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Agilent Technologies E1438
VXI 100 MSa/s ADC
with filters and memory

Installation and Service Guide

Agilent Technologies

Agilent Technologies Part Number E1438-90011

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8600 Soper Hill Road, Everett, Washington 98205-1209 U.S.A.

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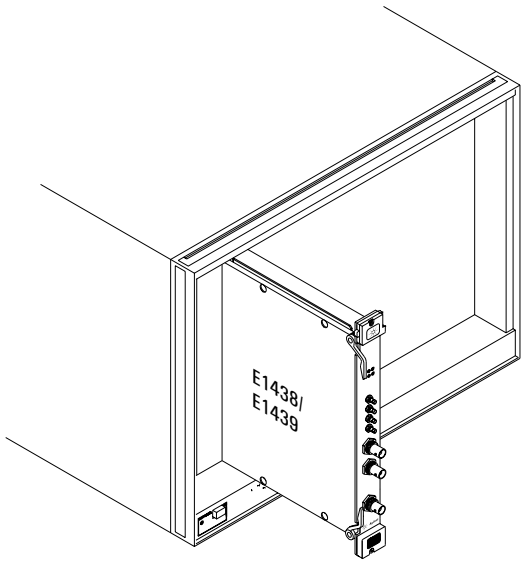
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395 Page Mill Road
Palo Alto, CA
94303-0870 USA

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The Agilent Technologies E1438 at a Glance

The Agilent Technologies E1438 100 MSa/s Digitizer with DSP and Memory provides high precision digitizing for time and frequency domain applications along with signal conditioning, filtering, and memory. The module plugs into a single C-size slot in a VXI mainframe.



Number of Channels	1
Type of Input	50 ohm
Input Bandwidth	150 MHz, 40 MHz alias protected
Sample Rate	100/102.4 Msample/sec
Input Range	–21 to +30 dBm
Raw ADC resolution	12 bits
VXI Bus Support	VME (and Local Bus E1438D only)
VXI Device Type	Register based
I/O Data Port (E1438D only)	Fiber optic serial FPDP (front panel data port)
Size	C-sized, single slot

What You Get With the Agilent Technologies E1438

The following items are included with your Agilent Technologies E1438

Hardware:

- Agilent Technologies E1438 ADC, C-size VXI module
- CD-ROM for Windows and HP-UX setup

Software

A Windows setup program that installs:

- Firmware installation program
- The Agilent Technologies E1438 VXI*plug&play* libraries and drivers
- Soft Front Panel program for the Agilent Technologies E1438 with source files
- Web-based help for the Agilent Technologies E1438
- AGDSP function library and online help
- Example programs and source files
- Microsoft Visual C++ C-library and source files
- Microsoft Visual Basic header files

Documentation

- Agilent Technologies E1438 Installation and Service Guide (this book)
- Online documentation available after software installation:
  - Agilent Technologies E1438 User's Guide in PDF format
  - Web-based help files providing operational information and programmer's reference
  - WinHelp files for the Agilent Technologies E1438 Soft Front Panel

In This Book

This book documents the Agilent Technologies E1438 module. It provides information on:

- hardware installation
- software installation
- getting started information
- replaceable parts

Other Documentation

After running the setup program the following documentation is available:

- Complete documentation (*Agilent Technologies E1438 User's Guide*) is provided as a PDF document.
- Web-based help files are available from the Start menu.
- WinHelp for the Soft Front Panel is available from the application.

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About this edition

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Installing the Agilent E1438

E1438To inspect the Agilent E1438

The Agilent E1438 single channel VXI ADC Module was carefully inspected both mechanically and electrically before shipment. It should be free of marks or scratches and it should meet its published specifications upon receipt.

If the module was damaged in transit, do the following:

- Save all packing materials.
- File a claim with the carrier.
- Call your Agilent Technologies sales and service office.

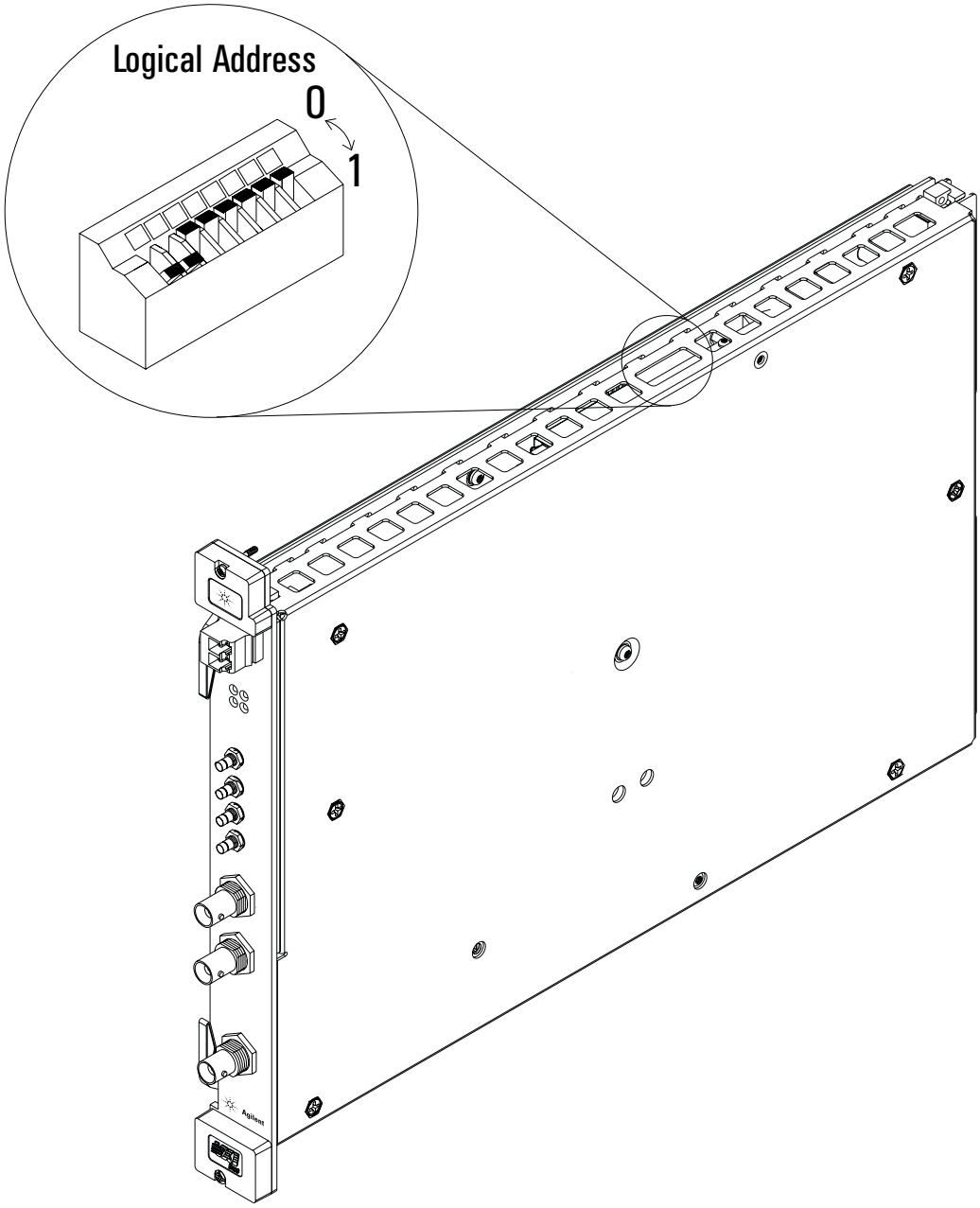
To install the Agilent E1438

Caution **To protect circuits from static discharge, observe anti-static techniques whenever handling the Agilent E1438 VXI ADC Module.**

1. Set up your VXI mainframe. See the installation guide for your mainframe.
2. Select a slot in the VXI mainframe for the E1438 module.
   The Agilent E1438D module's local bus receives ECL-level data from the module immediately to its left and outputs ECL-level data to the module immediately to its right. Every module using the local bus is keyed to prevent two modules from fitting next to each other unless they are compatible. If you will be using the local bus, select adjacent slots immediately to the left of the data-receiving module. If the VXI bus is used, maximum data rates will be reduced but the module can be placed in any available slot.
3. Using a small screwdriver or similar tool, set the logical address configuration switch on the E1438. (See the illustration on the next page.) Each module in the system must have a unique logical address. The factory default setting is 1100 0000 (192).

Note For optimal phase noise performance in multi-module systems it is recommended that the first channel be an Agilent E1438C or D. The Agilent E1438C does not support local bus or fiber optic transfers.

Note Multi-module systems may include multiple Agilent E1438s or Agilent E1439s but not a mixture of the two types of modules.

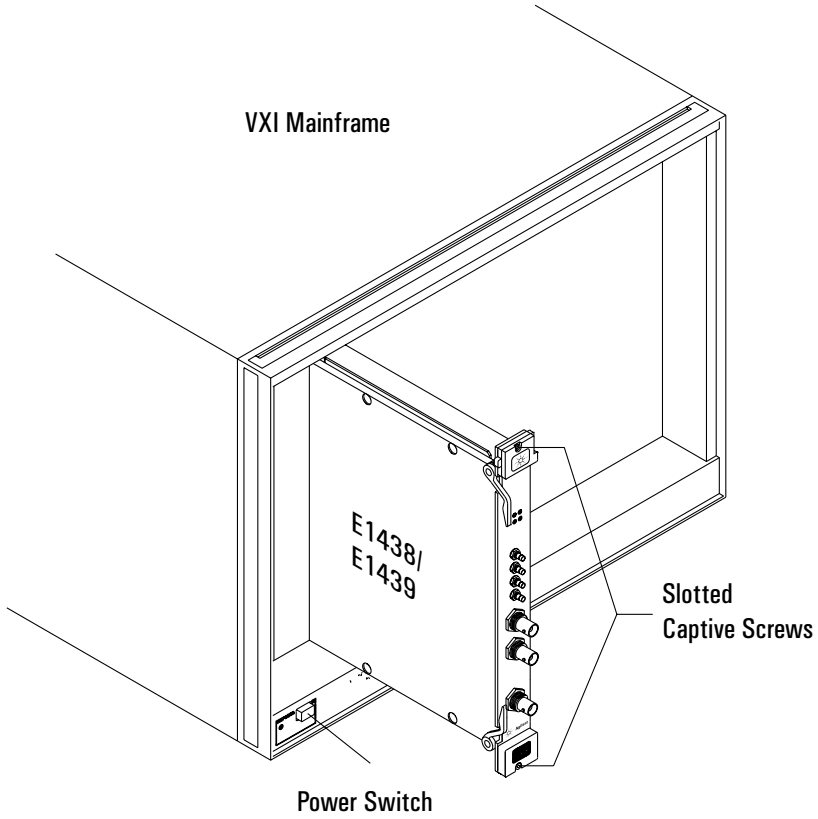


4. Set the mainframe's power switch to off (0).

Caution **Installing or removing the module with power on may damage components in the module.**

5. Place the module's card edges (top and bottom) into the module guides in the slot.
6. Slide the module into the mainframe until the module connects firmly with the backplane connectors. Make sure the module slides in straight and that the insertion/extraction levers are pressed parallel to the front panel.

7. Attach the module's front panel to the mainframe chassis using the module's captive mounting screws.



To clean fiber optic connectors

The Agilent E1438D has a fiber optic serial FPDP (front panel data port). Since the data transmits via light, the fiber optic connections must be clean. The following procedure describes how to clean fiber optic connectors.

Caution **Do not use any type of foam swab to clean optical fiber ends. Foam swabs can leave filmy deposits on fiber ends.**

1. **Apply pure isopropyl alcohol to a clean lint-free cotton swab or lens paper.**

   Cotton swabs can be used as long as no cotton fibers remain on the fiber end after cleaning.

2. **Clean the connector while avoiding the ends of the fiber.**
3. **Apply isopropyl alcohol to a new clean lint-free cotton swab or lens paper.**
4. **Clean the fiber end with the swab or lens paper.**

   Do not scrub during this initial cleaning because grit can be caught in the swab and become a gouging element.

5. **Immediately dry the fiber end with a clean, dry, lint-free cotton swab or lens paper.**
6. **Blow across the connector end face from a distance of 6 to 8 inches using filtered, dry, compressed air. Aim the compressed air at a shallow angle to the fiber end face.**

   Nitrogen gas or compressed dust remover can also be used.

Caution **Do not shake, tip, or invert compressed air canisters because this releases particles in the can into the air. Refer to instructions provided on the compressed air canister.**

7. **As soon as the connector is dry, connect or cover it for later use.**

Note To order multimode LC fiber optic cables, call Stratos Lightwave at (708) 867-9600 (http://www.stratoslightwave.com) or call Fiber Instrument at (800) 500-0347 (http://www.fisfiber.com).

To store the module

Store the module in a clean, dry, and static free environment.

For other requirements, see storage and transport restriction in “Technical Specifications”.

To transport the module

- Package the module using the original factory packaging or packaging identical to the factory packaging.
- If returning the module to Agilent Technologies for service, attach a tag describing the following:
  - Type of service required
  - Return address
  - Model number
  - Full serial number

In any correspondence, refer to the module by model number and full serial number.

- Mark the container FRAGILE to ensure careful handling.
- If necessary to package the module in a container other than original packaging, observe the following (use of other packaging is not recommended):
  - Wrap the module in heavy paper or anti-static plastic.
  - Protect the front panel with cardboard.
  - Use a double-wall carton made of at least 200-pound test (32 ECT) material.
  - Cushion the module to prevent damage. For example, several layers of plastic bubble wrap is usually sufficient.

Caution

Do not use styrene pellets in any shape as packing material for the module. The pellets do not adequately cushion the module and do not prevent the module from shifting in the carton. In addition, the pellets create static electricity that can damage electronic components.

2

Getting Started with the Agilent E1438

Getting Started and Introduction

This section helps you get your Agilent E1438 running and making simple measurements without programming. It shows you how to install the software libraries and how to run the Soft Front Panel program. It also introduces you to the example programs. The Host Interface Library is available as a Windows Library that communicates with the hardware using VISA (Virtual Instrument Software Architecture). VISA is the input-output standard upon which all the VXI*plug&play* software components are based..

This section assumes you have already installed the module in the VXI mainframe as shown in the previous chapter. It also assumes that you have installed a VXI interface according to the manufacturer's instructions.

Note Be sure to read the `readme` file for important up-to-date software installation information.

System Requirements

System Requirements (Microsoft Windows)

- A Pentium-class personal computer:
- Microsoft Windows 2000, or NT.
- One of the following interfaces:
  - HP/Agilent FireWire – E8491B IEEE-1394 PC Link to VXI
  - National Instruments PCI MXI-2
  - Other VISA compliant VXI interface
- VISA (Virtual Instrument Software Architecture) library
- The computer must have a CD ROM drive for the installation media
- One of the following Web browsers:
  - Microsoft Internet Explorer 4.0 or greater
  - Netscape Navigator 4.08 or greater

To install the Windows VXI*plug&play* drivers

This procedure assumes that you have already installed a VISA (Virtual Instrument Software Architecture) library.

Note

If you attempt to install the Windows VXIplug&play drivers without having installed a VISA library you will receive a fatal error.

1. Insert the CD labeled: “Agilent E1438 VXI 100 MSa/s ADC with filters and memory”
2. Run the program: *drive*:\windows\setup.exe
   Where *drive* represents the drive containing the setup CD.
3. The setup program asks you to confirm or change the directory path. The default directory path is recommended.
4. A dialog box asks if you want to install startup shortcuts
   This creates a program group called “AGE1438” within the *Vxipnp* directory that includes:
   - A shortcut to run the Agilent E1438 Soft Front Panel
   - A shortcut for the Agilent E1438 web-based online help file
   - A shortcut for the PDF version of the *Agilent E1438 User’s Guide*
   - A shortcut for the AGDSP web-based online help file
   - Several shortcuts for example programs
   - A shortcut for a readme file
5. A readme file may be displayed. If so, be sure to read it and follow the instructions.

Updating firmware

Future updates will be distributed on the Web. To check your current revision run the Info Utility or check Help/About in the Soft Front Panel program.

To check for new revisions access the Agilent Technologies Web page `http://www.agilent.com/` and search for "E1438".

Install the updated firmware using the firmware installation program—FirmwareInstall. This program’s default location is *drive*`:\vxipnp\`win[95|NT]`\age1438\firmware`. Start the program, then use the "Select File" button to locate the firmware image you want to install. Enter the VXI address of the instrument to be updated and click the "Update" button. The installation will take one or two minutes. This program requires VISA to be installed on the host computer.

To use the Resource Manager

The Resource Manager is a program from your hardware interface manufacturer. It looks at the VXI mainframe to determine what modules are installed. You need to run it every time you power up. If you get the message: "VISUCCESS_DEVICE_NPRESENT" then run the Resource Manager.

Before running the Agilent E1438 software make sure that your hardware is configured correctly and that the Resource Manager runs successfully. Before using your measurement system, you must set up all of its devices, including setting their addresses and local bus locations. No two devices can have the same address. Usually addresses 0 and 1 are taken by the Resource Manager and are not available.

For more information about the Resource Manager, see the documentation with your hardware interface.

Note

Most Resource Managers will recognize the manufacturer and model number of the Agilent E1438 but if your interface requires that you enter this information manually, use the following:

```
Manufacturer number: 4095 (Hex FFF)

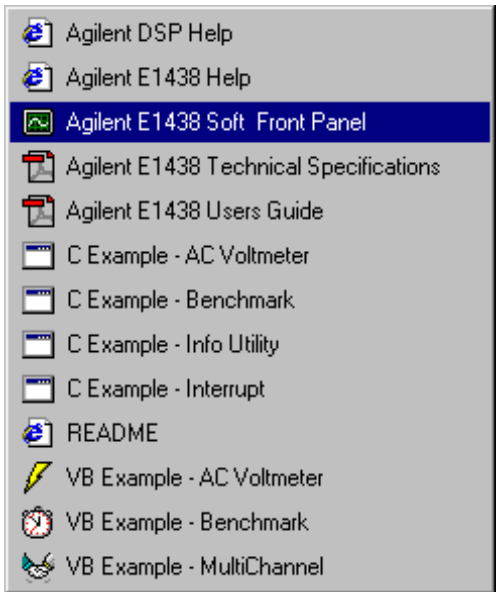
Model number: 622 (Hex 26E)
```

To use the program group (Windows)

If you installed the program group using the default method during the installation procedure, you have a shortcut for a program group similar the one below. Access it through the Start button:
`Programs \ Vxipnp \ age1438`

This program group contains shortcuts that access the Soft Front Panel program, the User's Guide, online help, and example programs. The following pages provide an overview of these items.

If you did not install the program group, executable files for each of the items represented by group shortcuts are available in the *drive*:\vxipnp directory and its subdirectories.



To use the VXI*plug&play* Soft Front Panel (SPF)

In a Windows environment, the Soft Front Panel is the best place to start to explore the capabilities of the Agilent E1438. The Soft Front Panel is useful for checking your system to make sure that it is installed correctly and that all of its parts are working. You can also use it to make actual measurements, since it accesses most of the Agilent E1438's functionality.

Select the E1438 Front Panel shortcut in your program group to start the program. This assumes you have already installed all required hardware and drivers (including VISA) and have run the configurator and Resource Manager required by your hardware interface.

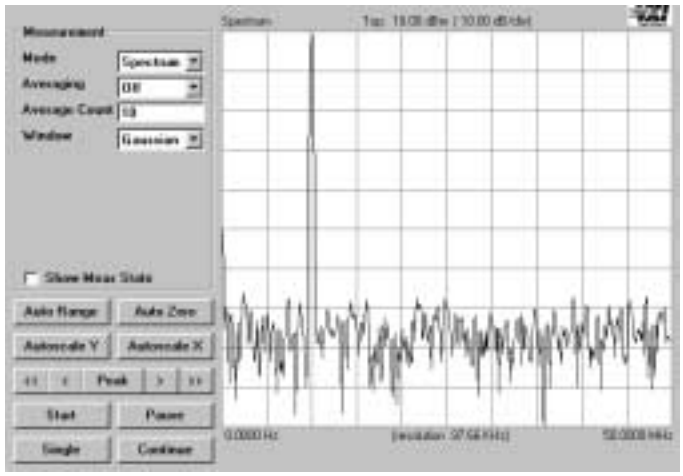
If prompted for the resource descriptor, use the default "VXI::192" unless the logical address of the Agilent E1438 has been changed from its default setting of 192. If it has been changed, type the appropriate logical address instead of 192, then press OK.

Note

You can also run the Agilent E1438 Front Panel in a simulation mode without an Agilent E1438 module, a hardware interface, or VISA libraries by typing "sim" in place of the resource descriptor.

The Agilent E1438 Front Panel Help, available from the Soft Front Panel Help menu, describes the capability of the Soft Front Panel and has links to functions that control and define many of the parameters.

The source files for this program are provided for you to use as sample code.



To use the example programs

Several example programs are included that perform useful tasks and can serve as a basis for your own programs. When you installed your Agilent E1438 Windows libraries and drivers using the setup program or utility, you also installed executable and source code files for several useful example programs. The programs demonstrate programming the module with "C", Microsoft Visual Basic,

The executables for these examples require an Agilent E1438 and, for Windows, VXI*plug&play* support; in other words, they will not run in simulation mode like the Agilent E1438 Soft Front Panel program.

Shortcuts for the executables appear in the age1438 Windows program group if you added it during setup.

In Windows environments, executable files and source code for the Microsoft Visual Basic examples are installed in the *drive*:\vxipnp\win[95|NT]\age1438\vb directory. The "C" examples are in the ...\age1438\msc\examples directory.

The group of programs described here may be supplemented with additional programs later, which will be described in the online help or readme file.

ACVolts_32.exe

This is the simplest practical complete program using the Agilent E1438, and it functions like an AC voltmeter. It is written in Visual Basic.

acvolts.exe

This is a console version of acvolts_32.exe, written in Microsoft Visual C++.

Benchmark_32.exe

This performance benchmark program is really more of a utility than an example, although source code is provided. It allows users to measure data transfer rates and command processing times on their system without having to write new code. The utility is written in Visual Basic.

bench.exe

This is a console version of Benchmark_32.exe, written in Microsoft Visual C++.

multchan_32.exe

This example shows how to synchronize two modules to achieve simultaneous sampling, filter decimation, and matched local oscillator phase. It is written in Visual Basic.

info.exe

This example shows how to retrieve option and revision information from an Agilent E1438, and it doubles as a handy utility. It is written as a console program in Microsoft Visual C++.

interrupt.exe

This example shows how to set up and trap a VXI interrupt to indicate an error condition in the Agilent E1438. It is written as a console program in Microsoft Visual C++.

3

Replacing Assemblies

Replaceable parts

The Agilent E1438 must be returned to Agilent Technologies for service or calibration. Exchange modules are shipped with no memory so you must move the memory from the original module to the replacement module. This section shows you how to add or replace memory modules.

For information on upgrading your module or replacing parts, contact your local Agilent Technologies sales and service office. See the Technical Specifications or the Agilent Technologies web site (http://www.agilent.com) for a list of office locations and addresses.

Ordering Information

To order parts in the U.S., call Agilent Technologies Parts Direct Ordering at (877) 447-PART or go to https://www.parts.agilent.com/. Outside the U.S., please contact your local Agilent Technologies parts center.

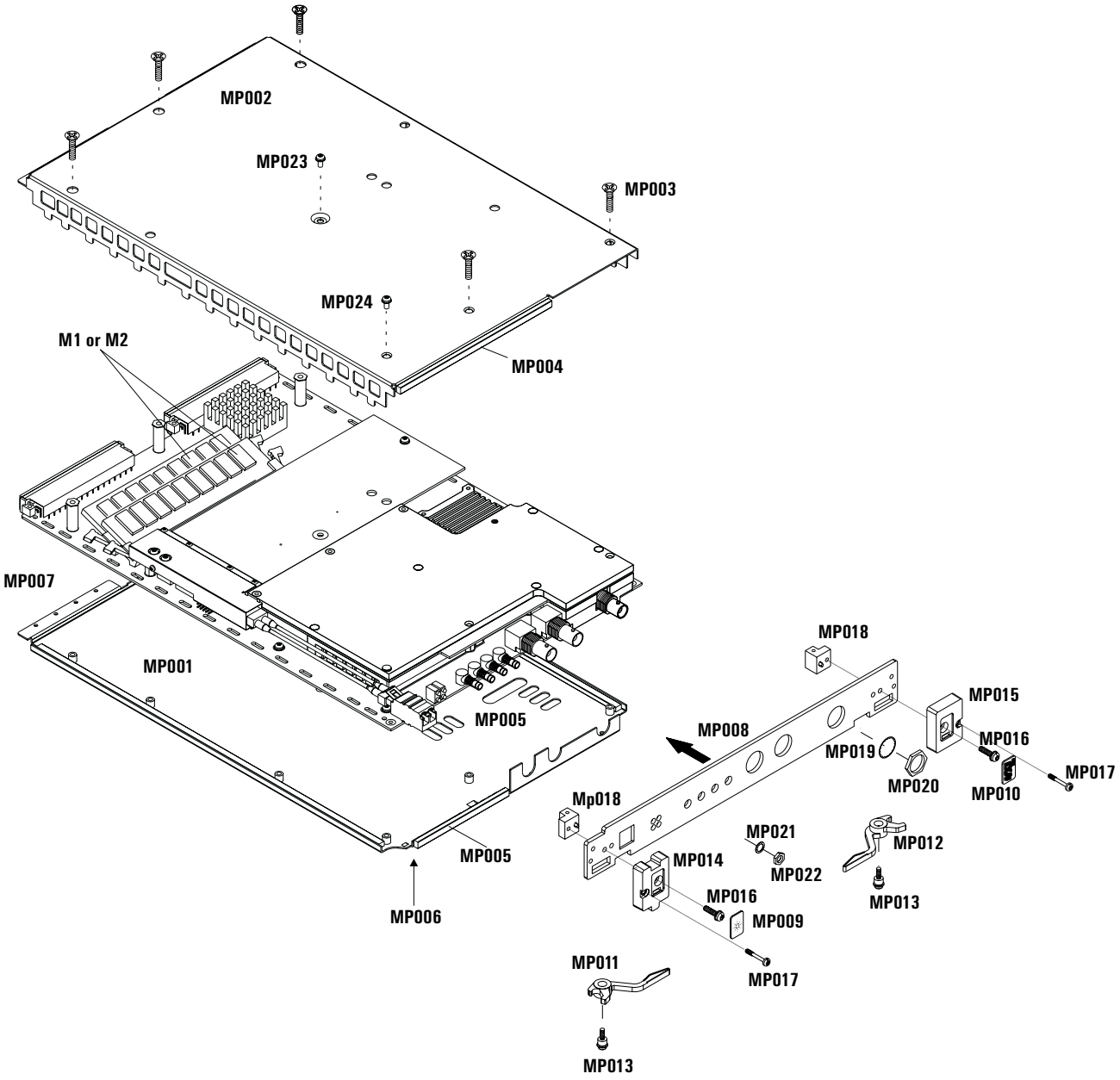
Code Numbers

The following table provides the name and location for the manufacturers' code numbers (Mfr. Code) listed in the replaceable parts table.

Mfr. No.	Mfr. Name	Location
28480	Agilent Technologies, Inc.	Palo Alto, CA U.S.A.
03647	Instrument Specialties Co. Inc.	Delaware Water Gap, PA U.S.A.
04637	Phelps Dodge Corp.	New York, NY U.S.A.
16044	Kingston Technology Corp.	Fountain Valley, CA U.S.A
07606	ITW Inc. / Medalist	Glenview, IL U.S.A.
04605	Fischer Special Mfg. Co	Cincinnati, OH U.S.A.
05610	Textron, Inc.	Providence, RI U.S.A.
06363	Oudensha America Inc.	Elk Grove Village, IL U.S.A.

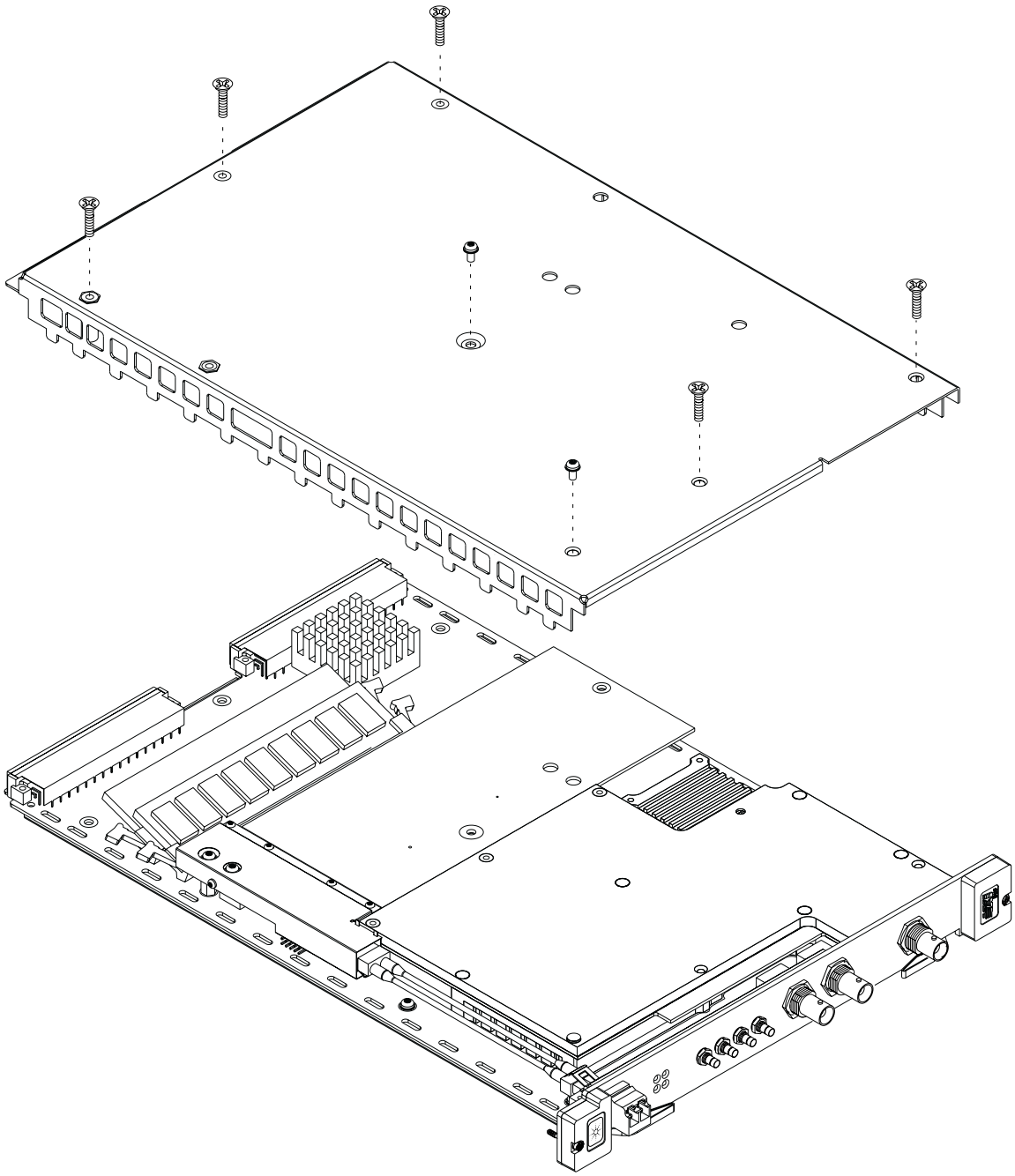
Assemblies

Caution **The module is static sensitive. Use the appropriate precautions when removing, handling, and installing to avoid damage.**

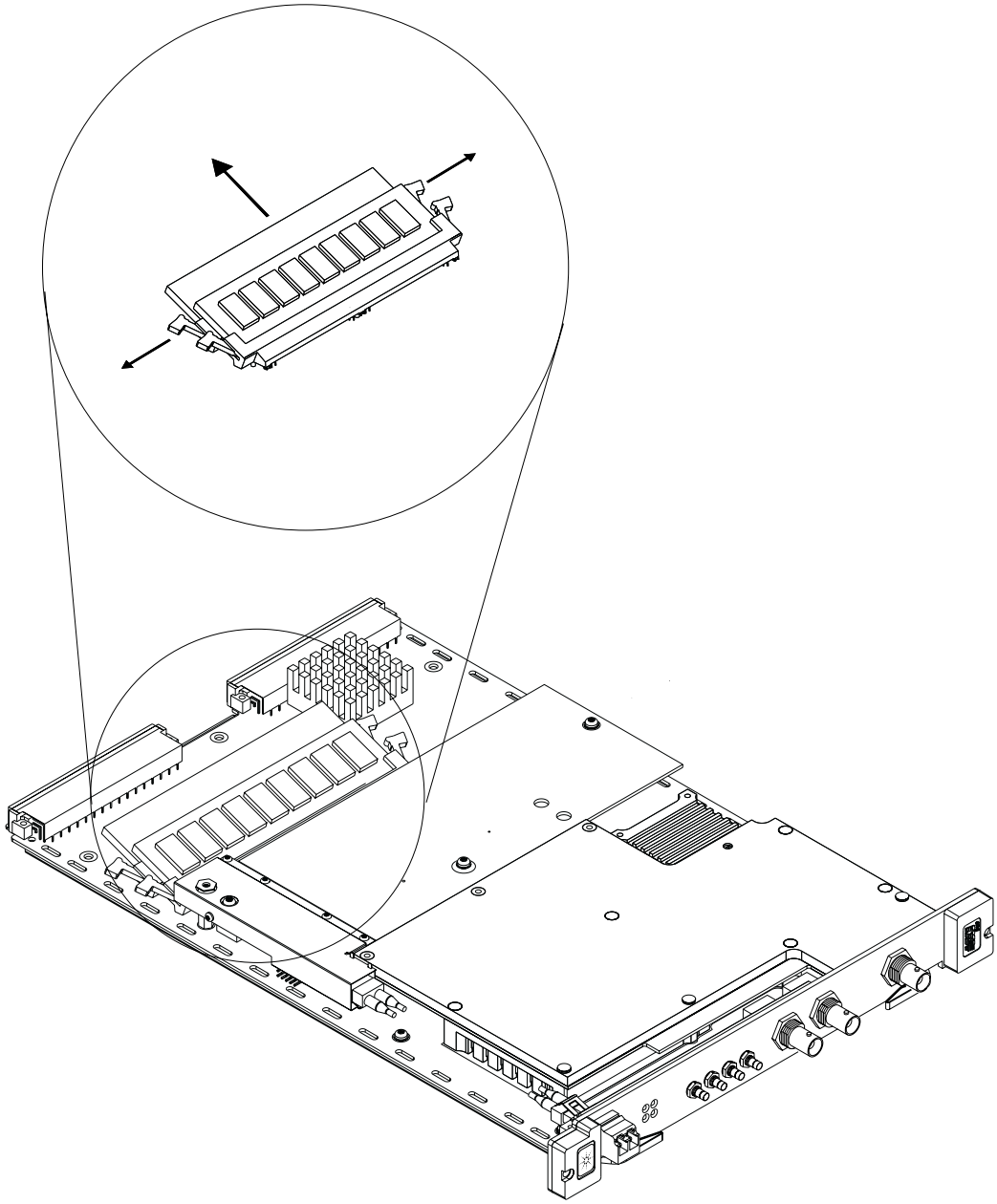


Ref Des	Agilent Part Number	Qty	Description	MfrCode	Part Number
	E1438-69201	1	E1438A EXCHANGE MODULE	28480	E1438-69201
	E1438-69211	1	E1438B EXCHANGE MODULE	28480	E1438-69211
	E1438-69202	1	E1438C EXCHANGE MODULE	28480	E1438-69202
	E1438-69212	1	E1438D EXCHANGE MODULE	28480	E1438-69212
M1	1818-7889	1	SYNC DIMM 16MB 2X72 66MHZ - 16 M mem	16044	KTM66X72/16
M2	1818-7901	2	SYNC-DIMM 16MX72 PC100 168-DIMM - 128 M mem	16044	KGM100X72C3/128
M2	1818-8606	2	SYNC-DIMM 16MX72 PC100 168-DIMM - 512 M mem	16044	KVR100X72C3/512
MP001	E1438-00203	1	SHTF—BOTTOM COVER	28480	E1438-00203
MP002	E1438-00242	1	SHTF—TOP COVER	28480	E1438-00242
MP003	0515-1135	5	SCREW-MACH M3 x 0.5 25MM-LG	05610	0515-1135
MP004	E1438-40601	1	GSKT—RFI-FRT PNL	28480	E1438-40601
MP005	E1485-40601	2	GSKT—RFI-BTTM CVR	28480	E1485-40601
MP006	8160-0686	2	RFI STRIP—FINGERS	03647	00786-185
MP007	8160-0634	0.4	RFI STRIP—FINGERS	03647	0097-0611
MP008	E1438-00234	1	FRONT PANEL 'E1438A'	28480	E1438-00234
MP008	E1438-00244	1	FRONT PANEL 'E1438B'	28480	E1438-00244
MP008	E1438-00235	1	FRONT PANEL 'E1438C'	28480	E1438-00235
MP008	E1438-00245	1	FRONT PANEL 'E1438D'	28480	E1438-00245
MP009	7121-7893	1	PLT-NAME 'SPARK'	06363	7121-7893
MP010	7121-7965	1	PLT-NAME VXI 'PLUG&PLAY'	06363	7121-7965
MP011	E1400-45101	1	MOLD—TOP	28480	E140045101
MP012	E1400-45102	1	MOLD—BOTTOM	28480	E140045102
MP013	E1400-00610	2	SCR-ASM SHLDR	28480	E1400-00610
MP014	E1400-45011	1	MOLD TOP—'SPARK'	28480	E1400-45011
MP015	E1400-45008	1	MOLD BTTM—'VXI'	28480	E1400-45008
MP016	0515-0664	2	SCREW MACHINE ASSEMBLY M3 X 0.5 12MM-LG	07606	0515-0064
MP017	0515-2733	2	SCREW SPCL M2.5 X 0.45 17MM-LG PAN-HD	07606	0515-2733
MP018	E1400-40104	2	CAST	28480	E1400-40104
MP019	2190-0068	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	07606	1924-02NP
MP020	2950-0154	3	NUT-HEX-DBL-CHAM 1/2-28-THD .078-IN-THK	04605	2950-0154
MP021	2190-0124	4	WASHER-LK INTL T NO. 10 .195-IN-ID	04637	500222
MP022	2950-0078	4	NUT-HEX-DBL-CHAN 10-32-THD .067-IN-THK	04637	500220
MP023	0515-0430	1	SCREW-MACHINE M3 X 0.5 6MM-LG	05610	0515-0430
MP024	0515-1103	1	SCREW-MACHINE M3 X 0.5 10MM-LG	05610	0515-1103

To remove the top cover



To remove the M1, M2 assemblies



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Need Assistance?

If you need assistance, contact your nearest Agilent Technologies Service Office. You can find a list of local service representatives on the Web at: http://www.agilent.com/. If you do not have access to the internet, one of the centers listed below can direct you to your nearest representative.

If you are contacting Agilent Technologies about a problem with your Agilent E1438 module, please provide the following information:

Model number:

Software version:

Serial number:

Options:

Date the problem was first encountered:

Circumstances in which the problem was encountered:

Can you reproduce the problem?

What effect does this problem have on you?

United States	1 800 452 4844
Canada	1 877 894 4414 (905) 206 4120 (FAX)
Europe	(31 20) 547 2323 (31 20) 547 2390 (FAX)
Japan	(81) 426 56 7832 (81) 426 56 7840 (FAX)
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About this edition

December 2002: This edition documents the transition from the Agilent E1438A to the Agilent E1438C and from the Agilent E1438B to the Agilent E1438D. The A and B models will become obsolete. The Agilent E1438C has no local bus capability.

April 2001: This edition documents the new fiber optic interface on the Agilent E1438B. In addition, this edition documents the new external TTL trigger on all Agilent E1438B modules and on Agilent E1438A modules with a serial number greater than US41140000.

May 2000: This edition documents a new software upgrade utility, FirmwareInstall, and a new function, age1438_frequency_center_raw_compute. In addition, the descriptions changed for the following functions:

- age1438_clock_setup
- age1438_trigger_setup
- age1438_combo_setup

November 1999: In this edition, all references to the product changed to support rebranding the product from Hewlett-Packard to Agilent Technologies.

September 1999: First Edition

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