



# Agilent PXIe Embedded Controller M9036A

## User Guide



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Refer to manual for additional safety information.



Earth Ground.



Chassis Ground.



Alternating Current (AC).



Direct Current (DC).



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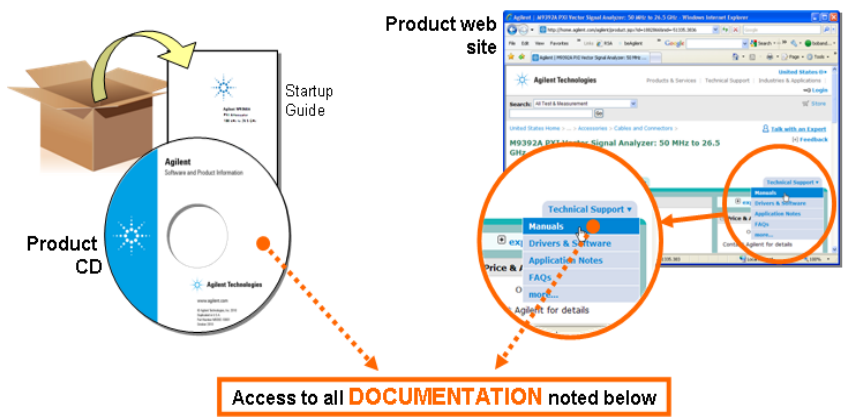
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# Documentation Map



## Startup Guide



- Unpack product
- Verify shipment
- Install software
- Install & connect hardware
- Verify operation

## Data Sheet



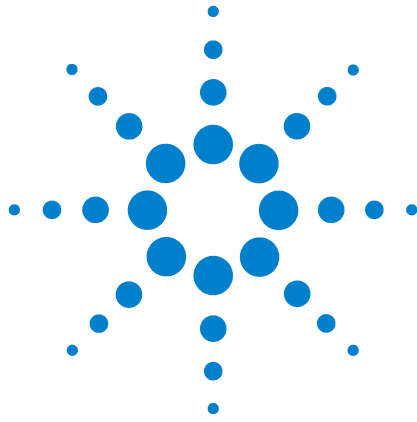
- Product description
- Technical specifications

## User Guide



- Setup and configuration
- Operating System
- Basic service including installing additional memory, replacing the hard drive, etc.





# 1 Introduction

Agilent's M9036A is a 3U PXIe Embedded Controller with a state-of-the-art Intel® dual core processor. It includes:

- Intel® Core™ i5-520M, 2.4 GHz processor
- 4GB (or optional 8GB) 1333 MHz DDR3 Memory\*
- 160GB SATA 2.5 inch solid state drive (SSD)
- Integrated IO on the front panel includes two Gigabit Ethernet ports, four USB 2.0 ports, 25-pin micro GPIB connector, ExpressCard 34, DVI-I video, etc.
- Front Panel SMB Trigger Connector used to route an external trigger signal (TTL level) to and from the PXI backplane with software trigger
- Preloaded with Agilent IO Libraries and your choice of either Microsoft® Windows 7® 32-bit or Windows 7® 64-bit Operating System
- IVI drivers for the Agilent M9018A 18-slot PXIe chassis are also pre-installed on the controller.

## Related Documentation

Because the operating system and drivers were installed at the factory and no additional drivers are required, no printed documentation other than this Startup Guide is supplied with the controller. A User Guide, detailed specifications, web links, etc., are found on the M9036A Product Information CD supplied with the controller. For the latest specifications, check the Agilent web site at: [www.agilent.com/find/M9036A](http://www.agilent.com/find/M9036A).

For the IVI driver, help file, program examples, etc. go to:

```
C:\ProgramFiles\IVI Foundation\IVI\Drivers\AgM9036
```

For the Soft Front Panel interface: from the Window's Start menu, select:

```
Start > All Programs > Agilent > M9036 PXIe Embedded Controller
```

You can also check the M9036A Product Information CD or check on the web for the latest driver and documentation.

\* The M9036A has two 240-pin, RDIMM sockets which support DDR3-1333 REG/ECC RAM sticks. Each socket can support memory modules up to 4GB for a total memory capacity of 8GB. The standard M9036A configuration is a single 4GB memory stick with a factory option to add a second 4GB memory stick. Note: The capability of addressing 4GB memory is operating system dependent. A 32-bit OS system may not be able to address the full 4GB memory space. To use the full 4GB/8GB memory, a 64-bit OS must be used.



## M9036A at a Glance

The following figure shows the front panel for the M9036A PXIe Controller. Detailed information about the module follows in this manual.

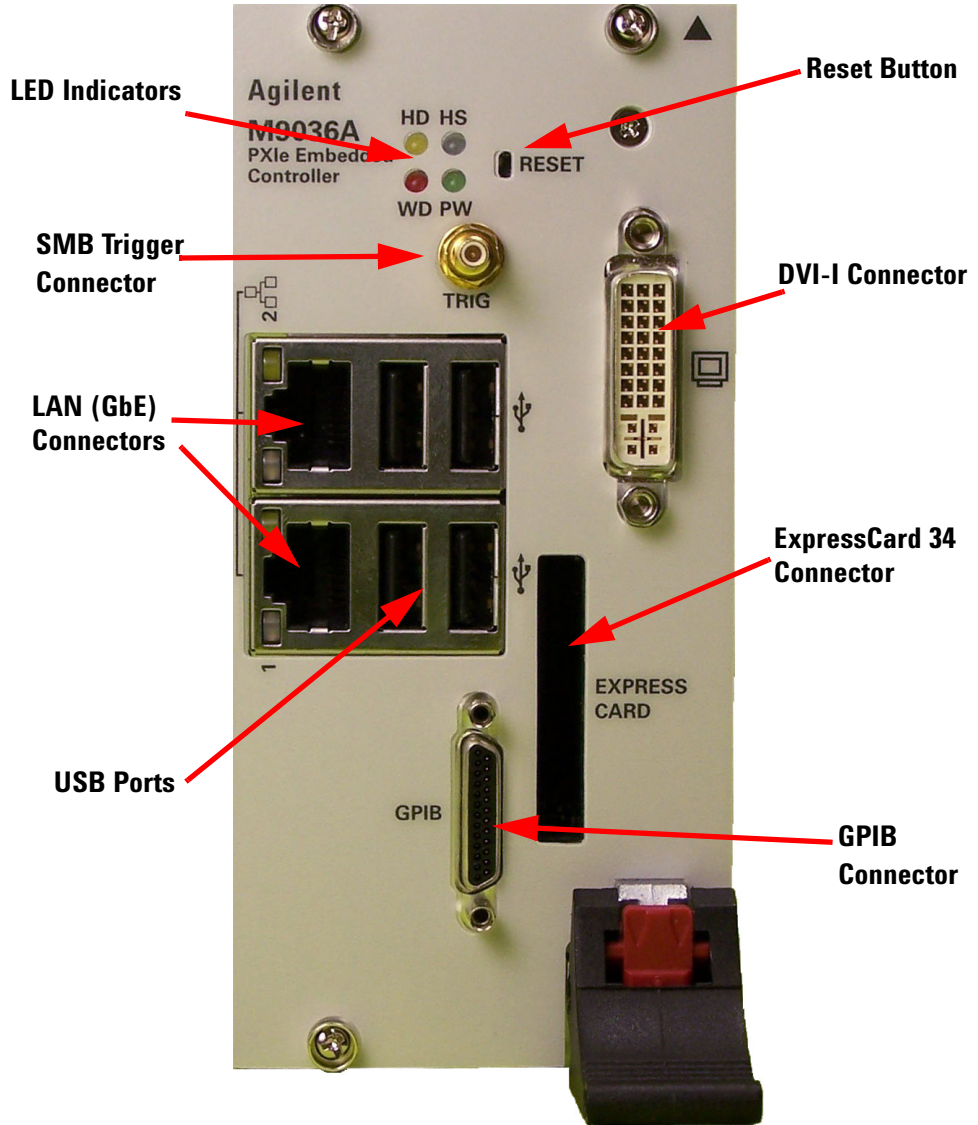


Figure 1 M9036A Embedded Controller Front Panel



## Front panel LED indicators

The following table lists the LEDs on the front panel and a brief description of their use and what they indicate.

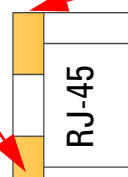
LED Indicator	Color	Description
HD (Hard Drive)	Yellow	When the hard drive is active, the LED will flash.
HS (System Status)	Blue	If the LED is on then turns off during system boot, then the system status is normal. If the LED keeps blinking or stays on, the system is malfunctioning.
PW (power)	Green	If the LED is on, the power supply to the controller is good and the system should boot.
WD	Red	Not used

### Gigabit Ethernet (GbE) connector LED

LED2: Speed and Link

1Gbps: Amber

100Mbps: Green



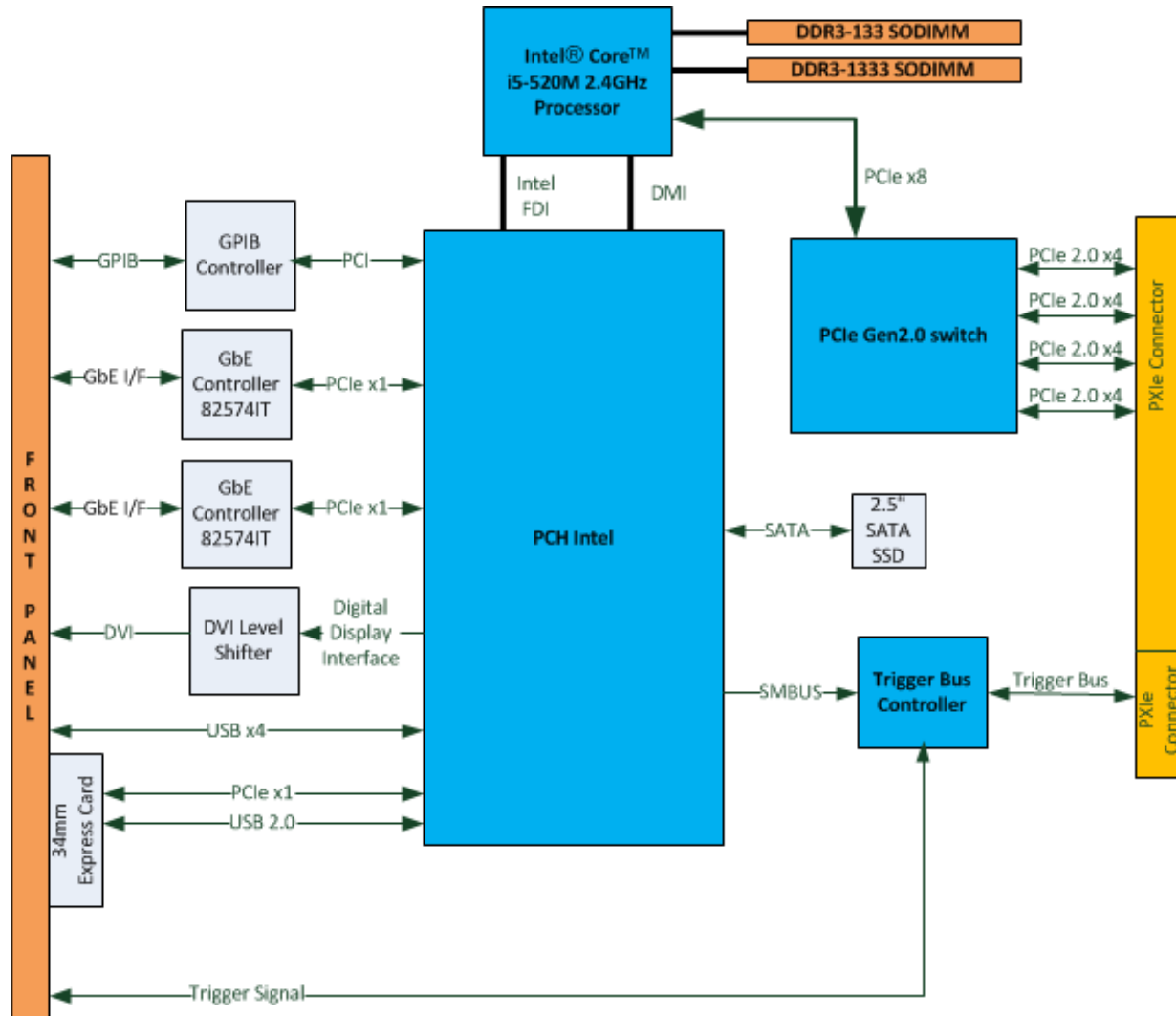
LED1: ACT

Blinking when accessing IO

1Gbps: Amber

LED	Status	Description
Active/Link LED (yellow)	Off	Ethernet port is disconnected
	On	Ethernet port is connected but no data transmission
	Flash	Ethernet port is connected and is transmitting/receiving data
Speed LED	Off	10Mbps
	Green	100Mbps
	Amber	1000Mbps

# M9036A Functional Description



Note: PCIe links are PCIe 1.0 unless otherwise noted

Figure 2 M9036A Embedded Controller Functional Block Diagram

## CPU, Memory and Chipset

By introducing Intel® dual core technology, the M9036A has two computing engines on a single processor, which can execute two independent tasks at the same time in a multi-tasking environment. Combining this superior performance with a variety of instrument platforms makes the M9036A an ideal solution for your hybrid PXIe-based testing system.

The M9036A is also specifically designed to deliver excellent durability and reliability. A large aluminum heat sink dissipates heat generated by CPU and other critical components uniformly to maintain a stable operating temperature.

### Processor

- Intel® Core™ i5-520M 2.4GHz processor
- DMI (Direct Media Interface) with 1 GB/s of bandwidth in each direction

### Chipset

- Mobile Intel® QM57 Chipset

### Memory

- Two standard 204-pin DDR3 SODIMM sockets
- Supports +1.5V DDR3, 1333 MHz RAM per socket (up to 8 GB total)
- Supports non-ECC, unbuffered memory

## Peripherals

### CMOS Backup Battery

Agilent's M9036A is equipped with a 3.0 V “coin cell” lithium battery. This battery runs the clock circuit and retains configuration memory is CMOS RAM while the system is turned off. For instructions on replacing the battery, refer to [“CMOS Battery Backup”](#) on page 35.

### Reset Button

The reset button is used to perform hard reset for M9036A. You can use a pin-like object to push the reset button.

## I/O Interfaces

### USB

Agilent's M9036A provides four USB 2.0 Type A ports on the faceplate. All USB ports are compatible with high-speed, full-speed and low-speed USB devices. The M9036A controller supports multiple boot devices, including USB flash drive, USB floppy, USB CD-ROM, etc. The boot priority and boot device can be configured in BIOS

### DVI-I Connector

The DVI-I connector connects the M9036A to a video monitor. DVI-I supports both digital (DVI) and analog (VGA) monitors. While connecting to an analog (VGA) monitor, you need to install the DVI-to-VGA adapter, which is shipped with the M9036A controller, on the DVI-I connector. DVI-I contains both the digital and analog connections, (DVI-D and DVI-A), it's essentially a combination of DVI-D and DVI-A video output within one connector (and cable).

The DVI-I output provides up to 1920x 1200 60 Hz resolution or up to 2048 x 1536 at 75Hz resolution

**DVI to VGA Adapter:** The DVI to VGA adapter (really DVI-A to VGA adapters) connects a regular VGA/SVGA monitor to the DVI-I connector on the controller module. A DVI-I connection from a video card or monitor will connect to a digital signal (DVI-D) and an analog signal (VGA) as well.

### Ethernet

- Dual Gigabit Ethernet controllers
- Two RJ-45 connectors with speed/link/active LED on the faceplate
- The upper RJ-45 connector on faceplate supports the wake on LAN function

### GPIB connector

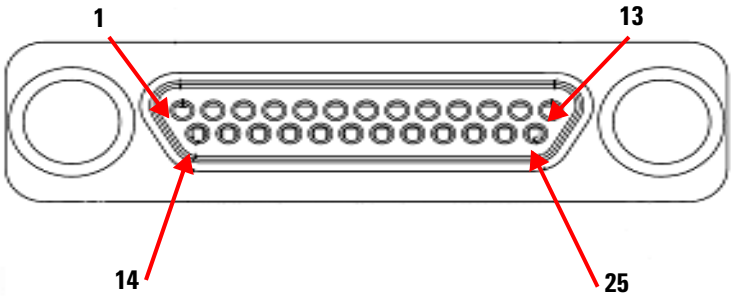
The GPIB connector on M9036A is a micro D-sub 25P connector and is used to control external bench-top instruments. You need the supplied GPIB adapter cable to connect instruments. The on-board GPIB controller has the following features:

- Fully compatible with the IEEE 488 standard
- Up to 1.5MB/s data transfer rates
- On-board 2 KB FIFO for read/write operations
- Connect up to 14 instruments
- GPIB is a standard VISA Resource

**NOTE**

Because there is no industry standard for the front panel micro D-sub 25-pin GPIB connector, interoperability cannot be guaranteed with other similar GPIB cables. A replacement adapter cable may be ordered from Agilent with the part number: M9036-31301.

The following table provides the pin-out of the front panel micro D-sub 25-pin GPIB connector.



Pin	Signal	Description	Pin	Signal	Description
1	DIO1#	GPIB Data 1	14	DIO5#	GPIB Data 5
2	DIO2#	GPIB Data 2	15	DIO6#	GPIB Data 6
3	DIO3#	GPIB Data 3	16	DIO7#	GPIB Data 7
4	DIO4#	GPIB Data 4	17	DIO8#	GPIB Data 8
5	EOI	End or Identify	18	REN	Remote Enable
6	DAV	Data Valid	19	Ground	Signal Ground
7	NRFD	Not Ready for Data	20	Ground	Signal Ground
8	NDAC	Not Data Accepted	21	Ground	Signal Ground
9	IFC	Interface Clear	22	Ground	Signal Ground
10	SRQ	Service Request	23	Ground	Signal Ground
11	ATN	Attention	24	Ground	Signal Ground
12	Chassis Ground	Chassis Ground	25	Ground	Signal Ground
13	Ground	Signal Ground			

Figure 3 shows the Agilent Connection Expert with the GPIB interface as a VISA resource connected to an Agilent 33220A Function Generator (VISA address is GPIB0::10::INSTR). Refer to the IO Libraries Suite documentation for general VISA programming information or your GPIB instrument documentation for specific VISA programming information.

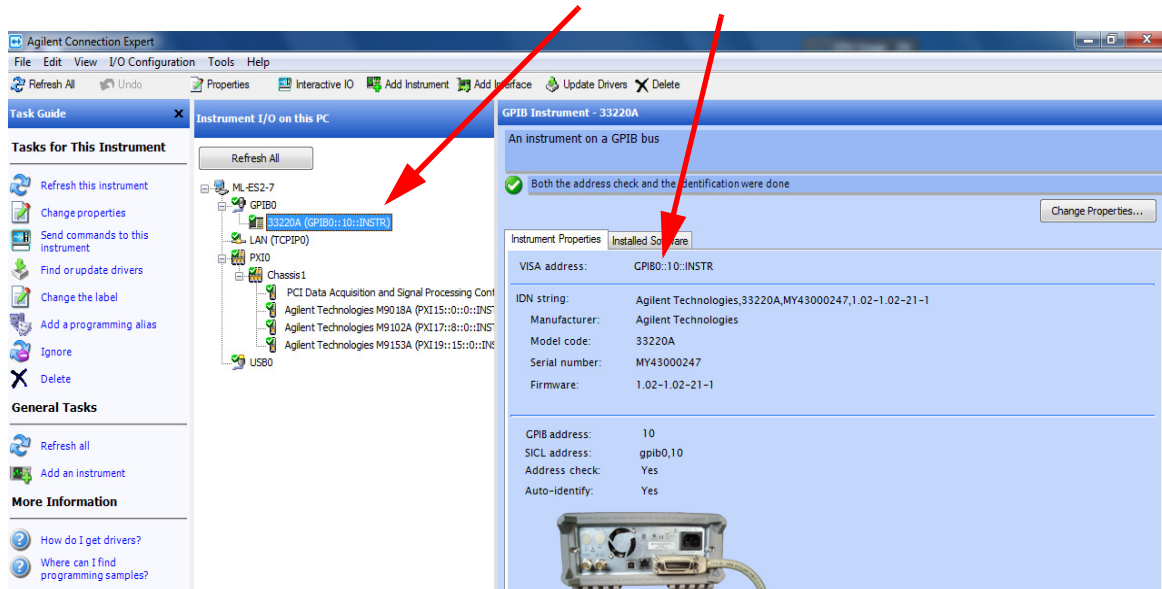


Figure 3 Agilent Connection Expert showing GPIB Interface as VISA Resource

### PXI trigger

The front panel PXI trigger connector is an SMB connector and is used to route an external trigger signal to or from the PXI backplane or from a software-generated trigger. Trigger signals are TTL compatible and edge sensitive. The M9036A provides the following trigger routing possibilities:

- From the front panel PXI trigger connector to a specified PXI backplane trigger bus line.
- From a selected PXI backplane trigger bus line to the front panel PXI trigger connector.
- From a software-generated trigger to a specified PXI backplane trigger bus line.
- From a software-generated trigger to the front panel SMB connector via a specified PXI backplane trigger bus line.

**Trigger IO functions** All trigger modes are programmable through the factory-installed IVI trigger driver (M9036). Please refer to the Trigger Driver help files for information on using the trigger functions. The help files are available on the M9036A Product CD supplied with your controller.

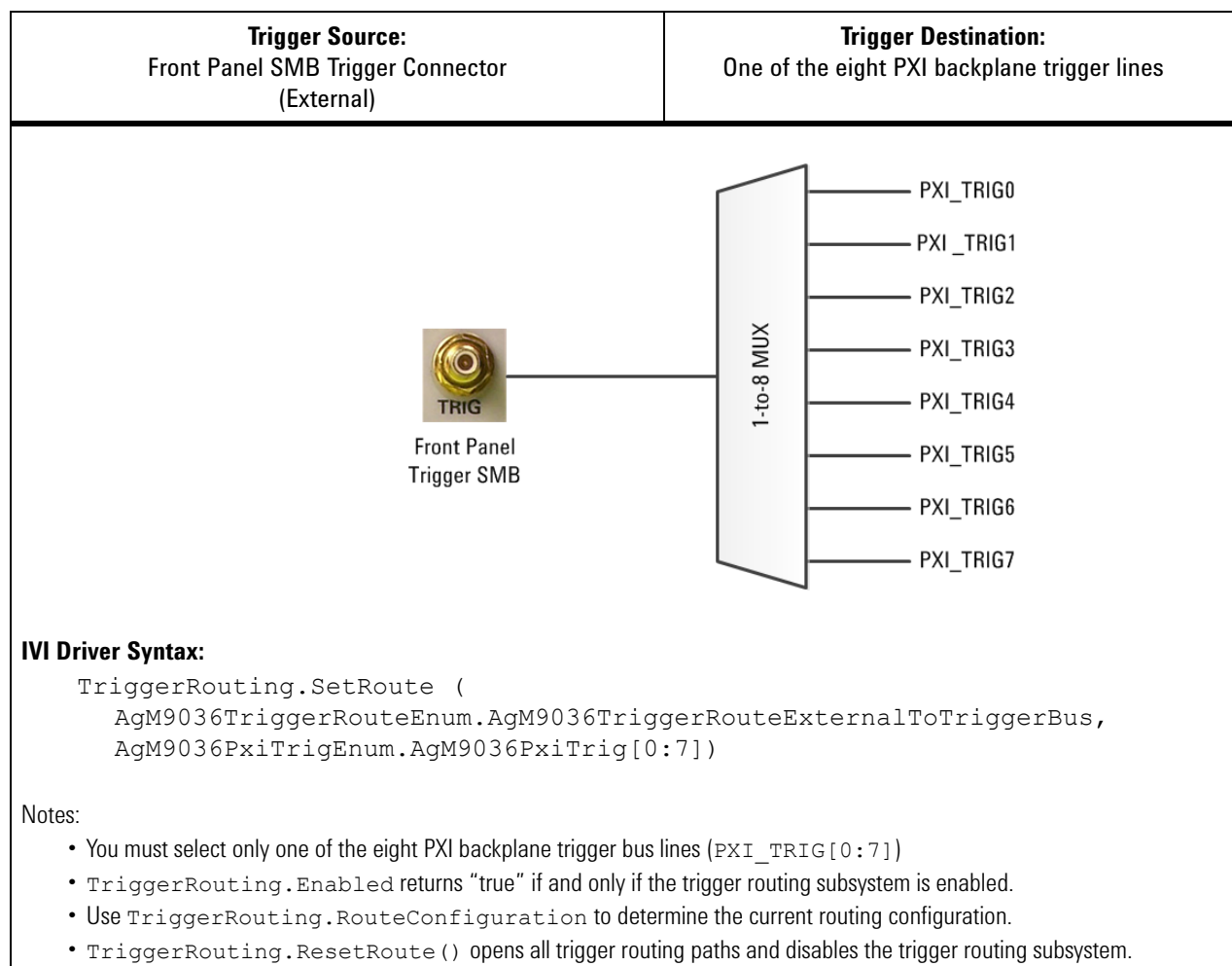
- The default trigger route (the path established at power on or at `ResetRoute`) has no internal connection to the front panel SMB connector and no connection to any of the PXI backplane trigger lines.
- If you read the current trigger routing (`GetRoute`) at power on or after executing a `ResetRoute`, it will return the string:  
`AgM9036TriggerRouteNone`.

- Trigger routes other than the four described above and in the following diagrams are invalid and result in an error. For example, you cannot route a trigger from one backplane trigger bus line to another backplane trigger bus line. Similarly, you cannot route a trigger sourced by the front panel SMB connector back to itself.

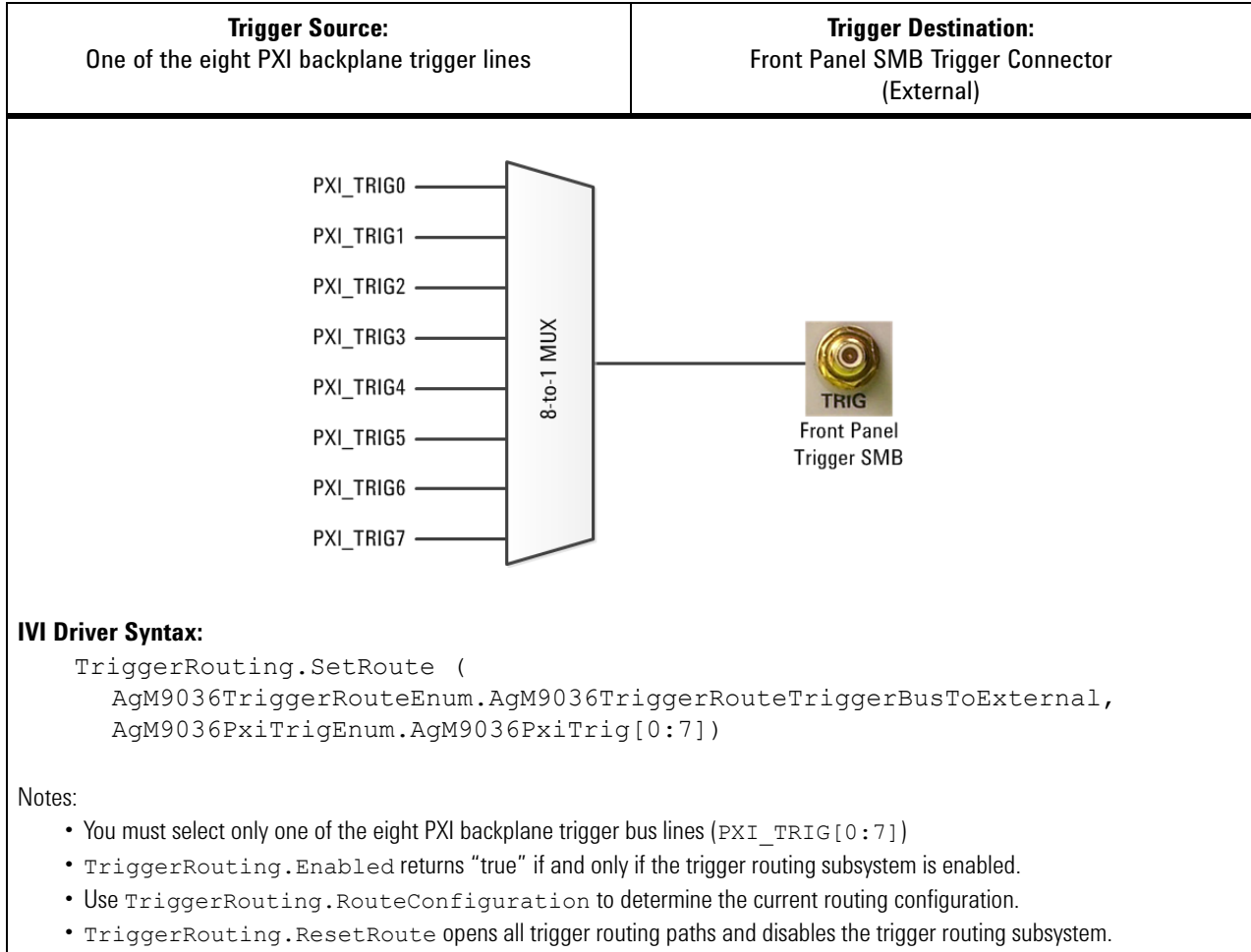
Refer to the following diagrams and explanations. Also, for an example program, refer to the IVI program examples; go to:

C:\ProgramFiles\IVI Foundation\IVI\Drivers\AgM9036

### Front panel SMB trigger connector to selected backplane trigger bus

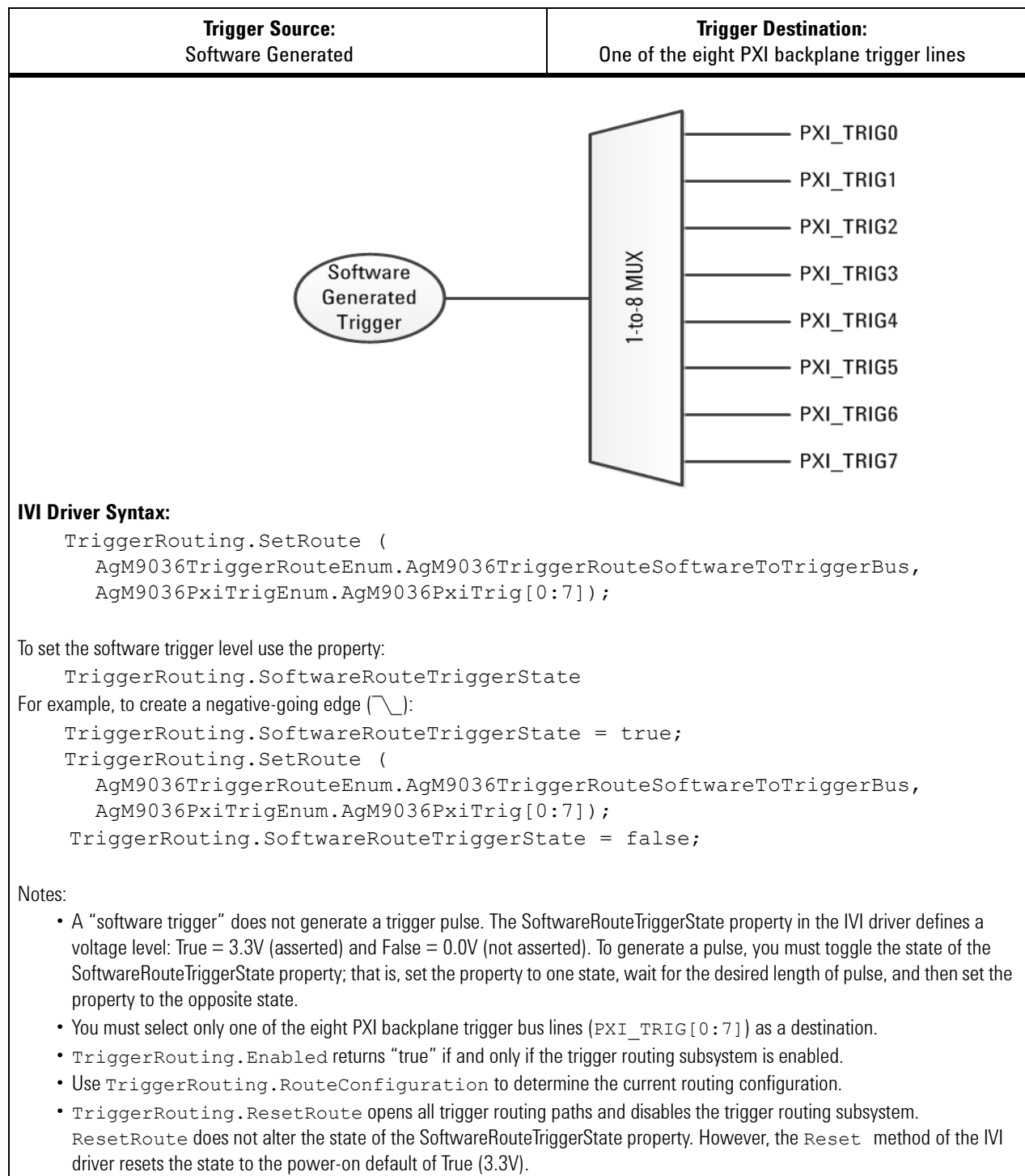


### Selected backplane trigger bus to front panel SMB trigger connector



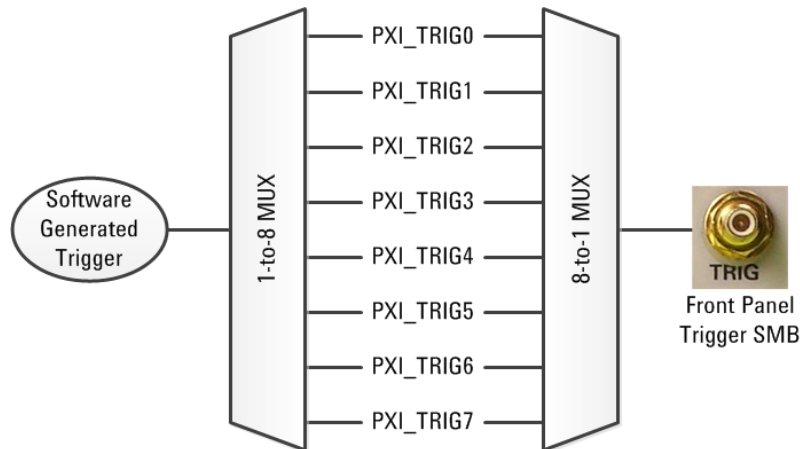


### Software generated trigger to selected backplane trigger bus



### Software generated trigger to selected backplane trigger bus and front panel SMB trigger connector

<b>Trigger Source:</b> Software Generated	<b>Trigger Destination:</b> One of the eight PXI backplane trigger lines <u>and</u> the front panel SMB trigger connector
----------------------------------------------	------------------------------------------------------------------------------------------------------------------------------



#### IVI Driver Syntax:

```
TriggerRouting.SetRoute (
    AgM9036TriggerRouteEnum.AgM9036TriggerRouteSoftwareToTriggerBusAndExternal,
    AgM9036PxiTrigEnum.AgM9036PxiTrig[0:7])
```

To set the software trigger level use the property:

```
TriggerRouting.SoftwareRouteTriggerState
```

For example, to create a negative-going edge (⌋):

```
TriggerRouting.SoftwareRouteTriggerState = true;
TriggerRouting.SetRoute (
    AgM9036TriggerRouteEnum.AgM9036TriggerRouteSoftwareToTriggerBusAndExternal,
    AgM9036PxiTrigEnum.AgM9036PxiTrig[0:7]);
TriggerRouting.SoftwareRouteTriggerState = false;
```

#### Notes:

- A "software trigger" does not generate a trigger pulse. The `SoftwareRouteTriggerState` property in the IVI driver defines a voltage level: `True` = 3.3V (asserted) and `False` = 0.0V (not asserted). To generate a pulse, you must toggle the state of the `SoftwareRouteTriggerState` property; that is, set the property to one state, wait for the desired length of pulse, and then set the property to the opposite state.
- You must select one of the eight PXI backplane trigger bus lines (TTL `TRIG[0:7]`). The software-generated trigger signal will be active on the selected backplane trigger bus line and thus available to any PXI module installed in the chassis. You cannot select only the front panel SMB trigger connector as a trigger destination without selecting one of the PXI backplane trigger bus lines.
- `TriggerRouting.Enabled` returns "true" if and only if the trigger routing subsystem is enabled.
- Use `TriggerRouting.RouteConfiguration` to determine the current routing configuration.
- `TriggerRouting.ResetRoute` opens all trigger routing paths and disables the trigger routing subsystem. `ResetRoute` does not alter the state of the `SoftwareRouteTriggerState` property. However, the `Reset` method of the IVI driver resets the state to the power-on default of `True` (3.3V).

## ExpressCard 34

The M9036A controller is equipped with an ExpressCard 34 slot on the front panel, which provides I/O expansion. An ExpressCard module is a small, modular add-in. ExpressCard 34 refers to one of two standard modules sizes (34 mm wide, the other size is 54 mm wide). The standard was developed by PCMCIA member companies from all parts of the PC card industry. The ExpressCard standard delivers high-performance, modular expansion to desktop, notebook, and embedded computers.

**Installing an ExpressCard** You can install an ExpressCard while the Agilent M9036 is operating. Agilent's M9036A will automatically recognize the ExpressCard. always insert the ExpressCard until it is firmly seated in the connector.

### NOTE

Some third-party ExpressCard modules may require additional drivers not supplied with the M9036A. Contact the ExpressCard vendor for driver information.

**Removing an ExpressCard** The ExpressCard connector has an automatic eject mechanism. To remove an ExpressCard, simply push in the module and then release. It should eject automatically.

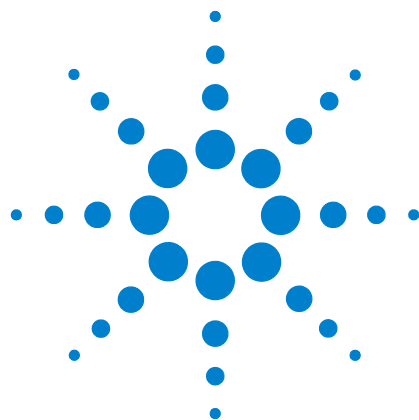
### CAUTION

To prevent potential data loss when removing an ExpressCard, always stop all communication with the module before removing it from the M9036A. In Microsoft® Windows®, you can use the Safely Remove Hardware utility.

## SATA port

The M9036A provides a SATA 2.0 port and is shipped with a pre-installed 2.5" 160GB SATA 2.5 inch solid state drive (SSD).





## 2 Controller Operating System

Your M9036A comes with the Windows Operating System of your choice (Windows 7<sup>®</sup> 32-Bit, or Windows 7<sup>®</sup> 64-Bit) preinstalled along with the latest version of Agilent's IO Libraries Suite (version 16.1 or later). This chapter provides some general system configuration and preventative maintenance procedures that you, the customer, are responsible for. In general, the M9036A operates as any other PC, including remote desktop access.

For more detailed information about the operating system, refer to the documentation provided by the operating system vendor.

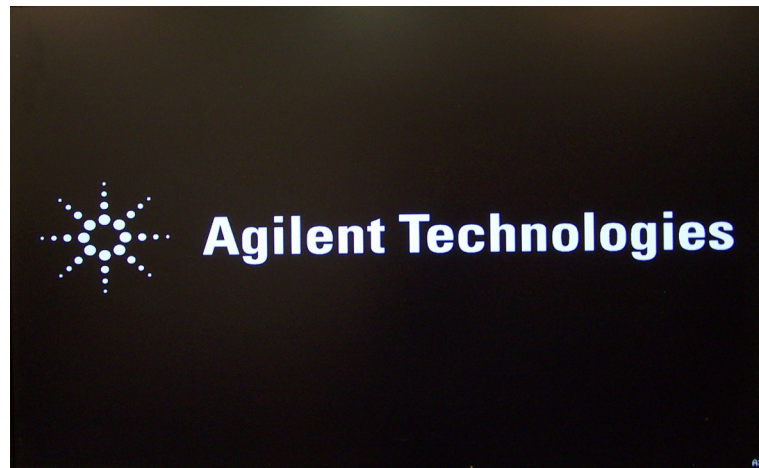
The M9036A controller supports USB CD-ROM drive, USB flash disk, USB external hard drive, or a USB floppy drive as the first boot device. Please refer to “[Accessing BIOS setup utility](#)” on page 25 for information about setting the boot devices. These devices should be configured, installed, and tested with the supplied drivers before attempting to load a new operating system.

Read any release notes and installation documentation provided by the operating system vendor. Be sure to read all the README files or documents provided by the vendor, as these typically note documentation discrepancies or compatibility problems.



## Controller Startup

After installing the M9036A controller in a PXIe chassis, press the chassis' power on button. After a few moments, the controller will beep indicating it passed its POST self tests. The following screen will display for a few moments:



**Figure 4** M9036A Startup Screen

Typically, you would allow the controller to run through its normal startup routine. However, at this screen, you can press the **DEL** key to enter the BIOS setup. Refer to [Chapter 3, “BIOS Setup”](#).

After a few moments, Microsoft® Windows® 7 starts.

### NOTE

Microsoft® Windows® 7 (either 32- or 64-bit version) is the only operating system installed on your M9036A. It includes a small system partition for the Agilent Recovery System. If you select this option, the Windows Boot Manager opens a menu with five selections:

- 1) Run ChkDisk
- 2) Recover the original factory system image
- 3) View troubleshooting documentation
- 4) Repair the system drive
- 5) Exit and restart the instrument.

Enter your selection and press the **OK** button. Follow the instructions on the screen.

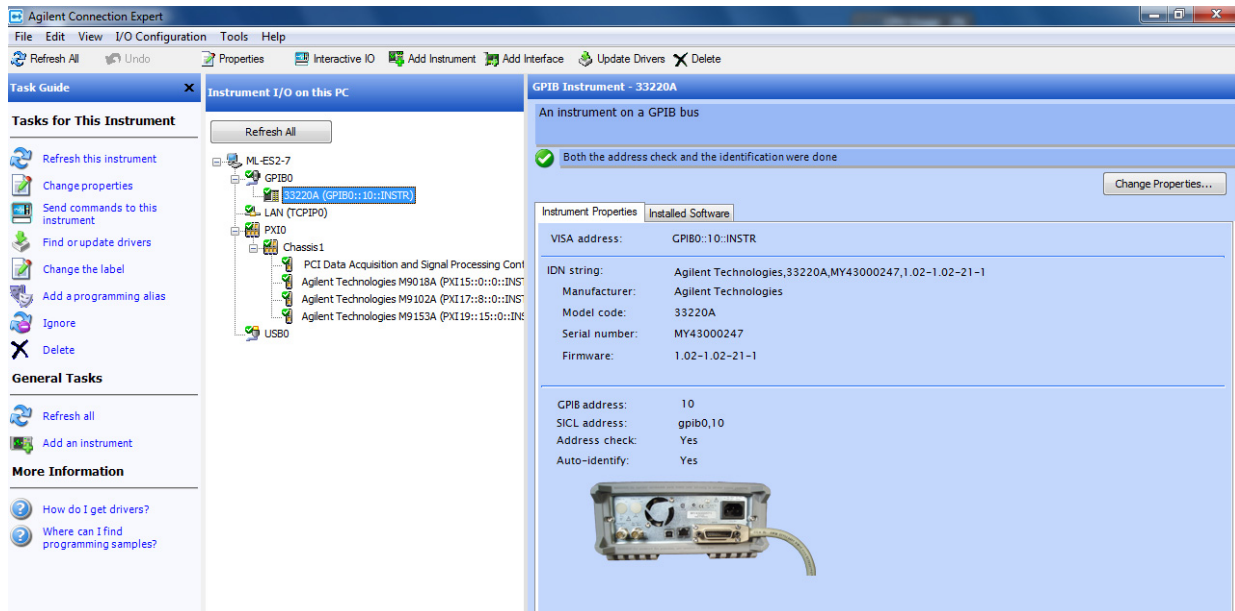
## Using Agilent Connection Expert

- 1 From the Windows Start button, select **All Programs > Agilent IO Libraries Suite > Agilent Connection Expert**. Alternately, you can double-click the IO control icon (Ⓜ) in the lower right Windows Notification area to run Agilent Connection Expert.



**Figure 5** Starting Agilent Connection Expert

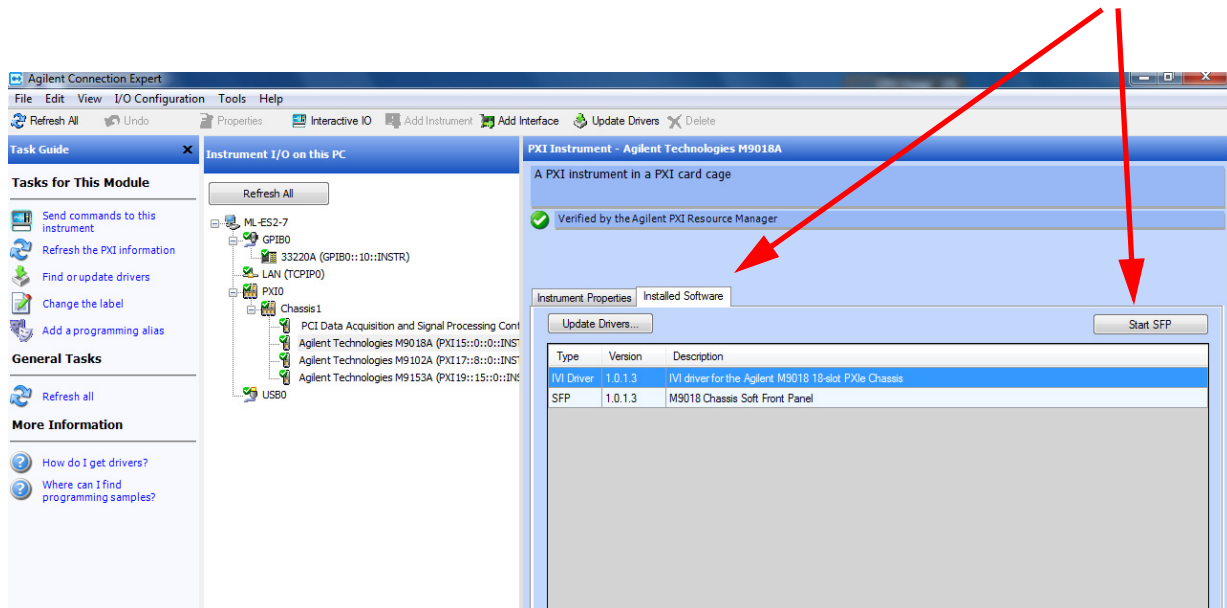
- 2 **Figure 6** below shows Agilent Connection Expert with the GPIB interface as a VISA resource connected to an Agilent 33220A Function Generator (VISA address is GPIB0::10::INSTR). Refer to the IO Libraries Suite documentation for information on using Connection Expert and general VISA programming information or your specific GPIB instrument documentation for specific VISA programming information.



**Figure 6** Agilent Connection Expert for a M9036A Embedded Controller



- 3 The **Instrument I/O on this PC** pane shows instrument connections on your controller. From here you can interact with the instruments in the chassis. For example, [Figure 7](#) shows the M9018A PXIe chassis is selected. Select the **Installed Software** tab in the right-hand pane. Then select the **Start SFP** button to initiate the Soft Front Panel software for the instrument (in this example, the chassis).



**Figure 7** Agilent Connection Expert LAN (TCP/IP0) Connection

## Windows® security

If your system is connected to the internet, you should take the following steps to ensure the operating system is protected:

- Use an internet fire wall
- Get the latest Windows® updates
- Install and use up-to-date antivirus software.

To check the status of, or make changes to, the security settings for your controller, open the Windows Security Center (Start > Control Panel > Security Center).

The default system setting is to automatically check for critical Windows Updates and notify you, if the controller has internet access. You can change the configuration of the Microsoft Automatic Updates to not notify you of updates, in which case you would need to manually update windows OS by accessing internet Explorer and from the Tools menu, select Windows Update.

### NOTE

Downloading and installing Windows Updates can be network and CPU intensive (impacting system performance) and some Windows Updates automatically reboot the controller. Therefore, windows updates should be performed when the system is not in normal use.

### NOTE

There is no antivirus or spy ware software included with your controller. Antivirus application software is the customer's responsibility. Having antivirus software installed may have a slight impact on system performance if your system uses intensive network data transfer.

## Hard drive

Over time, the information on the hard drive will become fragmented. Fragmentation can slow down your computer. Windows operating systems have a disk defragmentation utility that you can use to defragment the hard drive so it can work more efficiently. Access this utility from **Start > All Programs > Accessories > System Tools**.

### NOTE

All measurement applications should be closed prior to running the disk defragmentation utility. Measurement throughput will be significantly impacted while disk defragmentation is in process.

Two other utilities are also provided on Windows<sup>®</sup> operating systems. They are Check Disk and Disk Cleanup.

- Start Check Disk by going to **Start > My Computer** then right-click on the hard drive (C:) and select **Properties**. From the **Tools** menu, select **Check Now...** under the Error Checking section.
- Disk Cleanup starts from the **Start > All Programs > Accessories > System Tools**.

## User data backup

All user data should be regularly backed up to an external memory device. This can be done across a network or to a USB device. Your IT department may already have a backup strategy which is suitable for the system and data. Also, user data back up must be done just prior to sending the controller back to Agilent for service.

The Windows operating system supplied with your M9036A is licensed for use on the hard drive mounted to the controller. If the hard drive is replaced, you may be responsible to purchase or relicense the operating system.

## Chassis shutdown

As with any PC, Windows-based instruments should not be shut down by either turning off the power via an external power source or by pulling the power plug out from the rear panel. This could corrupt the operating system. The only approved way to shut down the controller is to execute the Windows shut down process which turns off the chassis.

## Things not to do

As with any PC, there are several system-level settings and files that you should not change, move, or delete as this could cause a number of difficulties.

## Windows<sup>®</sup> Registry

Do not manually make any changes to the registry unless you know exactly what you are doing. Making changes to the registry could affect the controller's ability to boot-up, execute programs, and display desired information.

## Application software

Do not remove files under the **C:\Program Files** folder by any means other than using the Add or Remove Programs utility found on the Control Panel. Do not remove any software application that was preinstalled by Agilent, even using the Add or Remove Program Utility, unless you are instructed by Agilent to do so while performing an update.

## Display Settings

Do not change any of the settings on Settings tab of the Display settings window.

## SSD Drive

Do not repartition the SSD drive or rename any of the existing partitions. Doing so could cause the controller to either not have the disk space required or not be able to find needed data.

## Software application licenses

Some software applications require a license to use to the software. For security reasons the licensing mechanism often uses a composite HostID which depends on several system identifiers. A change to any of these identifiers may result in invalidating the licenses on that system. In general, you can retrieve “lost” Agilent software licenses at any time on the Agilent Software Licensing system (ASL) web site at <http://www.agilent.com/find/softwarelicense>. You will need the license order number and certificate number as well as a valid login and password.

If either of the following occurs, you will need to verify and possibly reissue the license.

- The hard drive is reimaged, replaced, or corrupted.
- The controller motherboard is replaced or the primary (system) BIOS serial number has changed.

For more information, refer to the software application documentation.

## Microsoft® Operating System Licensing

You are responsible of licensing the OS on this computer. The Windows operating system supplied with your M9036A is licensed for use on the hard drive mounted to the controller. If the hard drive is replaced, you may be responsible to purchase or relicense the operating system.

## Updating Drivers

Periodically check the M9036A web page ([www.agilent.com/find/M9036A](http://www.agilent.com/find/M9036A)) for any updated drivers (graphics driver, IVI or LabVIEW Trigger Subsystem driver, etc.). Instructions for updating the drivers are on the web.

Note that if you update the IVI Trigger Subsystem driver, the driver may be out of sync with the trigger driver fundamental (provided by ADLINK Technology). To correct this problem:

- 1 First, run the latest Agilent installer file.
- 2 Use the Windows Uninstaller (**Start > Control Panel > Programs and Features**) to uninstall the ADLINK PXI Trigger I/O Driver Ver.x.x.x.
- 3 In Windows Explorer, go to:  
C:/Program Files (x86)/Agilent/M9036/BIN (Windows 64-bit)  
or  
C:/Program Files /Agilent/M9036/BIN (Windows 32-bit)
- 4 Execute **AdlinkTrig\_Setup.exe**. Use all of the default installation options. This installs the latest ADLINK trigger driver fundamental.

## Changing and Restoring the PCIe Link Configuration

*PCIe link configuration* refers to how the PXIe chassis (such as the M9018A) PCIe Switch Fabric is configured to connect PCI Express signals between slot 1, the system controller slot, and the other chassis slots. For a review of the supported PCIe link configurations, please refer to the M9018A User Guide (supplied with the M9018A chassis and available on the web at [www.agilent.com/find/M9018A](http://www.agilent.com/find/M9018A)).

The M9018A chassis ships from the factory in “2-Link Configuration: 1x8”. This configuration, referred to as 1x8, provides one x8 PCIe link from the system controller slot to the PCIe Switch Fabric. This link can be routed by the PCIe Switch Fabric to the chassis slots as either x4 or x8 links.

The other supported PCIe link configurations are:

- **2-Link Configuration: 2x8** – Referred to as 2x8, this configuration provides two x8 links from the system controller slot to the PCIe Switch Fabric. Link 1 can be routed by the PCIe Switch Fabric to slots 2-9, while Link 2 can be routed to slots 10-18.

- **4-Link Configuration: 4x4** – Referred to as 4x4, this configuration provides four x4 links from the system controller slot to the PCIe Switch Fabric. Link 1 can be routed by the PCIe Switch Fabric to slots 10-14, Link 2 can be routed to slots 15-18, Link 3 can be routed to slots 2-5, and Link 4 can be routed to slots 6-9.

If your system design requires another PCIe link configuration, such as 2x8, you'll need to use the chassis **Configurator** utility to change the PCIe Switch Fabric from 1x8 to 2x8.

**NOTE**

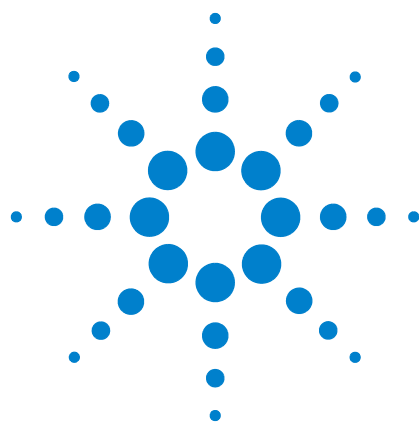
If you want to configure the chassis PCIe Switch Fabric to 2x8, you must have the latest chassis firmware.

**CAUTION**

Once the chassis configuration process begins, it is very important that the process be allowed to run to completion. Any interruption of the configuration process will leave the chassis PCIe Switch Fabric in an indeterminate state, and will require multiple power cycles of the chassis and multiple reboots of the computer to restore operation (which will be to the 1x8 factory default PCIe Switch Fabric). To ensure that the chassis configuration process runs to completion, perform the following:

- 1 Disable the Windows power management Sleep and Hibernate modes so that your computer doesn't power down during the configuration process.
- 2 Do not turn your M9036A Controller off nor terminate the **Configurator** program while it is reconfiguring the switch fabric.

If the configuration process is interrupted, see section [Restoring operation after an interruption of the configuration process](#) in the M9018A User Guide for information on how to restore your system to an operating state. The User Guide was supplied with the M9018A chassis and available on the web at [www.agilent.com/find/M9018A](http://www.agilent.com/find/M9018A)



## 3 BIOS Setup

### Starting the BIOS

The Basic Input/Output System (BIOS) is a program that provides a basic level of communication between the processor and peripherals. In addition, the BIOS also contains code for various advanced features applied to the M9036A controller. The BIOS setup program includes menus for configuring settings and enabling M9036A controller features.

#### CAUTION

Changing BIOS settings may lead to incorrect controller behavior and possibly an unbootable controller. If this happens, follow the instructions in “[Clear CMOS \(JP1\)](#)” on page 34 to clear CMOS and then restore the default settings. In general, do not change a BIOS setting unless you are absolutely certain of what it does.

### Accessing BIOS setup utility

To start the BIOS setup program:

- 1 Power on or reboot your M9036A controller.
- 2 Press the <Delete> key when the controller beeps. This should be concurrent with the main startup screen. The BIOS setup program loads after a short delay.

The Main BIOS setup menu, [Figure 8](#), is displayed when you first enter the BIOS setup program.

Use the following keys to navigate through the BIOS setup program:

- ←, → - Use the left/right arrow keys to move between the different setup menus.
- ↑, ↓ - Use the up/down arrow keys to move between the options within a setup menu.
- <Enter> - Use this key to enter a submenu or display all available settings for a highlighted configuration option.
- <Esc> - Use this key to return to the previous menu. This key serves as a shortcut to the Exit menu when user is at the top-level menus.

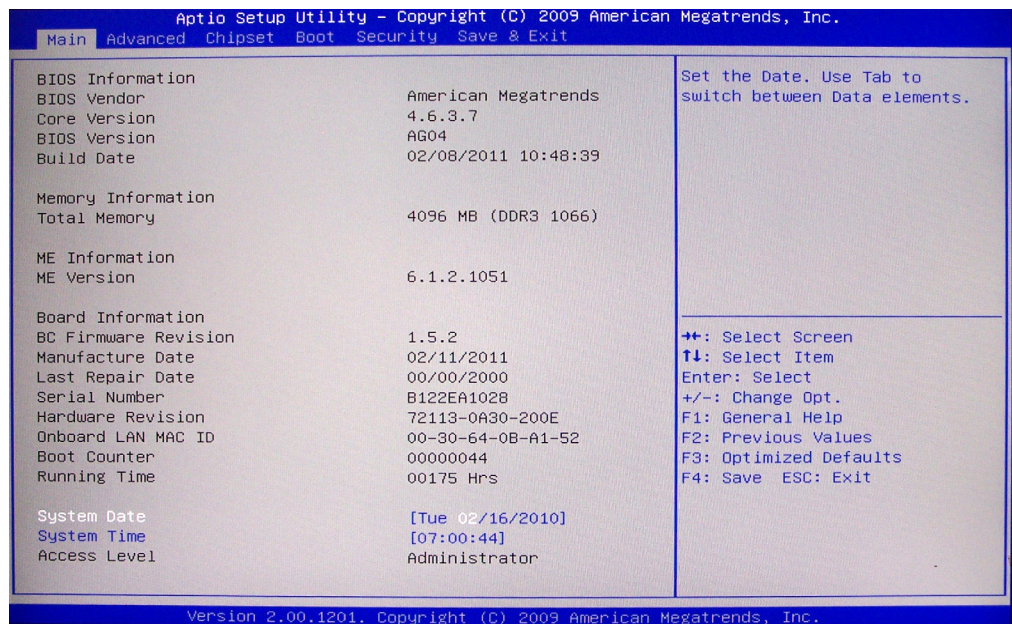




- <+> and <-> - Use these keys to cycle between all available settings for a selected configuration option.
- <Tab> - Use this key to select time and date fields.
- <F1> - This key opens the general help window for the BIOS.
- <F2> This key loads previous values into the BIOS.
- <F3> - This key restores default values into the BIOS.
- <F4> - this key saves the current configuration and exits the BIOS setup.
- <F9> - Use this key to load the optimal default BIOS settings.

## Main Setup Menu

The Main setup menu reports some basic information of controller:



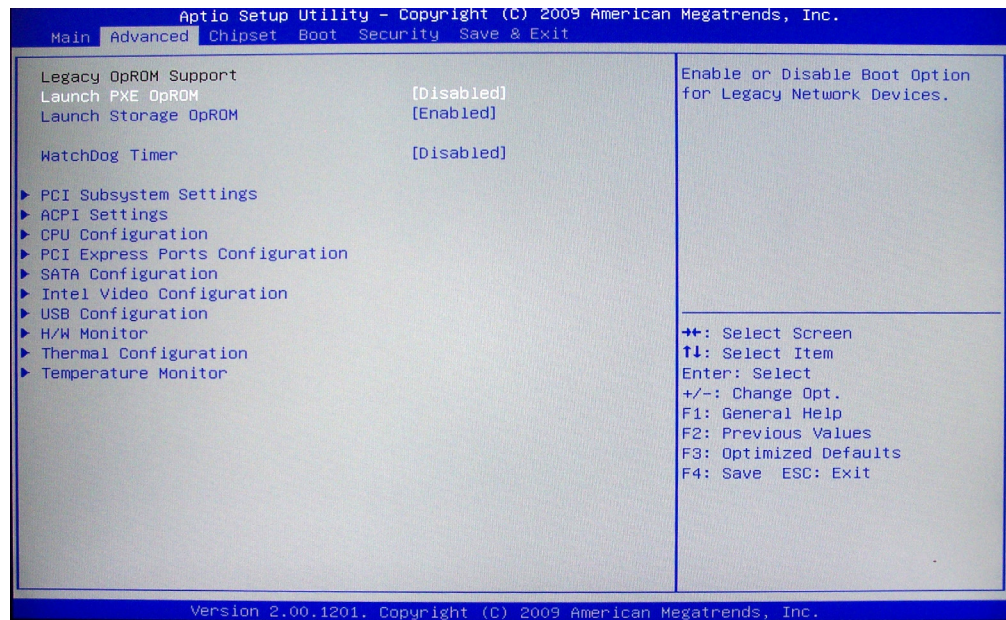
**Figure 8** Main BIOS Setup Menu

- BIOS Information - This item includes the BIOS version and the date on which the BIOS was built.
- Memory Information - This item shows the memory size, type and speed detected by the BIOS.
- ME Information - This value indicates the version of management engine.
- Board Information - Such as hardware revisions and serial number.
- From this screen you are able to set the system date and time.



## Advanced Setup Menu

Select the Advanced Setup Menu to obtain information such as processor configuration, SATA configuration, PCI subsystem settings, etc. You should not need to alter the configuration. Many items have submenus.

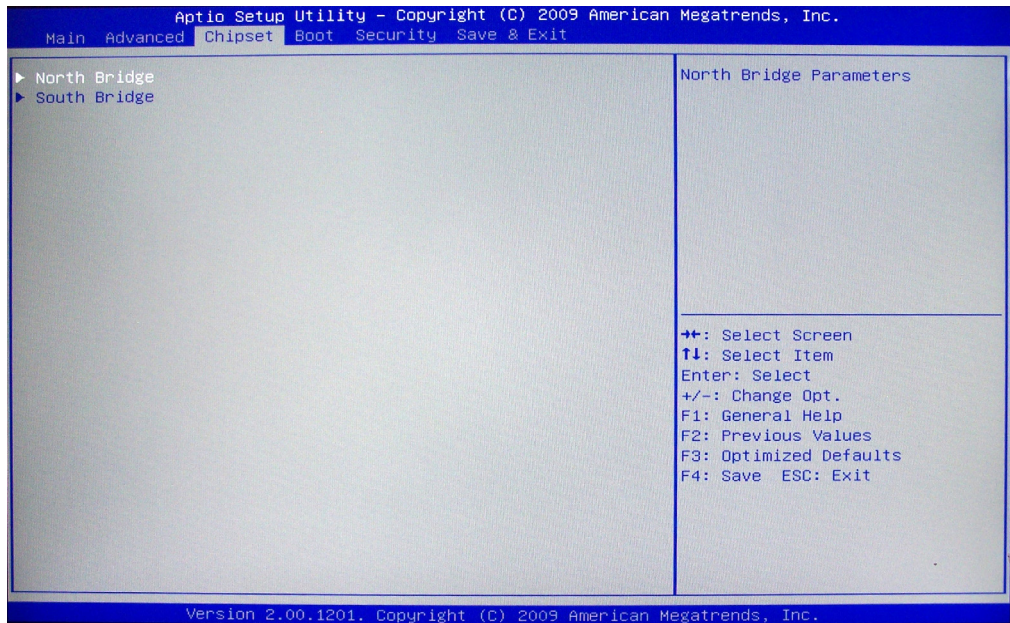


**Figure 9** Advanced BIOS Setup Menu

- PXE OpROM - enables or disable the legacy network device (default is Disabled)
- Launch Storage OpROM - Enables/disables the option for Legacy Mass Storage Devices with option ROM (default is Enabled).
- PCI Subsystem Settings - This item allows you to view and configure the PCI and PCIe Subsystem settings.
- ACPI Settings - Enables/disables the AXCIPI auto configuration (default is Disabled).
- CPU Configuration -- displays the processor type, speed, system bus speed, etc.
- USB Configuration - provides USB support and lists the devices attached to the USB port (keyboard, mouse, and one hub).
- H/W Monitor - displays the voltages on the backplane connector (+3.3V, +5.0V, +12V, 5VSB, and Vbat).
- Temperature Monitor - The controller has two temperature sensors, one for the system temperature and one for the CPU temperature. This allows you to view the current operating temperature inside the controller.

## Chipset Setup Menu

The setup menu includes some functions related with the North and South Bridge:

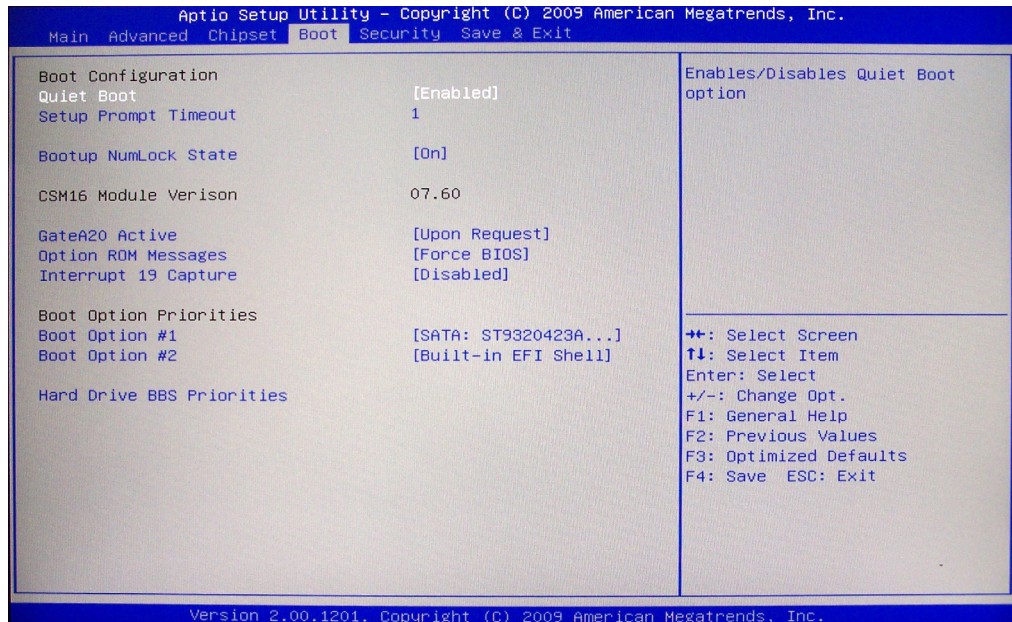


**Figure 10** Chipset Setup Menu

- The North Bridge Configuration provides memory and PCIe compliance information.
- The South Bridge Configuration provides SMBus, GbE Controller, Wake on LAN, Audio, USB Configuration, and PCIe Ports Configuration information.
  - SMBus Controller-User can enable/disable the SMBus controller.
  - SMBALERT# Wake-This setting enables or disables a System Management device's ability to wake a powered off system by asserting the ALERT# signal. The default value is Disabled.
  - PXIe Backplane Wake#-This setting enables or disables a PXIe peripheral module's ability to wake a powered-off system. The default value is Disabled.

## Boot Setup Menu

Boot setup allows you to configure your system boot settings. For example, you can select SATA or USB device as the boot device in BIOS from this menu.



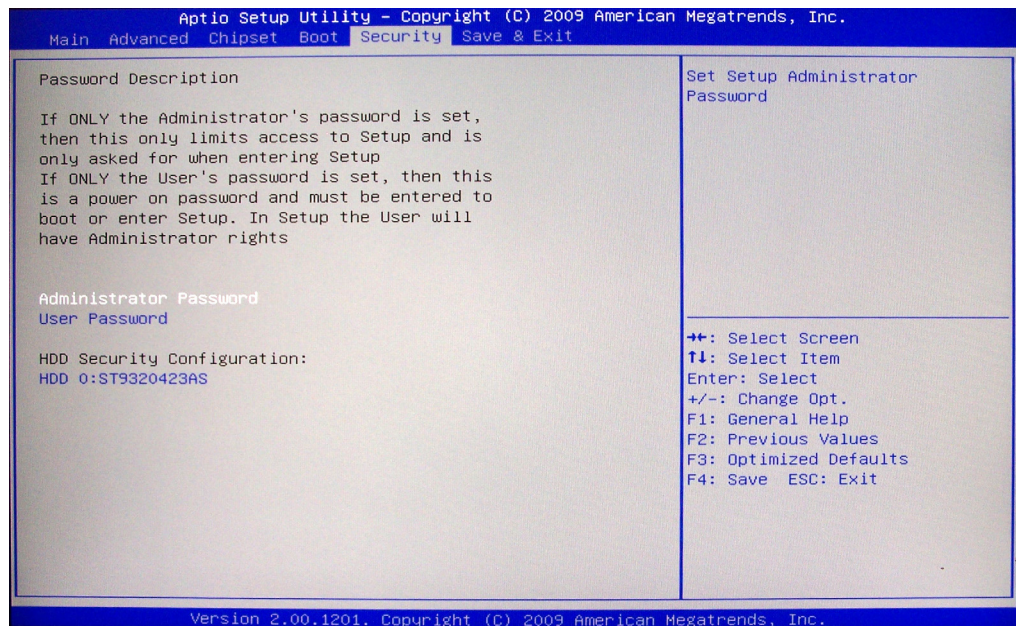
**Figure 11** Boot Setup Menu

- Quiet Boot - Disable to view POST messages. Default is Enabled.
- Boot Option #1,#2 - This option allows you to select the priority of boot options.



## Security Setup Menu

This option allows you to specify both Administrator and User Passwords. If you use both passwords, the Administrator password must be set first. The system can be configured so that all users must enter a password (either Administrator or User) every time the system boots or when Setup is executed. Administrators and User passwords activate different levels of security.



**Figure 12** Security Setup Menu

- If you use the passwords, you will be prompted for a three to twenty character password. As you type the password, it is not displayed on the screen.

### NOTE

Make certain that you record the passwords. Passwords are not recoverable. If you lose the passwords, you must erase the NVRAM and reconfigure.

- User Passwords sets a user level password for the BIOS.
- Administrators Passwords sets an administrative level password for the BIOS.

## Save and Exit Setup Menu

This option allows you to:

- Save your changes to the BIOS configuration and then exit to Windows 7
- Discard changes and exit to Windows 7
- Save changes and Reset (reboot) the system
- Discard changes and Reset (reboot) the system
- Save changes and continue BIOS configuration
- Discard changes and continue BIOS configuration
- Restore the default values for all setup options (see Note below)
- Save the current configuration as your user default
- Restore to your last saved user default
- Boot override allows you to bypass the configuration and boot immediately from the selected device.

### NOTE

The “Restore the default values for all setup options” selection does not restore the original boot priority sequence. You must use the Boot Setup Menu (see “[Boot Setup Menu](#)” on page 29) to manually restore the boot priority sequence.

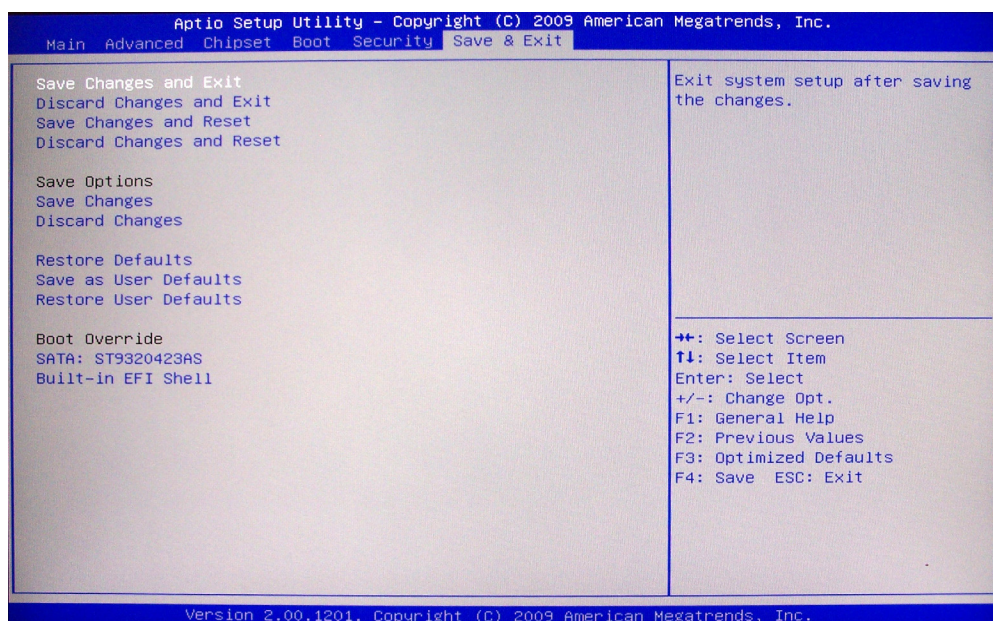


Figure 13 Save and Exit Setup Menu





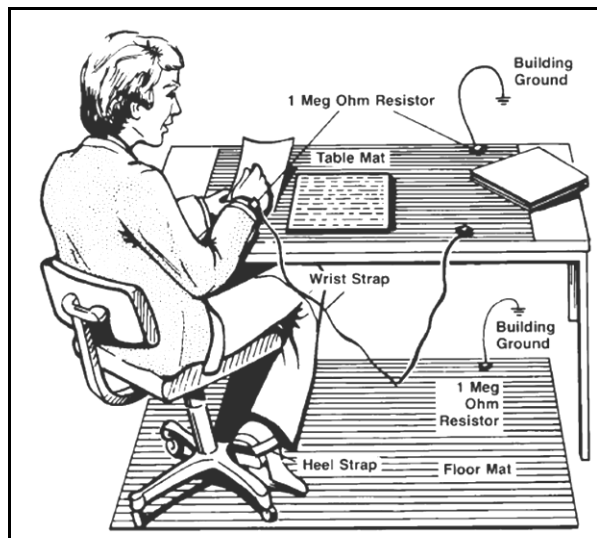
## 4 Service

Agilent's M9036A PXIe Embedded Controller has some user serviceable parts. In general, you should not need to change switch settings. Always observe Electrostatic Discharge precautions.

### Electrostatic Discharge

Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe work station. The following figure shows an example of a static-safe work station using two types of ESD protection. Purchase acceptable ESD accessories from your local supplier.

- Conductive table-mat and wrist-strap combination.
- Conductive floor-mat and heel-strap combination.



Both methods, when used together, provide a significant level of ESD protection. Of the two, only the table-mat and wrist-strap combination provides adequate ESD protection when used alone. To ensure user safety, the static-safe accessories must provide at least 1 M $\Omega$  of isolation from ground.



## Controller Switch Settings

There are no user-accessible switches on the M9036A controller.

### Clear CMOS (JP1)

If you encounter an abnormal condition that causes M9036A to halt or fail to boot, clear the CMOS and restore the controller BIOS to its default settings. To clear the CMOS:

- 1 Shut down the controller operating system (see “Chassis shutdown” on page 21). Turn off the PXIe Chassis.
- 2 Remove the M9036A Embedded Controller from the chassis. Observe all anti-static precautions.
- 3 Remove CMOS battery Backup. Refer to “CMOS Battery Backup” on page 35. After a few moments, re-install the CMOS backup battery
- 4 Locate the JP1 jumper on the board. Move the jumper from Normal to Clear (short pin#2 and pin#3). Refer to Figure 14 below.
- 5 Install the controller back into the PXIe chassis.
- 6 Power on the chassis and **immediately** depress the Reset button on the controller front panel (**before** the monitor displays anything).
- 7 After the operating system starts, shut down the controller operating System and turn off the PXIe chassis.
- 8 Once again, remove the M9036A Embedded Controller from the chassis.
- 9 Restore jumper JP1 to the Normal position (short pin#1 and pin#2).
- 10 Reinstall the controller in the PXIe chassis and power it up.

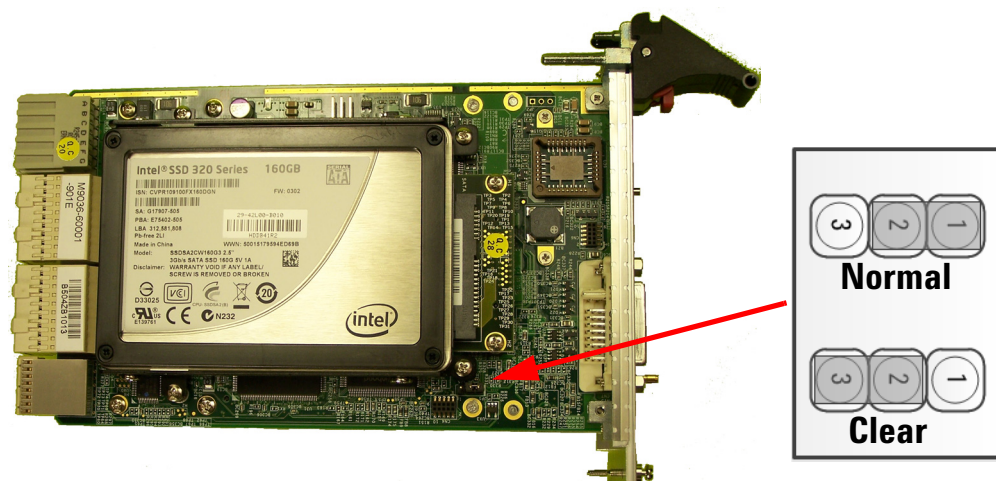


Figure 14 Clear CMOS Jumper JP1



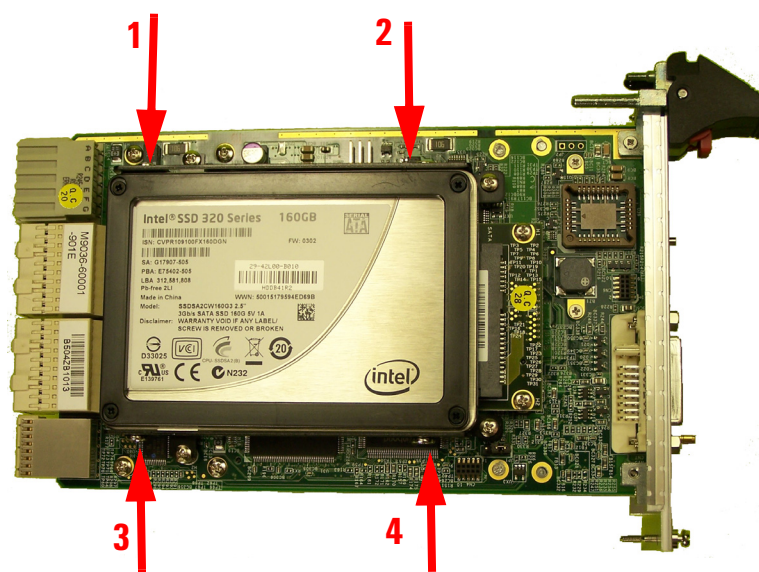
## CMOS Battery Backup

The M9036A is provided with a 3.0 V “coin cell” lithium battery. To replace the battery, proceed as follows:

**CAUTION** Always observe ESD precautions. See “[Electrostatic Discharge](#)” on page 33.

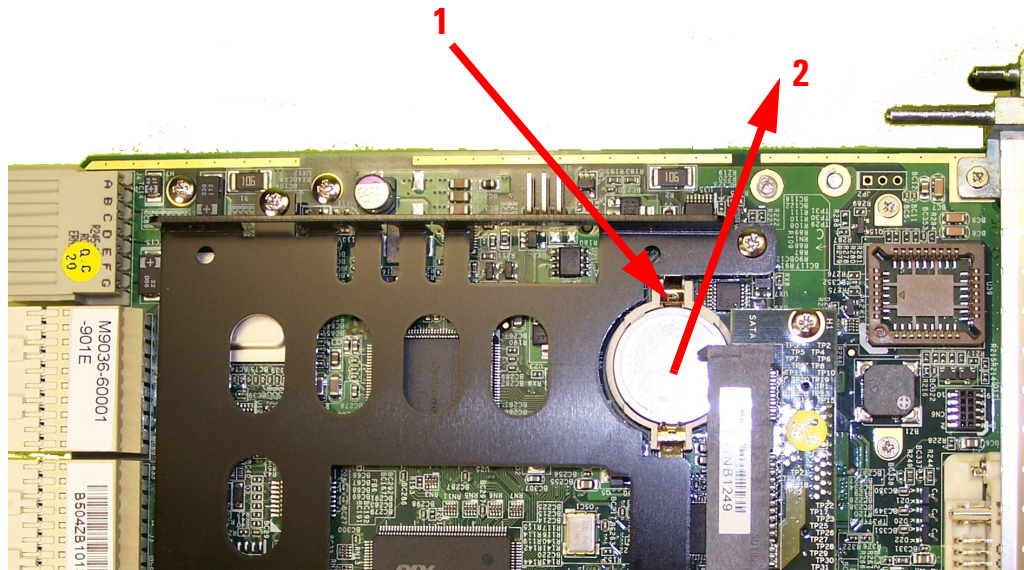
- 1 Turn off the PXIe Chassis.
- 2 Remove the M9036A Embedded Controller from the chassis. Observe all anti-static precautions.
- 3 Remove the hard drive from the M9036A as shown in Figure 15

Remove the four screws on the side of the SSD



**Figure 15** Remove the four side screws as indicated.

- 4 Gently push the drive toward the back of the module (toward the module’s connectors) to disengage the drive from the connector. Carefully lift out the hard drive.
- 5 Remove the battery (see Figure 16 below). Press the battery release latch (1). The battery should pop out (2).



**Figure 16** Replacing the Battery

- 6 Place the new battery in the socket. Make sure that you correctly orient the battery for installation. The positive pole (+) **must** be on the top. You may find it helpful to angle the battery in and pull back on the battery release latch.

**NOTE**

**Replace the lithium battery with an identical battery (CR2032 or equivalent).**

- 7 Replace the hard drive in its carrier.
- 8 Install the embedded controller back in the PXIe chassis and apply power.

**NOTE**

The battery's operational temperature range is less than that of the M9036A's storage temperature range. For exact range information, refer to the battery manufacturer's specifications.

**NOTE**

Ensure that the battery is correctly replaced. Replace the battery only with an identical type (CR2032 or equivalent). Dispose of used batteries according to the manufacturer's instructions. Typical battery life varies considerably and depends on operating temperature and standby (shutdown) time of the system. Typical life expectancy of a 225mAh battery is 4 to 5 years with an average on-time of 8 hours per working day at an operating temperature of 30°C. To ensure that the lifetime of the battery has not been exceeded, you should change the battery after 3 to 4 years of service.

## Replacing the Hard Drive

The Agilent M9036A Embedded controller comes with a 160 GB, 2.5" Serial ATA (SATA) II SSD drive.

Replacement SSD drives are available with installed operating system as:

- Y1207A replacement SSD with Windows 7, 32-bit OS.
- Y1208A replacement SSD with Windows 7, 64-bit OS.

To replace the hard drive, perform the following steps:

**CAUTION**

**BACK UP YOUR HARD DRIVE BEFORE PROCEEDING!** There are several ways to transfer files from your old drive to the new one. One possible way of doing this is with disk-imaging software. A disk image is an exact duplicate of your existing hard drive including the operating systems, user settings, all data files and application software. The imaging software should also create an "emergency" bootable CD or USB drive.

---

**CAUTION**

Always observe ESD precautions. See "[Electrostatic Discharge](#)" on page 33.

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The replacement hard drive must conform to the same dimensions and mounting as the original.

- 1 Power off the PXIe chassis.
- 2 Remove the M9036A controller from the PXIe chassis.
- 3 Position the controller, top side up on the workbench. Locate and remove the four SSD mounting screws as indicated in Figure 17.

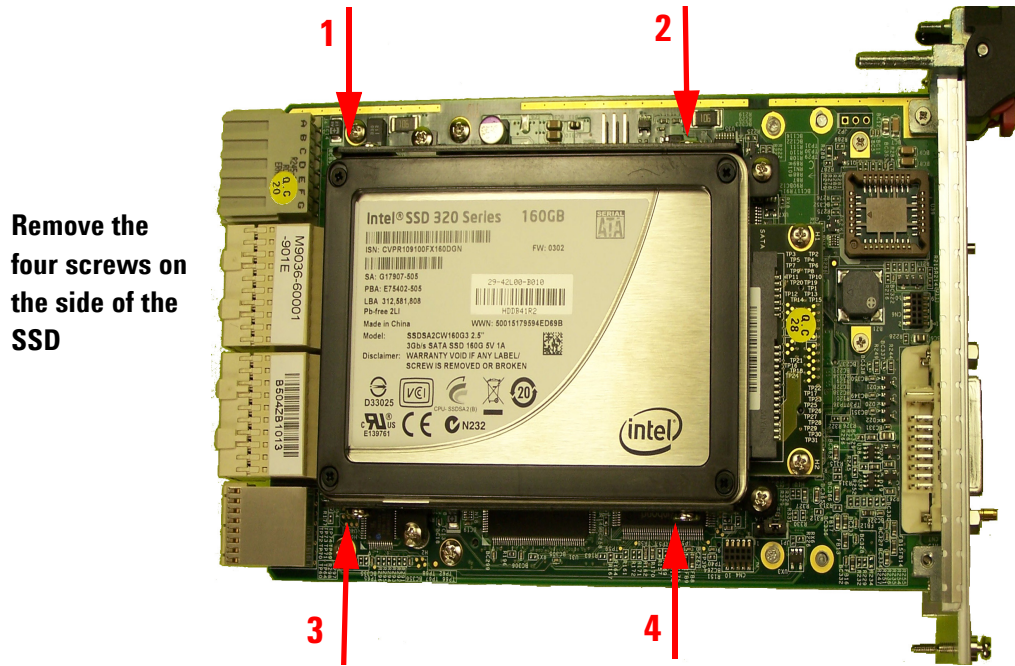


Figure 17 Remove the four screws to replace the SSD

- 4 Gently push the drive toward the back of the module (toward the controller's backplane connectors) to disengage the drive from the connector. Carefully lift out the hard drive.
- 5 Remove the frame from the SSD and place it on the new drive (if necessary for spacing).



Figure 18 SSD Frame, remove four screws

- 6 To replace the hard drive, reverse the preceding steps. Place the new hard drive in the carrier and carefully slide the hard drive into the empty socket.

**CAUTION**

If you feel resistance as you install the new hard drive, do not force it. You may have the drive upside down. Damaging the signal pins may render the drive useless.

---

- 7 When you power up the chassis, the controller BIOS should automatically detect the new hard drive. If you created the disk image on the new hard drive, the controller should boot normally and be ready to operate. If you created the image on an external drive, you will need to boot from the emergency CD or USB stick and then use the disk imaging software to transfer the operating system, user settings, application software, data files, etc. to the new hard drive.

## Memory Modules

Agilent's M9036A has two memory connectors; one on top of the other. The module comes standard with either one 4GB memory module (installed in the bottom position) or two 2GB memory modules. Optionally, two 4GB memory modules can be installed bringing the total memory to 8GB. No more than 8GB memory may be used with the module. The controller uses DDR3 1333 SODIMM memory modules.

**CAUTION**

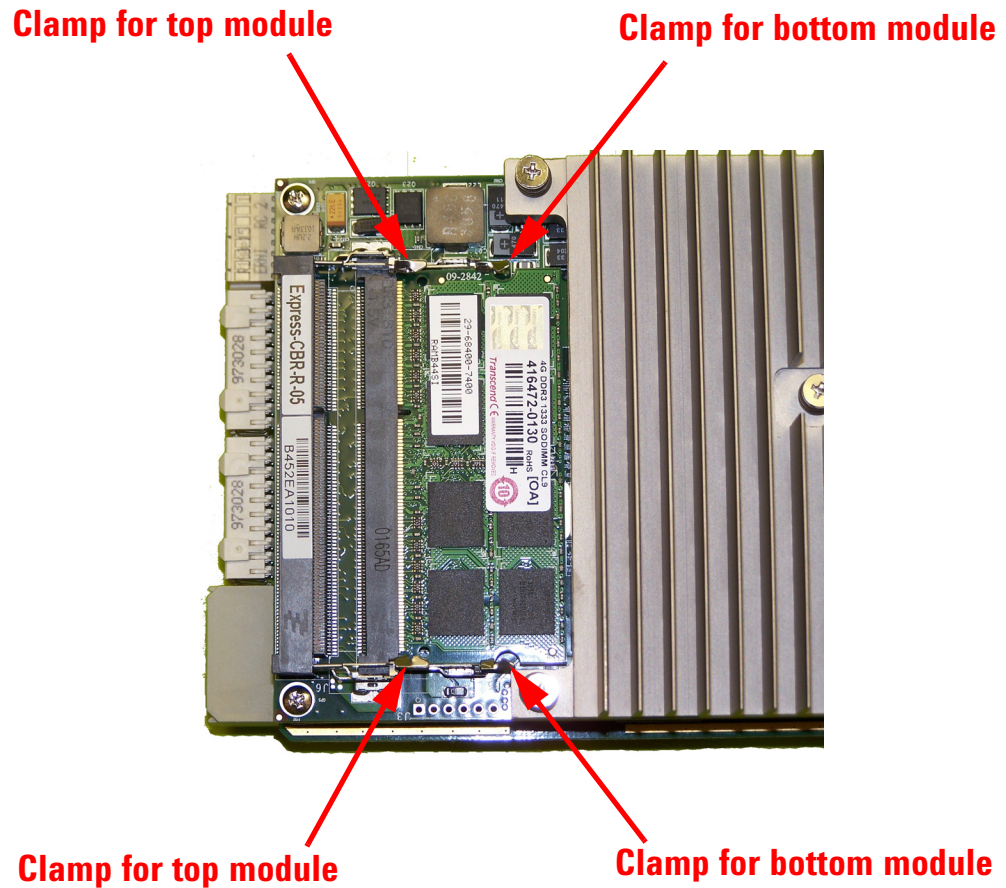
Always observe ESD precautions. See [“Electrostatic Discharge”](#) on page 33.

---

To remove memory modules from the controller:

- 1 Power off the PXIe chassis.
- 2 Remove the M9036A controller from the PXIe chassis.
- 3 Position the controller, top side up on the workbench as shown in Figure 19.





**Figure 19** M9036A Memory Modules (only the bottom module shown)

- 4 Spread the two memory clamps for the module you want to replace.
- 5 The memory module should pop up. Carefully slide the memory module out of the edge connector.

To install memory modules, reverse the previous steps. Carefully place the memory module in the socket. Press the module into the clamps until they lock the module in place.

Replace the controller module in the PXIe chassis and power it up. The controller BIOS should automatically detect the new memory.

To verify the amount of memory installed in your controller: from the Start menu, select **Computer**. Select **System Properties**. under **System Properties**, locate **Installed memory**.

## Memory Declassification

Some test equipment users have a need to “declassify” or “sanitize” their instruments for security purposes. This involves following a procedure that clears all user data from the instrument’s memory. The result is a sanitized instrument that can be removed from a secure area without any chance of classified data being recovered from it. Follow the procedure below to ensure that your controller no longer contains any user configurations or data.

### Procedure for declassifying a faulty controller

Even if the M9036A is not able to power on, it may be declassified by removing the SSD (disk drive) from the controller. Follow the procedure “[Replacing the Hard Drive](#)” on page 37.

For additional information, go to: <http://www.agilent.com/find/security> and enter the model number of your controller (M9036A).

### Controller memory

The following table lists the types of memory used in the M9036A controller. It explains the memory size, how it is used, its location, volatility, and the sanitization procedure.

Memory type and size	Writable during normal operation?	Data retained when powered off?	Purpose/ contents	Data input method	Location in controller	Sanitization procedure
Main memory (RAM) 4GB or 8GB Std.	Yes	No	Windows Operating System memory	Operating system, user	Mother board	Cycle power. This is volatile memory.
Media Storage 160GB SSD drive	Yes	Yes	Windows Operating System boot device and user files including saved programs, data, settings, images, etc.	Operating System factory installed. Other data is user-saved.	Motherboard	Remove. See instructions below.
Flash memory for BIOS (Non-volatile memory)	No	Yes	Contains default BIOS settings for use when booting the controller. Contains no user data.	Programmed at factory (or during BIOS upgrade). Settings may be toggled by user.	Motherboard	None.
DDR2-533 memory	No	No	Video RAM	Controller Video graphics only.	Motherboard	Cycle power. This is volatile memory.

**SSD Data Destruction** Several commercially available software programs exist to completely destroy all data on a data storage device such as the SSD. DoD 5220.22-M is a software based data sanitization method for total data destruction. The DoD 5220.22-M sanitization method was originally defined by the U.S. National Industrial Security Program (NISP) in the National Industrial Security Program Operating Manual (NISPOM). The process involves overwriting existing information on the SSD (or other data storage device). Typically, this means writing a 0 (zero) to every addressable location on the device, verifying the write, writing a 1 (one) to every addressable location and verifying the write, and then writing a random character (in some cases writing a 97) to every addressable location and verifying the write. Using a DoD 5220.22-M sanitization (or a variant) prevents all software and hardware based data recovery methods from obtaining information from the SSD.

**SSD Removal** Because it is virtually impossible to completely and selectively erase all user data on a hard drive without also destroying the operating system, the best method for maintaining security when the controller must be removed from a secure area is to remove or replace the hard drive.

- 1 Turn the PXIe chassis off.
- 2 Remove the controller from the PXIe chassis.
- 3 Remove the SSD drive. For instructions on removing the SSD drive, refer to [“Replacing the Hard Drive”](#) on page 37.

## Chassis Power Inhibit Functionality

On some PXI chassis, the controller may go into a state where the blue LED on the front panel is constantly lit and the controller never boots.

- For the Agilent M9018A PXIe chassis, this may happen when the rear panel Inhibit switch is set to "MAN." If the controller is stuck in this state, toggling (pulse low for a minimum of 500 ms) the inhibit pin (pin 5) on the DB-9 connector causes the system to reboot.
- For other chassis, refer to the manufacturer’s chassis documentation.



## A

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