of the internal hardcoded, current key or user G values.

AUG_[pqg_type],[line],[b1], . . . ,[b16]<ENTER>

Where:

[pqg_type] - 0 = Internal hardcoded DSA PQG values.
1 = Current DSA PQG values (those of the current key pair stored in the Fortezza card).
2 = User supplied DSA PQG values.
[line] – 1 to 8 lines of 16 bytes each (? To display all lines).
[bX] - 16 bytes values (in Hexadecimal AND only valid for pqg_type = 2) (? to display this line).

Example (entering 16 byte for user G line 1):

AUG_2,1,23,F4,AB,00,76,5C,45,99,EE,8A,D3,22,B6,63,D6,64<ENTER>

Example (displaying line 5 of the current key G values):

AUG_1,5,?<ENTER>

Example Output (displaying line 5 of the current key G values):

```
AUG 1,1,A3,E4,7D,7A,EC,74,9A,12,95,0C,FA,00,21,74,B9,C7
```

Example (displaying all lines of the internal hardcoded G values):

AUG_0,?<ENTER>

Example Output (displaying all lines of the internal hardcoded G values):

```
AUG 0,1,A3,E4,7D,7A,EC,74,9A,12,95,0C,FA,00,21,74,B9,C7
AUG 0,2,21,79,75,F6,73,F1,CD,BC,F2,11,14,44,B7,A7,AD,82
AUG 0,3,9F,8A,B4,6B,D4,5C,C0,33,B0,F4,49,62,71,28,0B,FD
AUG 0,4,9B,93,F8,5E,FA,30,88,5A,1F,6D,DE,22,83,3D,1E,7A
AUG 0,5,A5,64,49,E1,F1,DE,44,E6,65,8C,99,1E,06,43,05,51
AUG 0,6,45,D8,AA,14,BE,17,8F,3B,17,32,3A,A0,03,2C,68,05
AUG 0,7,67,3D,8C,2C,2C,00,A1,50,7A,69,6B,EE,FA,6A,93,F3
AUG 0,8,96,C2,D3,9C,3F,EF,9A,B4,FF,98,51,2C,2D,CD,0A,73
```

3.6.4.8.5 AUP – Set User DSA P Values

AUP – Set user DSA P parameter values. Values are entered one line (16 bytes) at a time for eight lines totaling 128 bytes. This command can also display an individual line or all lines of the internal hardcoded, current key or user P values.

AUP_[pqg_type],[line],[b1], . . . ,[b16]<ENTER>

Where:

[pqg_type]	- 0 = Internal hardcoded DSA PQG values. 1 = Current DSA PQG values (those of the current key pair stored in the Fortezza card). 2 = User supplied DSA PQG values.
[line]	– 1 to 8 lines of 16 bytes each (? To display all lines).
[bX]	- 16 bytes values (in Hexadecimal AND only valid for pqg_type = 2) (? to display this line).

Example (entering 16 bytes for user P line 1):

AUP_2,1,23,F4,AB,00,76,5C,45,99,EE,8A,D3,22,B6,63,D6,64<ENTER>

Example (displaying line 5 of the current key P values):

AUP_1,5,?<ENTER>

Example Output (displaying line 5 of the current key P values):

```
AUP 1,1,A3,E4,7D,7A,EC,74,9A,12,95,0C,FA,00,21,74,B9,C7
```

Example (displaying all lines of the internal hardcoded P values):

AUP_0,?<ENTER>

Example Output (displaying all lines of the internal hardcoded P values):

```
AUP 0,1,A3,E4,7D,7A,EC,74,9A,12,95,0C,FA,00,21,74,B9,C7
AUP 0,2,21,79,75,F6,73,F1,CD,BC,F2,11,14,44,B7,A7,AD,82
AUP 0,3,9F,8A,B4,6B,D4,5C,C0,33,B0,F4,49,62,71,28,0B,FD
AUP 0,4,9B,93,F8,5E,FA,30,88,5A,1F,6D,DE,22,83,3D,1E,7A
AUP 0,5,A5,64,49,E1,F1,DE,44,E6,65,8C,99,1E,06,43,05,51
AUP 0,6,45,D8,AA,14,BE,17,8F,3B,17,32,3A,A0,03,2C,68,05
AUP 0,7,67,3D,8C,2C,2C,00,A1,50,7A,69,6B,EE,FA,6A,93,F3
AUP 0,8,96,C2,D3,9C,3F,EF,9A,B4,FF,98,51,2C,2D,CD,0A,73
```

3.6.4.8.6 AUQ – Set User DSA Q Values

AUQ – Set user DSA Q parameter values. Values are entered one line (10 bytes) at a time for two lines totaling 20 bytes. This command can also display an individual line or all lines of the internal hardcoded, current key or user Q values.

AUQ_[pqg_type],[line],[b1], . . . ,[b10]<ENTER>

Where:

[pqg_type]	- 0 = Internal hardcoded DSA PQG values. 1 = Current DSA PQG values (those of the current key pair stored in the Fortezza card). 2 = User supplied DSA PQG values.
[line]	– 1 to 2 lines of 10 bytes each (? To display all lines).
[bX]	- 10 bytes values (in Hexadecimal AND only valid for pqg_type = 2) (? to display this line).

Example (entering 10 bytes for user Q line 1):

AUQ_2,1,23,F4,AB,00,76,5C,45,99,EE,8A<ENTER>

Example (displaying line 2 of the current key Q values):

AUQ_1,2,?<ENTER>

Example Output (displaying line 2 of the current key Q values):

```
AUQ 1,2,AB,9B,E0,15,8F,9C,8C,E2,C2,BD
```

Example (displaying all lines of the internal hardcoded Q values):

AUQ_0,?<ENTER>

Example Output (displaying all lines of the internal hardcoded Q values):

```
AUQ 0,1,9B,0F,6C,FD,37,4A,9E,11,76,8E
AUQ 0,2,AB,9B,E0,15,8F,9C,8C,E2,C2,BD
```

3.6.4.8.7 Notes On Fortezza Card and Key Management Usage

1) New Fortezza Cards must be initialized prior to being inserted into a SMART-24 digitizer for the first time. This initialization sets up the proper user ID and password to allow the SMART-24 to work with the Fortezza Cars correctly. Please consult with Geotech on how to perform this initialization procedure.

2) Upon being used the first time with a SMART-24 digitizer, the Fortezza Card will be "formatted" for use and initial key pairs will be generated using the internal hardcoded PQG values embedded in the firmware.

3) The following sequence of commands would be needed to generate new keys using the internal hardcoded PQG values, retrieve the newly created public key and start its use immediately:

AGK 0,1000<ENTER>	Generate a new pending key (key id = 1000).
ARK 1<ENTER>	Return the new pending public key (signed by the current key).
ASK 1<ENTER>	Start it immediately.

4) The following sequence of commands would be needed to generate new keys using the current key PQG values, retrieve the newly created public key and schedule its use at a future time:

AGK 1,1001<ENTER>	Generate a new pending key (key id = 1001).
ARK 1<ENTER>	Return the new pending public key (signed by the current key).
ASK 2,12:00:00,01/01/2006<ENTER>	Scheduled to start at 12 noon on Jan. 1, 2006.

5) The following sequence of commands would be needed to generate new keys using user entered PQG values, retrieve the newly created public key and schedule its use at a future time:

AUP 2,1,23,F4,AB,00,76,5C,45,99,EE,8A,AB,00,76,5C,45,99<ENTER>

AUP 2,2,EE,8A,AB,00,76,5C,45,99,23,F4,AB,00,76,5C,45,99<ENTER>
AUP 2,3,23,F4,AB,00,76,5C,45,99,EE,8A,AB,00,76,5C,45,99<ENTER>
AUP 2,4,EE,8A,AB,00,76,5C,45,99,23,F4,AB,00,76,5C,45,99<ENTER>
AUP 2,5,23,F4,AB,00,76,5C,45,99,EE,8A,AB,00,76,5C,45,99<ENTER>
AUP 2,6,EE,8A,AB,00,76,5C,45,99,23,F4,AB,00,76,5C,45,99<ENTER>
AUP 2,7,23,F4,AB,00,76,5C,45,99,EE,8A,AB,00,76,5C,45,99<ENTER>
AUP 2,8,EE,8A,AB,00,76,5C,45,99,23,F4,AB,00,76,5C,45,99<ENTER>

AUQ 2,1,23,F4,AB,00,76,5C,45,99,EE,8A<ENTER>
AUQ 2,2,EE,8A,AB,00,76,5C,45,99,23,F4<ENTER>

AUG 2,1,23,F4,AB,00,76,5C,45,99,EE,8A,AB,00,76,5C,45,99<ENTER>
AUG 2,2,EE,8A,AB,00,76,5C,45,99,23,F4,AB,00,76,5C,45,99<ENTER>
AUG 2,3,23,F4,AB,00,76,5C,45,99,EE,8A,AB,00,76,5C,45,99<ENTER>
AUG 2,4,EE,8A,AB,00,76,5C,45,99,23,F4,AB,00,76,5C,45,99<ENTER>
AUG 2,5,23,F4,AB,00,76,5C,45,99,EE,8A,AB,00,76,5C,45,99<ENTER>
AUG 2,6,EE,8A,AB,00,76,5C,45,99,23,F4,AB,00,76,5C,45,99<ENTER>
AUG 2,7,23,F4,AB,00,76,5C,45,99,EE,8A,AB,00,76,5C,45,99<ENTER>
AUG 2,8,EE,8A,AB,00,76,5C,45,99,23,F4,AB,00,76,5C,45,99<ENTER>

AGK 2,1002<ENTER>	Generate a new pending key (key id = 1002).
ARK 1<ENTER>	Return the new pending public key (signed by the current key).
ASK 2,12:00:00,01/01/2006<ENTER>	Scheduled to start at 12 noon on Jan. 1, 2006.

3.7 ADDITIONAL RECORDER CSP COMMAND SUMMARY

3.7.1 Alphabetical

The following table gives an alphabetical listing of the additional CSP commands available to support SMART-24R and SMART-24A instruments.

Table 8. Alphabetical Recorder CSP Command Summary

Command	Function	Note	Section
CCR	Set Continuous Channels to Record	CR	3.8.1.1.7
CDB	Set Continuous Drive Buffer Size	CR	3.8.1.1.6
CFS	Set Continuous File Size	CR	3.8.1.1.4
CGO	Save & Start Using New Continuous Recording Parameters	CR	3.8.1.1.8
CRM	Set Continuous Recording Mode	CR	3.8.1.1.2
CSM	Set Continuous Start Mode	CR	3.8.1.1.1
CTD	Set Continuous Target Drive	CR	3.8.1.1.3
CTI	Set Continuous Start Time	CR	3.8.1.1.5
DRV	Get Drive Status	I	3.8.1.6.1
DMF	Set Data Move Percent Full Trigger Limit	I	3.8.1.9.2
DMI	Start Data Move Immediate Command	I	3.8.1.9.3
DMT	Set Data Move Time Interval Trigger Limit	I	3.8.1.9.4
ECR	Set Event Channels to Record	ER	3.8.1.2.10
ECV	Set Channel Vote Weight	ER	3.8.1.2.9
EGO	Save & Start Using New Event Recording Parameters	ER	3.8.1.2.11
EMA	Set Max-Event Record Time	ER	3.8.1.2.5
EPO	Set Post-Event Record Time	ER	3.8.1.2.4
EPR	Set Pre-Event Record Time	ER	3.8.1.2.3
ESM	Set Event Start Mode	ER	3.8.1.2.1
EST	Set Event Record Start Time	ER	3.8.1.2.8
ETD	Set Event Target Drive	ER	3.8.1.2.2
ETV	Set Event Trigger Vote Level	ER	3.8.1.2.7
ETW	Set Event Trigger Window	ER	3.8.1.2.6
FAL	Set Fixed Altitude	FR	3.8.1.5.5
FCM	File Coordinate Mode	FR	3.8.1.5.7
FCP	Set File Compression Mode	FR	3.8.1.5.2
FFC	Force Fixed Coordinates to GPS Coordinates	FR	3.8.1.5.6
FFM	Set File Format	FR	3.8.1.5.1
FGO	Save & Start Using New File Recording Parameters	FR	3.8.1.5.8
FLN	Set Fixed Longitude	FR	3.8.1.5.4
FLT	Set Fixed Latitude	FR	3.8.1.5.3
LGG	Save & Start Using New LOG Recording Parameters	LR	3.8.1.8.2
LTD	Set LOG Target Drive	LR	3.8.1.8.1
NPD	Enable/Disable No Power Down Drive Mode	I	3.8.1.9.5

SGO	Save & Start Using New SOH Recording Parameters	SR	3.8.1.7.2
STD	Set SOH Target Drive	SR	3.8.1.7.1
TDR	Set STA/LTA De-Trigger Ratio	TR	3.8.1.3.8
TGO	Save & Start Using New Trigger Setup Parameters	TR	3.8.1.3.10
THP	Set Trigger High Pass Corner Frequency	TR	3.8.1.3.2
TLC	Set LTA Time Constant	TR	3.8.1.3.6
TLP	Set Trigger Low Pass Corner Frequency	TR	3.8.1.3.3
TLV	Set Level Trigger Threshold	TR	3.8.1.3.4
TMO	Set Trigger Mode	TR	3.8.1.3.1
TSC	Set STA Time Constant	TR	3.8.1.3.5
TTR	Set STA/LTA Trigger Ratio	TR	3.8.1.3.7
TUL	Set Updating LTA Enable/Disable	TR	3.8.1.3.9
USB	Enable/Disable Host USB Hardware Interface	R	3.8.1.9.1
WDU	Set Recording Window Duration	WR	3.8.1.4.4
WEN	Set Recording Window Enable/Disable	WR	3.8.1.4.1
WGO	Save & Start Using New Window Recording Parameters	WR	3.8.1.4.7
WIN	Set Recording Window Interval	WR	3.8.1.4.5
WMO	Set Recording Window Mode	WR	3.8.1.4.2
WRE	Set Recording Window Repetitions	WR	3.8.1.4.6
WST	Set Recording Window Start Time	WR	3.8.1.4.3

Notes: I) Immediate Command (if a value is set, an ASR is required to save but will not cause a system reboot.
R) Requires an ASR command to save and will cause a system reboot.
CR) Continuous Recording Command that requires a CGO to start, then ASR to Save but will not cause a system reboot.
ER) Event Recording Command that requires an EGO to start, then ASR to Save but will not cause a system reboot.
FR) File Recording Command that requires a FGO to start, then ASR to Save but will not cause a system reboot.
LR) LOG Recording Command that requires a LGG to start, then ASR to Save but will not cause a system reboot.
SR) SOH Recording Command that requires a SGO to start, then ASR to Save but will not cause a system reboot.
TR) Event Recording Command that requires a TGO to start, then ASR to Save but will not cause a system reboot.
WR) Window Recording Command that requires a WGO to start, then ASR to Save but will not cause a system reboot.

3.8 ADDITIONAL RECORDER CSP COMMAND DESCRIPTIONS

3.8.1 SMART-24R & SMART-24A Additional Recorder Commands

The commands in this section are additional commands to support the recording functions of the SMART-24R and SMART-24A. The SMART-24D does not support these commands.

3.8.1.1 Continuous Recording Commands

Note that after all continuous recording parameters have been set to their desired values, the CGO command must be issued to re-start the continuous recording task using the new parameters. After all instrument parameters are setup, the ASR command should be issued to save them to FLASH. This may or may not cause a system reboot depending on the parameters changed. Only changing the continuous recording parameters will not cause a system reboot. Files currently open for continuous recording will be closed immediately. New files will then open as specified by the new continuous recording parameters.

3.8.1.1.1 CSM – Set Continuous Start Mode

CSM – Sets the start mode for continuous recording.

CSM_[mode]<ENTER>

Where:

[mode] – Start mode; 0 = Disabled, 1 = Immediate Start,
2 = Delayed Start Time
(Factory default is 0, disabled.)
[? will return the current value]

Example:

CSM _1<ENTER>

CSM_?<ENTER>	Query
CSM_1<CR><LF>	Returned string

3.8.1.1.2 CRM – Set Continuous Recording Mode

CRM – Sets the recording mode for continuous recording.

CRM_[mode]<ENTER>

Where:

[mode] – Recording mode: 0 = Ring Buffer Mode
1 = Fill All and Stop
(Factory default is 1, fill all and stop.)
[? will return the current value]

Example:

CRM _1<ENTER>

CRM_?<ENTER> Query
CRM_1<CR><LF> Returned string

3.8.1.1.3 CTD – Set Continuous Target Drive

CTD – Sets the target drive for continuous recording.

CTD_[target drive]<ENTER>

Where:

[target drive] – Target Drive: A = Internal RAM Disk
B = Internal PCMCIA Disk 1
C = Internal PCMCIA Disk 2
D = Removable USB Disk
E = USB Drive Extended Partition
(Factory default is D, removable USB disk.)
[? will return the current value]

Example:

CTD_D<ENTER>

CTD_?<ENTER> Query
CTD_D<CR><LF> Returned string

3.8.1.1.4 CFS – Set Continuous File Size

CFS – Sets the file size for continuous recording.

CFS_[file size]<ENTER>

Where:

[file size] – File Size: 1, 5, 10, 15, 30, 60, 120 or 240 minutes.
(Factory default is 5 minutes.)
[? will return the current value]

Example:

CFS_60<ENTER>

CFS_?<ENTER>	Query
CFS_60<CR><LF>	Returned string

3.8.1.1.5 CTI – Set Continuous Start Time

CTI – Sets the delayed start time for continuous recording.

CTI_[time]<ENTER>

Where:

[time] – Start time; HH:MM:SS,MM/DD/YYYY
(Factory default is 00:00:00,01/01/1970.)
[? will return the current value]

Example:

CTI_00:00:00,02/19/2003<ENTER>

CTI_?<ENTER>	Query
CTI_00:00:00,02/19/2003<CR><LF>	Returned string

3.8.1.1.6 CDB – Set Continuous Drive Buffer Size

CDB – Sets the drive buffer size allocated for continuous recording. Note: This command and value is no longer used and is provided here for historical documentation purposes only.

CDB_[size]<ENTER>

Where:

[size] – Buffer size in Mbytes (1 – 99999 Mbytes).
(Factory default is 1000 Mbytes.)
[? will return the current value]

Example:

CDB_1000<ENTER>

CDB_?<ENTER>	Query
CDB_1000<CR><LF>	Returned string

3.8.1.1.7 CCR – Set Continuous Channels to Record

CCR – Sets the channels to record in continuous mode.

CCR_[channel],[channel]…<ENTER>

Where:

[channel] – Channel number to enable; 1P, 2P, 3P, 4P, 5P or 6P (primary data streams); 1S, 2S, 3S, 4S, 5S or 6S (secondary data streams); 1A or 2A (I/O Aux input streams); 1M, 2M, 3M, 4M, 5M or 6M (mass position streams). Special cases: 0P will enable all primary data streams, 0S will enable all secondary data streams, 0A will enable all aux data streams and 0M will enable all mass position data streams.
(Factory default is all disabled.)
[? will return the current value]

Example:

CCR_1P,2P,3P,1S,2S,3S<ENTER>	Enable channels 1, 2 and 3 (primary and secondary).
CCR_0P,0S,0A,0M<ENTER>	Enable all channels.
CCR_?<ENTER>	Query
CCR_1P,2P,3P,4P,5P,6P,1S,2S,3S,4S,5S,6S <CR><LF>	Returned string

3.8.1.1.8 CGO – Save & Start Using New Continuous Recording Parameters

CGO – Saves any new continuous recording parameters and causes the unit to start using them for continuous recording.

CGO<ENTER>

3.8.1.2 Event Recording Commands

Note that after all event recording parameters have been set to their desired values, the EGO command must be issued to re-start the event recording task using the new parameters. After all instrument parameters are setup, the ASR command should be issued to save them to FLASH. This may or may not cause a system reboot depending on the parameters changed. Only changing the event recording parameters will not cause a system reboot. Files currently open for event recording will be closed immediately. New files will then open as specified by the new event recording parameters.

3.8.1.2.1 ESM – Set Event Start Mode

ESM – Sets the start mode for event recording.

ESM_[mode]<ENTER>

Where:

[mode] – Start mode; 0 = Disabled, 1 = Immediate Start,
2 = Delayed Start Time
(Factory default is 0, disabled.)
[? will return the current value]

Example:

ESM_1<ENTER>

ESM_?<ENTER>	Query
ESM_1<CR><LF>	Returned string

3.8.1.2.2 ETD – Set Event Target Drive

ETD – Sets the target drive for event recording.

ETD_[target drive]<ENTER>

Where:

[target drive] – Target Drive: A = Internal RAM Disk
B = Internal PCMCIA Disk 1
C = Internal PCMCIA Disk 2
D = Removable USB Disk
E = USB Drive Extended Partition
(Factory default is D, removable USB disk.)
[? will return the current value]

Example:

ETD_D<ENTER>

ETD_?<ENTER>	Query
ETD_D<CR><LF>	Returned string

3.8.1.2.3 EPR – Set Pre-Event Record Time

EPR – Sets the pre-event time for event recording.

EPR_[seconds]<ENTER>

Where:

[seconds] – Pre-Event Time in seconds (1 to 3600 seconds).
(Factory default is 60 seconds.)
[? will return the current value]

Example:

EPR_60<ENTER>

EPR_?<ENTER>	Query
EPR_60<CR><LF>	Returned string

3.8.1.2.4 EPO – Set Post-Event Record Time

EPO – Sets the post-event time for event recording.

EPO_[seconds]<ENTER>

Where:

[seconds] – Post-Event Time in seconds (1 to 3600 seconds).
(Factory default is 60 seconds.)
[? will return the current value]

Example:

EPO_60<ENTER>

EPO_?<ENTER>	Query
EPO_60<CR><LF>	Returned string

3.8.1.2.5 EMA – Set Max-Event Record Time

EMA – Sets the max-event time for event recording.

EMA_[seconds]<ENTER>

Where:

[seconds] – Max-Event Time in seconds (1 to 14400 seconds).
This value must also be greater than the sum of the pre and post event times.
(Factory default is 240 seconds.)
[? will return the current value]

Example:

EMA _60<ENTER>

EMA _?<ENTER>	Query
EMA _60<CR><LF>	Returned string

3.8.1.2.6 ETW – Set Event Trigger Window

ETW – Sets the event trigger window time for event recording.

ETW_[seconds]<ENTER>

Where:

[seconds] – Event Trigger Windows in seconds (1 to 3600 seconds).
(Factory default is 1 second.)
[? will return the current value]

Example:

ETW_1<ENTER>

ETW_?<ENTER>	Query
ETW_1<CR><LF>	Returned string

3.8.1.2.7 ETV – Set Event Trigger Vote Level

ETV – Sets the total votes require to declare an event.

ETV_[votes]<ENTER>

Where:

[votes] – Votes require to declare an event (-100 to +100 votes).
(Factory default is 1 vote.)
[? will return the current value]

Example:

ETV_1<ENTER>

ETV_?<ENTER>	Query
ETV_1<CR><LF>	Returned string

3.8.1.2.8 EST – Set Event Record Start Time

EST – Sets the delayed start time for event recording.

EST_[time]<ENTER>

Where:

[time] – Start time; HH:MM:SS,MM/DD/YYYY
(Factory default is 00:00:00,01/01/1970.)
[? will return the current value]

Example:

EST_00:00:00,02/19/2003<ENTER>

EST_?<ENTER>	Query
EST_00:00:00,02/19/2003<CR><LF>	Returned string

3.8.1.2.9 ECV – Set Channel Vote Weight

ECV – Sets the event vote weight for each input channel.

ECV_[channel],[vote]<ENTER>

Where:

[channel] – Data channels 1 – 6 (primary) or E for external input.
[vote] – Vote weight assigned to the selected channel (-10 to +10 votes).
(Factory default is 1 vote for all channels.)
[? will return the current value]

Example:

ECV_1,1<ENTER>

ECV_1,?<ENTER> Query
ECV_1,1<CR><LF> Returned string

3.8.1.2.10 ECR – Set Event Channels to Record

ECR – Sets the channels to record in event mode.

ECR_[channel],[channel]…<ENTER>

Where:

[channel] – Channel number to enable; 1P, 2P, 3P, 4P, 5P or 6P (primary data streams); 1S, 2S, 3S, 4S, 5S or 6S (secondary data streams); 1A or 2A (I/O Aux input streams); 1M, 2M, 3M, 4M, 5M or 6M (mass position streams). Special cases: 0P will enable all primary data streams, 0S will enable all secondary data streams, 0A will enable all aux data streams and 0M will enable all mass position data streams.
(Factory default is all disabled.)
[? will return the current value]

Example:

ECR_1P,2P,3P,1S,2S,3S<ENTER> Enable channels 1, 2 and 3 (primary and secondary).

ECR_0P,0S,0A,0M<ENTER> Enable all channels.

ECR_?<ENTER> Query
ECR_1P,2P,3P,4P,5P,6P,1S,2S,3S,4S,5S,6S <CR><LF> Returned string

3.8.1.2.11 EGO – Save & Start Using New Event Recording Parameters

EGO – Saves any new event recording parameters and causes the unit to start using them for event recording.

EGO <ENTER>

3.8.1.3 Trigger Setup Commands

Note that after all trigger parameters have been set to their desired values, the TGO command must be issued to re-start the trigger task using the new parameters. After all

instrument parameters are setup, the ASR command should be issued to save them to FLASH. This may or may not cause a system reboot depending on the parameters changed. Only changing the trigger parameters will not cause a system reboot. Files currently open for event recording will be closed immediately. New files will then open as specified by the new event & trigger parameters.

3.8.1.3.1 TMO – Set Trigger Mode

TMO – Sets the trigger mode of operation.

TMO _[channel],[mode]<ENTER>

Where:

[channel] – Data channels 1 – 6 (primary).
[mode] – Trigger mode: 0 = Disabled
1 = Level
2 = STA/LTA
(Factory default is 0, disabled for all channels.)
[? will return the current value]

Example:

TMO _1,2<ENTER>

TMO _1,?<ENTER> Query
TMO _1,2<CR><LF> Returned string

3.8.1.3.2 THP – Set Trigger High Pass Corner Frequency

THP – Sets trigger high pass corner frequency for event recording.

THP _[channel],[frequency]<ENTER>

Where:

[channel] – Data channels 1 – 6 (primary).
[frequency] – High Pass Corner Frequency – 0 to disable the filter, 0.001 to 100.000 Hz (Max frequency is $1/4^{th}$ of the primary sample rate.)
(Factory default is 1.0 hertz for all channels.)
[? will return the current value]

Example:

THP _1,2.500<ENTER>

THP _1,?<ENTER>	Query
THP _1,2.500<CR><LF>	Returned string

3.8.1.3.3 TLP – Set Trigger Low Pass Corner Frequency

TLP – Sets trigger low pass corner frequency for event recording.

TLP _[channel],[frequency]<ENTER>

Where:

[channel] – Data channels 1 – 6 (primary).
[frequency] – High Pass Corner Frequency – 0 to disable the filter, 0.001 to 100.000 Hz (Max frequency is $1/4^{th}$ of the primary sample rate.) **(Factory default is 10.0 hertz for all channels.)** [? will return the current value]

Example:

TLP _1,10.500<ENTER>

TLP _1,?<ENTER>	Query
TLP _1,10.500<CR><LF>	Returned string

3.8.1.3.4 TLV – Set Level Trigger Threshold

TLV – Sets level trigger threshold for event recording.

TLV _[channel],[threshold]<ENTER>

Where:

[channel] – Data channels 1 – 6 (primary).
[threshold] – Level trigger threshold in % of full scale (0.001% to 100.0%). **(Factory default is 1% for all channels.)** [? will return the current value]

Example:

TLV _1,15.5<ENTER>

TLV _1,?<ENTER>	Query
TLV _1,15.5<CR><LF>	Returned string

3.8.1.3.5 TSC – Set STA Time Constant

TSC – Sets STA time constant for STA/LTA event recording.

TSC _[channel],[seconds]<ENTER>

Where:

[channel] – Data channels 1 – 6 (primary).
[seconds] – STA time constant in seconds (0.001 to 3600.000 sec).
(Factory default is 0.1 seconds for all channels.)
[? will return the current value]

Example:

TSC _1,2<ENTER>

TSC _1,?<ENTER>	Query
TSC _1,2.000<CR><LF>	Returned string

3.8.1.3.6 TLC – Set LTA Time Constant

TLC – Sets LTA time constant for STA/LTA event recording.

TLC _[channel],[seconds]<ENTER>

Where:

[channel] – Data channels 1 – 6 (primary).
[seconds] – LTA time constant in seconds (0.001 to 3600.000 sec).
(Factory default is 10.0 seconds for all channels.)
[? will return the current value]

Example:

TLC _1,2<ENTER>

TLC _1,?<ENTER>	Query
TLC _1,2.000<CR><LF>	Returned string

3.8.1.3.7 TTR – Set STA/LTA Trigger Ratio

TTR – Sets STA/LTA trigger ratio for STA/LTA event recording.

TTR _[channel],[ratio]<ENTER>

Where:

[channel] – Data channels 1 – 6 (primary).
[ratio] – STA/LTA trigger ratio (0.001 to 100.0).
(Factory default is 3.0 for all channels.)
[? will return the current value]

Example:

TTR _1,0.2<ENTER>

TTR _1,?<ENTER>	Query
TTR _1,0.2<CR><LF>	Returned string

3.8.1.3.8 TDR – Set STA/LTA De-Trigger Ratio

TDR – Sets STA/LTA de-trigger ratio for STA/LTA event recording.

TDR _[channel],[ratio]<ENTER>

Where:

[channel] – Data channels 1 – 6 (primary).
[ratio] – STA/LTA de-trigger ratio (0.001 to 100.0).
(Factory default is 2.0 for all channels.)
[? will return the current value]

Example:

TDR _1,0.1<ENTER>

TDR _1,?<ENTER>	Query
TDR _1,0.1<CR><LF>	Returned string

3.8.1.3.9 TUL – Set Updating LTA Enable/Disable

TUL – Sets the enable or disable of the updating LTA for STA/LTA event recording.

TUL _[channel],[enable/disable]<ENTER>

Where:

[channel] – Data channels 1 – 6 (primary).
[enable/disable] – Enable/Disable: 0 = Disable, 1 = Enable
(Factory default is 0, disabled, for all channels.)

[? will return the current value]

Example:

TUL _1,1<ENTER>

TUL _1,?<ENTER> Query
TUL _1,1<CR><LF> Returned string

3.8.1.3.10 TGO – Save & Start Using New Trigger Setup Parameters

TGO – Saves any new trigger setup parameters and causes the unit to start using them for event recording.

TGO <ENTER>

3.8.1.4 Window Recording Commands

Note that after all window recording parameters have been set to their desired values, the WGO command must be issued to re-start the window recording task using the new parameters. After all instrument parameters are setup, the ASR command should be issued to save them to FLASH. This may or may not cause a system reboot depending on the parameters changed. Only changing the window recording parameters will not cause a system reboot. Files currently open for window recording will be closed immediately. New files will then open as specified by the new window recording parameters.

3.8.1.4.1 WEN – Set Recording Window Enable/Disable

WEN – Sets a recording window enabled or disabled.

WEN _[window],[enable/disable]<ENTER>

Where:

[window] – Recording Window 1 to 4 or A for all.
[enable/disable] – Enable/Disable: 0 = Disable, 1 = Enable
(Factory default is 0, disabled, for all windows.)
[? will return the current value]

Example:

WEN _1,1<ENTER>

WEN _1,?<ENTER> Query
WEN _1,1<CR><LF> Returned string

3.8.1.4.2 WMO – Set Recording Window Mode

WMO – Sets a recording window to record in continuous or event mode.

WMO _[window],[mode]<ENTER>

Where:

[window] – Recording Window 1 to 4 or A for all.
[mode] – Recording Mode: 0 = Continuous, 1 = Event
(Factory default is 0, continuous, for all windows.)
[? will return the current value]

Example:

WMO _1,1<ENTER>

WMO _1,?<ENTER>	Query
WMO _1,1<CR><LF>	Returned string

3.8.1.4.3 WST – Set Recording Window Start Time

WST – Sets a recording window's start time.

WST _[window],[time]<ENTER>

Where:

[window] – Recording Window 1 to 4 or A for all.
[time] – Start time; HH:MM:SS,MM/DD/YYYY
(Factory default is 00:00:00,01/01/1970.)
[? will return the current value]

Example:

WMO _1,00:00:00,02/19/2003<ENTER>

WMO _1,?<ENTER>	Query
WMO _1,00:00:00,02/19/2003<CR><LF>	Returned string

3.8.1.4.4 WDU – Set Recording Window Duration

WDU – Sets a recording window's duration. Note that the interval MUST be larger than the duration!

WDU _[window],[seconds]<ENTER>

Where:

[window] – Recording Window 1 to 4 or A for all.
[seconds] – Window duration in seconds (>= 0 seconds).
(Factory default is 0 seconds.)
[? will return the current value]

Example:

WDU _1,7200<ENTER>

WDU _1,?<ENTER>	Query
WDU _1,7200<CR><LF>	Returned string

3.8.1.4.5 WIN – Set Recording Window Interval

WIN – Sets a recording window's interval (start time to next start time). Note that the interval MUST be larger than the duration!

WIN _[window],[seconds]<ENTER>

Where:

[window] – Recording Window 1 to 4 or A for all.
[seconds] – Window interval in seconds (>= 0 seconds).
(Factory default is 0 seconds.)
[? will return the current value]

Example:

WIN _1,14400<ENTER>

WIN _1,?<ENTER>	Query
WIN _1,14400<CR><LF>	Returned string

3.8.1.4.6 WRE – Set Recording Window Repetitions

WRE – Sets a recording window's number of repetitions to execute.

WRE _[window],[repetitions]<ENTER>

Where:

[window] – Recording Window 1 to 4 or A for all.

[repetitions] – Number of repetitions to execute this window (>= 0 repetitions).
(Factory default is 0 repetitions.)
[? will return the current value]

Example:

WRE _1,365<ENTER>

WRE _1,?<ENTER>	Query
WRE _1,365<CR><LF>	Returned string

3.8.1.4.7 WGO – Save & Start Using New Window Recording Parameters

WGO – Saves any new window recording parameters and causes the unit to start using them for window recording.

WGO <ENTER>

3.8.1.5 File Recording Commands

Note that the Geotech internal file-recording format is a modified CD 1.1 format. The file recording will use the site, station and channel names as defined by the CD profile 1.

Note that after all file recording parameters have been set to their desired values, the FGO command must be issued to re-start the file recording using the new parameters. After all instrument parameters are setup, the ASR command should be issued to save them to FLASH. This may or may not cause a system reboot depending on the parameters changed. Only changing the file recording parameters will not cause a system reboot. Files currently open for recording will finish using the old parameters. New files will then start using the new file parameters.

3.8.1.5.1 FFM – Set File Format

FFM – Sets the file format for recorded data files.

FFM _[format] <ENTER>

Where:

[format] – File recording format: 0 = Geotech Modified CD-1.1
>0 = Others TBD
(Factory default is 0, Geotech modified CD-1.1.)
[? will return the current value]

Example:

FFM _0<ENTER>

FFM _?<ENTER>	Query
FFM _0<CR><LF>	Returned string

3.8.1.5.2 FCP – Set File Compression Mode

FCP – Sets the file data compression mode.

FCP _[compression] <ENTER>

Where:

[compression] – Compression Mode: 0 = None, 1 = Canadian
(Factory default is 0, none.)
[? will return the current value]

Example:

FCP _1<ENTER>

FCP _?<ENTER>	Query
FCP _1<CR><LF>	Returned string

3.8.1.5.3 FLT - Set Fixed Latitude

FLT - Set the fixed latitude to be reported in recorded data files.

FLT_[latitude]<ENTER>

Where:

[latitude]- Latitude, +/-XX.XXXXXX degrees.
(-90.000000 to +90.000000 degrees)
(Factory default is 0.0 degrees.)
[? will return the current value]

Example:

FLT_32.895888<ENTER>

FLT_?<ENTER>	Query
FLT_32.895888<CR><LF>	Returned string

3.8.1.5.4 FLN - Set Fixed Longitude

FLN - Set the fixed longitude to be reported in recorded data files.

FLN_[longitude]<ENTER>

Where:

[longitude]- Longitude, +/-XXX.XXXXXX degrees
(-180.000000 to +180.000000 degrees)
(Factory default is 0.0 degrees.)
[? will return the current value]

Example:

FLN_-96.694223 <ENTER>

FLN_?<ENTER>	Query
FLN_-96.694223<CR><LF>	Returned string

3.8.1.5.5 FAL - Set Fixed Altitude

FAL - Set the fixed altitude (in meters) to be reported in recorded data files.

FAL_[altitude]<ENTER>

Where:

[altitude]- Altitude, +/-XXXXX.XXX meters.
(-20000.000 to +20000.000 meters)
(Factory default is 0.0 meters.)
[? will return the current value]

Example:

FAL_168.794689 <ENTER>

FAL_?<ENTER>	Query
FAL_168.794689 <CR><LF>	Returned string

3.8.1.5.6 FFC – Force Fixed Coordinates to GPS Coordinates

FFC – If GPS coordinates are available; this command loads and saves the current GPS coordinates into the fixed coordinates (latitude, longitude & altitude).

FFC<ENTER>

3.8.1.5.7 FCM – File Coordinate Mode

FCM – Selects whether to use the fixed or GPS coordinates (latitude, longitude & altitude) in recorded files.

FCM_[mode]<ENTER>

Where:

[mode]- File Coordinate Mode, 0 = Fixed, 1 = GPS
(Factory default is 0, fixed.)
[? will return the current value]

Example:

FCM_0<ENTER>

FCM_?<ENTER>	Query
FCM_0<CR><LF>	Returned string

3.8.1.5.8 FGO – Save & Start Using New File Recording Parameters

FGO – Saves any new window recording parameters and causes the unit to start using them for window recording.

FGO <ENTER>

3.8.1.6 Drive Status Commands

3.8.1.6.1 DRV – Get Drive Status

DRV – Returns the Smart Series Instrument disk drive status. There are two forms of this command as follows:

Form 1

DRV <ENTER>	Command

Example Output:

```
DRV START
TIME: 20:31:45,01/06/2005
DRIVE_A_AVAILABLE: YES
DRIVE_A_TYPE: RAMDRIVE
DRIVE_A_VOL_LABEL: RamDrive
```

```
DRIVE_A_SERIAL_NUM: 3226-81FA
DRIVE_A_FREE_SPACE: 66979840
DRIVE_A_TOTAL_SPACE: 67024896
DRIVE_B_AVAILABLE: NO
DRIVE_B_TYPE: NA
DRIVE_B_VOL_LABEL: NA
DRIVE_B_SERIAL_NUM: NA
DRIVE_B_FREE_SPACE: NA
DRIVE_B_TOTAL_SPACE: NA
DRIVE_C_AVAILABLE: NO
DRIVE_C_TYPE: NA
DRIVE_C_VOL_LABEL: NA
DRIVE_C_SERIAL_NUM: NA
DRIVE_C_FREE_SPACE: NA
DRIVE_C_TOTAL_SPACE: NA
DRIVE_D_AVAILABLE: YES
DRIVE_D_TYPE: USBDRIVE
DRIVE_D_VOL_LABEL: SMART24
DRIVE_D_SERIAL_NUM: 3119-7F67
DRIVE_D_FREE_SPACE: 29023846400
DRIVE_D_TOTAL_SPACE: 39971733504
DRV END
```

Note: Other entries may be added as needed.

Form 2

DRV_[drive],[option] <ENTER>

Where:

[drive] - Drive letter to get status from: A = Internal RAM Disk
B = Internal PCMCIA Disk 1
C = Internal PCMCIA Disk 2
D = Removable USB Disk

[option] - Optional: F = Do a full disk scan status. Note: Using the F option can take several minutes to do a full disk scan of a larger drive.

Example Output of 'DRV_A<ENTER>':

```
Type of file system is FAT16
Volume in drive A: is RamDrive
Volume serial number is 3226-81FA

          1 FAT(s)
        512 entries in root directory
        512 bytes per sector
          4 sectors per cluster
      32727 total clusters
   67024896 bytes total disk space

      32705 free cluster(s)
   66979840 bytes free disk space
```

Example Output of 'DRV_D,F<ENTER>':

```
Type of file system is FAT32
Volume in drive D: is SMART24
Volume serial number is 3119-7F67

           2 FAT(s)
           0 entries in root directory
         512 bytes per sector
          32 sectors per cluster
     2439681 total clusters
 39971733504 bytes total disk space

     1771475 free cluster(s)
 29023846400 bytes free disk space

           0 cluster(s) with bad sectors
        7668 file(s)
        7844 file chain(s)
           1 free cluster chain(s)
     1771475 cluster(s) in longest free cluster chain
           2% fragmentation
```

3.8.1.7 SOH Recording Commands

NOTE: AS OF THIS PUBLICATION, INTERNAL SOH RECORDING HAS NOT BEEN IMPLEMENTED IN THE SMART SERIES INSTRUMENTS. THESE COMMANDS ARE PROVIDED FOR FUTURE USE.

Note that after all SOH recording parameters have been set to their desired values, the SGO command must be issued to re-start the SOH recording task using the new parameters. After all instrument parameters are setup, the ASR command should be issued to save them to FLASH. This may or may not cause a system reboot depending on the parameters changed. Only changing the SOH recording parameters will not cause a system reboot. Files currently open for SOH recording will be closed immediately. New files will then open as specified by the new SOH recording parameters.

3.8.1.7.1 STD – Set SOH Target Drive

STD – Sets the target drive for SOH recording.

STD_[target drive]<ENTER>

Where:

[target drive] – Target Drive: A = Internal RAM Disk
B = Internal PCMCIA Disk 1
C = Internal PCMCIA Disk 2

D = Removable USB Disk
E = USB Drive Extended Partition
(Factory default is D, removable USB disk.)
[? will return the current value]

Example:

STD_D<ENTER>

STD_?<ENTER>	Query
STD_D<CR><LF>	Returned string

3.8.1.7.2 SGO – Save & Start Using New SOH Recording Parameters

SGO – Saves any new SOH recording parameters and causes the unit to start using them for window recording.

SGO <ENTER>

3.8.1.8 LOG Recording Commands

Note that after all LOG recording parameters have been set to their desired values, the LGG command must be issued to re-start the LOG recording task using the new parameters. After all instrument parameters are setup, the ASR command should be issued to save them to FLASH. This may or may not cause a system reboot depending on the parameters changed. Only changing the LOG recording parameters will not cause a system reboot. Files currently open for LOG recording will be closed immediately. New files will then open as specified by the new LOG recording parameters.

3.8.1.8.1 LTD – Set LOG Target Drive

LTD – Sets the target drive for LOG recording.

LTD_[target drive]<ENTER>

Where:

[target drive] – Target Drive: A = Internal RAM Disk
B = Internal PCMCIA Disk 1
C = Internal PCMCIA Disk 2
D = Removable USB Disk
E = USB Drive Extended Partition
(Factory default is D, removable USB disk.)
[? will return the current value]

Example:

LTD_D<ENTER>

LTD_?<ENTER>	Query
LTD_D<CR><LF>	Returned string

3.8.1.8.2 LGG – Save & Start Using New LOG Recording Parameters

LGG – Saves any new LOG recording parameters and causes the unit to start using them for window recording.

LGG <ENTER>

3.8.1.9 Miscellaneous Commands

3.8.1.9.1 USB –Enable/Disable the Host USB Hardware Interface

USB – Enables or disables the internal host USB hardware interface (the removable drive interface).

USB_[enable/disable]<ENTER>

Where:

[enable/disable] –	Enable/Disable; 0 = disabled, 1 = enabled. **(Factory default is 1, enabled.)** [? will return the current value]

Example:

USB_1<ENTER>

USB_?<ENTER>	Query
USB_1<CR><LF>	Returned string

3.8.1.9.2 DMF – Set Data Move Percent Full Trigger Limit

DMF – Set the drive A percent full trigger point at which data file moves (to the appropriate target drive) will start.

DMF_[percent]<ENTER>

Where:

[percent] – Percent Full Trigger Point (10% to 80%).
(Factory default is 80% full.)
[? will return the current value]

Example:

DMF_50<ENTER>

DMF_?<ENTER>	Query
DMF_50<CR><LF>	Returned string

3.8.1.9.3 DMI – Start Data Move Immediately

DMI – Command to start a data file move immediately via software command. If used as a query command, it will report back if a data move is currently in progress (1) or not (0).

DMI<ENTER>

Example:

DMI<ENTER>

DMI_?<ENTER>	Query
DMI_1<CR><LF>	Returned string (move in progress)

3.8.1.9.4 DMT – Set Data Move Time Interval Trigger Limit

DMT – Sets a time interval at which the unit will automatically trigger a data file move (to the appropriate target drive).

DMT_[minutes]<ENTER>

Where:

[minutes] – Time interval to start data file moves (0 to 1439 minutes).
(Factory default is 0 minutes, disabled.)
[? will return the current value]

Example:

DMT_60<ENTER>	Would cause a data move once a hour, on the hour.
DMT_?<ENTER>	Query

DMT_60<CR><LF> Returned string

3.8.1.9.5 NPD – No Power Down Drive Enable/Disable

NPD – Enables or disables the no power down mode for the unit's disk drives. If enabled, the unit will keep all disk drives powered up to improve system performance. Note that power consumption will increase using this mode.

NPD_[enable/disable]<ENTER>

Where:

[enable/disable] – 0 = Disable, 1 = Enable
(Factory default is 0, disabled.)
[? will return the current value]

Example:

NPD_0<ENTER>

NPD_?<ENTER> Query
NPD_0<CR><LF> Returned string

A. APPENDIX A – EXAMPLE GET OUTPUT

[SMART-24R GET – Factory Default Settings]

```
GET START
TIME: 20:33:42,08/31/2010
CONFIGURATION VERSION: 2
CONFIGURATION SIZE: 7680
CONFIGURATION TIME: 00:00:00,01/01/1970
SERIAL NUMBER: 1268
LGE 4294967295
LGL 16791552
LGT 0
TYP SMART-24R
SUN smart24
SPW changeme
SCU smart24
SCP changeme
SRP 1,50
SRS 1,0
SCG 1,1
SCG 2,1
SCG 3,1
RCL 1,0
RCL 2,0
RCL 3,0
SRP 2,50
SRS 2,0
SCG 4,1
SCG 5,1
SCG 6,1
RCL 4,0
RCL 5,0
RCL 6,0
AZE 0
AZS 00:00:00,01/01/1970
AZI 0
AZR 0
AZC
AZW 250
GCE 1,2,3,4,5,6
SPB 1,115200
SPP 1,3
SPC 1,2
SPM 1,0
SPH 1,0
SPB 2,115200
SPP 2,1
SPC 2,2
SPM 2,0
SPH 2,0
SPB 3,115200
SPP 3,1
SPC 3,2
SPM 3,0
SPH 3,0
SPB 4,115200
```

```
SPP 4,0
SPC 4,0
SPM 4,0
SPH 4,0
SPB 5,115200
SPP 5,0
SPC 5,0
SPM 5,0
SPH 5,0
IPP 1E
IPH sr24sn1268
IPE 1E,1
IPA 1E,192.168.0.1
IPM 1E,255.255.255.0
IPG 1E,192.168.0.255
IPN 1E,0.0.0.0
IPD 1E,smart24.net
ISA 1E,192.168.0.10
ISM 1E,255.255.255.0
ICA 1E,192.168.0.11
IDM 1E,1
IPE 2E,1
IPA 2E,192.168.0.2
IPM 2E,255.255.255.0
IPG 2E,192.168.0.255
IPN 2E,0.0.0.0
IPD 2E,smart24.net
ISA 2E,192.168.0.20
ISM 2E,255.255.255.0
ICA 2E,192.168.0.21
IDM 2E,1
IPE 1S,1
IPA 1S,192.168.0.3
IPM 1S,255.255.255.0
IPG 1S,192.168.0.255
IPN 1S,0.0.0.0
IPD 1S,smart24.net
ISA 1S,192.168.0.30
ISM 1S,255.255.255.0
ICA 1S,192.168.0.31
IDM 1S,1
IPE 2S,1
IPA 2S,192.168.0.4
IPM 2S,255.255.255.0
IPG 2S,192.168.0.255
IPN 2S,0.0.0.0
IPD 2S,smart24.net
ISA 2S,192.168.0.40
ISM 2S,255.255.255.0
ICA 2S,192.168.0.41
IDM 2S,1
IPE 3S,1
IPA 3S,192.168.0.5
IPM 3S,255.255.255.0
IPG 3S,192.168.0.255
IPN 3S,0.0.0.0
IPD 3S,smart24.net
ISA 3S,192.168.0.50
ISM 3S,255.255.255.0
ICA 3S,192.168.0.51
```

```
IDM 3S,1
IPE 4S,1
IPA 4S,192.168.0.6
IPM 4S,255.255.255.0
IPG 4S,192.168.0.255
IPN 4S,0.0.0.0
IPD 4S,smart24.net
ISA 4S,192.168.0.60
ISM 4S,255.255.255.0
ICA 4S,192.168.0.61
IDM 4S,1
IPE 5S,1
IPA 5S,192.168.0.7
IPM 5S,255.255.255.0
IPG 5S,192.168.0.255
IPN 5S,0.0.0.0
IPD 5S,smart24.net
ISA 5S,192.168.0.70
ISM 5S,255.255.255.0
ICA 5S,192.168.0.71
IDM 5S,1
CDE 1,1
CDF 1,10
CSF 1,1
CBF 1,0
CBM 1,0
CNC 1,S1268
CNS 1,S1268
CSN 1,S1268
CLN 1,1A,01
CLN 1,2A,01
CLN 1,1M,01
CLN 1,2M,01
CLN 1,3M,01
CLN 1,1P,01
CLN 1,2P,01
CLN 1,3P,01
CLN 1,1S,02
CLN 1,2S,02
CLN 1,3S,02
CLN 1,4M,01
CLN 1,5M,01
CLN 1,6M,01
CLN 1,4P,01
CLN 1,5P,01
CLN 1,6P,01
CLN 1,4S,02
CLN 1,5S,02
CLN 1,6S,02
CCN 1,1A,c1a
CCN 1,2A,c2a
CCN 1,1M,c1m
CCN 1,2M,c2m
CCN 1,3M,c3m
CCN 1,1P,c1p
CCN 1,2P,c2p
CCN 1,3P,c3p
CCN 1,1S,c1s
CCN 1,2S,c2s
CCN 1,3S,c3s
```

```
CCN 1,4M,c4m
CCN 1,5M,c5m
CCN 1,6M,c6m
CCN 1,4P,c4p
CCN 1,5P,c5p
CCN 1,6P,c6p
CCN 1,4S,c4s
CCN 1,5S,c5s
CCN 1,6S,c6s
CDA 1,192.168.0.201
CCP 1,9000
CDT 1,1A,0
CDT 1,2A,0
CDT 1,1M,0
CDT 1,2M,0
CDT 1,3M,0
CDT 1,1P,0
CDT 1,2P,0
CDT 1,3P,0
CDT 1,1S,0
CDT 1,2S,0
CDT 1,3S,0
CDT 1,4M,0
CDT 1,5M,0
CDT 1,6M,0
CDT 1,4P,0
CDT 1,5P,0
CDT 1,6P,0
CDT 1,4S,0
CDT 1,5S,0
CDT 1,6S,0
CST 1,1A,4
CST 1,2A,4
CST 1,1M,4
CST 1,2M,4
CST 1,3M,4
CST 1,1P,0
CST 1,2P,0
CST 1,3P,0
CST 1,1S,0
CST 1,2S,0
CST 1,3S,0
CST 1,4M,4
CST 1,5M,4
CST 1,6M,4
CST 1,4P,0
CST 1,5P,0
CST 1,6P,0
CST 1,4S,0
CST 1,5S,0
CST 1,6S,0
CCM 1,0
CAM 1,0
CCL 1,1A,0,0.000000,1.000000
CCL 1,2A,0,0.000000,1.000000
CCL 1,1M,0,0.000000,1.000000
CCL 1,2M,0,0.000000,1.000000
CCL 1,3M,0,0.000000,1.000000
CCL 1,1P,0,0.000000,1.000000
CCL 1,2P,0,0.000000,1.000000
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CCL 1,3P,0,0.000000,1.000000
CCL 1,1S,0,0.000000,1.000000
CCL 1,2S,0,0.000000,1.000000
CCL 1,3S,0,0.000000,1.000000
CCL 1,4M,0,0.000000,1.000000
CCL 1,5M,0,0.000000,1.000000
CCL 1,6M,0,0.000000,1.000000
CCL 1,4P,0,0.000000,1.000000
CCL 1,5P,0,0.000000,1.000000
CCL 1,6P,0,0.000000,1.000000
CCL 1,4S,0,0.000000,1.000000
CCL 1,5S,0,0.000000,1.000000
CCL 1,6S,0,0.000000,1.000000
CRT 1,2
CRR 1,2
CIP 1,8000
CCE 1,1P,2P,3P,4P,5P,6P
CDS 1,5
CSS 1,5
CTM 1,0
CDE 2,0
CDF 2,10
CSF 2,1
CBF 2,0
CBM 2,0
CNC 2,S1268
CNS 2,S1268
CSN 2,S1268
CLN 2,1A,01
CLN 2,2A,01
CLN 2,1M,01
CLN 2,2M,01
CLN 2,3M,01
CLN 2,1P,01
CLN 2,2P,01
CLN 2,3P,01
CLN 2,1S,02
CLN 2,2S,02
CLN 2,3S,02
CLN 2,4M,01
CLN 2,5M,01
CLN 2,6M,01
CLN 2,4P,01
CLN 2,5P,01
CLN 2,6P,01
CLN 2,4S,02
CLN 2,5S,02
CLN 2,6S,02
CCN 2,1A,c1a
CCN 2,2A,c2a
CCN 2,1M,c1m
CCN 2,2M,c2m
CCN 2,3M,c3m
CCN 2,1P,c1p
CCN 2,2P,c2p
CCN 2,3P,c3p
CCN 2,1S,c1s
CCN 2,2S,c2s
CCN 2,3S,c3s
CCN 2,4M,c4m
```

```
CCN 2,5M,c5m
CCN 2,6M,c6m
CCN 2,4P,c4p
CCN 2,5P,c5p
CCN 2,6P,c6p
CCN 2,4S,c4s
CCN 2,5S,c5s
CCN 2,6S,c6s
CDA 2,192.168.0.201
CCP 2,9000
CDT 2,1A,0
CDT 2,2A,0
CDT 2,1M,0
CDT 2,2M,0
CDT 2,3M,0
CDT 2,1P,0
CDT 2,2P,0
CDT 2,3P,0
CDT 2,1S,0
CDT 2,2S,0
CDT 2,3S,0
CDT 2,4M,0
CDT 2,5M,0
CDT 2,6M,0
CDT 2,4P,0
CDT 2,5P,0
CDT 2,6P,0
CDT 2,4S,0
CDT 2,5S,0
CDT 2,6S,0
CST 2,1A,4
CST 2,2A,4
CST 2,1M,4
CST 2,2M,4
CST 2,3M,4
CST 2,1P,0
CST 2,2P,0
CST 2,3P,0
CST 2,1S,0
CST 2,2S,0
CST 2,3S,0
CST 2,4M,4
CST 2,5M,4
CST 2,6M,4
CST 2,4P,0
CST 2,5P,0
CST 2,6P,0
CST 2,4S,0
CST 2,5S,0
CST 2,6S,0
CCM 2,0
CAM 2,0
CCL 2,1A,0,0.000000,1.000000
CCL 2,2A,0,0.000000,1.000000
CCL 2,1M,0,0.000000,1.000000
CCL 2,2M,0,0.000000,1.000000
CCL 2,3M,0,0.000000,1.000000
CCL 2,1P,0,0.000000,1.000000
CCL 2,2P,0,0.000000,1.000000
CCL 2,3P,0,0.000000,1.000000
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CCL 2,1S,0,0.000000,1.000000
CCL 2,2S,0,0.000000,1.000000
CCL 2,3S,0,0.000000,1.000000
CCL 2,4M,0,0.000000,1.000000
CCL 2,5M,0,0.000000,1.000000
CCL 2,6M,0,0.000000,1.000000
CCL 2,4P,0,0.000000,1.000000
CCL 2,5P,0,0.000000,1.000000
CCL 2,6P,0,0.000000,1.000000
CCL 2,4S,0,0.000000,1.000000
CCL 2,5S,0,0.000000,1.000000
CCL 2,6S,0,0.000000,1.000000
CRT 2,2
CRR 2,2
CIP 2,8000
CCE 2,1P,2P,3P,4P,5P,6P
CDS 2,5
CSS 2,5
CTM 2,0
CDE 3,0
CDF 3,10
CSF 3,1
CBF 3,0
CBM 3,0
CNC 3,S1268
CNS 3,S1268
CSN 3,S1268
CLN 3,1A,01
CLN 3,2A,01
CLN 3,1M,01
CLN 3,2M,01
CLN 3,3M,01
CLN 3,1P,01
CLN 3,2P,01
CLN 3,3P,01
CLN 3,1S,02
CLN 3,2S,02
CLN 3,3S,02
CLN 3,4M,01
CLN 3,5M,01
CLN 3,6M,01
CLN 3,4P,01
CLN 3,5P,01
CLN 3,6P,01
CLN 3,4S,02
CLN 3,5S,02
CLN 3,6S,02
CCN 3,1A,c1a
CCN 3,2A,c2a
CCN 3,1M,c1m
CCN 3,2M,c2m
CCN 3,3M,c3m
CCN 3,1P,c1p
CCN 3,2P,c2p
CCN 3,3P,c3p
CCN 3,1S,c1s
CCN 3,2S,c2s
CCN 3,3S,c3s
CCN 3,4M,c4m
CCN 3,5M,c5m
```

```
CCN 3,6M,c6m
CCN 3,4P,c4p
CCN 3,5P,c5p
CCN 3,6P,c6p
CCN 3,4S,c4s
CCN 3,5S,c5s
CCN 3,6S,c6s
CDA 3,192.168.0.201
CCP 3,9000
CDT 3,1A,0
CDT 3,2A,0
CDT 3,1M,0
CDT 3,2M,0
CDT 3,3M,0
CDT 3,1P,0
CDT 3,2P,0
CDT 3,3P,0
CDT 3,1S,0
CDT 3,2S,0
CDT 3,3S,0
CDT 3,4M,0
CDT 3,5M,0
CDT 3,6M,0
CDT 3,4P,0
CDT 3,5P,0
CDT 3,6P,0
CDT 3,4S,0
CDT 3,5S,0
CDT 3,6S,0
CST 3,1A,4
CST 3,2A,4
CST 3,1M,4
CST 3,2M,4
CST 3,3M,4
CST 3,1P,0
CST 3,2P,0
CST 3,3P,0
CST 3,1S,0
CST 3,2S,0
CST 3,3S,0
CST 3,4M,4
CST 3,5M,4
CST 3,6M,4
CST 3,4P,0
CST 3,5P,0
CST 3,6P,0
CST 3,4S,0
CST 3,5S,0
CST 3,6S,0
CCM 3,0
CAM 3,0
CCL 3,1A,0,0.000000,1.000000
CCL 3,2A,0,0.000000,1.000000
CCL 3,1M,0,0.000000,1.000000
CCL 3,2M,0,0.000000,1.000000
CCL 3,3M,0,0.000000,1.000000
CCL 3,1P,0,0.000000,1.000000
CCL 3,2P,0,0.000000,1.000000
CCL 3,3P,0,0.000000,1.000000
CCL 3,1S,0,0.000000,1.000000
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CCL 3,2S,0,0.000000,1.000000
CCL 3,3S,0,0.000000,1.000000
CCL 3,4M,0,0.000000,1.000000
CCL 3,5M,0,0.000000,1.000000
CCL 3,6M,0,0.000000,1.000000
CCL 3,4P,0,0.000000,1.000000
CCL 3,5P,0,0.000000,1.000000
CCL 3,6P,0,0.000000,1.000000
CCL 3,4S,0,0.000000,1.000000
CCL 3,5S,0,0.000000,1.000000
CCL 3,6S,0,0.000000,1.000000
CRT 3,2
CRR 3,2
CIP 3,8000
CCE 3,1P,2P,3P,4P,5P,6P
CDS 3,5
CSS 3,5
CTM 3,0
CDE 4,0
CDF 4,10
CSF 4,1
CBF 4,0
CBM 4,0
CNC 4,S1268
CNS 4,S1268
CSN 4,S1268
CLN 4,1A,01
CLN 4,2A,01
CLN 4,1M,01
CLN 4,2M,01
CLN 4,3M,01
CLN 4,1P,01
CLN 4,2P,01
CLN 4,3P,01
CLN 4,1S,02
CLN 4,2S,02
CLN 4,3S,02
CLN 4,4M,01
CLN 4,5M,01
CLN 4,6M,01
CLN 4,4P,01
CLN 4,5P,01
CLN 4,6P,01
CLN 4,4S,02
CLN 4,5S,02
CLN 4,6S,02
CCN 4,1A,c1a
CCN 4,2A,c2a
CCN 4,1M,c1m
CCN 4,2M,c2m
CCN 4,3M,c3m
CCN 4,1P,c1p
CCN 4,2P,c2p
CCN 4,3P,c3p
CCN 4,1S,c1s
CCN 4,2S,c2s
CCN 4,3S,c3s
CCN 4,4M,c4m
CCN 4,5M,c5m
CCN 4,6M,c6m
```

```
CCN 4,4P,c4p
CCN 4,5P,c5p
CCN 4,6P,c6p
CCN 4,4S,c4s
CCN 4,5S,c5s
CCN 4,6S,c6s
CDA 4,192.168.0.201
CCP 4,9000
CDT 4,1A,0
CDT 4,2A,0
CDT 4,1M,0
CDT 4,2M,0
CDT 4,3M,0
CDT 4,1P,0
CDT 4,2P,0
CDT 4,3P,0
CDT 4,1S,0
CDT 4,2S,0
CDT 4,3S,0
CDT 4,4M,0
CDT 4,5M,0
CDT 4,6M,0
CDT 4,4P,0
CDT 4,5P,0
CDT 4,6P,0
CDT 4,4S,0
CDT 4,5S,0
CDT 4,6S,0
CST 4,1A,4
CST 4,2A,4
CST 4,1M,4
CST 4,2M,4
CST 4,3M,4
CST 4,1P,0
CST 4,2P,0
CST 4,3P,0
CST 4,1S,0
CST 4,2S,0
CST 4,3S,0
CST 4,4M,4
CST 4,5M,4
CST 4,6M,4
CST 4,4P,0
CST 4,5P,0
CST 4,6P,0
CST 4,4S,0
CST 4,5S,0
CST 4,6S,0
CCM 4,0
CAM 4,0
CCL 4,1A,0,0.000000,1.000000
CCL 4,2A,0,0.000000,1.000000
CCL 4,1M,0,0.000000,1.000000
CCL 4,2M,0,0.000000,1.000000
CCL 4,3M,0,0.000000,1.000000
CCL 4,1P,0,0.000000,1.000000
CCL 4,2P,0,0.000000,1.000000
CCL 4,3P,0,0.000000,1.000000
CCL 4,1S,0,0.000000,1.000000
CCL 4,2S,0,0.000000,1.000000
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CCL 4,3S,0,0.000000,1.000000
CCL 4,4M,0,0.000000,1.000000
CCL 4,5M,0,0.000000,1.000000
CCL 4,6M,0,0.000000,1.000000
CCL 4,4P,0,0.000000,1.000000
CCL 4,5P,0,0.000000,1.000000
CCL 4,6P,0,0.000000,1.000000
CCL 4,4S,0,0.000000,1.000000
CCL 4,5S,0,0.000000,1.000000
CCL 4,6S,0,0.000000,1.000000
CRT 4,2
CRR 4,2
CIP 4,8000
CCE 4,1P,2P,3P,4P,5P,6P
CDS 4,5
CSS 4,5
CTM 4,0
CAO I,0
CAA I,1.000000
CAF I,1.000000
CAW I,1.000000
CAD I,10
CAI I,3600
CAR I,1
CAT I,00:00:00,01/01/1970
CAS I,1,0
CAS I,2,0
CAS I,3,0
CAS I,4,0
CAS I,5,0
CAS I,6,0
CAC I,0
CAO S,0
CAA S,1.000000
CAF S,1.000000
CAW S,1.000000
CAD S,10
CAI S,3600
CAR S,1
CAT S,00:00:00,01/01/1970
CAS S,1,0
CAS S,2,0
CAS S,3,0
CAS S,4,0
CAS S,5,0
CAS S,6,0
CAC S,0
TSM 2
JST 10
GCT 7200
FFM 0
FCP 0
FLT 0.000000
FLN 0.000000
FAL 0.000000
FCM 0
CSM 0
CRM 1
CTD D
CFS 5
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CCR
ESM 0
ETD D
EPR 60
EPO 60
EMA 240
ETW 1
ETV 1
EST 00:00:00,01/01/1970
ECV 1,1
ECV 2,1
ECV 3,1
ECV 4,1
ECV 5,1
ECV 6,1
ECV E,1
ECR
TMO 1,0
THP 1,1.000
TLP 1,10.000
TLV 1,1.000
TSC 1,0.100
TLC 1,10.000
TTR 1,3.000
TDR 1,2.000
TUL 1,0
TMO 2,0
THP 2,1.000
TLP 2,10.000
TLV 2,1.000
TSC 2,0.100
TLC 2,10.000
TTR 2,3.000
TDR 2,2.000
TUL 2,0
TMO 3,0
THP 3,1.000
TLP 3,10.000
TLV 3,1.000
TSC 3,0.100
TLC 3,10.000
TTR 3,3.000
TDR 3,2.000
TUL 3,0
TMO 4,0
THP 4,1.000
TLP 4,10.000
TLV 4,1.000
TSC 4,0.100
TLC 4,10.000
TTR 4,3.000
TDR 4,2.000
TUL 4,0
TMO 5,0
THP 5,1.000
TLP 5,10.000
TLV 5,1.000
TSC 5,0.100
```

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TLC 5,10.000
TTR 5,3.000
TDR 5,2.000
TUL 5,0
TMO 6,0
THP 6,1.000
TLP 6,10.000
TLV 6,1.000
TSC 6,0.100
TLC 6,10.000
TTR 6,3.000
TDR 6,2.000
TUL 6,0
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WMO 1,0
WST 1,00:00:00,01/01/1970
WDU 1,0
WIN 1,0
WRE 1,0
WEN 2,0
WMO 2,0
WST 2,00:00:00,01/01/1970
WDU 2,0
WIN 2,0
WRE 2,0
WEN 3,0
WMO 3,0
WST 3,00:00:00,01/01/1970
WDU 3,0
WIN 3,0
WRE 3,0
WEN 4,0
WMO 4,0
WST 4,00:00:00,01/01/1970
WDU 4,0
WIN 4,0
WRE 4,0
STD D
LTD D
USB 1
NPD 0
DMF 80
DMT 0
SFG 1,4.000000
SFG 2,4.000000
SFG 3,4.000000
SFG 4,4.000000
SFG 5,4.000000
SFG 6,4.000000
SSS 1,0.000000
SSS 2,0.000000
SSS 3,0.000000
SSS 4,0.000000
SSS 5,0.000000
SSS 6,0.000000
ANO 0
SFT 1,0
SFT 2,0
SSD 1
URT 50,0D,0,0,0,0,0,0A,0
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DDC 1,1,1
DCL 1A,0,0.000000,1.000000
DCL 2A,0,0.000000,1.000000
DCL 1M,0,0.000000,1.000000
DCL 2M,0,0.000000,1.000000
DCL 3M,0,0.000000,1.000000
DCL 4M,0,0.000000,1.000000
DCL 5M,0,0.000000,1.000000
DCL 6M,0,0.000000,1.000000
EWS 1,0
EWE 1,0
EWI 1,255
EWM 1,0
EWS 2,0
EWE 2,0
EWI 2,255
EWM 2,0
EWS 3,0
EWE 3,0
EWI 3,255
EWM 3,0
EWS 4,0
EWE 4,0
EWI 4,255
EWM 4,0
GOS 0
GPR 1
GFM 1
DFB 0
GET END
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