Venable Instruments

Instrument Security Procedures

for Analyzer Models: 43xx, 63xx, 74xx, 88xx, 9x50 and 350c

Version 2.0

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Summary

The Venable Frequency Response analyzers contain 3 levels of data clearing and declassification. The memory sanitization procedures are designed for customers who need to meet the requirements specified by the US Defense Security Service (DSS). These requirements are outlined in the "Clearing and Sanitization Matrix" issued by the Cognizant Security Agency (CSA) and referenced in National Industrial Security Program Operating Manual (NISPOM) DoD 5220.22M ISL 01L-1 section 8-301.

Level 1: CLEAR DATA

Clears the Non-Volatile memory area used to store measurement data. No other memory areas are affected.

Level 2: SANITIZE

Clears all Non-Volatile memory as described in this manual, except for memory containing boot code and unit configuration data necessary to allow the end-user to reload firmware and calibration data back into the analyzer to bring it back to an operational state.

Level 3: SANITIZE

Clears all Non-Volatile memory as described in this manual, including memory containing boot code and unit configuration data. Level 3 will require the instrument to be sent to Venable Instruments to be reloaded with firmware, reinitialized and reloaded with calibration data.

Analyzer Firmware Requirements

Sanitization capability only exists in firmware released after December 2014. This consists of the following versions:

Bootloader Firmware:	1.5 or later
Communication Firmware:	2.1 or later, if running version 2.x1.2 or later, if running version 1.x
Application Firmware:	4.0 or later3.2 or later, if running version 3.x2.5 or later, if running version 2.x1.7 or later, if running version 1.x

Digital Interface Firmware (88xx only): 2.1 or later

Use the ver? button on the analyzer control menu in the Venable Stability Analysis software to determine the firmware versions loaded on your analyzer. Contact Venable Instruments to obtain a firmware update tool, with the latest firmware files, if your analyzer requires an update.

For analyzers running Application Firmware version 5.0 or later, Table 1a supercedes Table 1. Refer to Table 1a instead.

Instrument Memory

This section contains information on the types of memory available in your instrument. It explains the size of memory, how it is used, its location, volatility, and the sanitization procedure.

Table	1.5	Summary	of	Instrument	Memory -	Base	Instrument
1 4010	T • •	Jummary	01	monument	Wiemory	Duse	monument

Memory Type and Size	Location	Writable During Normal Operation?	Data Retained When Powered Off?	Purpose	Sanitization Procedure
Dual-Port RAM	MPC855T	Yes	No	Firmware Operations	
(SDRAM) 8 KBytes	Processor				Cycle power
Data Cache	MPC855T	Yes	No	Firmware Operations	
(SDRAM)	Processor			_	Cycle power
4 KBytes		X 7	N. 7		
Instruction Cache	MPC8551 Processor	Yes	No	Firmware Operations	Cycla power
4 KBytes	110005501				Cycle power
CPM ROM	MPC855T	No	Yes	Operational code.	
	Processor			Programmed only by	N/A
				processor manufacturer.	
Operations Memory	SDRAM64MBX16	Yes	No	Firmware Operations	Cycle power
64 MBit					Cycle power
Boot ROM	M29W640	No*	Ves	Boot loader for Main	See
(Flash)	1012 / 0040	140	103	Processor MPC855T	Procedure
64 MBit					
Instrument Memory	AT45DB321D-SU	Yes	Yes	Stores program S/W, user	See
(FLASH)				settings, calibration data and	Procedure
32 MBit Program Mamory	DIC 18E4550	No*	Vac	Stores program S/W for	Saa
(FLASH)	Processor	INO.	105	communication interface	Procedure
32 KByte					
Operations Memory	PIC 18F4550	Yes	No	Firmware Operations	
(SRAM)	Processor				Cycle power
2 KByte	DIC 19E4550	No	Vac	Not used	
(FEPROM)	PIC 18F4550 Processor	INO	res	Not used	N/A
256 Bytes	110000001				1 1/ 2 1
Programmable Registers					
r rogrammable Registers	NAT9914BPL	No	No	GPIB configuration control	

* This memory can be modified using the Venable Instruments firmware update tool.

Table 1a. Summary	of Instrument N	Aemor	y - Ba	se Instrument

Memory Type and Size	Location	Writable During Normal Operation?	Data Retained When Powered Off?	Purpose	Sanitization Procedure
Dual-Port RAM (SDRAM) 256 KBytes	ZYNQ 7007S Processor	Yes	No	Firmware Operations	Cycle power
Data Cache (SDRAM) 32 KBytes	ZYNQ 7007S Processor	Yes	No	Firmware Operations	Cycle power
Instruction Cache (SDRAM) 32 KBytes	ZYNQ 7007S Processor	Yes	No	Firmware Operations	Cycle power
L2 Cache 512 KBytes	ZYNQ 7007S Processor			Firmware Operations	Cycle power
Boot ROM 128 KBytes	ZYNQ 7007S Processor	No	Yes	Operational code. Programmed only by processor manufacturer.	N/A
Programmable Logic	ZYNQ 7007S Processor		No	Expanded circuitry	Cycle power
Operations Memory (DDR3 RAM) 64 MBit	MT41K64M16TW -107	Yes	No	Firmware Operations	Cycle power
Boot ROM (Flash) 128 MBit	S25FL128SAGBH I200	No*	Yes	Boot loader and Application for Main Processor ZYNQ 7007S	See Procedure
Instrument Memory (FLASH) 32 MBit	AT45DB321D-SU	Yes	Yes	Stores program S/W, user settings, calibration data and measurement data.	See Procedure
Program Memory (FLASH) 32 KByte	PIC 18F4550 Processor	No*	Yes	Stores program S/W for communication interface	See Procedure
Operations Memory (SRAM) 2 KByte	PIC 18F4550 Processor	Yes	No	Firmware Operations	Cycle power
Config Memory ROM (EEPROM) 256 Bytes	PIC 18F4550 Processor	No	Yes	Not used	N/A
Programmable Registers (SRAM)	NAT9914BPL	No	No	GPIB configuration control	Cycle power

* This memory can be modified using the Venable Instruments firmware update tool.

Memory Type and Size	Location	Writable During Normal Operation?	Data Retained When Powered Off?	Purpose	Sanitization Procedure
Program Memory	TI TMS320F2808	No*	Yes	Stores program S/W	See
(FLASH) 64 KByte	Processor				Procedure
Boot ROM 4 KByte	TI TMS320F2808 Processor	No	Yes	Boot code installed by processor manufacturer	N/A
Operation Memory (SRAM) 18 KByte	TI TMS320F2808 Processor	Yes	No	Firmware Operations	Cycle power

Table 2. Summary of Additional Instrument Memory – Model series 88xx only

* This memory can be modified using the Venable Instruments firmware update tool.

Procedures:

Level 1: CLEAR DATA

Data clear is initiated by sending the GPIB command "SANITIZE,1" to the analyzer. This command will erase the sectors of flash program memory that stores measurement data. This memory is loaded with measurement data through the use of the "STORE" GPIB command. This function is accomplished by performing a chip sector erase on the relevant sectors and followed with programming the security value, 0x55 (U), into all associated memory locations. Front panel LEDS will flash in sequence from left to right during the programming phase of the security value. When data clearing is complete, all front panel LEDS will transition to a constant "on" state. If the LEDS do not complete all transition states stated above, the data clearing should not be considered complete. Power the analyzer off for at least 30 seconds to clear volatile memory. This action can be repeated.

Level 2: SANITIZE

Level 2 sanitization is initiated by sending the GPIB command "SANITIZE,22" to the analyzer. The operational state of the analyzer can be restored by the customer without requiring the unit to be sent to the manufacturer. Contact Venable instruments to obtain the necessary software tools to restore firmware to a sanitized analyzer.

Instrument Memory (flash):

All sectors of flash program memory are erased except the sector that contains the analyzer configuration data. The configuration data consists of data that define the analyzer model and serial number, as well as interface address information. User configuration settings are also stored here. Sanitization is accomplished by performing a chip sector erase on the relevant sectors and followed with programming the security value, 0x55 (U), into all associated memory locations.

Front panel LEDs will be set to a constant state with every other LED in the "on" state during the erase phase. Front panel LEDS will flash in sequence from left to right during the programming phase of the security value.

Boot ROM (flash):

Application Firmware version 5.0 or later:

Erases all memory, except the files required for bootloading. Sanitization is accomplished by performing an erase of non-bootload sectors and followed with programming the security value, 0x55 (U), into all associated memory locations. Front panel LEDs will be set to a constant state with every other LED in the "on" state during the erase phase. Front panel LEDS will flash in sequence from right to left during the programming phase of the security value.

Application Firmware version 4.x or earlier:

Boot ROM is not erased. This area can only be written during a firmware update procedure, a process that loads data from a remote computer into the flash memory of the instrument.

Communications Processor (flash):

Writes the security value to Flash Blocks 0, 1, 2 and all of the Boot Block except for the bootstrap loader and sanitization routine in the first 384 bytes. Flash Block 3, which contains bootload code, is write protected and cannot be modified. Flash Block 3 can only be modified at the factory.

Digital Processor (flash): [Model 88xx only]

All sectors of flash program memory are erased, except the boot sector containing the bootload code. Sanitization is accomplished by performing a chip sector erase on the relevant sectors and followed with programming the security value, 0x55 (U), into all associated memory locations.

When sanitization is complete, all front panel LEDS will transition to a constant "on" state. If the LEDS do not complete all transition states stated above, the sanitization should not be considered complete. Power the analyzer off for at least 15 seconds to clear volatile memory.

Note: It is possible that the firmware update utility could be used to upload arbitrary data into any memory devices above. It is also possible, although extremely unlikely, that a specialized remote application could write data into free areas of the Flash via the instrument's ethernet interface. The procedures for doing this are not available to users, but could possibly be "hacked" by a highly skilled and determined individual. This would allow a small amount of arbitrary data to be concealed into areas of the memory devices.

Level 3: SANITIZE

Level 3 sanitization is initiated by sending the GPIB command "SANITIZE,333" to the analyzer. Sanitization using this level requires the analyzer to be sent to the manufacturer to be reloaded with firmware.

Instrument Memory (flash):

All flash program memory is erased. Sanitization is accomplished by performing a full chip erase and followed with programming the security value, 0x55 (U), into all associated memory locations. Front panel LEDs will be set to a constant state with every other LED in the "on" state during the erase phase. Front panel LEDS will flash in sequence from left to right during the programming phase of the security value.

Boot ROM (flash):

All Boot ROM is erased. Sanitization is accomplished by performing a full chip erase and followed with programming the security value, 0x55 (U), into all associated memory locations. Front panel LEDs will be set to a constant state with every other LED in the "on" state during the erase phase. Front panel LEDS will flash in sequence from right to left during the programming phase of the security value.

Communications Processor (flash):

Writes the security value to Flash Blocks 0, 1, 2 and the Boot Block. Flash Block 3, which contains bootload code, is write protected and cannot be modified. Flash Block 3 can only be modified at the factory.

NOTE: In the event that this does not meet your security requirements, the analyzer will need to be opened up and chip U3 on the main board, P/N 102027 will need to be removed. Perform this step after completing the level 3 sanitization. It is recommended that the chip be removed by cutting the pins near the top, closest to the chip, and leaving pins soldered to main board. Damage to main board will incur additional replacement cost.

Digital Processor (flash): [Model 88xx only]

All sectors of flash program memory are erased, *including the boot sector containing the bootload code*. Sanitization is accomplished by performing a chip sector erase on all sectors and followed with programming the security value, 0x55 (U), into all associated memory locations.

When sanitization is complete, all front panel LEDS will transition to a constant "on" state. If the LEDS do not complete all transition states stated above, the sanitization should not be considered complete. Power the analyzer off for at least 15 seconds to clear volatile memory.

How to send GPIB commands to the Analyzer

Turn on analyzer power. Wait for analyzer to finish boot up.

Connect USB cable to back of analyzer. Or, Connect GPIB cable for firmware version 1.x and skip to "Using National Instruments Tools".

If you are using Venable Software version 6.0 or later, refer to the section on "Using the Venable FRA Interactive IO Tool". Otherwise, refer to the sections for Keysight/Agilent or National Instruments Tools, depending on which driver set you are using.

Using the Venable FRA Interactive IO Tool (Venable S/W ver. 6 or later)

Open the Venable FRA Interactive IO tool from the Windows Start Menu. Enter the instrument Serial Number and select the Model number of the FRA. Click on the "Connect" button.

Venable FRA Interactive IO v1.2	×
Command to Send *IDN?	
Send Read Send and Read	Get F/W Version
	^
	~
Connect Serial Number:	375056
Disconnect Model: Compatible with Venable S/W 6.0 or later only	6305 👻

Wait for Output to say "Connected". Enter the Command to Send and then click on the "Send" button.

Using Keysight (Agilent) Tools

Open the Keysight/Agilent "Connection Expert" application. Select your instrument in the list.



Agilent Connection Expert File Edit View 1/0 Configuration Tools Help	
🥸 Refresh All 🛷 Undo 🔄 🍸 Properties 🔛 Interactive IO 📲 Add Instrument 📷 Add Interface	👶 Update Drivers 🗙 Delete
Task Guide X Instrument I/O on this PC	USB Instrument - 350c
Tasks for This Instrument Refresh All Refresh this instrument	An instrument on the USB bus
Change properties Cont (ASRLI)	Change Properties
instrument	VISA alias: USBInstrument3
Change the label Image the label Add a programming allas Image the label Ignore USBI:nstrument3 USBI:nstrument1 USBI:nstrument1	IDN string: VENABLE,350c,110002,3.0 Manufacturer: VENABLE Model code: 350c Serial number: 110002 Firmware: 3.0
General Tasks Refresh all	VISA address: USB0::0x7669::0x350C::110002::0:INSTR SICL address: usb0[30313::13580::110002::0] Address check: No Autor-identifier Yac
More Inform Agglent Interactive IO - CONNECTED TO USB0::0x7669::0x350C:: Image: Step Program Connect Interact Help Image: Step Program Image: Step Program Image: Step Program Step Program Image: Step Program Image: Step Program Image: Step Program	USB driver vendor: IVI Foundation, Inc USB Driver Help USB Driver Help USB Driver Help USB Driver Help

Click on "Interactive IO" tab, to open a communication window.

Enter the command into the Command box. Click on "Send Command" button.

(S) Stop	Device Clear	101 Read STB	SYST:ERR?	<u>छ</u> Clear History	ाः Options
Command:	_			•	Commands)
	Send Command	Read Re	sponse Se	nd & Read	
nstrument S	Session History:				
* Conne ->	ected to: USI	30::0x766	9::0x350C:	:110002::0::	INSTR
					1

Using National Instruments Tools

Open the National Instruments "Measurement & Automation Explorer" application. Open Devices and Interfaces on left panel and select GPIB.

S GPIB0 (GPIB-USB-HS) - Measurement &	ሂ Automation Explorer		
File Edit View Tools Help		n a la Black a construction d'Altra de la La Black	» (*******
Devices and Interfaces	🖬 Save 🔡 Revert 📸 Restor	e Defaults 🔍 Scan for Instruments 🛛 🚰 Interactive Control 🦷 NI Spy	/
GPIB0 (GPIB-USB-HS)	GP1B Interface properties can only be	e changed by an Administrator.	🔄 Back 🔛 🔺
🔔 Network Devices	Name	Value	
PXI PXI System (Unidentified)	Interface Information		GPIB Interface Basics
▷ Jy Serial & Parallel	GPIB Hardware Model	GPIB-USB-HS	Use the dran-down lists
D Survivare Survivare Survivare	Serial Number	012748B3	checkboxes, and text
p G nemote systems	Name or IP Address	Not Applica	GPIB board settings.
	🖻 General Settings		Select Save when the settings are correct or
	GPIB Interface ID	GPIB0 -	Revert to go back to the
	Primary Address	0	can also use the
	Secondary Address	None 🔻	to change the board
	System Controller	\checkmark	settings to a standard
	I/O Timeout	13 (10 sec] 💌	Changes to board
	Autopolling	\checkmark	settings do not affect
	Termination Settings		interface. You must
	Send EOI at End of Write	\checkmark	close all existing handles to this interface
	Terminate Read on EOS		before the settings are
	EOS Byte	0	Note By
	8-bit EOS Compare		default, you 🗸
	Set EOI with EOS on Write		
	🖻 Advanced Settings		
	H5488 Cable Length	0 (Disable 💌	GPIB Board
	Parallel Poll Duration	0 (2 usec) =	Settings
	Assert REN when SC		This section provides 🛛 🗉
	Bus Timing	2 (500 nse 💌	access to all GPIB board settings. Some settings
			such as Hardware Model
			for information only and
	Properties		while others such as
			Interface ID and

Click on the "Scan for Instruments" tab.

Venable Instruments

My System		- A A	D.C. H.			» 🙆 119 11
Devices and Interfaces	Save 🔛 Kevert	Restore	Defaults	Con for Instruments He Interactive Co	ontrol 🐂 NI Spy	N Hide H
GPIB0 (GPIB-USB-HS)	GPIB Interface propertie	is can only be	changed by	an Administrator.		🗧 Back 📰
🔔 Network Devices	Name		Value		^	
PXI PXI System (Unidentified)	🎫 Interface Informat	ion				GPIB Interface
卢 ᢖ Serial & Parallel	GPIB Hardware Mo	del	GPIB-US	5B-HS		Basics
Software	Serial Number		012748	B3		Use the drop-down lists, checkboxes, and text
🔋 Remote Systems	Name or IP Addres	s	Not App	olica		boxes to change the GRIB board settings.
	💼 General Settings					Select Save when the
	GPIB Interface ID		GPIBO	-		Revert to go back to the
	Primary Address		0	-	=	previous settings. You can also use the
	Secondary Address	;	None	*		Restore Defaults button
	System Controller		1			settings to a standard
	I/O Timeout		13 (10	sec] 🔻		set of values.
	Autopolling		1			settings do not affect
	📄 🖻 Termination Setting	js				open handles to this interface. You must
	Send EOI at End of	Write	1			close all existing handles to this interface
	Terminate Read on	EOS				before the settings are
	EOS Byte		0			Note By
	8-bit EOS Compare					default, you
	Set EOI with EOS o	n Write				
	Advanced Settings				-	
	Connected Instruments					CDIB Instrument
	Instrument	PAD	SAD	Identification		Settings
	Instrument 0	8	None	VENABLE,350c,090005,1.3		This section provides
						basic information about your instrument, such as
						Primary Address (PAD),
	•			III		(SAD), and response to

Double click the VENABLE instrument listed in "Connected Instruments" window.

	t <u>C</u> ommunicate with In:	strument 😫 Interactive Control 🛛 🧌 NI Spy	🧊 Hide
Interfaces and Interfaces GPIB0 (GPIB-USB-HS)	Name	Value	Back
 ■ Instrument 0 ■ Network Devices ■ PXI PXI System (Unidentified) ■ Software ■ Remote Systems 	Primary Address Secondary Address Identification GPIB Interface ID	8 None VENABLE,350c,090005,1.3 0	GPIB Instrument Basics What do you want t do? Communicate with n instrument Interactively control the GPIB Capture NI-488.2 ca Monitor GPIB activity
		NI-488.2 Communicator GPIB0 Instrument 0 Primary Ad	dress 8 lobals Status status teR
		Query Write Read Ib	err: None END
		Query Write Read b Configured	err: None END cntl: 24 Ros
		Query Write Read Ib Configured String Received:	TIMO END END RQS CMPL GPIB Instrument

Click on the "Communicate with Instrument" tab to open an NI-488.2 Communicator window.

Enter the command into the Send String box. Click on Write button.

NI-488.2 Communicator		×
GPIB0 Instrument 0 Primary	Address 8	
Send String:	Globals Statu: ibsta: 0x100 ERR TIMO	s
Query Write Read	iberr: None END	
Configured	ibentl: 6 SRQI	
Coningalea	RQS	
String Received:	CMPL	
	LOK REM	
	ATN TACS LACS	
Configure EOS Show Sample	Exit DCAS	

Contact Information

Venable Industries

8656 SH 71 West, Cuesta Centre — Bldg. E Austin, TX 78735

Phone: (512) 949-3100

Website: http://www.venableinstruments.com

Call our main phone number between 9am and 5pm (U.S. Central Time) and speak directly with a systems engineer for prompt problem resolution.