SMARTGeoSOHMonitor User's Manual

Version 1.2

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Revision History

Rev	Date	Description	Ву
1.0	6/17/04	Initial Release	PCK
1.1	7/28/05	Some text updates	MR
1.2	5/22/12	Updated	MR

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About This Document

This manual is designed for technical personnel installing and operating Geotech Instruments' SMARTGeoSOHMonitor program. The following chapters are included in this manual:

- **Chapter 1**, General Information about the SMARTGeoSOHMonitor
- Chapter 2, Installation and setup
- Chapter 3, SMARTGeoSOHMonitor features and operation

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1 General Information

1.1 SMARTGeoSOHMonitor Overview

SMARTGeoSOHMonitor (Figure 1-1) checks the State Of Health (SOH) of remote SMART digitizers and comunication link status. Alarm conditions are displayed and logged to a file on disk. The Client is written in Java as a Graphic User Interface (GUI) application that runs on all Unix, Windows, and Linux operating systems. SMARTGeoSOHMonitor operates as either a local or remote client for SMARTGeoHub® DataBase Server software.

🚰 SMARTGeoSOHMonitor	
File Tools Help	
Digitizer Array	¥ ST001
ST001	^ <u></u>
- X ST002	
🛛 — 🙀 ST003	
🛛 — 🚧 ST004	
— 🐅 ST005 🔲	
Power remperature	GPS
PWR VIN PWR VSW PWR GPS DSP TEMP	GPS STATUS
	Liniaskad
- X ST009 13.154 12.076 12.223 23.836 C	Oniockeu
Inputs	
	Analog
	PWR AUX1
	6.979.1/
	0.070 V
DSP DIG IN 4 DSP DIG IN 5 DSP DIG IN 6	PWR AUX2
ST018 Closed Closed	-0.468 V
- X ST019	
- 🚾 ST020	
📗 — 🍋 ST021	
🛛 — 🍋 ST022	
📗 — 🍋 ST023 🖉	
2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST062	<u> </u>
2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST036	
2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST028	
2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST007	
[2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST058	
[2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST119	
12004-05-20 14.31.54 [COWM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST035	
2004-05-2014.51.34 [COMMITAILORE] 2004-05-25 21.45.57 (1085521557000) S1030	
2004-05-2014.31.34 [COMIN FAILORE] 2004-05-23 21.45.57 (1085521557000) 51057	254
2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (100521557000) ST021	
Dracessing 0 records 2004.05.25 21:50:01 0	264 2 128 5/25/04 0-55 DM
F1006331119 0 1600143. 2004-03-23 2 1.3000 1.0	204 2 120 0/20/04 9:00 PW

Figure 1-1. Typical SMARTGeoSOHMonitor

1.2 Operator Functionality

The operators of SMARTGeoSOHMonitor can:

- Set alarms levels for specific network digitizer conditions, including comunication links, power, and environmental conditions.
- View real-time status of specific network digitizers.
- Log alarm messages to an external file. The files are viewable via any ASCII file editor or viewer, such as Microsoft[™] Notepad.

1.3 System Requirements

The minimal hardware requirements are: a computer with Intel Pentium[™] 4 @ 2.26GHz processor, 512 MB RAM, with Microsoft Windows XP[™] operating system.

Additional resources may be required to support large seismic networks. Support for Linux and Unix operating systems is also available.

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2 SMARTGeoSOHMonitor Installation

The SMARTGeoSOHMonitor Client is installed as part of the SMARTGeoHub® data acquisition system. The install procedure is very simple and automated, as described below.

To install SMARTGeoHub® onto your computer:

Insert the Geotech's SMARTGeoHub® CD in the system CD drive and double-click on the Install program from the CD root directory. This procedure will create all folders and will copy all files necessary to run SMARTGeoHub®. On a Windows platform the installation folder defaults to c:\SmartGeoHub, where the SMARTGeoHub® programs will be installed in different subfolders, one for each software component.

Next the Java Runtime Environment will be installed, or updated to the newest version if already present on the computer. The Typical setup should be selected during the Java Runtime Environment Install Wizard.

The install procedure will also install the relational database needed by SMARTGeoHub®.

This installation procedure assumes that you have no current SMARTGeoHub® installation on the computer. Another procedure should be used to update or reinstall SMARTGeoHub®, by double-clicking on the Update program from the CD root directory. The update procedure is similar to the install procedure but it excludes the installation of the relational database.

When the software installation is completed, it is recommended to create (or update existing) shortcuts on the Desktop to point to the SMARTGeoHub® programs. The SMARTGeoSOHMonitor shortcut should point to the following program file (given here as an example):

c:\SMARTGeoHub\SMARTGeoSOH_Monitor\bin\SOH_Monitor.bat. Also, it is recommended to set the program icon (by editing the shortcut Properties) to point to: c:\SMARTGeoHub\icons\SmartSOH.ico

Double-click on the SMARTGeoSOHMonitor icon to start the SMARTGeoSOHMonitor Client.

The SMARTGeoHub® Sever application is used to accept incoming real time data connections from SMART-24 instruments via a TCP/IP network connection, and to write the received SOH data to the database, from where they can be accessed by the SMARTGeoSOHMonitor Client. To start the SMARTServer, double-click on the SMARTServer shortcut that points to the following program file (given here as an example): c:\SMARTGeoHub\SMARTServer\bin\runServer.bat.

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3 SMARTGeoSOHMonitor Operation

This chapter describes the user interface and operating procedures for the SMARTGeoSOHMonitor.

3.1 User interface

The user interface (Figure 3-1) consists of a menu toolbar, an area to select network digitizers or the array, an area for display of current parameter values, and the event log which displays alarms and their resolution. When an alarm threshold value is reached, the affected indictor flashes red, an audible alarm may sound, and a log entry is added to the list. An additional bar at the bottom of the interface indicates processor activity, total number of unacknowledged and acknowledged alarms, number of digitizers that have encountered a communication interruption, and the current date and time.

The frames that make up SMARTGeoSOHMonitor can be re-sized with a mouse cursor to suit the user's viewing requirements. Simply click on a border and move it. If the information to be displayed in any area exceeds the available display space, scrollbars appear at the bottom and right edges.



Figure 3-1. Typical SOH Display

Note that when Digitizer Array is selected in the left panel or D is pressed on the keyboard, icons for each digitizer are displayed in the right-hand area (Figure 3-2). An individual digitizer icon in this area can be clicked to select it, highlighting the same unit on the left, and the digitizer values are displayed. When a fault has occurred for a digitizer, the digitizer icon turns red. Additionally if there is a communications problem, a red **X** appears over icon. Faults are acknowledged by right clicking the affected value, the color changes to yellow until the fault is corrected.

音 SMAR TGeo SOHMonil	tor										_ 🗆 ×
File Tools Help											
🗶 Digitizer Array	Digitizer Array										
- 🍋 ST001 🛛 🎆	¥8 ·		¥6	¥6	¥6	¥6	¥6	¥6	¥6	¥6	¥6
– 🍋 ST002 👘	ST001 S	T002 ST003	ST004	STODS	STOD6	STOOZ	STOOR	STOO9	ST010	ST011	ST012
- 🍋 STOO3 🛛	× ×		×6		X	X	*	X	X	X	×
- 🍋 ST004 🛛	ST013 S	T014 ST015	ST016	ST017	ST018	ST019	ST020	ST021	ST022	ST023	ST024
- X ST005	× 😭		×	X	×	×	X	X	X	×	×
- X STUU6	ST025 S	T026 ST027	ST028	ST029	ST030	ST031	ST032	ST033	ST034	ST035	ST036
- 1007	🛛 🗶 🕄	× 🖴 🗠	×	×	×	×	×	×	×	×	×
	ST037 S	T038 ST039	ST040	ST041	ST042	ST043	ST044	ST045	ST046	ST047	ST048
CT010	🛛 🗶 🕄	X 🖴 🗠	×	×	×🖴	×	×	×	×	×	×🖴
- ST011	ST049 S	T050 ST051	ST052	ST053	ST054	ST055	ST056	ST057	ST058	ST059	ST060
- 🙀 ST012	🔰 💥 🕄	X 🖴 🖌	×	×	×	×	×	×	×🖴	×	×
- 🚾 ST013	ST061 S	T062 ST063	ST064	ST065	ST066	ST067	ST068	ST069	ST070	ST071	ST072
- 🙀 ST014	X🖴 🔅		×	*	×🖴	×	×	×	×🖴	*	×🖴
- 🍋 ST015	ST073 S	T074 ST075	ST076	ST077	ST078	ST079	ST080	ST081	ST082	ST083	ST084
- 🍋 ST016	X 🖬 🔅		X	X	X	X	X	X	X	X	×
- 🍋 ST017	ST085 S	T086 ST087	ST088	ST089	ST090	ST091	ST092	ST093	ST094	ST095	ST096
- 🍋 ST018	X		X	X	X	X	X	X	X	X	X
- 🍋 ST019	S1097 S	1098 \$1099	ST100	ST101	ST102	ST103	ST104	ST105	ST106	ST107	ST108
- X ST020					X			X			
- X S1021	51109 5		SITIZ	51113	51114	51115	51110	51117	51118	51119	51120
S1022	ET424 E		CT424	CT425	ET426	ST427	CT420				
отори	31121 3	1122 31123	31124	31123	31120	31127	31120				
2004-05-26 14:31:54 [C]	OMM FAILURE1	2004-05-2	5 21:45:57	(10855216	57000) S	T062					
2004-05-26 14:31:54 [C	OMM FAILURE	2004-05-2	5 21:45:57 5 21:45:57	(10855215	57000) S	T036					
2004-05-26 14:31:54 IC	OMM FAILURE	2004-05-2	5 21:45:57	(10855215	57000) S	T028					
2004-05-26 14:31:54 [C	OMM FAILURE]	2004-05-2	5 21:45:57	(10855215	57000) S	T007					
2004-05-26 14:31:54 [C	OMM FAILURE]	2004-05-2	5 21:45:57	(10855215	57000) S	T058					
2004-05-26 14:31:54 [C	OMM FAILURE]	2004-05-2	5 21:45:57	(10855215	57000) S	T119					
2004-05-26 14:31:54 [C	OMM FAILURE]	2004-05-2	5 21:45:57	(10855215	57000) S	T035					
2004-05-26 14:31:54 [C	OMM FAILURE]	2004-05-2	5 21:45:57	(10855215	57000) S	тозо					
2004-05-26 14:31:54 [C	OMM FAILURE]	2004-05-2	5 21:45:57	(10855215	57000) S	T057					Terror I
2004-05-2614:31:54 [Ci	OMM FAILURE]	2004-05-2	5 21:45:57	(10855215	67000) S	1021					1999
2004-05-26 14:31:54 [C		2004-05-2	ə Z1:45:57	(10855215	137000) S	1005		and the second se			•
				1911919191919191				333333			
Processing 0 records. 2	2004-05-25 21:51	:14.0						264	2	128 5/2	5/04 9:55 PM

Figure 3-2. Top Level Display

3.1.1 Menu Bar

The SMARTGeoSOHMonitor menu bar provides quick access the following pulldown menus:

File – Allows the user to select the Exit submenu to exit and close the SMARTGeoSOHMonitor application.

Tools – Allows the user to select the Configurator tool or to synchronize to the database.

Help – Allows the user to select the About submenu which provides information on the SMARTGeoSOHMonitor application date and version.

3.1.2 Configurator Tool

The Configurator tool provides quick access to the following functions:

• Connectivity – Select the data server accessed for digitizer status.

- Event Log Select event log size and backup settings.
- Input Naming Enter a preferred name for the six digital and two analog inputs of a SMART-24 Digitizer.
- Notification Enable an audible alarm or audible communication failure.
- Alarm Policies Set the values and conditions that will trigger an alarm.

3.1.2.1 Connectivity Configuration

The Connectivity window (Figure 3-3) allows the user to select the Internet Protocol (IP) address or computer name were the SMARTGeoHub® DataBase resides. The SMARTGeoHub® DataBase receives the SMART-24 Digitizer data streams. It also allows you to select how often in seconds the monitor polls the database server for status information. After entering a selection, click **Apply**. Clicking **OK** closes the window, and clicking **Cancel** deletes the entries and closes the window.

😭 SMARTGeoSO	HMonitor - Conf	igurator			×
Input Naming	Notification	Alarm Po	licies		
Ca	onnectivity			Event Log	
	Server: Poll Rat	shane te: 1			
	ОК	Apply	Cancel	I	

Figure 3-3. Connectivity Window

3.1.2.2 Event Log Configuration

The Event Log Widow (Figure 3-4) allows the user to select:

- The log file size in kilobytes, megabytes, or gigabytes.
- The maximum number of backup files created. After the maximum number is reached, the monitor will delete the oldest file for each new file created.
- The number of lines allowed to accumulate in the event log before the application automatically saves to a backup file.

Note that users can also save event logs separately from the automatic backups selected via this window. To manually save event logs, right click in the event log

area of the monitor and when Save Copy is displayed, left click it with the mouse cursor. The file name is automatically generated, and the file is saved to a "logs" folder in the same location as the SMARTGeoSOHMonitor. After entering a selection, click **Apply**. Clicking **OK** closes the window, and clicking **Cancel** deletes the entries and closes the window.

音 SMARTGeoSO	HMonitor - Confi	gurator			×
Input Naming	Notification	Alarm Pol	icies		
Ca	onnectivity			Event Log	
	Log Size: Max Back Display Si	100 ups: 10 ze: 500	MB T	s	
	ОК	Apply	Can	cel	

Figure 3-4. Event Log Window

3.1.2.3 Input Naming Configuration

The Input Naming Window (Figure 3-5) allows users to enter a preferred name for up to six spare digital and two spare analog inputs. The name is dependent on user preferences for specific points. After the names are entered and **Apply** or **OK** at the bottom of the window is clicked, these names appear in the Alarm Policies window and on the monitored values section of the display. Clicking **Cancel** deletes the entries and closes the window.

3.1.2.4 Notification Configuration

The Notification Window (Figure 3-6) allows the user to enable or disable an audible alarm or audible communication failure. The Audible Alarm sounds when any preset digitizer alarm policy is faulted. The Audible Communication Failure sounds when communication with a digitizer is lost. After selecting, click **Apply**. Clicking **OK** closes the window, and clicking **Cancel** deletes the entries and closes the window.

3.1.2.5 Alarm Policies Configuration

The Alarm Policies Window (Figure 3-7) sets the allowed voltage ranges and conditions that trigger an alarm. When a voltage exceeds a set range or a signal condition (such as an open circuit or an unlocked state) an alarm is triggered. The values are dependent on the respective site conditions in the seismic array. This

window is divided into four levels of decreasing importance. Level 1 includes the most important policies, level 4 policies are the least important.

音 SMARTGeoSO	HMonitor - Conl	igurator			×
Input Naming	Input Naming Notification Alarm Policies				
Connectivity Event Log					
	Digital li	nput 1 DS	P DIG IN	1	
	Digital lı	nput 2 DS	 P_DIG_IN_:	2	
	Digital li	nput 3 DS	P_DIG_IN_:	3	
	Digital II	nput 4 DS	P_DIG_IN_	4	
	Digital li	nput 5 DS	P_DIG_IN_	5	
	Digital li	nput 6 <u>28</u>	P_DIG_IN_I	6	
	Analog	Input 1 PV	VR_AUX1		
	Analog	Input 2 PV	VR_AUX2		
OK Apply Cancel					

Figure 3-5. Input Naming Window

😭 SMARTGeoSO	HMonitor - Configurat	or	×	:
Input Naming	Notification Alarn	n Policies		
Ca	onnectivity		Event Log	
	Enable Audible Al Enable Audible Co	arm ommunicat	tion Failure	
	ОК Арр	ly Ca	ancel	

Figure 3-6. Notification Window

3.1.2.5.1 Level 1 Policies

Policies included at this level include:

 Minimum and maximum main input supply voltage to the digitizer both before (PWR_VSW) and after the power relay and its diodes (PWR_VIN). The PWR_VSW voltage may also include batteries.

🚰 SMARTGeoSOHMonitor - Configurator					
Input Naming Notification	Alarm Po	licies			
Connectivity		Event Log			
Digitizer:	All Digitizers	▼ 🗵 Enabled			
Loupl 1					
		May Theorem 14 47,000			
PVVK_VIN Min Threshold	3.000	Max Threshold 17.000			
DMR GDS Min Threshold	3.000	Max Threshold 17.000			
DSP_TEMP_Min Threshold	-100.000	Max Threshold 275 000			
GPS STATUS State		·	8888		
	Onen T				
DSP_DIG_IN_1 State	Open •		1000		
DSP_DIG_IN_2 State	Open 🔻		00000		
DSP_DIG_IN_3 State	Open 💌				
DSP_DIG_IN_4 State	Open 🔻				
DSP_DIG_IN_5 State	Open 🔻		1000		
DSP_DIG_IN_6 State	Open 🔻				
PWR AUX1 Min Threshold	-8.500	Max Threshold 8.500			
PWR_AUX2 Min Threshold	-8.500	Max Threshold 8.500			
Level 2	·				
GPS CLK STATUS	State	Locked 🔻			
GPS_CLK_DIFFERENCE_Mat	x Threshold	1 000			
GPS_POWER	State	Off V			
GDS_SATELLITES Mi	n Throshold				
GDS_ERROR	II THESHOLU	nahlad			
		паыси	-		
PWR_SENSOR1 Min Thres	hold 3.000	Max Threshold 17.000			
PWWR_SENSURZ Min Infest	hold 3.000	Max Threshold 9,500			
ADC1_CH1_MP_MINTINTES	hold -8.500	Max Threshold 8.500			
ADC1_CH2_WP_Win Thres	hold -8 500	Max Threshold 8 500			
ADC2 CH4 MP Min Thres	hold -8.500	Max Threshold 8.500			
ADC2_CH5_MP Min Thres	hold -8.500	Max Threshold 8.500			
ADC2_CH6_MP Min Thres	hold -8.500	Max Threshold 8.500			
ОК	Apply	Cancel			

Figure 3-7. Alarm Policies Window (Page 1 of 2)

音 SMARTGeoSOHM	SMARTGeoSOHMonitor - Configurator					
Input Naming N	lotification 4	Marm Polic	ies			
Conr	nectivity		Event	Log		
	Diaitizer: All Di	aitizers 🔻	Enabled			
	.					
Level 4				Ĥ		
PWR_+5V	Min Threshold	1.000	Max Threshold	6.300		
PWR_+3.3V	Min Threshold	1.000	Max Threshold	6.300		
PWR_+1.8V	Min Threshold	1.000	Max Threshold	6.300		
PWR_+3.3VA	Min Threshold	1.000	Max Threshold	6.300		
PWR3.3VA	Min Threshold	1.000	Max Threshold	6.300		
PWR_TEMP	Min Threshold	l <u>-100.000</u>	Max Threshold	275.000		
PWR_FIREWIRE	Min Threshold	l <u>3.000</u>	Max Threshold	17.000		
PWR_USB_HOST	f Min Threshold	l <u>1.000</u>	Max Threshold	6.300		
PWR_USB	Min Threshold	l <u>1.000</u>	Max Threshold	6.300		
DSP_VCTCXO	Min Threshold	1.000	Max Threshold	6.300		
DSP_FLASH	Min Threshold	1.000	Max Threshold	6.300		
DSP_PSEUDO	Min Threshold	1.000	Max Threshold	6.300		
DSP_SDRAM	Min Threshold	1.000	Max Threshold	6.300		
DSP_+5VA	Min Threshold	1.000	Max Threshold	6.300		
DSP_+2.5VREF	Min Threshold	l 1.000	Max Threshold	6.300		
DSP_+3.6VBAT	Min Threshold	l 1.000	Max Threshold	6.300		
DSP_+1.8V	Min Threshold	1.000	Max Threshold	6.300		
ADC1_+3VA	Min Threshold	1.000	Max Threshold	6.300		
ADC13VA	Min Threshold	l -6.300	Max Threshold	-1.000		
ADC1_+3V	Min Threshold	1.000	Max Threshold	6.300		
ADC1_GND	Min Threshold	1.000	Max Threshold	6.300		
ADC1_TEMP	Min Threshold	I -100.000	Max Threshold	275.000		
ADC2_+3VA	Min Threshold	1.000	Max Threshold	6.300		
ADC23VA	Min Threshold	l -6.300	Max Threshold	-1.000		
ADC2_+3V	Min Threshold	1.000	Max Threshold	6.300		
ADC2_GND	Min Threshold	1.000	Max Threshold	6.300		
ADC2_TEMP	Min Threshold	I -100.000	Max Threshold	275.000		
ETH1_+3.3V	Min Threshold	1.000	Max Threshold	6.300		
ETH1_TEMP	Min Threshold	l -100.000	Max Threshold	275.000		
ETH2_+3.3V	Min Threshold	1.000	Max Threshold	6.300		
ETH2_TEMP	Min Threshold	100.000	Max Threshold	275.000		
				_		
	ОК	Apply	Cancel			
	· ·					

Figure 3-7. Alarm Policies Window (Page 2 of 2)

- Minimum and maximum output voltage (**PWR_GPS**) to the Global Positioning System (GPS).
- Minimum and maximum allowed Digital Signal Processor (DSP) board temperature (**DSP_TEMP**) in degrees Celsius.
- GPS output status (**GPS_STATUS**) either locked or unlocked. Digitizers do not receive position or time information when GPS is unlocked.
- Data outputs from up to six DSP processor boards (DSP_DIG_IN_1 through DSP_DIG_IN_6) in each digitizer to the SMARTGeoHub® DataBase Server. These circuits are either Open (no DSP data input from digitizer) or Closed (DSP data is received at the Hub). The SMART-24 digitizers can be configured for up to 6 channels. Each channel requires a DSP processor board.
- Minimum and maximum auxiliary analog input power to the digitizer I/O boards (PWR_AUX1 and PWR_AUX2).

These settings translate to the Level 1 digitizer display values shown in Figure 3-8.

🚰 SMARTGeoSOHMonitor	<u>_ ×</u>
File Tools Help	
Digitizer Array Eevel 1 Level 2 Level 3 Level 4 ST001 ST002 ST003 ST003 ST003 ST003 ST003 ST003 ST004 ST005 ST005 ST005 ST006 ST007 ST008 ST007 ST008 SST009 SST009 SST009 SST009 SST011 SST011 SST011 SST012 SST013 Closed Closed Closed Closed SClosed SClosed SClosed Closed C	¥ ST001
2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST062 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST036 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST028 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST028 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST058 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST058 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST035 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST036 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST030 2004-05-26 14:31:54 [COMM FAILURE] 20	
Processing O records. 2004-05-25 21:50:01.0 264 2 128	5/25/04 9:55 PM

Figure 3-8. Level 1 Display

3.1.2.5.2 Level 2 Policies

Policies included at this level are related to the Global Positioning System (GPS). They include:

• GPS clock status (GPS_CLK_STATUS) – either locked or unlocked. This policy should be set to unlocked – the digitizers do not receive time information when the GPS clock is unlocked.

- The maximum allowable difference between the local system time and the time received from the GPS (**GPS_CLK_DIFFERENCE**).
- GPS power switch either on or off (GPS_POWER). This policy should be set to off – the digitizers do not receive GPS information when the power has been switched off.
- The minimum number of satellites required for the GPS system to operate accurately (**GPS_SATELLITES**).
- **GPS_ERROR** An encoded message provided from the GPS manufacturer.

These settings translate to the Level 2 digitizer display values shown in Figure 3-9. The following GPS values are also displayed:

- Current time received from the GPS (**GPS_TIME**).
- The last date and time the GPS clock was locked (**GPS_CLK_LAST_LOCK**).
- Digitizer location (GPS_LATITUDE, GPS_LONGITUDE, and GPS_ALTITUDE).
- The last version and date of GPS navigational (**GPS_NAV_VER**) and signal (**GPS_SIG_VER**) firmware in use.

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File Tools Help					
Les Digitizer Array ▲	vel 1 Level 2 Level 3 I	.evel 4		X 😭 STOO1	
- * ST002 - * ST003 - * ST004 - * ST005	Status	Clock	Location GPS LATITUDE		
- ** ST006 - ** ST007 - ** ST008 - ** ST008	GPS Off	_POWER	25.886 * 0 GPS_LONGITUDE		
- X ST010 - X ST011 - X ST012 - X ST013 - X ST013	GPS Unlock	STATUS GPS_CLK_STATUS	GPS_ALTITUDE 25.886 Meters		
- X STU14 - X STU15 - X STU15 - X STU16 - X STU17	GPS_5 0 GPS	CERROR GPS_CLK_DIFFEREN	CK 6PS_NAV_VER 02.02 10/05/2000		
ST018 - X ST019 - X ST020 - X ST021 - X ST021		2004-05-25 15:17:49	.0 GPS_SIG_VER 10.02 08/23/1999		
ST022					
2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST062 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST036 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST038					
2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST007 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST058 2004-05-26 14:31:54 [COMM FAILURE] 2004-05-25 21:45:57 (1085521557000) ST058					
2004-05-26 14:31:54 [COMM F. 2004-05-26 14:31:54 [COMM F. 2004-05-26 14:31:54 [COMM F.	AILURE] 2004-05-25 2 'AILURE] 2004-05-25 2 'AILURE] 2004-05-25 2 'AILURE] 2004-05-25 2	1:45:57 (1085521557000) ST035 1:45:57 (1085521557000) ST030 1:45:57 (1085521557000) ST030			
2004-05-26 14:31:54 COMM F. 2004-05-26 14:31:54 COMM F.	AILURE] 2004-05-25 2 AILURE] 2004-05-25 2	21:45:57 (1085521557000) ST021 21:45:57 (1085521557000) ST065			
Processing 0 records. 2004-0	05-25 21:50:30.0	264 2	128 5/25/04 9:55 PM		

Figure 3-9. Level 2 Display

3.1.2.5.3 Level 3 Policies

Policies included at this level include:

Minimum and maximum voltage to one or two I/O sensors (PWR_SENSOR1 and PWR_SENSOR2).

 Minimum and maximum allowed mass position analog inputs from up to six channels (ADC1_CH1_MP through ADC2_CH6_MP). Each of the two ADC boards in a SMART-24 digitizer has three channels.

These settings translate to the Level 3 digitizer display values shown in Figure 3-10.



Figure 3-10. Level 3 Display

3.1.2.5.4 Level 4 Policies

Policies included at this level include:

- Minimum and maximum voltages allowed for main system digital power (PWR_+5V, PWR_+3.3V, and PWR_+1.8V)
- Minimum and maximum voltages allowed for main system analog power (PWR_+3.3VA and PWR_-3.3VA).
- Minimum and maximum allowed temperature in degrees Celsius for Power I/O board (PWR_TEMP).
- Minimum and maximum allowed firewire input voltage (PWR_FIREWIRE).
- Minimum and maximum allowed input voltages to the internal USB host (PWR_USB_HOST) and the USB peripheral drive (PWR_USB).
- Minimum and maximum allowed Digital System Processor (DSP) board voltages, including oscillator voltage (DSP_VCTCX0), digital supply +3.3V voltage (DSP_FLASH) and +5V voltage (DSP_SDRAM), analog supply voltage (DSP_+5VA), analog reference voltage (DSP_+2.5VREF), real time clock battery voltage (DSP_+3.6VBAT), and digital supply voltage (DSP_+1.8V).

- Minimum and maximum Digital System Processor (DSP) board ground potential (DSP_PSEUDO).
- Minimum and maximum voltages for both ADC boards (1 and 2), including analog supply voltages (ADC1_+3VA and ADC1_-3VA), digital supply voltage (ADC1_+3V), and ground chassis ground (ADC1_GND).
- Minimum and maximum temperatures in degrees Celsius for both ADC boards (ADC1_TEMP and ADC2_TEMP).
- Minimum and maximum allowed voltages for both Ethernet boards (ETH1_+3.3V and ETH2_+3.3V) and temperature (ETH1_TEMP and ETH2_TEMP).

These settings translate to the Level 4 digitizer display values shown in Figure 3-11.

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File Tools Help	Level 3 Level	4				X STOO1
★▲ ST002 ★▲ ST003 ★▲ ST004 ★▲ ST005	Output	DSP		ADC1	ADC2	Ethernet
→ ST006 5.299 V → ST007 → ST008 PWR_+3.3V → ST009 3.611 V	PWR_FIREWIRE	DSP_VCTCXO 3.598 V	DSP_+5VA 5.301 V	ADC1_+3VA 3.302 V ADC13VA	ADC2_+3VA 3.302 V ADC23VA	ETH1_+3.3V 3.611 V
- X ST010 - X ST011 - X ST012 - X ST012 - X ST012 - X ST012 - X ST013 - X ST014 - X ST014	10.300 V PWR_USB_HOST 5.223 V	DSP_FLASH 3.598 V	DSP_+2.5VREF	-2.699 V ADC1_+3V 3.302 V	-2.699 V ADC2_+3V 3.302 V	ETH1_TEMP 26.186 ° C
X = S1014 PWR_+3.3VA X = ST015 S.589 ∨ X = ST016 X = ST017 PWR3.3VA ST017 PWR3.3VA X = ST018 X = ST018 X = ST018	PWR_USB 5.300 ∨	3.598 V DSP_SDRAM	3.900 V DSP_+1.8V	ADC1_GND 4.300 V	ADC2_GND 3.300 V	ETH2_+3.3V 3.611 V ETH2_TEMP
- ★ ST019 - ★ ST020 - ★ ST020 - ★ ST021 - ★ ST021 - ★ ST021 - ★ ST022		3.598 V	2.098 V	ADC1_TEMP 26.256 ° C	ADC2_TEMP 25.386 * C	25.886 ° C
- 🧱 ST023						۱ ــــــــــــــــــــــــــــــــــــ
2004-05-26 14:31:54 [COMM FAILURE] 2004-05-26 14:31:54 [COMM FAILURE]	2004-05-25 21:45: 2004-05-25 21:45: 2004-05-25 21:45: 2004-05-25 21:45: 2004-05-25 21:45: 2004-05-25 21:45: 2004-05-25 21:45: 2004-05-25 21:45: 2004-05-25 21:45: 2004-05-25 21:45:	57 (10855215570) 57 (10855215570)	00) ST062 00) ST036 00) ST028 00) ST028 00) ST058 00) ST035 00) ST035 00) ST030 00) ST057 00) ST021 00) ST021 00) ST065			
Processing 0 records, 2004-05-25 21:51:01 (264	2 128	5/25/04 9:55 PI

Figure 3-11. Level 4 Display

3.2 Operation Procedures

The major user functions for this application include:

- Configuring SMARTGeoSOHMonitor for your digitizer array.
- Acknowledging alarms and using them to troubleshoot your digitizer array.

3.2.1 How to Configure SMARTGeoSOHMonitor

The Configurator tool (paragraph 3.1.2) allows users to set up the SMARTGeoSOHMonitor for their specific system requirements. Initially, Users should configure SMARTGeoSOHMonitor to address connectivity to the appropriate SMARTGeoHub® DataBase Server, define the event logging function, enable or disable the audible notification functions, and define the desired alarm settings.

Users should be prepared with operating tolerances for each model of digitizer used in their array and the conditions they will operate within. The SMART system assumes the use of similar digitizers. The user has the option of entering a preferred name for up to six digital and two analog inputs from the digitizers. Note that the names apply to the same SOH channel of all digitizers in the user's array.

As a convenience, the **Alarm Policies** window of the configurator allows the user to enter all of the common digitizer alarm settings by selecting **All Digitizers** before entering the values. After this step, the individual digitizers can be selected and any special values entered.

3.2.2 How to Acknowledge and Clear Alarms

The primary function of the SMARTGeoSOHMonitor is to ensure the digitizers of an array are maintained in optimal working order. When an alarm occurs, the user(s) should troubleshoot the affected digitizer(s) to return them to working order.

When a fault has occurred for a digitizer, the digitizer icon turns red. Additionally if there is a communications problem, a red **X** appears over icon. The easiest way to find faulty digitizers is to press **D** on your keyboard to move to the top level display (Figure 3-2), the digitizers are shown in the value display area. You can also scroll through the digitizer list on the left side of the page. You can then click any marked icon to move to the value display for the specific digitizer. Move through the various display levels by clicking the tabs. Alarms are indicated in red.

To acknowledge each alarm, right click it with your mouse. You should then attempt to find the problem which caused the alarm (i.e.: a faulty power supply if a voltage is out of tolerance or inadequate ventilation if a board has overheated). The alarms should clear automatically after each problem is solved.

3.2.3 The Event Log

The event log displays alarms and their resolution. The following specific data is displayed for each event:

- The log date (year, month, and day) and time (hour, minute, and second)
- Event description including [ALARM], [ALARM CLEARED], [COMM FAILURE] or [COMM FAILURE CLEARED]
- The alarm date (year, month, and day) and time (hour, minute, and second) according to the digitizer, and also the alarm date in seconds after January 1st 1970
- The name of an affected digitizer (site)
- A short explanation of the alarm event along with the logged value, and the minimum and maximum event thresholds.
- If [ALARM CLEARED] or [COMM FAILURE CLEARED] is displayed, the alarm duration is also included.

3.2.4 Quick Keys

When reviewing the alarm messages or searching for a particular digitizer, the user can quickly move through either list by clicking on it and using the following keystrokes:

- Ctrl+Home to move to the top of the list.
- Ctrl+End to move to the end of the list.
- Page Up or Page Down to move one display area in either direction.
- Your mouse wheel can be used to scroll through either list.

Additionally, you can select the digitizer list by clicking it and using the S key to move through the list. The value display area will update with each selection, however the digitizer list will not automatically scroll. Pressing D returns to the top level display.