Agilent 16900 Series Logic Analysis System Mainframes

Data Sheet

Conquer your toughest digital debug problems while staying within your budget

The Agilent 16900 Series modular logic analysis mainframes deliver the performance you need to conquer your toughest digital debug problems. You get accurate and reliable measurements for today's complex circuits, with expandability and performance headroom to cover future technology trends. In addition, the intuitive user interface gives you the ultimate in productivity without sacrificing performance or capability. You get performance and intuitive usability at a price you can afford.

Expand your system as your needs evolve

Expandability is the key to the long-term value of the Agilent 16900 Series logic analysis systems. Purchase the capability you need now, then expand as your needs evolve. Maximize mainframe usage by operating them separately, then connecting them together for complex, high-channel-count, multiple-bus applications. Whether you are doing simple hardware debug, real-time analysis of instruction execution, hardware/software integration, signal-quality analysis or complex system validation, you have a system that meets each of your long-term digital measurement needs.

Spend more time designing and less time learning how to use your tools

If you want to focus on solving your digital debug problems, you need to be able to quickly master your debug tools. The 16900 Series logic analysis mainframes let you set up measurements easily and navigate through your data quickly with an intuitive user interface and familiarity of Windows® XP Professional.

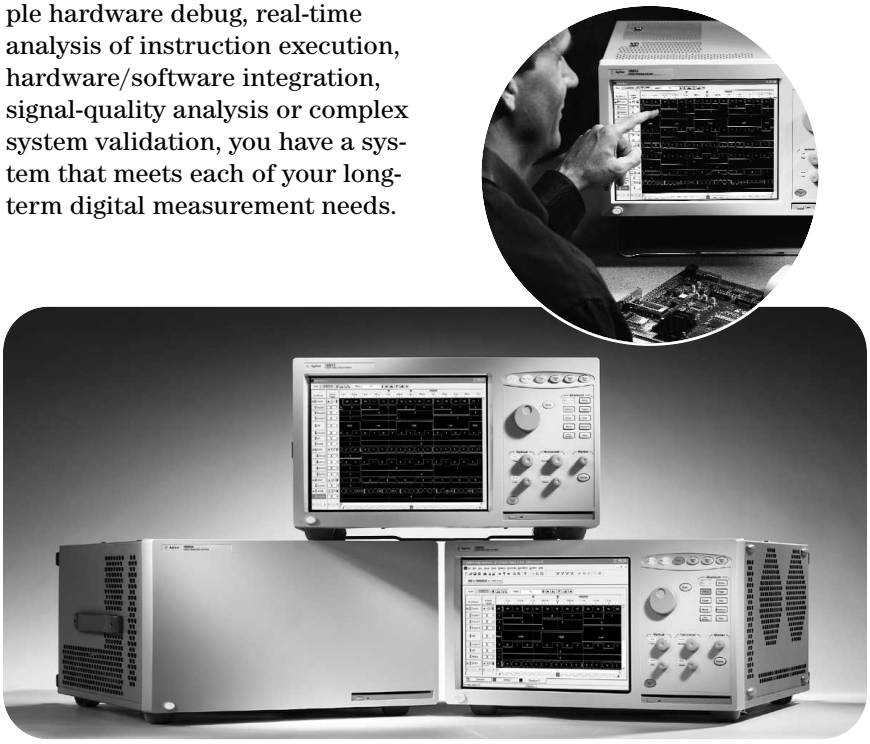

Figure 1. The Agilent 16900A, 16902A and 16903A modular logic analysis systems.

Agilent Technologies

The flexibility you need to debug your design your way

Increase your productivity with a variety of operating modes that maximize your analyzer's usage. Whether you work alone at a bench or with team members distributed around the world, the 16900 Series provides a use model that easily integrates into your debug environment.

Work at your bench — Operate the analyzer via touch screen, mouse or keyboard.

Expand view across multiple monitors — Get the most comprehensive view of your data with extended desktop viewing.

Remotely control and monitor the logic analyzer — Access a remote logic analyzer via built-in Windows XP desktop sharing. Receive e-mail when the logic analyzer triggers.

Work offline — Increase equipment and team productivity. View and analyze captured data on a PC while the logic analyzer makes other measurements Also, create setups for your next round of measurements.

Run automated tests — Execute a series of tests via Microsoft DCOM programmability.

Offload data for custom analysis — Move data quickly over the optional Gbit LAN connection to an external PC.

Combine mainframes to expand measurement capability — Use mainframes individually, then connect them together when you need to analyze complex, multiple-bus problems.

Maximize system performance — Augment the logic analyzer's high performance with the latest PC or server technology to control the logic analyzer and analyze data.

Share information with others — Save your results to shared drives.

Document your findings — Print screen shots to networked printers and cut and paste data into other software applications.

Comply with your company's network standards — Add anti-virus software to the logic analyzer.

Figure 2. Get the most comprehensive view of your data with extended desktop viewing.

16900 Series mainframe — the power you need at a price you can afford

The mainframe you select is the foundation of your system. The Agilent 16900 Series includes a range of powerful logic analysis mainframes that deliver the performance you need at a price you can afford. You get accurate and reliable measurements, for today's complex systems, plus expandability and performance headroom to cover future technology trends.

Key things to consider when selecting a 16900 Series mainframe:

- **Number of module slots —** Determine the number of measurement modules required for your specific measurement need. Also consider having additional slots for future needs.

- **Multiframe Pro —** 16900 Series mainframes can always be used as a standalone unit. In some instances your channel needs may surpass a single mainframe. For situations where you need to debug large, multiple-bus systems, ensure that the mainframe you choose supports Multiframe Pro. Multiframe Pro allows you to connect multiple frames into one measurement system with a single interface control.

- **Display and resolution —** If you prefer to operate the analyzer directly from the front panel, select a mainframe with a large, built-in touch display. All 16900 Series mainframes can also be used with external monitors.

- **PCI expansion slots —** Customize your logic analyzer peripherals by adding PCI cards for a specific capability like Gbit LAN or multiple monitor video.

Select the 16900 Series mainframe that meets your requirements

Agilent model number	16902A	16900A	16903A
Number of module slots	6	6	3
Multiframe Pro	Yes	Yes	No
Display and resolution	Built-in color touch screen display, 12.1 inch at 800 x 600, supports up to four external monitors at up to 1600 x 1200 (with PCI video card)	Uses external display. Supports up to four external displays at up to 1600 x 1200 (with PCI video card)	Built-in color touch screen display, 12.1 inch at 800 x 600, supports up to four external monitors at up to 1600 x 1200 (with PCI video card)
PCI expansion slots	2 full profile, 1 low profile	2 full profile, 1 low profile	1 full profile, 1 low profile

Table 1. Agilent modular 16900 Series mainframes.

Agilent 16900 Series Features

Modularity and Expandability	Protect your long-term investment. Start with the capability you need now, then add measurement modules or expand the number of frames in the system as your needs evolve.
Intuitive user interface	Quickly master the logic analyzer due to the award winning usability and familiarity of Windows XP Pro.
Hosted Power Mode and Offline Analysis	Achieve the ultimate in performance by hosting the logic analyzer application software on your fastest server to remotely control the logic analyzer and analyze data.
B4655A FPGA Dynamic Probe (optional software)	Get internal visibility of Xilinx FPGAs. Switch internal probe points in seconds while the FPGA timing stays constant. Saves time as there is no recompile. Automated signal/bus setup eliminates mistakes.
Innovative Probing	Connect to your system under test with your choice of a wide variety of probing options that support general-purpose and application-specific needs. Agilent's latest probing innovations include the industry's smallest connectorless probe.
Open PC platform	Accelerate your debugging process with an extensive range of optional software analysis tools. Protect your data and make your logic analyzer compliant with your network environment with anti-virus software. Share your work and communicate results easily via LAN or USB flash drives
Connection to Infiniium Oscilloscopes	Determine the impact of analog characteristics on your digital signals with time-correlated analog acquisitions of up to 6 GHz, 20 GSa/s, and 32 Mb.
Broad processor, FPGA, ASIC and bus support	Debug with non-intrusive, real-time analysis tools for the devices and buses in your digital system.
Full programmability	Modify any measurement setting using COM via LAN.

Table 2. Key features and benefits of Agilent 16900 Series logic analysis systems.

Modular expandability protects your long-term investment

Configure a custom logic analysis system with analyzer modules to fit your performance and price needs. Protect your investment by upgrading memory depths or state speeds as your needs change.

Support for other modules
The 16900 Series also support the following 16700 Series measurement modules:

- 16740A, 16741A, 16742A
- 16750A/B, 16751A/B, 16752A/B
- 16753A, 16754A, 16755A, 16756A
- 16720A pattern generator supported in future software release

Headroom for your future needs (Extend the life of your equipment)
Easily upgrade your 16900 Series modules. "Turn on" additional memory depth and state speed when you need more. Purchase the capability you need now, then upgrade as your needs evolve.

16910A 16911A	Upgrade max. state speed from 250 MHz to 450 MHz and max. data rate from 250 Mb/s to 500 Mb/s
	Memory depth options 256 K, 1 M, 4 M, 16 M or 32 M
16950A	Memory depth options 256 K, 1 M, 4 M, 16 M, 32 M or 64 M

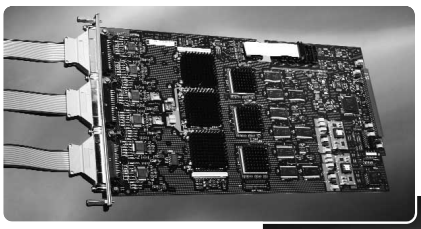

Figure 3. Combine multiple acquisition modules when you need to measure across many channels.

Figure 4. Modularity provides configuration flexibility to meet your measurement needs—now and in the future.

Choose the modules that meet your specific needs

Agilent Model Number	Ultra Performance 16950A[2]	High Performance 16910A[2] / 16911A[2]
Channels Per Module	68	102 / 68
Max Channels on Single Time Base and Trigger	340	510 / 340
High-Speed Timing Zoom[1]	4 GHz (250 ps) with 64 K depth	4 GHz (250 ps) with 64 K depth
Max Timing Sample Rate (Half/Full Channels)	1.2 GHz (833 ps)/ 600 MHz (1.67 ns)	1.0 GHz (500 ps)/ 500 MHz (2.0 ns)
Max State Clock Rate	600 MHz	450 MHz with option 500, 250 MHz with option 250
Max State Data Rate	800 Mb/s	500 Mb/s with option 500 250 Mb/s with option 250
Memory Depth	256 K up to 64 M	256 K up to 32 M
Supported Signal Types	Single-ended and differential	Single-ended
Eye Finder Capability	Yes	Yes
Eye Scan Capability	Yes, in future software release	No
Probe Compatibility	90-pin cable connector	40-pin cable connector

1. All channels, all the time, simultaneous state and timing through same probe.
2. Probes are ordered separately. Please specify probes when ordering to ensure the correct connection between your logic analyzer and the device under test. Specify desired memory depth, state clock and data rate using available options. Feature also available via software upgrade to existing module.

Table 3. Select the logic analyzer modules that best suit your requirements.

Unleash the complementary power of a logic analyzer and an oscilloscope

Effectively track down problems across the analog and digital portions of your design. Easily make time-correlated measurements between an Agilent 16900 Series logic analysis system and an Infiniium 54800 Series oscilloscope with the Agilent E5850A time-correlation fixture.

With this additional capability, you can perform the following more effectively

- Validate signal integrity and correct operation of A/D and D/A converters.
- Track down problems caused by signal integrity.
- Validate correct logical and temporal relationships between the analog and digital portions of a design.

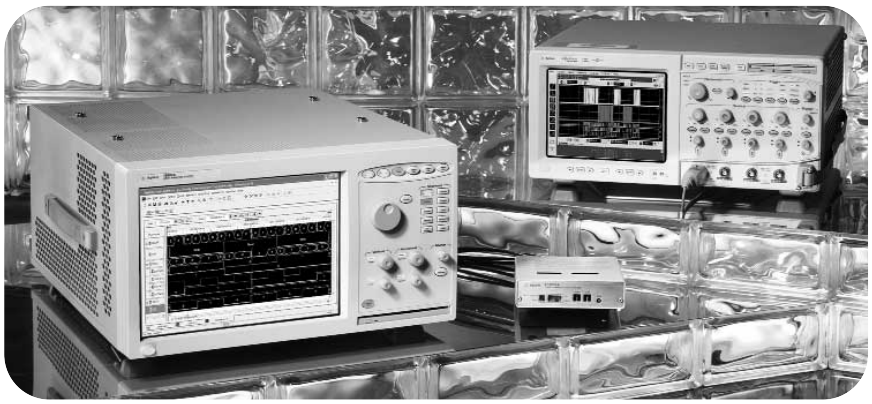

Figure 5. Make time-correlated measurements between an Agilent logic analyzer and oscilloscope with the Agilent E5850 time-correlation fixture.

Agilent E5850A Features

Automated Setup	The 16900 Series provides a help wizard for easy setup, regardless of which Infiniium 54800 Series scope you connect to.
Automatic Measurement De-Skew	Measurements between the logic analyzer and Infiniium oscilloscope are automatically de-skewed in time to save you time and give you confidence in the measurement results.
Cross Trigger the Logic Analyzer and Oscilloscope	Trigger the Infiniium oscilloscope from the logic analyzer (or vice versa).
Tracking Markers	The Infiniium time markers and two of the 16900 Series global markers are time-correlated and track each other. Relate information on the oscilloscope and logic analyzer displays precisely.

Table 4. Key features and benefits of integrating Infiniium oscilloscope capabilities with the logic analyzer.

Supported Infiniium oscilloscopes

Agilent Infiniium oscilloscope model number	Agilent 16900 series logic analyzer software version	Agilent Infiniium oscilloscope software version
54810A, 54815A, 54820A, 54825A, 54835A, 54845A, 54846A	02.00 or higher	A.04.00 or higher
54830B, 54831B, 54832B	02.00 or higher	A.02.10 or higher
53845B, 54846B	02.00 or higher	A.04.35 or higher
53854A, 54855A	02.00 or higher	A.03.00 or higher

Logic Analyzer and Oscilloscope Connection
Number of oscilloscopes connected to a 16900 Series logic analyzer – 1
16900 Series logic analyzer connections – LAN, Trigger In, Trigger Out
Infiniium 54800 Series oscilloscope connections – LAN, Trigger In, Trigger Out

Table 5. Agilent 16900 Series logic analyzer and Infiniium oscilloscope software versions and connections.

16900 Series mainframes characteristics

16900 Series data views, file formats and analysis tools

Standard data views	
Waveform	Displays data as digital waveforms.
Listing	Displays data as a state listing.
Compare	Compares data from different acquisitions and highlights differences.
Source code	Displays time-correlated source code and inverse assembly simultaneously in a split display.
	Define the trigger event by simply clicking on a line of source code.
	Obtain source-code-level views of dynamically loaded software or code moved from ROM to RAM during a boot-up sequence using address offsets.
	Requires access to source files via the LAN or instrument hard drive to provide source code correlation.
	Source correlation does not require any modification or recompilation of your source code.
Numeric bases for data display	Binary, hex, octal, decimal, signed decimal (two's complement), ASCII, symbols, and processor mnemonics
Symbolic support/ object file format compatibility	Number of symbols/ranges — Unlimited (limited only by amount of virtual memory available on 16900 Series mainframes)
	IEEE-695
	Aout
	Omf86, Omf96, Omf386
	Sysrof
	ELF/DWARF1,* ELF/DWARF2*
	ELF/Stabs1, ELF/Stabs2, ELF/Mdebug Stabs
	TICOFF/COFF, TICOFF/Stabs
	GPA (General Purpose ASCII)
	User defined — specify a mnemonic for a given bit pattern for a label or bus
Available data/file formats	
ala	Contains information to reconstruct the display appearance, instrument settings, and trace data (optional) that were present when the file was created.
xml	Extensible markup language for configuration portability and programmability.
csv	CSV (comma-separated values) format for transferring data to other applications like Excel.
mfb	Export logic analyzer data for post-processing. Mfb data can be parsed using programming tools.
Analysis tools	Filter/colorize
	Find (next/previous)
	Processor/bus inverse assembly and analysis (optional)
	FPGA dynamic probe (optional)

*Supports C++ name de-mangling

16900 Series PC characteristics

Operating system	Microsoft Windows XP Professional
Processor	Intel Pentium® III
Chipset	Intel 815E
System memory	512 MB PC 133 SDRAM max
CD ROM	24x CD-R writing, 24x CD-RW writing, 8x CD ROM reading
Hard disk drive	80 GB
Installed on hard drive	Operating system, latest revision of the logic analyzer application software, optional application software ordered with the mainframe

16900 Series instrument controls

Touch-screen LCD display (16902A and 16903A)	Large 30.7-cm (12.1-in.) display makes is easy to view a large number of waveforms or states.
Front-panel hot keys (16902A and 16903A)	Dedicated hot keys give instant access to the most frequently used menus, displays, and on-line help.
Front-panel knobs (16902A and 16903A)	Dedicated knobs for horizontal and vertical scaling and scrolling
Keyboard and mouse	PS/2 keyboard and mouse (shipped standard)

16900 Series video display modes

Built-in touch-screen display (16902A and 16903A)	
Size	30.7 cm (12.1 in.) diagonal
Resolution	800 x 600
Simultaneous display capability	Front panel and external display can be used simultaneously at 800 x 600 resolution.
External display	Supports up to four external monitors at up to 1600x1200 (with PCI video card)

Programmability

The COM automation server is part of the logic analyzer application. This software lets you write programs that control the logic analyzer application from remote computers on the local area network (LAN). All measurement functionality is controllable via the COM interface.

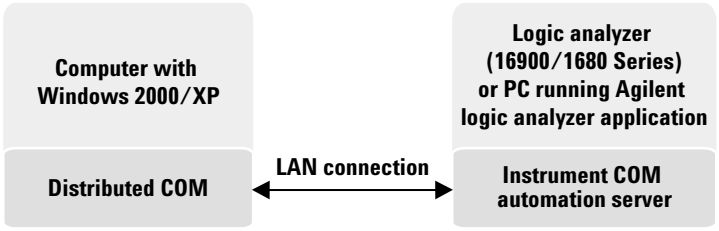

Figure 6. 16900 Series programming overview

16900 Series interfaces

Peripheral interfaces

Display	15-pin VGA connector
Keyboard	PS/2
Mouse	PS/2
Parallel	25-pin D-sub
Serial	9-pin D-sub
PCI card expansion slots	2 full profile, 1 low profile (16900A and 16902A)
	1 full profile and 1 low profile (16903)
USB	Two 1.1 ports

Connectivity interfaces

LAN	10/100Mb/s, Gbit (optional)
Connector	RJ-45

Interface with external instrumentation

Trigger or arm external devices or receive signals that can be used to arm measurement modules within the logic analyzer with Trigger In/Out.

Trigger In	
Input	Rising edge or falling edge
Action taken	When received, the logic analyzer takes the actions described in the trigger sequence step.
Input signal level	± 5 V max
Threshold level	Selectable: ECL , LVPECL, LVTTL, PECL, TTL
	User defined (± 5 V in 50 mV increments)
Minimum signal amplitude	200 mV
Connector	BNC
Input resistance	4 k ohm nominal
Trigger Out	
Trigger	Rising edge or falling edge. OR of selected events that cause Trigger Out (module trigger or flags)
Output signal	V_{OH} (output high level) 2.0 V min
	V_{OL} (output low level) 0.5 V max
	Pulse width approx. 80-160 ns
Threshold level	LVTTL (3.3 V logic)
Signal load	50 ohm (For good signal quality, the trigger out signal should be terminated in 50 ohms to ground)
Connector	BNC

Remote control or your device under test

Conveniently control your target remotely by using the target control port to activate reset or interrupt lines.

Target control port	
Number of signals	8
Output Disabled Output Enabled	Tri-state, high-impedance TTL level with 1 high, 0 low
Toggle	Flips the setting of the signal. If the signal is set to 1, Toggle changes the signal to 0.
Pulse	Flips the signal setting for one clock cycle which is at least 16 ms. The pulse duration cannot be specified.
Levels	3.3 V (LVTTL) compatible
Connector	2 rows of 5 pins, 0.1-inch centers

16900 Series physical characteristics

Dimensions

Power

16900A	115/230 V, 48 to 66 Hz, 1300 W max
16902A	115/230 V, 48 to 66 Hz, 1300 W max
16903A	115/230 V, 48 to 66 Hz, 900 W max

Weight*

	Max Net	Max Shipping
16900A	16 kg (35.2 lbs)	24.6 kg (54.2 lbs)
16902A	17.2 kg (37.8 lbs)	25.8 kg (56.8 lbs)
16903A	14.5 kg (32.0 lbs)	23.2 kg (51.0 lbs)

* Weight of modules ordered with mainframes will add 0.9 kg (2.0 lb per module)

Instrument operating environment

Temperature	• 0˚ C to 50˚ C (32˚ F to 122˚ F) for 16903A • 0˚ C to 40˚ C (32˚ F to 104˚ F) for 16900A and 16902A
Altitude	To 3000m (10,000 ft)
Humidity	8 to 80% relative humidity at 40˚ C (104˚ F)

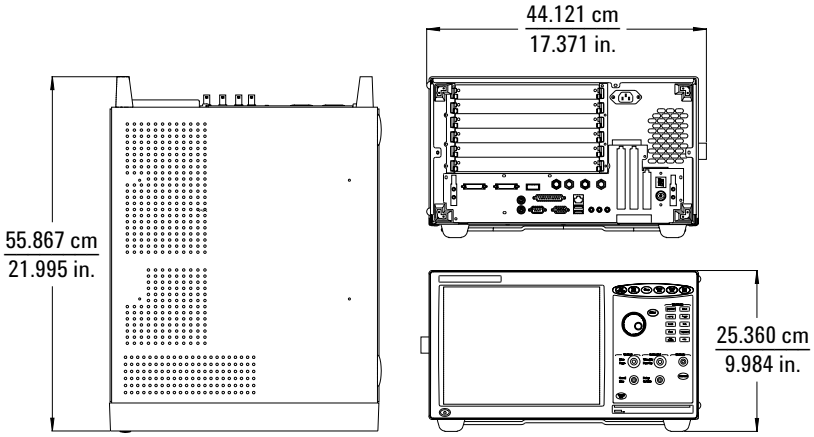

Figure 7. 16900A/16902A/16903A exterior dimensions

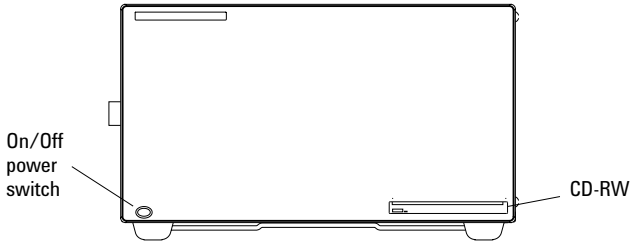

Figure 8. Agilent 16900A front panel

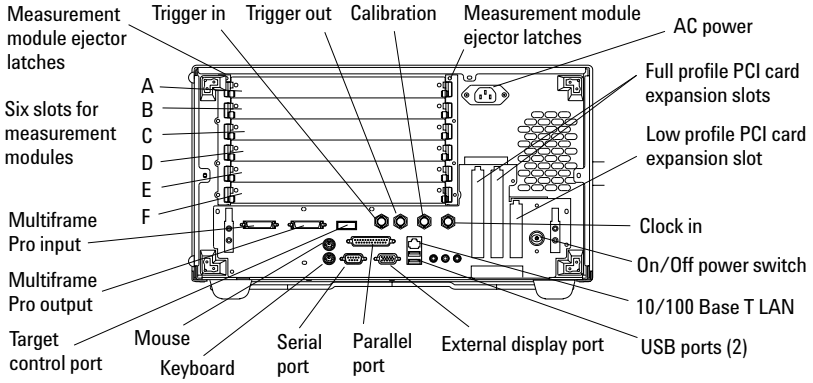

Figure 9. Agilent 16900A back panel

16900 Series physical characteristics

Dimensions, continued

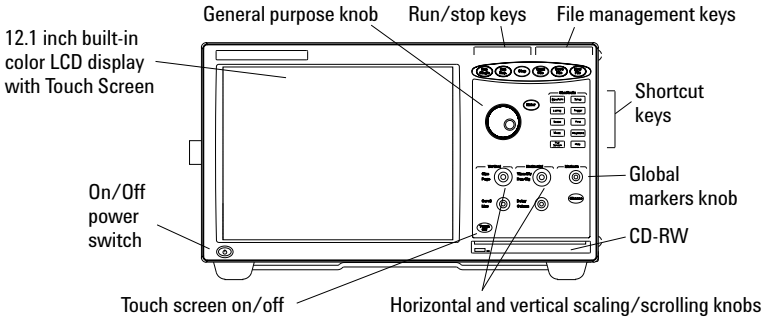

Figure 10. Agilent 16902A front panel

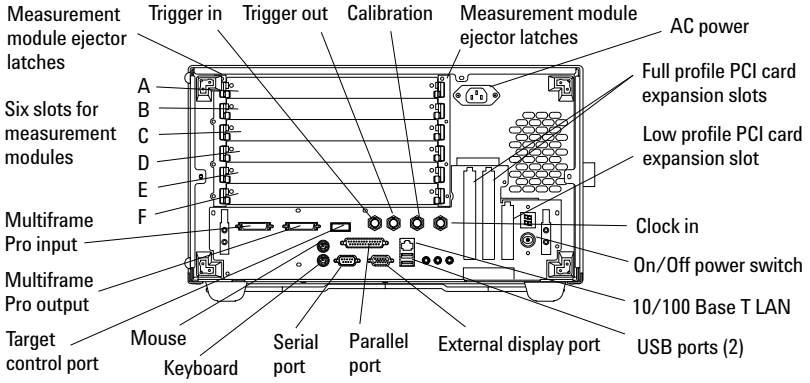

Figure 11. Agilent 16902A back panel

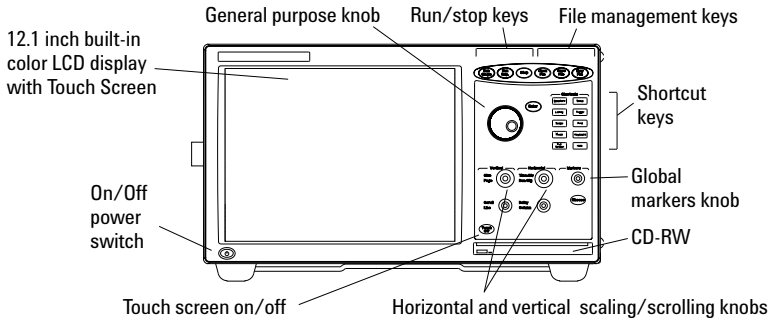

Figure 12. Agilent 16903A front panel

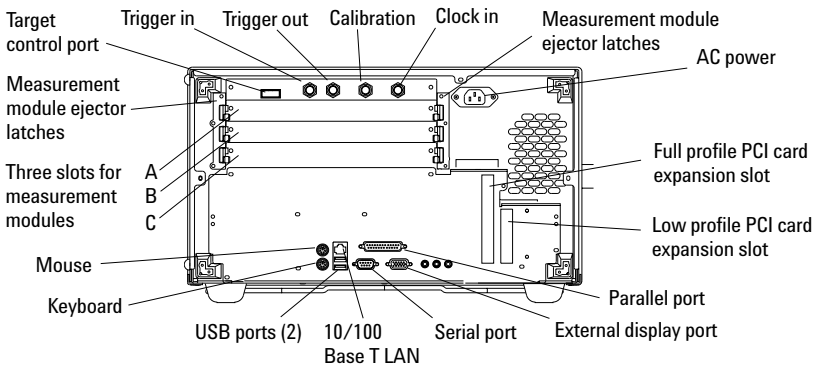

Figure 13. Agilent 16903A back panel

Agilent 1184A Testmobile

The Agilent 1184A testmobile gives you a convenient means of organizing and transporting your logic analysis system mainframes and accessories.

The testmobile includes the following:

- Drawer for accessories (probes, cables, power cords)
- Keyboard tray with adjustable tilt and height
- Mouse extension on keyboard tray for either right or left hand operation
- Locking casters for stability on uneven surfaces
- Strap to stabilize the monitor
- Load limits: Top tray: 68.2 kg (150.0 lb.) Lower tray: 68.2 kg (150.0 lb.) Total: 136.4 kg (300.0 lb.)

Figure 14. Agilent 1184A testmobile cart.

Weight

	Max Net	Max Shipping
1184A	48.0 kg (106.0 lb)	59.0 kg (130.0 lbs)

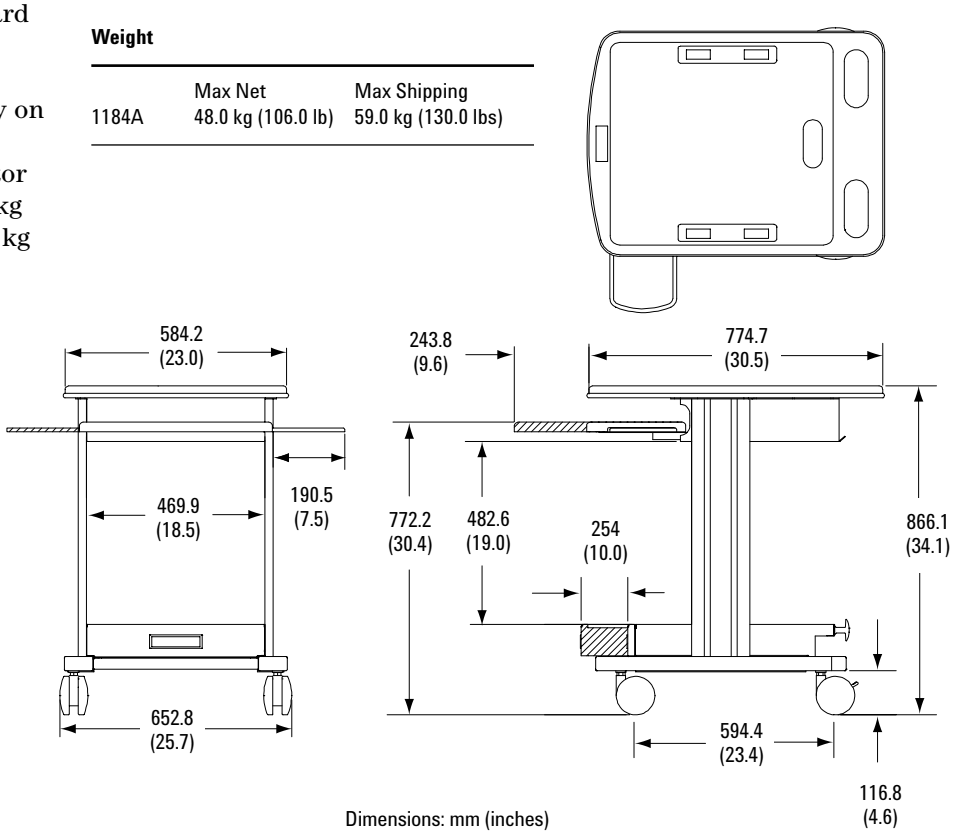

Figure 15. Agilent 1184A testmobile cart dimensions.

Ordering Information

Agilent product number	Description
16900A	6-Slot Logic Analysis System Mainframe
16902A	6-Slot Logic Analysis System Mainframe with Built-in Touch Display
16903A	3-Slot Logic Analysis System Mainframe with Built-in Touch Display

Each frame comes with one PS/2 keyboard, one PS/2 mouse, one ten-conductor flying lead cable for target control port, accessory pouch, and 1-year warranty standard.

Agilent product number or option number	Description	Ordering info
16900A-014 16902A-014 16903A-014	Gbit LAN card for 16900 Series mainframes (low profile, copper connection).	Installed in mainframe. Must be ordered at time of mainframe purchase
E5860A	Gbit LAN card for 16900 Series mainframes (low profile, copper connection).	Order for existing frames. Customer installable.
E5861A	Multiframe cable cable length	Order 1 less than the number of mainframes to be connected together

Optional Agilent analysis tools

- B4655A FPGA dynamic probe
- Processor/Bus specific inverse assembler
- E5850A Time-correlation fixture for connection to Infiniium oscilloscopes

Related Agilent literature

Publication	Description	Agilent pub. number
Agilent Technologies 16900 Series Logic Analysis Systems	Color Brochure	5989-0420EN
Agilent Technologies Timing and State Modules for the 16900 Series	Data Sheet	5989-0422EN
Agilent Technologies FPGA Dynamic Probe	Data Sheet	5989-0423EN
Probing Solutions for Agilent Technologies Logic Analyzers	Catalog	5968-4632E
Processor and Bus Support for Agilent Technologies Logic Analyzers	Configuration Guide	5966-4365E

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Printed in USA March 1, 2004
5989-0421EN

Agilent Technologies