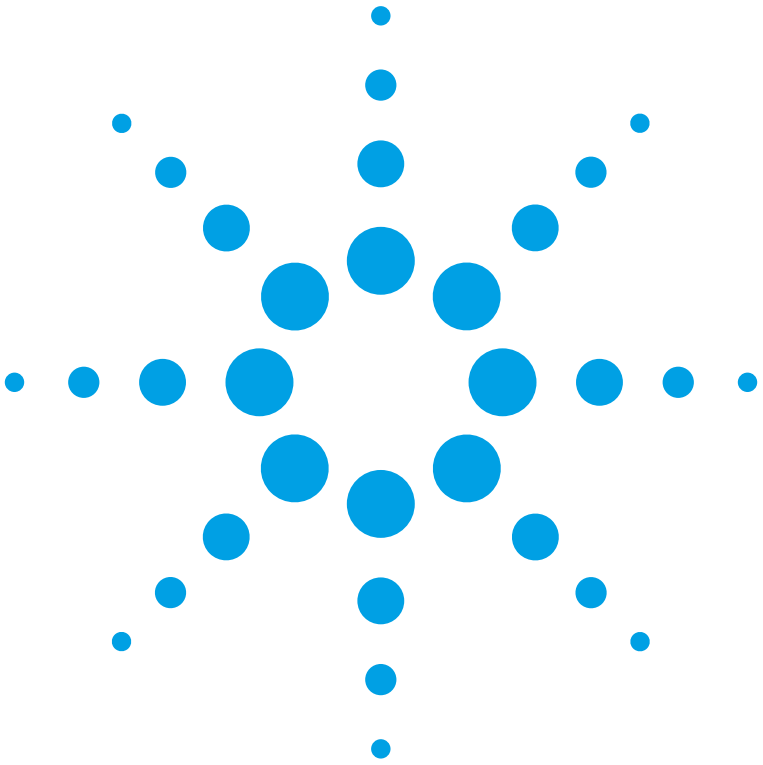
infiniium DCA

Agilent 86100A/B/C Wide-Bandwidth Oscilloscope Mainframe Service Guide



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Notices

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Safety Notices

CAUTION

Caution denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in damage to or destruction of the product. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

WARNING

Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning sign until the indicated conditions are fully understood and met.

Contents

1

General Information

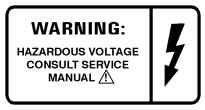
Introduction

In this chapter, you will find general information on caring for your optical devices. This manual documents the service and repair of the Agilent 86100A/B/C to the assembly level. Before servicing the mainframe, you should be aware that amplitude calibration data can only be installed by the factory. Whenever you contact Agilent Technologies about your mainframe, have the complete serial number and option designation available. This will ensure you obtain accurate service information. Refer to Table 1-1 for a list of internal labels. To locate a major instrument assembly, refer to the following figures:

- For the 86100A, refer to Figure 8-1 on page 8-5
- For the 86100B, refer to Figure 9-1 on page 9-5
- For the 86100C, refer to Figure 10-1 on page 10-6

Protect against ESD damage
Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe work station. Refer to "Electrostatic Discharge Information" on page 1-8 for more information on preventing ESD.

Table 1-1. Internal Labels

	This label warns you about hazardous voltages present on the power supply. Use extreme caution.

Servicing requires special tools

The tools listed below are required to repair all versions of the Agilent 86100A/B/C.

- T-6 screwdriver p/n 8710-1618
- T-8 screwdriver p/n 8710-1614
- T-10 screwdriver p/n 8710-1623
- T-25 screwdriver p/n 8710-1617
- T-15 screwdriver p/n 8710-1622
- wire cutter p/n 8710-0012
- small pozidrive screwdriver p/n 8710-0899
- long-nose pliers p/n 8710-1107
- Flexure Lock p/n 5022-0115
- 4-mm allen driver
- 5/64 allen driver

Safety Information

Before servicing the mainframe, familiarize yourself with the safety markings on the instrument and the safety instructions in this manual. This instrument has been manufactured and tested according to international safety standards. To ensure safe operation of the instrument and the personal safety of the user and service personnel, the cautions and warnings in this manual must be heeded. Refer to the summary of safety considerations at the front of this manual.

This product has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Electronic Measuring Apparatus, and has been supplied in a safe condition. The instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

WARNING These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

WARNING The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the product from all voltage sources while it is opened.

WARNING The power cord is connected to internal capacitors that may remain live for five seconds after disconnecting the plug from its power supply.

WARNING The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front panel switch is only a standby switch and is not a LINE switch (disconnecting device).

WARNING This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.

WARNING Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CAUTION Clean the cabinet using a damp cloth only.

NOTE The warranty is null and void on instruments that have had the seals broken by the customer. The instrument should only be disassembled by Agilent Technologies Customer Engineers.

Cleaning Optical Connectors

Accurate and repeatable measurements require clean connections. Use the following guidelines to achieve the best possible performance when making measurements on a fiber-optic system:

- Keep connectors covered when not in use.
- Use dry connections whenever possible.
- Use the cleaning methods described in this section.
- Use care in handling all fiber-optic connectors.
- When inserting a fiber-optic connector into a front-panel adapter, make sure that the fiber end does not touch the outside of the mating connector or adapter.

Because of the small size of cores used in optical fibers, care must be used to ensure good connections. Poor connections result from core misalignment, air gaps, damaged fiber ends, contamination, and improper use and removal of index-matching compounds.

Use dry connections. Dry connectors are easier to clean and to keep clean. Dry connections can be used with physically contacting connectors (for example, Diamond HMS-10, FC/PC, DIN, and ST). If a dry connection has 40 dB return loss or better, making a wet connection will probably not improve, and can actually degrade, performance.

CAUTION Agilent Technologies strongly recommends that index matching compounds *not* be applied to their instruments and accessories. Some compounds, such as gels, may be difficult to remove and can contain damaging particulates. If you think the use of such compounds is necessary, refer to the compound manufacturer for information on application and cleaning procedures.

Table 1-2. Cleaning Accessories

Item	Agilent Part Number
Pure isopropyl alcohol	—
Cotton swabs	8520-0023
Small foam swabs	9300-1223
Compressed dust remover (non-residue)	8500-5262

Table 1-3. Dust Caps Provided with Lightwave Instruments

Item	Agilent Part Number
Laser shutter cap	08145-64521
FC/PC dust cap	08154-44102
Biconic dust cap	08154-44105
DIN dust cap	5040-9364
HMS10/dust cap	5040-9361
ST dust cap	5040-9366

Inspecting Fiber-Optic Cables

Consistent measurements with your lightwave equipment are a good indication that you have good connections. However, you may wish to know the insertion loss and/or return loss of your lightwave cables or accessories. If you test your cables and accessories for insertion loss and return loss upon receipt, and retain the measured data for comparison, you will be able to tell in the future if any degradation has occurred.

Connector (or insertion) loss is one important performance characteristic of a lightwave connector. Typical values are less than 0.5 dB of loss, and sometimes as little as 0.1 dB of loss with high performance connectors. Return loss is another important factor. It is a measure of reflection: the less reflection the better (the larger the return loss, the smaller the reflection). The best physically contacting connectors have return losses better than 50 dB, although 30 to 40 dB is more common.

Although it is not necessary, visual inspection of fiber ends can be helpful. Contamination or imperfections on the cable end face can be detected as well as cracks or chips in the fiber itself. Use a microscope (100X to 200X magnification) to inspect the entire end face for contamination, raised metal, or dents in the metal as well as any other imperfections. Inspect the fiber for cracks and chips. Visible imperfections not touching the fiber core may not affect performance (unless the imperfections keep the fibers from contacting).

To clean a non-lensed connector

CAUTION Do not use any type of foam swab to clean optical fiber ends. Foam swabs can leave filmy deposits on fiber ends that can degrade performance.

1 Apply 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 Before cleaning the fiber end, clean the ferrules and other parts of the connector.

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. Move the swab or lens paper back and forth across the fiber end several times.

Wiping or mild scrubbing of the fiber end can help remove particles when application of alcohol alone will not remove them. This technique can remove or displace particles smaller than one micron.

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.

To clean an adapter

1 Apply isopropyl alcohol to a clean foam swab.

Cotton swabs can be used as long as no cotton fibers remain after cleaning. The foam swabs listed in this section’s introduction are small enough to fit into adapters.

Although foam swabs can leave filmy deposits, these deposits are very thin, and the risk of other contamination buildup on the inside of adapters greatly outweighs the risk of contamination by foam swabs.

2 Clean the adapter with the foam swab.

3 Dry the inside of the adapter with a clean, dry, foam swab.

4 Blow through the adapter using filtered, dry, compressed air.

Nitrogen gas or compressed dust remover can also be used. 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.

Cleaning Electrical Connections

The following list includes the basic principles of microwave connector care.

Handling and Storage

- Keep connectors clean
- Extend sleeve or connector nut
- Use plastic endcaps during storage
- Do *not* touch mating plane surfaces
- Do *not* set connectors contact-end down

Visual Inspection

- Inspect all connectors carefully before every connection
- Look for metal particles, scratches, and dents
- Do *not* use damaged connectors

Cleaning

- Try cleaning with compressed air first
- Clean the connector threads
- Do *not* use abrasives
- Do *not* get liquid onto the plastic support beads

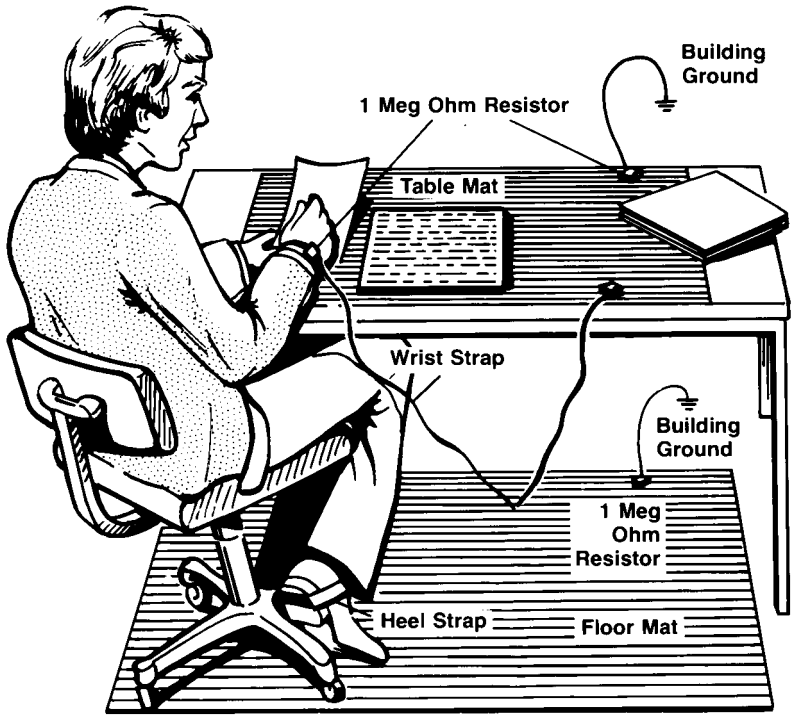
Making Connections

- Align connectors carefully
- Make preliminary connection lightly
- To tighten, turn connector nut *only*
- Do *not* apply bending force to connection
- Do *not* overtighten preliminary connection
- Do *not* twist or screw in connectors
- Do *not* tighten past the “break” point of the torque wrench

Electrostatic Discharge Information

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:

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



Both types, 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 MΩ of isolation from ground. Purchase acceptable ESD accessories from your local supplier.

WARNING These techniques for a static-safe work station should not be used when working on circuitry with a voltage potential greater than 500 volts.

Returning the Instrument for Service

The instructions in this section show you how to properly return the instrument for repair or calibration. Always contact Agilent to initiate service *before* returning your instrument to a service office. This ensures that the repair (or calibration) can be properly tracked and that your instrument will be returned to you as quickly as possible. In the United States call: Agilent Instrument Support Center (800) 829-4444.

To find the number of the Agilent Support Center in your area go to www.agilent.com/find/contactus.

If the instrument is still under warranty or is covered by an Agilent maintenance contract, it will be repaired under the terms of the warranty or contract (the warranty is at the front of this manual). If the instrument is no longer under warranty or is not covered by an Agilent maintenance plan, Agilent Technologies will notify you of the cost of the repair after examining the unit.

When an instrument is returned to an Agilent Technologies service office for servicing, it must be adequately packaged and have a complete description of the failure symptoms attached. When describing the failure, please be as specific as possible about the nature of the problem. Include copies of additional failure information (such as the instrument failure settings, data related to instrument failure, and error messages) along with the original calibration data disks and the instrument being returned.

Preparing the instrument for shipping

1 Write a complete description of the failure and attach it to the instrument. Include any specific performance details related to the problem. The following information should be included with the instrument being returned for service:

- Type of service required.
- Date instrument was returned for repair.
- Description of the problem:
  - Whether problem is constant or intermittent.
  - Whether instrument is temperature-sensitive.
  - Whether instrument is vibration-sensitive.
  - Instrument settings required to reproduce the problem.
  - Performance data.
- Company name and return address.
- Name and phone number of technical contact person.
- Model number of returned instrument.
- Full serial number of returned instrument.
- List of any accessories returned with instrument.

2 Cover all front or rear-panel connectors that were originally covered when you first received the instrument.

CAUTION Cover electrical connectors to protect sensitive components from electrostatic damage. Cover optical connectors to protect them from damage due to physical contact or dust.

CAUTION Instrument damage can result from using packaging materials other than the original materials. Never use styrene pellets as packaging material. They do not adequately cushion the instrument or prevent it from shifting in the carton. They may also cause instrument damage by generating static electricity.

3 Pack the instrument in the original or comparable shipping containers. Original materials are available through any Agilent Technologies office. Or, use the following guidelines:

- Wrap the instrument in antistatic plastic to reduce the possibility of damage caused by electrostatic discharge.
- For instruments weighing less than 54 kg (120 lb), use a double-walled, corrugated cardboard carton of 159 kg (350 lb) test strength.
- The carton must be large enough to allow approximately 7 cm (3 inches) on all sides of the instrument for packing material, and strong enough to accommodate the weight of the instrument.
- Surround the equipment with approximately 7 cm (3 inches) of packing material, to protect the instrument and prevent it from moving in the carton. If packing foam is not available, the best alternative is S.D-240 Air Cap™ from Sealed Air Corporation (Commerce, California 90001). Air Cap looks like a plastic sheet filled with air bubbles. Use the pink (antistatic) Air Cap™ to reduce static electricity. Wrapping the instrument several times in this material will protect the instrument and prevent it from moving in the carton.

4 Seal the carton with strong nylon adhesive tape.

5 Mark the carton “FRAGILE, HANDLE WITH CARE”.

6 Retain copies of all shipping papers.

Supplied Accessories

The following accessories are supplied with the purchase of an Infiniium DCA.

Table 1-4. Supplied Accesories

Accessory Description	Agilent Part Number
86100C Quick Start Guide	86100-90102
86100A/B/C Programmer's Guide	86100-90103
Mouse (86100C)	1150-7799
Mouse (86100A/B)	C3751-60201
Keyboard with 2-port USB hub, USB connector (86100C)	0960-2427
Keyboard, PS/2 connector (86100B)	1150-7809
Keyboard, AT style DIN 5 connector (86100A)	E2610-68700
External CD-RW drive (86100C)	0950-4658
USB Flash Drive (86100C)	1818-8989
APC 3.5 mm (f-f) adapter/connector saver	5061-5311
Power cord for country of destination	Also included

Preventative Maintenance, 86100A/B/C

The following steps should be checked or performed at the yearly calibration interval.

Check Date and Time

Refer to the On-Line Help for instructions on resetting the date and time.

NOTE

If the date and time setting do not remain after it is set, the battery on the A4 PC Motherboard assembly may need to be replaced. Refer to "To Replace the Batteries" on page 7-13.

Perform a Mainframe Timebase Adjustment

For users who need "As Received" or "Pre Cal" data at the yearly calibration interval, a verification process must be done first. Otherwise, a yearly Horizontal Timebase Adjustment is recommended before performance verification is started. Refer to "Timebase Adjustment" on page 3-3.

Perform a Touch Screen Alignment

Refer to "Touchscreen Calibration" on page 3-9.

Run Scan Disk 86100A/B

Scan Disk will check the files and folders of the selected drive for any errors, lost clusters, lost chains, and bad sectors.

1. On the DCA screen, click Help and About 86100A(or B).
2. On the DCA front panel, press the Local hardkey 5 times (until Service Mode enabled is displayed).
3. On the DCA screen, click Utilities, Service, Exit Scope.
4. On the DCA screen, click Start, Programs, Accessories, System Tools, Scan Disk.
5. Select Standard Test and click Start.
6. If there are any errors after the completion of the test, select Repair the Errors and press OK.
7. Close the dialog boxes and cycle power.

Run Disk Scan 86100C

Disk error checking on Windows XP:

1. On the DCA click Exit on the File menu to close the 86100C application.
2. When asked "are you sure you want to exit 86100C", click Yes.
3. Click START
4. Click My Computer
5. Click INFINIIUM drive (C:)
6. Select File Properties
7. Click Tools, Check Now...
8. Select Options, Start.

NOTE You may be prompted to restart Windows before it will run.

Clean Display Use a soft cloth and multi-purpose anti static cleaner for computers. Spray cleaner on the cloth (not directly on the screen), and clean the screen with the cloth.

Clean Fans Remove the cover and vacuum the fans using a small vacuum designed for computer systems.

Memory Declassification Procedure

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 DCA no longer contains any user configurations or data.

1 Turn instrument off and replace the hard drive, refer to “To Replace the A9 Hard Drive” on page 7-39.

2 Press the “Default Setup” key two times to clear SRAM (NV RAM) on Scope Interface Board and Acquisition Board Sequencer Memory. This sets the current state and prior state to default (known) settings.

3 To clear A13 Acquisition assembly “FIFO Channel Memory”, A14 Counter Assembly (86100C only) “Sequencer Memory”, GPIB address, and QuickMeasure Config, follow the Step a through Step h below:

NOTE Although the FIFO memory cannot be retrieved by the instrument after the unit has been turned off, it is stored in memory nonetheless. The following process stores “noise” into all four channels of FIFO memory.

a Install modules (any measurement module) into both left and right slots. Do NOT connect any signal to the inputs of the channels.

b Enable all four channels by pressing the numbered Channel key above the modules.

c Change # Points/Waveform = 4096 (max). This sets up the DCA to overwrite all waveform memory.

d Click Setup->Acquisition.

e Click Manual and enter 4096.

f Enter Pattern Lock Mode (86100C only).

g Click the Pattern Lock button.

NOTE This will result in a fail, this is expected.

h Click Cancel.

4 Reset Remote Interface (GPIB) Address

a Clicking Utilities, Remote Interface.

b Enter 7.

c Close the window.

5 Set QuickMeasure Configuration to default.

a Click Measure, QuickMeasureConfig.

b Click the “Apply Default Setup to Quick Measure” checkbox.

c Close the window.

6 This completes the declassification process.

Software License Maintenance, 86100C

On the 86100C DCA, additional measurement capabilities or features can be enabled with the installation of a software license. Option 100, Jitter Analysis, is an example of an added feature.

Agilent Software Licensing provides a web license redemption facility on the Internet that enables customer license redemption. The system also provides a centralized licensing data repository with administrative, factory, and support interfaces on the Agilent Intranet. ASL is developed and maintained by the Global Software Distribution Center (GSDC).

In the case of instrument repair where the hard drive or motherboard is replaced, or if the license has become invalid, the original licence may need to be replaced or regenerated.

When a software license is purchased, the owner receives a Software Entitlement Certificate from Agilent. A certificate number and an Agilent order number is printed on the entitlement certificate.

Redemption of the entitlement certificate at an Agilent web site provides a license key or file which is used to unlock the software option in a specified DCA. The license key is derived from the Host ID number (MAC address) which resides on the DCA motherboard.

The following information is required to redeem the certificate for a license:

- Entitlement Certificate Number (from Entitlement Certificate)
- Order number (from Entitlement Certificate)
- DCA serial number (on 86100C click Utilities, License)
- Host ID number (on 86100C click Utilities, License)
- E-mail address

ASL will generate a license key contained within a file, and E-mail the license file to the owner within a few minutes of submittal.

General Requirements for Maintaining Software Licenses:

- Access to the world wide web
- Log in capability at ASL
- External memory device such as USB flash drive, USB CD drive, or network drive
- 86100C Serial Number
- 86100C Host ID Number

Hard Drive Failure

Query License Data

When the 86100C hard drive is replaced or a license file or key is inadvertently removed, the original license data can be queried and retrieved by accessing the ASL license database.

After a hard drive failure it may not be possible to know what software options were previously installed on the 86100C. Checking the options sticker on the rear panel of the instrument might not show all of the options. In some cases the software option may have been retrofitted into the instrument after the original purchase. Always check the ASL web site to see which options are associated with the instrument after a hard drive replacement.

To obtain the license key or confirm which options are installed on an 86100C, visit the ASL web site at:

http://pamirs.cos.agilent.com/license/

NOTE This is a Agilent Internal web site. Contact your support representative if you are not able to access this web site.

1 Go the ASL web site and follow the Quick Start Instructions for entering the site as a Read Only user.

2 Select Query License Data.

3 At the next screen, follow the instructions to query license data.

a Select Search by: Serial Number.

b Select Search Condition: Contains.

c Enter Value of the serial number of the 86100C.

NOTE Use care not to add spaces before or after the number.

d Select date range: All Dates.

e Click on Search.

4 At the next screen you should see a list of all orders for this serial number. Confirm that it is associated with the 86100C product number under the column Product Number.

5 Click on the order number link under the Agilent Order Number column.

6 On the next page, Agilent Software Licensing Order Details, locate the License File column under Order Content And License Information.

7 Right-Click on the link(s) under each License File and select Save Target As...

8 Save the file(s) to one of the following medias.

- local hard drive:
- USB memory stick (recommended)
- USB CD ROM
- Network Share

9 Repeat Step 7 and Step 8 for each license.

10 Install the license. Refer to “Install a License File” on page 1-18.

Motherboard Replacement

Regenerate a License File

Replacing the motherboard in the 86100C requires that a License File be regenerated (rehost). The motherboard contains a unique Host ID number which is used in the license key generation process. The steps below will move a license to a new Host ID number.

NOTE You must have full Support Login capabilities at the ASL web site before proceeding. Contact your Factory support representative if you require assistance with the login process.

1 Log in to the following ASL web site:

http://pamirs.cos.agilent.com/license/login.asp

2 After successfully logging in, click on Licensing Support.

3 Click on Rehost Licenses.

4 At the next screen, follow the instructions to move the license to a new host.

a Pull down and select the vendor/entity name: AGILENT-DVS.

b Enter the Current Host Name/ID and click on Search.

c Verify the correct licenses are found by reviewing the license contents.

NOTE For multiple licenses on the same Host ID number, skip Step d and click Add All in Step e.

d Pull down the “Select License Item” menu and select the license line(s) from the license list.

e To add the License Line to the Work List, click on Add, or use Add All to enter all license lines.

NOTE The work list item should now list the old Host Name ID, Order Number, Product, Qty, Expiry Date, and E-mail.

f Click on the item in the work list.

NOTE After clicking on the item, the old Host Name ID should show on the left side of the screen under “Enter Host Name/ID”.

g Enter the new Host Name/ID in place of the old one.

h Enter your E-mail address (this is the address where the new license file will be sent).

NOTE Although listed as optional, you must enter your E-mail address so that you can receive the newly generated license file.

i Click the Update button or Update All for all lines.

j Enter your update notes briefly explaining the rehosting reason.

For example:(your name) replaced 86100C A4 motherboard; previous host ID number: 003064023C0A, new host ID number: 074091092F0B

k Review the information on the screen and click on Save.

5 Within a few minutes you should receive an E-mail with the license file for the new Host ID Number.

6 Once you have obtained the new license key or keys, install it in the DCA. Refer to “Install a License File” on page 1-18.

Install a License File

After you receive the new license file, copy it to a location that is available to the 86100C. This could be the 86100C hard drive, USB CD drive, network drive, or a USB memory stick (recommended).

1 On the 86100C DCA, click Licenses on the Utilities menu to view the Licenses dialog box.

2 Highlight the feature that you want to activate under Features.

3 Click Install New License.

4 Click Browse for License File and locate your license file.

5 Click Install This License File.

6 Repeat the above steps for all licenses.

7 To confirm that the license is installed verify that the Status is “License installed”.

8 Close the window.

NOTE If you can't make your license file available to the 86100C, you can manually enter a 60 digit key code. Refer to the steps below.

Enter the license key manually (optional)

Although it is faster to use the file, manually entering the key code provides an alternative that fully fulfills the installation requirements.

1 Obtain the 60 digit key code by using a text editor, such as Notepad, and view the contents of the license file. The license filename ends in the extension ".lic"

Here is an example of the contents of a license file:

FEATURE AdvancedWaveformAnalysis agilent 1.0 permanent uncounted HOSTID=003064023c0a TS_OK SIGN="00A2 E3A3 436C B985 ACE6 7732 036F AF00 9208 23B4 AEEC 1660 F8D9 EBD1 219A"

2 After opening the file, look for the 60-digit key code after the header "SIGN=" and in between the quotation marks e.g.:

00A2 E3A3 436C B985 ACE6 7732 036F AF00 9208 23B4 AEEC 1660 F8D9 EBD1 219A

NOTE There may be more that one 60-digit code because of multiple licenses. Be sure to enter all sets of 60-digit codes.

3 After finding the key code, click the Install New License dialog box to enter your code and activate your feature.

NOTE Because the letters in the key code are not case sensitive, you can enter letters in either upper or lower case. The key code is in hexadecimal using digits 0 through 9 and letters a through f.

Transferring a License

Transferring a license from one DCA to another is not permitted. A separate license must be purchased for each DCA that requires that feature.

Delete Licenses From the DCA

Deleting licenses is required when refurbishing a DCA for resale. To remove all installed feature licenses, follow the steps below:

1 Connect a keyboard to the instrument.

2 On the DCA click Exit on the File menu to close the 86100C application.

3 When asked "are you sure you want to exit 86100C", click Yes.

4 Click "Start" and select "Run..."

5 Type the following in the Run window:

c:\windows\i386\OEM\RemoveLicenses.bat

6 Click OK to run the batch file.

7 At the on-screen message referring to license removal, follow the instructions to proceed.

Warning!
You are about to remove a license.
Press any key to continue, or ctrl-c to break out...

8 Press any key such as the Enter key.

9 To confirm that the licenses are removed, start the DCA application by double clicking the 86100C infiniium DCA shortcut on the DCA desktop.

10 Touch/click Utilities, Licenses...

11 Check under the "Features That Require a License" box and confirm that the status for each feature listed is "Not Installed".

12 Close the window.

Cancel ASL License Entry

Even though license data is removed from the DCA, entries at Agilent Software Licensing still need to be removed or cancelled. Future enquiries at the ASL web site for the refurbished DCA must not show previous entitlements. If the motherboard or hard disk drive is subsequently replaced, the previous license data must not be installed on the DCA unless there is an entitlement for it. The procedure below will cancel any licenses for a particular serial number at ASL.

NOTE You must have full Support Login capabilities at the ASL web site before proceeding. Contact your Factory support representative if you require assistance with the login process.

1 Log in to the following ASL web site:

http://pamirs.cos.agilent.com/license/main.asp

2 After successfully logging in, click on Licensing Support.

3 Click on Query Licence Data.

4 At the next screen, follow the instructions to query license data.

a Pull down and select Search Context: ASL (License) Information

b Select Search by: Serial Number.

c Select Search Condition: Contains.

d Enter Value of the serial number of the 86100C.

NOTE Use care not to add spaces before or after the number.

e Select date range: All Dates.

f Click on Search.

5 On the next screen, refer to the first column titled:

Vendor/Agilent Order Number

6 Record the order number or print the page. You will be referring to this number on future steps.

7 Click Home.

8 Click Update Order Header.

9 On the next page select a Vendor/Entity Name: pull down and select AGILENT-DVS.

10 Fill in the Order Number in the Vendor/Agilent Order Number field.

11 Click Search

12 Change Current Status to: CANCELLED

13 In Update Notes write the serial number of the DCA and the following text:

Cancel license issued to previous owner

14 This completes the process to remove a software license.

DCA Options and Option Upgrades

Options that can be purchased with the DCA and options that can be retrofitted after the product ships are shown below.

Customer Installed Upgrades

The Agilent 86100C has additional measurement capabilities that can be customer enabled with the purchase of a software licence, refer to "Software License Maintenance, 86100C" on page 1-16. Table 1-5 shows the software option upgrades available for the 86100C.

Table 1-5. Customer Installable Options, 86100C

Customer Upgrade Number	Software Options	Description
86100CU-100	86100C Option 100 (obsolete)	Jitter Analysis. 86100CU-100 Superseded by 86100CU-200 in November 2004.
86100CU-101	86100C Option 101 (obsolete)	Enhanced Waveform Analysis. 86100CU-101 Superseded by 86100CU-201 in November 2004.
86100CU-200	86100C Option 200	Advanced Jitter Analysis
86100CU-201	86100C Option 201	Enhanced Waveform Analysis
86100CU-202	86100C Option 202	Enhanced Impedance and S-Parameter
86100CU-300	86100C Option 300	Advanced Amplitude Analysis/RIN/Q-Factor

Agilent Service Center Installed Upgrades

For the Agilent service centers requiring upgrade information on the DCA products, Table 1-6 shows the option upgrades and the orderable part number information.

Table 1-6. Service Center Installable Options

Service Center Upgrade Number	Upgrade Options	Option Capability Description
86100CS-001	86100C Option 001	Enhanced Divided Trigger 50 MHz to 13 GHz
E2660-68710	86100A/B Option 001	External Divided Trigger 2 to 12 GHz

Refer to the Agilent Internal Service web page for more information regarding option upgrades.

lwd.marketing.agilent.com

Navigate to the Technical Support Engineering link and go to the Individual Support Page for the 86100 Infiniium DCA.

2

Automated Testing and the VISION Test System

Introduction

The automated performance tests and adjustments for the 86100 mainframe use the VISION test system. The test system controller is a PC. When a test system component fails, such as the hard drive, it is important to have a process in place that maintains backups of the data files and to have a workable process to restore the files.

Follow the standard guidelines for keeping the ETE calibration current. Follow the recommended calibration intervals for all ETE, making sure that a DUT is tested with calibrated test equipment.

Table 2-1 on page 2-7 shows the differences between the manual performance verification and the VISION test software system. Table 2-2 on page 2-9 lists the equipment and accessories for the VISION test system.

The following three CDs ship with the Test System and are attached to the top of the controller. Although you can use the recovery disks in an emergency, it is probably better to use disks created as part of the regular backup process.

- DSA CAL Software Install Disk – contains the Test Software and Database and may be used if the test software becomes corrupted.
- DSA CAL Software Recovery Image – a two CD set that contains a factory ghost image of MicroSoft Windows 2000 and the Test Software and Database install.

  Test system upgrades will be available every 4 months through the software online distribution site. Please register with the following SW Online website, so that you will automatically receive email notification whenever the product is updated:

  http://www-ist.scs.agilent.com/cgi-bin/sw_online/csc_welcome.pl

To reinstall the test software

- Use the “DSA CAL Software Install Disk” CD that shipped with the system. This reinstalls the original factory test software and database. Following this restore, restore your backup database. This disk *does not* restore the entire HDD image.

  Download the latest copy from the software update site:

  http://www-ist.scs.agilent.com/cgi-bin/sw_online/csc_welcome.pl

  Obtain a backup copy from the backup test code executable (possibly out of date) located at:
  c:\lwdcal\Programs\ctb\previous\Dcamainframe.exe

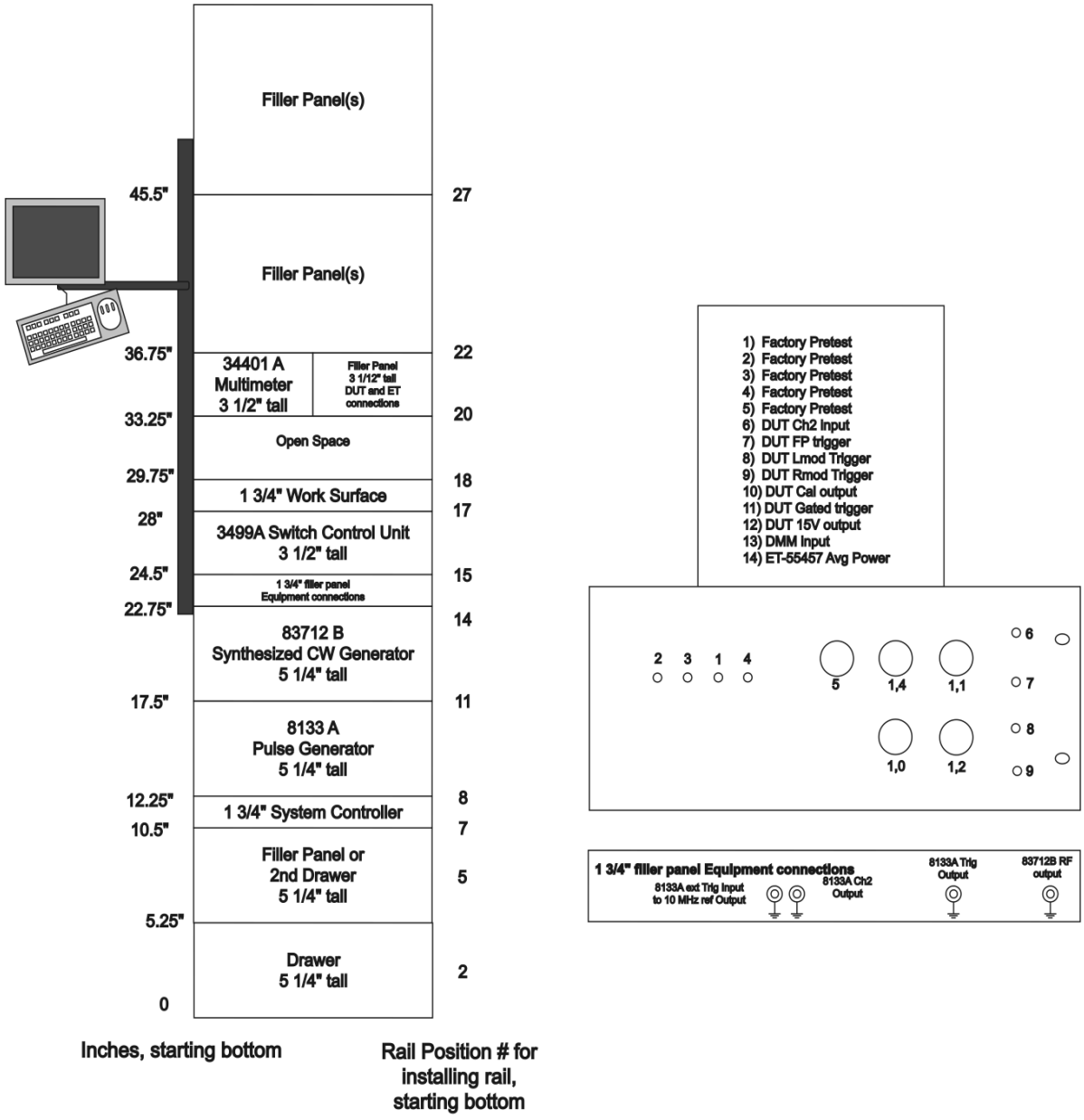


Figure 2-1. Equipment Rack Layout

Database Backup and Restore

There are at least two database files that need to be backed up weekly (or in the case of large calibration volumes, daily) to avoid data loss in the event of database corruption or hardware failure. Ideally the database files should be stored on a network share that is backed up nightly. This would eliminate the need to manually back up each of the files. If a network drive is not available, the database can be backed up to the built in DVD burner or CD ROM drive, a removable USB drive, or portable CD ROM drive. You can rename the database files or create new files if they become too big.

The following are the two database files:

- Electronic Test Equipment (ETE) database, *equipment.mdb*. The ETE database contains records of the test equipment model numbers, serial numbers and calibration dates.
- Device Under Test (DUT) database, *dca.mdb*. The DUT database stores the model numbers, serial numbers, pass/fail status, test limits, and test sequences.

To backup the ETE and DUT database

1 On the test system PC, close the “Lightwave Division” test executive software application.

2 Using Windows Explorer or My Computer, locate the subdirectory folder c:\lwdcal\data.

3 Select all “.mdb” data files that you wish to have backed up. This includes the files *equipment.mdb, dca.mdb, firefly.mdb etc*.

4 Copy the files to one of the backup medias as mentioned above.

To recover a database

1 Exit all applications.

2 Copy the database files from the backup location to the following disk drive folder: c:\lwdcal\data.

Controller Disk Drive Backup and Restore

Although recovery disks have been provided with the system, the controller disk drive should be backed up monthly to make it easier and faster to restore the system to the current revision of test software and databases. Use a disk imaging software application such as Ghost version 9.0 (or later) or equivalent backup program.

To back up the controller disk drive

1 Exit all applications.

2 Start up the image copy program. For example, Ghost.

3 When asked, select the entire contents of the hard disk drive and copy the image to the DVD or CD burner.

4 Store the newly created disks on top of the system controller.

To restore the controller disk drive

This procedure is valid for test systems vintage 2005 and later. Older systems will use a similar process but might have different hardware. For example, no DVD drive.

1 Connect a keyboard and mouse to the system.

2 Install the recovery CD or DVD in the drive.

3 Shutdown the system controller and restart. Wait for boot up to complete.

4 Eventually the following prompt will be displayed:

```
1. This computer was started from a Ghost Boot Disk
2. This computer was started from a Ghost Bootable CD
   Enter a choice
```

5 Select option 2, **"**This computer was started from a Ghost Bootable CD**"**. Press the Enter key.

NOTE There will be a number of error messages displayed after selecting prompt number 2. This is normal and can be ignored.

6 Next, the following prompt will be displayed:

```
Loading...
Insert Ghost boot disk 2 (containing Ghost.exe)
To run Ghost.exe from a hard disk or DC, press Ctrl-C at the following prompt then change to the appropriate
drive letter and type 'Ghost'
press any key to continue...
```

7 Press Ctrl-C.

8 When asked to terminate the batch job indicate Y for Yes.

9 At the A:\ prompt, type in C: then press Enter.

10 Click the OK button.

11 Type in *ghost.exe* and press the Enter key.

12 Select Local -> Disk -> From Image. Press Enter.

13 Open the first *.gho* file image in the list.

14 Press the Enter key.

15 Click OK, OK, and Yes to proceed with the disk restore.

16 Wait for the completion of the re-imaging. If a CD is used, look for the prompt to install CD #2. Follow the instructions and continue.

17 At the completion of the restoration process, the message “Clone Completed Successfully!” is displayed.

18 After the imaging is complete, remove the DVD or CD from the drive.

19 Shutdown the system controller and restart.

20 Copy the test software’s installation disk to a temporary directory.

21 Run the program and follow the on-screen instructions for installing the software.

22 Restore your backup database to the controller.

23 Upgrade the Test Software from SW Online.

Table 2-1. Comparison of Manual Tests to Automated Software Tests

86100A/B/C Software Performance Verification	86100A/B Manual Performance Verification	Difference	Type of Verification
Check Internal Temperature	Not Checked	New test	Functional
Trigger Port	Not Checked	New test	Functional
Gated Trigger	Gated Trigger	Same	Functional
Divided Trigger 86100C Opt 001	N/A (86100C only)	New test	Functional
Rear Panel 15 Volt Output 86100A/B	Not Checked	New test for 86100A/B only	Functional
Module Calibration	Module Calibration	Same	Functional
Delay & Timebase Accuracy	Delay & Time Interval	More points tested in software	Specification
Fine Timebase (86100C) [a]	—	New test for 86100C only	Specification
Trigger Level Accuracy	Not Checked	New test	Functional
Calibrator Accuracy	Front Panel Calibrator	More points tested in software	Specification
Trigger Jitter Standard	(Trig) Jitter Verification, Trigger Sensitivity Standard	More points tested in software	Specification
Trigger Jitter Opt 001	Trig Verification Opt 001 Trigger Sensitivity 001	More points tested in software	Specification
Pattern Trig 86100C Opt 001	N/A (86100C only)	New test	Functional
Optical Power	Not Checked	New test	Functional

a. Due to its complexity, the Fine Timebase Accuracy for the Agilent 86100C can only be tested with an automated test system.

Test System Connections and Equipment

Use the following illustration to help understand how the test equipment is connected and how the signals are routed for testing the 86100A/B/C.

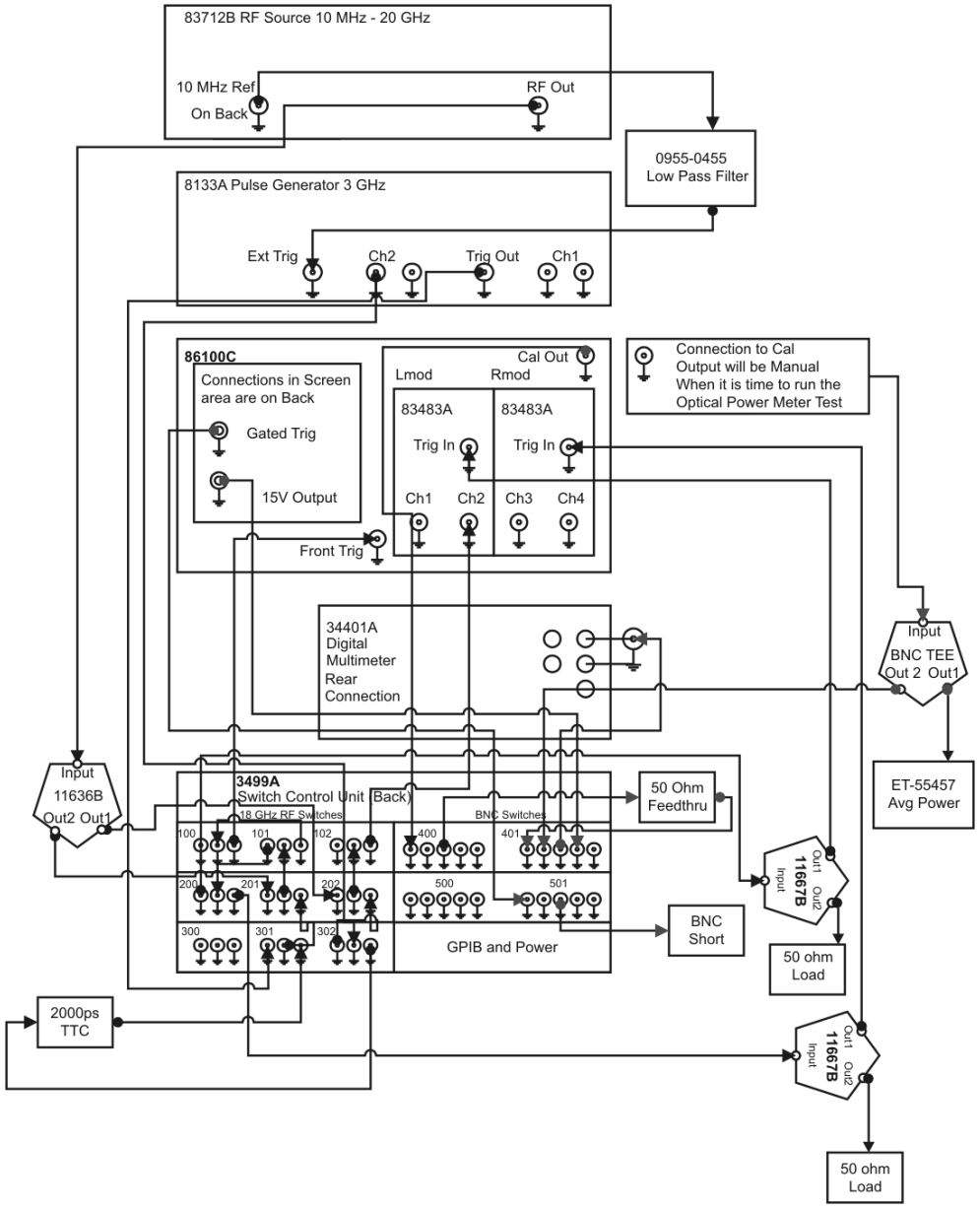


Figure 2-2. Test System Connections

Table 2-2. Equipment List (1 of 3)

Model	Description	Qty
System Controller + Accessories + Miscellaneous		
86030-80013	System controller with Agilent GPIB Card	1
AC-ms-ps2	2-Button Scroll Mouse (PS/2)	1
AC-key-ps2	Keyboard (PS/2)	1
2090-0804	Advance Display (LCD)	1
	Continuous Ground Monitor	1
Equipment + Fixtures + Components		
3499A	5-Slot Switch/Control Mainframe	1
44476A	Triple 1x2 50 Ohm Microwave Multiplexer	3
44478A	Dual 1x4 1.3 GHz, 50 Ohm Multiplexer	2
83712B	Synthesized CW Generator,.01 to 20 GHz Opt 1E1, 1E5, 1E8 & 1E9	1
34401A	Digital multimeter, 6.5 digit with options 001	1
8133A	Pulse Generator, 3 GHz Opt 1X002	1
83483A	2 Channel Electrical. Module, 12.4/20 GHz BW	2
11667B	DC - 26.5 GHz power splitter, APC 3.5	2
11636B	DC to 26.5 GHz power divider, APC 3.5	1
15438A	Transition Time Converter 2000 ps	1
11048C	Coax Termination Feed thru, Imp 50 Ohm	1
1250-0774	Shorting Cap Coax BNC Shorting Cap Coax BNC	1
ET51703B	Dummy Optical module	1
0935-0455	300 MHz Low Pass Filter	1
Adapter + Connector		
5061-5311	Connector Assembly - 3.5mm FEM to FEM	8
8710-1749	Wrench Thumb SMA	4
1250-0781	Adapter-coax Tee F-BNC M-BNC F-BNC	1
1250-1200	Adapter: BNC (f) to SMA (m)	1
E5250-65044	Dual Banana Plug to BNC (Female)	1
1250-0076	Adapter-coax RTANG F-BNC M-BNC (Used for Panel to ET's Cal Out)	2
1250-1249	Adapter: SMA right angle (m) (f) (Used for Front Frame Trigger)	1
Rack + Power Cable + GPIB Cable + Accessories		

Table 2-2. Equipment List (2 of 3)

Model	Description	Qty
5182-3144	Monitor Arm W/KB	1
5182-3143	Extrusion Kit (Flexible Industries)	1
1390-1256	Lever Adjustable Zinc Die Cast (6N20A02K - JW Winco)	1
35181M	5.25" Drwr Storg	1
46298S	Work Surface with mounting hardware	1
E3661B	1.6M rack cabinet, 32 EIA units with options AW3 (110V)	1
E3663AC	Rail: Standard	5
E3664AC	Solid (non-sliding) rack mount rail kit for non-Agilent racks	1
E4455A	PDU 100-120V N. Am w/nema i	1
E4470A	Extractor fan 100-120 Volt top mounted extractor fan with 200 cfm (342 cmh)	1
E7731A	Filler Panel 1 EIA unit quartz	1
5061-5311	Connector Assembly - 3.5mm FEM	4
5063-9240	Kit-rack Adapter	1
5061-5311	SMA Adapter, Female to Female C/W Wahser & Nuts, Wall mount	8
1250-0161	Adapter-coax STR F-BNC F-BNC	5
2190-0068	Washer-LK INTL T 1/2 IN.505-IN-ID	5
0590-1310	NUT-SPCLY 1/2-28-THD.11-IN-THK.665-WD; Nut; Specialty (Item Name: Nut)	5
E7733A	RK PNL-FLLR 3U	3
E7734A	RK PNL-FLLR 4U	1
8120-1378	PWR-CORD OPT-903 3-COND 2.3-M-LG	9
10833D	GPIB cable, 0.5 meter	5
10833C	GPIB cable, 4 meter	1
10834A	Adapter, extends GPIB connector 2.3 cm	1
E7901-64210	RJ-45 LAN Cable (2M)	1
	Bracket for cable resting	1
RF Cables: BNC + Semi Rigids + RF Cable		
5062-6684	Cable Assembly 9 IN SMA, 11636B to Switch	2
5062-6684	9" Semi Rigid Cable, Panel to ET, LMOD Trig and RMOD Trig	2
5062-6678	3" Semi Rigid Cable, Switch to 11667B	2
5062-6678	3" Semi Rigid Cable, Switch to Switch	4
5062-6679	3" Semi Rigid Cable, Panel to ET Front Frame Trigger	1

Table 2-2. Equipment List (3 of 3)

Model	Description	Qty
5062-6681	6" Semi Rigid Cable, Time Transition Converter to Switch	1
5062-6681	6" Semi Rigid Cable, Panel to ET LMOD CH2 input	1
5062-6681	6" Semi Rigid Cable, Switch to Switch	2
5062-6684	9" Semi Rigid Cable, 83712B RF Connection to Panel	1
5062-6687	12" Semi Rigid Cable, 8133A RF Connection to Panel	3
5062-6687	12" Semi Rigid Cable, RF Source from Panel to 11636B	1
5062-6693	24" Semi Rigid Cable, 11667B to panel	4
5062-6693	24" Semi Rigid Cable, 8133A Channel 2 & Trigger to Switch Control Unit	2
5062-6693	24" Semi Rigid Cable, Switch to 1/2 MW panel	4
8120-2582	48" Cable Assy Coaxial, Panel to 83712B 10 MHz reference	1
8120-2582	48" BNC Cable, Panel to DUT	4
8120-2582	48" BNC Cable, Switch to Panel	5
8120-2582	48" BNC Cable, Switch to ET Back - Gated Trigger	1
8120-2682	216, Cable Assy-coaxial, Panel to ET's Cal Out	1
8120-2682	216 BNC Cable, Switch to 50 ohm Feedthrough	1
8120-4948	Cable-assy-coax Cust-CBL 36 IN LG, Panel to DUT	4
8120-5048	Assembly Cable BNC to SMB (Male to Female SMB)	2

Test System Block Diagram

The test system block diagram shows the path of the electrical signal, from a source output, through a device such as a switch, to the DUT input. Part of the VISION test system is used in the Factory for board pretest.

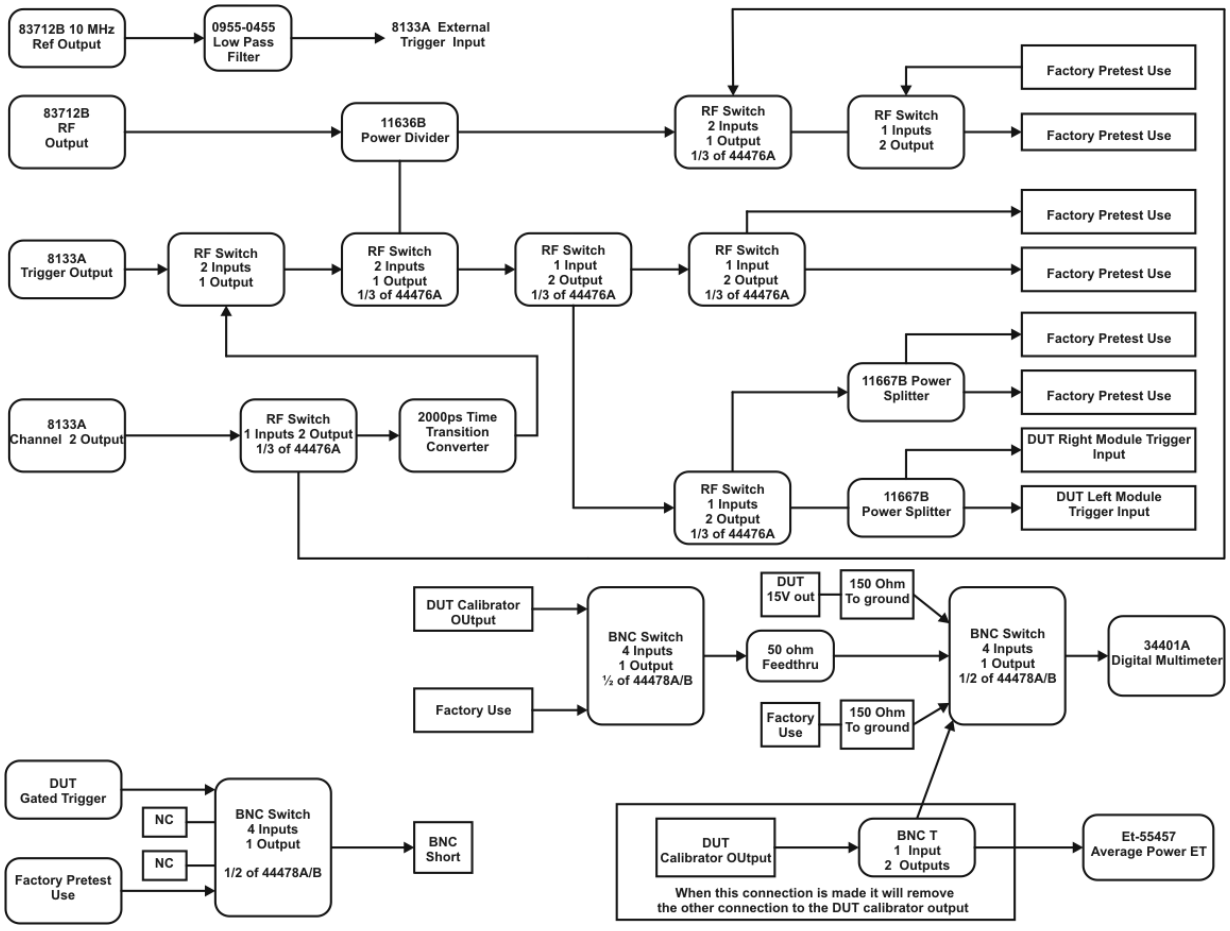


Figure 2-3. Test System Block

3

Adjustments

Introduction

This chapter provides adjustment procedures for the Agilent 86100A/B/C Infiniium DCA Mainframe. Equipment required for individual adjustments is listed in the adjustment descriptions in this chapter. Equipment satisfying the critical specifications listed may be substituted for the recommended model.

This chapter documents both manual and automated testing. The adjustments can be performed either manually or with the VISION test system and the Agilent DSA Test Executive.

NOTE Do a Performance Verification before attempting any adjustments for customers requiring “As Received” or “Pre Cal” data.

CAUTION Avoid damage to plug-in front panel connectors. Use 2.4 mm and 3.5 mm connector savers. These connector savers are a supplied accessory. Minimize connector swapping during the procedures to avoid connector wear. All connectors on test tools and adapters should be inspected both visually and mechanically every few calibrations.

CAUTION All connectors should be clean and undamaged to ensure accurate measurements. All 2.4 mm and 3.5 mm connectors should be mechanically and visually checked before inserting any calibration test tool into them. Damaged connectors or loose connectors may cause the performance verification tests to fail.

CAUTION Avoid sharp bends in 2.4 mm, 3.5 mm, SMA, and optical cables. When mating 2.4 mm to 2.4 mm or 3.5 mm to 3.5 mm, torque all connections to 8 in/lbs. When mating 3.5 mm to SMA or SMA to SMA, torque all connections to 5 in/lbs.

CAUTION The module inputs are very sensitive to static discharge. Failure to observe proper antistatic procedures may damage the gallium arsenide samplers. ESD damage is not covered under the warranty. All maintenance or operation should be performed with an antistatic mat and wrist strap. Refer to “Electrostatic Discharge Information” on page 1-8 for further information.

CAUTION Electrostatic discharge can seriously damage the module’s electrical inputs. To eliminate any electrostatic build up from a cable you’re connecting to the module, connect a female short to either end of the cable. Touch the short to an input connector hex nut on the module to discharge any static build up to ground. Remove the short. Use this procedure for all cables before connecting them to the module.

Timebase Adjustment

The frequency of the 250 MHz oscillator is adjusted with a variable capacitor located on the A13 Acquisition Assembly. The adjustment capacitor can be accessed from a hole in the bottom of the instrument cover. The adjustment is made so that one cycle of the 250 MHz oscillator matches the time of the 4 ns ramp.

Software routines built into the DCA firmware make the final adjustments so that the timebase is accurate across the full range of instrument settings.

NOTE This adjustment should be performed yearly or after every 2,000 hours of operation.

Manual Testing

Table 3-1. Equipment Required for Manual Timebase Adjustment

Equipment	**Critical Specifications**	**Recommended Model/Part**
Plug-in Module	54750A, 83480A, or 86100A/B Series plug-in with electrical input	Agilent 54751A, 83483A, 86112A
Synthesized CW Generator	No substitution	Agilent 83712B Required Options: 1E5 — High Stability Timebase Recommended Options: 1E1— Output Step Attenuator 1E8 — 1 Hz Frequency Res. 1E9 — 3.5 mm RF Out Connector
Attenuator[a]	10 or 20 dB; Frequency range of dc to 18 GHz	Agilent 33340C
Timing Generator	No substitution	Agilent 8133A Standard or Option 002
Transition Time Converter	2000 ps	Agilent 15438A
Cable, BNC	50 Ω, 122 cm (48.in)	Agilent 10503A
Adapter, BNC (m) to SMA (m)	50 Ω	Agilent E9633A BNC (m) to SMA (m), 50 W
Cable Assembly, 3.5 mm (m) to 3.5 mm (m) (2 each)	61 cm (24 in); Frequency range of dc to 26.5 GHz	Agilent 11500E

a. not required if 83712B option 1E1 installed

CAUTION Before performing this procedure, you must have firmware revision A.02.00 or higher installed in the Agilent 86100A/B. Refer to the Agilent website (www.agilent.com/comms/DCA) for instructions on obtaining the latest firmware revision). Trying to adjust the mainframe timebase with older firmware will cause timebase accuracy failure. After the DCA mainframe's timebase is adjusted, you can not install a version of firmware below A.02.00. Timebase failure will occur.

Procedure

1 Make sure the instrument cover is in place.

2 Install the plug-in module into the mainframe left-hand module slot, then tighten both screws.

3 Turn on the mainframe. After the boot-up is complete, press the Default Setup hardkey on the DCA front panel.

4 Turn on the electrical channel by pressing the CHANNEL 2 hardkey on the DCA front panel. Turn all other channels off.

5 On the DCA front panel, set the trigger source to Free Run by pressing the Source hardkey until Free Run is selected.

NOTE Allow all of the equipment to warm up for at least one hour in the settings specified above before you proceed. These settings are optimal for generating typical operating conditions.

6 Set the timing generator controls as follows:

a Turn on the timebase EXT and EXT DIVIDE, and set to divide by one

b Set the CHANNEL 2 output as follows:

SQUAR ON

AMPL 2.4 V

OFFS 0 (If needed, adjust the offset to center the output around 0 V.)

DISABLE OFF

c Set all other controls to zero or off.

7 On the synthesized CW generator, press PRESET, then set the controls as follows:

FREQ 500 MHz

POWER LEVEL -14 dBm

RF ON/OFF to OFF

NOTE If the Synthesized CW Generator does not have Option 1E1 installed, insert a 10 or 20 dB attenuator at the RF OUTPUT and set the POWER LEVEL so that the power going to the electrical channel is -14 dBm. (Example: 10 dB attenuator = -4 dBm; 20 dB attenuator = +6 dBm.)

8 Ensure that everything is disconnected from the electrical plug-in input.

9 On the DCA screen, press Calibrate..., All Calibrations..., Module, Calibrate Left Module, then press Continue.

10 After the successful completion of the calibration routine proceed to the next step.

11 Connect equipment as shown in Figure 3-1.

a Connect the synthesized CW generator's 10 MHz OUT to the timing generator's timebase EXTERNAL INPUT.

b Connect the 2000 ps transition time converter to the timing generator's CHANNEL 2 output.

c Connect the 2000 ps transition time converter to the DCA front panel trigger input, using the cable and adapters.

d Connect the synthesized CW generator RF OUTPUT to the module electrical channel.

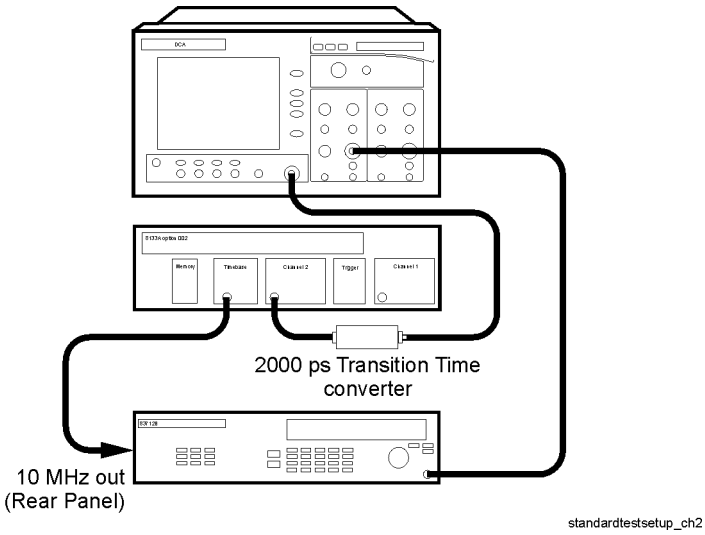


Figure 3-1. Timebase Adjustment Setup

12 On the Synthesized CW Generator, set the RF ON/OFF to ON.

13 On the DCA, set the Trigger input to Front Panel.

NOTE If everything is connected properly you should see a sine wave on the DCA screen. Make sure that the trigger is set to the front panel.

14 On the DCA screen, enable service mode by pressing Help, About 86100..., then pressing the Local hardkey five times, or until the message "Service mode enabled" appears in the message bar of the DCA screen.

15 On the DCA screen, press Calibrate, All Calibrations..., Mainframe and Skew. See Figure 3-2.

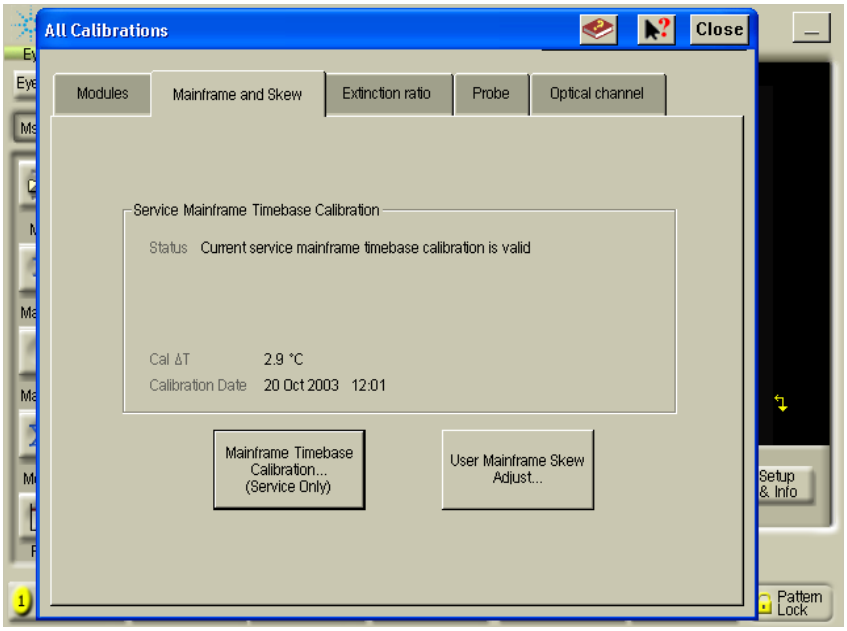


Figure 3-2. Mainframe Timebase Calibration

On the DCA screen press, Mainframe Time base Calibration (Service Only).

16 Follow the instructions on screen.

If it is necessary to adjust the tuning capacitor:

a Turn the DCA on it's side to locate the hole plug at the bottom. See Figure 3-3.

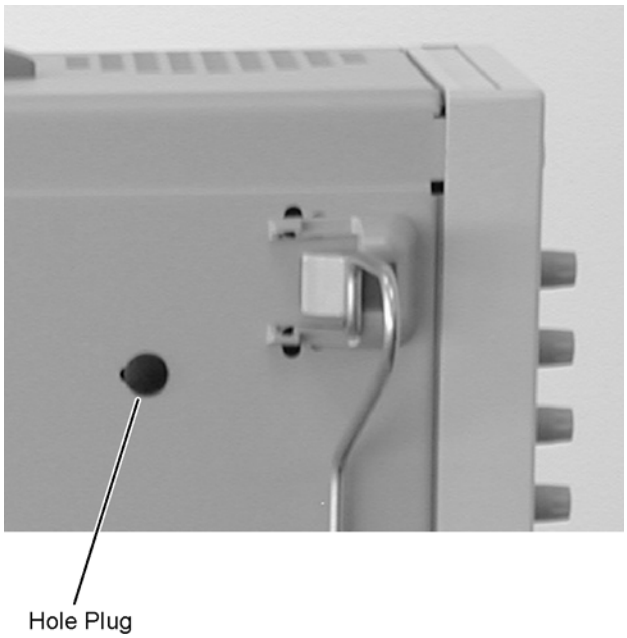


Figure 3-3. Hole Plug Location

b Rotate the hole plug while pulling to remove it from the adjustment hole.

CAUTION Be very gentle while adjusting the capacitor as it is fragile.

c Make the adjustment then pull the adjustment tool away. Be sure to check the readings; they may have changed.

NOTE After making the adjustment, place the DCA in the normal operation position and check to see that the readings are the same.

d After the adjustment is complete, reinstall the hole plug. Wait the full ten minutes before you proceed.

17 When the “Change source to 2 GHz” prompt appears, set the synthesized CW generator FREQ to 2 GHz.

18 When the “Change source to 16 GHz” prompt appears, set the synthesized CW generator FREQ to 16 GHz and press continue.

19 On the Synthesized CW Generator, adjust the POWER LEVEL to 400 mV on the DCA screen’s current reading.

NOTE If the Synthesized CW Generator does not have Option 1E1 installed, remove the attenuator at the RF OUTPUT.

20 The message “Calibration is complete” is displayed in the message bar when the procedure is complete.

21 Cycle the instrument power to disable the service mode.

Automated Test Software Procedure

1 Make sure the instrument cover is in place.

2 Install the plug-in module(s) into the mainframe module slots, then tighten both screws.

3 Turn on the mainframe. After the boot-up is complete, press the Default Setup hardkey on the DCA front panel.

4 Turn on the electrical channel by pressing the CHANNEL 2 hardkey on the DCA front panel. Turn all other channels off.

5 On the DCA front panel, set the trigger source to Free Run by pressing the Source hardkey until Free Run is selected.

NOTE Allow all of the equipment to warm up for at least one hour in the settings specified above before you proceed. These settings are optimal for generating typical operating conditions.

6 Connect all cables from the VISION test system to the DCA under test.

7 Register the DCA to the test system database.

8 Select Adjust/Cal for doing the mainframe calibration.

9 Select the following tests to run:

- Module Calibration
- Mainframe Cal

10 Follow the on-screen instructions for the automated testing

NOTE DCA firmware versions earlier than A.04.00 prevent the test software from querying the DCA for test completion during the mainframe timebase calibration. To workaround this issue the test software goes into a wait loop while the DCA routine is working. You STOP the loop when your see that the timebase routine is complete.

For example, at some point during the Mainframe Timebase Calibration, the message on the screen of the DCA will say to “Adjust Capacitor for 2 mV”. A wait loop will run on the test software for approximately 300 seconds (5 minutes), allowing you to make the adjustment. After the adjustment is complete, you click the STOP button on the test software to allow it to continue to the next step (or let the 300 seconds run out and it will automatically advance).

NOTE DCA firmware versions A.04.00 and above allow the test software to function normal, without the wait loop.

NOTE If a capacitor adjustment is required, refer to Step a above to locate the capacitor. Be sure to wait the full 10 minutes after changing the capacitor to allow it to settle and check the readings in the normal operation position.

Touchscreen Calibration

Calibrate the touchscreen by following the on-screen instructions. The procedures differ somewhat from one DCA model number to another.

Equipment List

Agilent Part Number 1535-5214, Touch screen stylus

Manual Procedure

With the DCA powered up touch/click as described for each model number:

86100A:

1 Click on Utilities, Touch Screen Config..., Calibration..., Calibrate

2 Using a stylus pen, follow the on-screen instructions of touching each of the three crosses on the screen

86100B:

1 Click on Utilities, Touch Screen Calibration...,

2 Using a stylus pen, touch the center of each cross as it appears. Calibration will terminate if no touch is received within 20 second

86100C:

1 Click on Utilities, Touch Screen Config...,

2 On the Pointer Device Properties window click on the Calibrate button to start the calibration process

3 Use stylus pen to touch the center of each cross as it appears. Calibration will terminate if no touch is received within 10 seconds

4 After completing the calibration, tap the OK button to complete and close the Pointer Device Properties window

Set Mainframe Serial Number

Use this procedure after a hard drive replacement or if the serial number needs to be changed.

Manual Procedure

1 On the DCA screen, click Help, About 86100...

2 Press the Local hardkey 5 times (until Service Mode enabled is displayed).

3 On the DCA screen:

a Close the About 86100... dialog box (click Close).

b click Utilities, Service, Frame.

c click the entry field in the Frame dialog box (the touch screen keypad opens).

d Enter the mainframe serial number from the rear panel serial tag.

NOTE Entering the serial number manually must be done with the built-in touch screen keyboard. Do not attempt to enter the serial number using an external keyboard.

e click OK.

f click Save.

4 Check the serial number entered:

a click Help

b click About 86100...

5 Confirm the new serial number appears in the dialog box.

Software Procedure

1 Select Adjust Calibration menu on the automated test software.

2 Select Program /Verify Serial number and follow the on-screen directions to change the serial number of the DCA.

4

Performance Verification

Introduction

This chapter documents the automatic performance verification procedures for the Agilent 86100A, 86100B, and 86100C Digital Communications Analyzer (DCA). A fully configured Agilent DSA Test Executive and VISION test system are required for performance testing.

Performance Testing Interval

The performance test procedures may be performed for incoming inspection of the instrument and should be performed periodically thereafter to ensure and maintain peak performance. The recommended test interval is yearly or every 2,000 hours of operation.

N O T E

For users who need “As Received” or “Pre Cal” data at the yearly calibration interval, a verification process must be done first. Otherwise, a yearly Horizontal Timebase Adjustment is recommended before performance verification is started, refer to “Timebase Adjustment” on page 3-3.

Specifications

The DCA on-line help contains the specifications for the DCA mainframe. To access the specifications on the 86100 mainframe touch/click Help, Contents, Specifications. You may also download the On-Line help and display it on a PC running Microsoft Windows. Connect to the Agilent Technologies web site at www.agilent.com/comms/dca select Manuals and Guides under Technical Support.

Test Limits

The automated test software has two different test suites: Adjust/Calibration and Verification. The tests in Adjust/Calibration are designed for Field adjustments and Factory performance testing. The tests within the Adjust/Calibration mode are sometimes run to a tighter test limit than the same test run under Verification mode.

The Verification test suite is designed for Field performance testing. The test limits are set to match customer specifications.

For performing adjustments use the Adjust/Calibration mode. Refer to “Introduction” on page 3-2.

Performance Test Record

At the completion of performance verification under the Verification mode, the test results can be viewed and printed. You can use the recorded results at incoming inspection for later comparisons during periodic maintenance, troubleshooting, and after repairs or adjustments.

NOTE Avoid damage to plug-in front panel connectors. Use 2.4 mm and 3.5 mm connector savers. These connector savers are a supplied accessory.

NOTE Minimize connector swapping during the procedures to avoid connector wear. All connectors on test tools and adapters should be inspected both visually and mechanically every few calibrations.

NOTE All connectors should be clean and undamaged to ensure accurate measurements. All 2.4 mm and 3.5 mm connectors should be mechanically and visually checked before inserting any calibration test tool into them. Damaged connectors or loose connectors may cause the performance verification tests to fail.

NOTE Avoid sharp bends in 2.4 mm, 3.5 mm, SMA, and optical cables. When mating 2.4 mm to 2.4 mm or 3.5 mm to 3.5 mm, torque all connections to 8 in/lbs. When mating 3.5 mm to SMA or SMA to SMA, torque all connections to 5 in/lbs.

CAUTION The module inputs are very sensitive to static discharge. Failure to observe proper antistatic procedures may damage the gallium arsenide samplers. ESD damage is not covered under the warranty. All maintenance or operation should be performed with an antistatic mat and wrist strap. Refer to “Electrostatic Discharge Information” on page 1-8 for further information.

CAUTION Electrostatic discharge can seriously damage the module’s electrical inputs. To eliminate any electrostatic build up from a cable you’re connecting to the module, connect a female short to either end of the cable. Touch the short to an input connector hex nut on the module to discharge any static build up to ground. Remove the short. Use this procedure for all cables before connecting them to the module.

Before Testing

NOTE Install the plug-in module(s) into the mainframe module slots, then tighten both screws. Turn on the mainframe and allow all of the equipment to warm up for at least one hour.

Setting Up For Automated Testing

1 Connect all cables from the VISION test system to the DCA under test.

2 Register the DCA to the test system database.

3 Select the Verification test suite for doing the performance testing.

4 Select all the tests in the verification menu.

NOTE Many of the checks must still be done manually, but software guides you through the check and provides on-line documentation as required.

NOTE Due to its complexity, the Fine Timebase Accuracy for the Agilent 86100C can only be tested with an automated test system.

Manual vs. Automated

To help understand the differences between the manual performance verification and the VISION test software system, please refer to Table 4-1.

Table 4-1. Comparison of Manual Tests to Automated Software Tests

86100A/B/C Software Performance Verification	86100A/B Manual Performance Verification	Difference	Type of Verification
Check Internal Temperature	Not Checked	New test	Functional
Trigger Port	Not Checked	New test	Functional
Gated Trigger	Gated Trigger	Same	Functional
Divided Trigger 86100C Opt 001	N/A (86100C only)	New test	Functional
Rear Panel 15 Volt Output 86100A/B	Not Checked	New test for 86100A/B only	Functional
Module Calibration	Module Calibration	Same	Functional
Delay & Timebase Accuracy	Delay & Time Interval	More points tested in software	Specification
Fine Timebase 86100C	N/A (86100C only)	New test for 86100C only	Specification
Trigger Level Accuracy	Not Checked	New test	Functional
Calibrator Accuracy	Front Panel Calibrator	More points tested in software	Functional
Trigger Jitter Standard	(Trig) Jitter Verification, Trigger Sensitivity Standard	More points tested in software	Specification
Trigger Jitter Opt 001	Trig Verification Opt 001 Trigger Sensitivity 001	More points tested in software	Specification
Pattern Trig 86100C Opt 001	N/A (86100C only)	New test	Functional
Optical Power	Not Checked	New test	Functional

Fan Check

The purpose of this test is to ensure that all fans are operating inside the instrument. If any of the fans are not working it can cause elevated temperature which is not desirable

Manual Procedure

1 Place your hand inside the module bay to feel the air flow. As an alternative, if the modules are installed in the mainframe, you may place your hand on the slots on the right side of the DCA to check for air flow through the modules.

2 Place your hand on the left side of the DCA for the first set of slots behind the LCD screen to feel the air flow.

3 Place your hand on the left side of the DCA for the second set of slots behind the LCD screen to feel the air flow.

4 Place your hand on the left side of the DCA at the slots near the back to feel the air flow.

All of the fans must be operating for this test to pass.

Software

Prompt the user to inspect the fans one at a time as described above and to confirm that each fan is operating. All fans must be operating for this test to pass.

Store Pass or Fail for each fan during this test. In addition store the serial number and date and time of the test.

Floppy Drive Check, 86100A/B

The purpose of this test is to verify that the floppy drive in the 86100A/B is operational. The drive in the 86100A is an LS120 but for commonality this test is checking it as a normal drive.

Equipment List

Blank 3.5 inch floppy disk

Manual Procedure

1. Insert the floppy disk into the floppy drive on the 86100A/B mainframe.
2. Push the Default Setup button.
3. Change the Trigger source until the freerun list is on.
4. Change the time per division until it read 500 ns/div. This can be done with the big knob above channel 1 and 2.
5. Using the touchscreen select File, Save, Instrument Setup…
6. In the window that appears select the A drive for the look in field.
7. Enter the filename as “FloppyTest.set”.
8. Push the save button.
9. Push the Default Setup button again (The trigger source and time per division should reset to default values.
10. Using the touchscreen select File, Open, Instrument Setup…
11. In the window that appears select the A drive for the look in field.
12. Select the “FloppyTest.set” file from the list on the A drive.
13. Push the Open button.
14. Check the trigger source to make sure it is in Freerun.
15. Check the time per division to make sure it is 500 ns/div.
16. Delete the file from the disk.
17. Remove the Floppy disk from the drive.

Software

Prompt the user to insert the floppy disk into the drive. Execute a default setup command. Set the trigger source to the Freerun. Set the time per division to 500 ns/div. Use the Disk Store Setup,”A:\FloppyTest.set” to save the file to the A drive.

Execute a default setup command Use the:Disk:Load Setup,”A:\FloppyTest.set” to load the saved setup from the A drive. Query the trigger source and make sure it is in freerun.Query the Time per division and make sure it is 500 ns/div. Prompt the user to remove the floppy disk from the drive.

Data Storage

Store Pass and Fail for both the write and read of the floppy drive.

CD Drive Check, 86100B

Checks the functionality of the built-in CD Drive in an 86100B.

Equipment list

CD-R with an instrument setup file present.

Manual Procedure

1. Insert the CD disk into the CD drive on the Back of the 86100B mainframe.
2. Push the Default Setup button.
3. Using the touchscreen select File, Open, Instrument Setup…
   a. In the window that appears select the E drive for the look in field.
   b. Select the “CDTest.set” file from the list on the E drive.
   c. Push the Open button.
4. Check the trigger source to make sure it is in Freerun.
5. Check the time per division to make sure it is 500 ns/div.
6. Remove the CD from the drive.

Front Panel Check

Using the built in self tests, ensure the front panel is working properly by exercising all buttons, knobs, and LEDs.

Manual Procedure

1 Touch/click Help, About 86100..., and press Local 5 times. This allows access to the service mode.

2 Touch/click Utilities, Service, Self Test.

3 Chose Front Panel and click Start Test.

4 The screen will display a layout of the mainframe front panel showing all the buttons and knobs in red except for the power button. The 86100A or B do not have a Jitter Button.

5 Verify that all keys toggle and that all knobs rotate left and right. Make sure all red buttons become green. The color of the knobs will turn yellow when you rotate left or right then green when you rotate the other direction.

6 Press All On for the LED Test. Make sure that all the LED light up properly with correct color.

7 Press All Off for the LED Test. Make sure that all LED do not light up except the power button.

8 Press Exit Front Panel Test to exit.

Software

Prompt user to execute the manual procedure. Query the user for when this step is completed (yes/no). Default should be no.

Data Storage

Store Pass and Fail based on the user input. Store the date and time the test was completed.

Touchscreen Check

Using the built in self tests, ensure the touch screen is working properly.

Manual Procedure

1. Touch/click Help, About 86100..., and press Local 5 times. This allows access to the service mode.
2. Touch/click Utilities, Service, Self Test.
3. Select Touch Screen and click Start Test.
4. Choose any 5 squares. Use a stylus or finger and click in the area around the box with an X in it. Do not click inside the X-box yet. Any change in color by clicking outside the box would be a failure.
5. Touch each of the target 'X's.The color of the box should change from red to green. If it doesn’t change, it is a failure.
6. Click exit.

Software

Prompt user to execute the manual procedure. Query the user for when this step is completed (yes/no). Default should be no.

Data Storage

Store Pass and Fail based on the user input. Store the date and time the test was completed.

All Non-Interactive Checks

Ensure the integrity of the A13 Acquisition Assembly, the A5 Display Adapter Assembly (El Mirage), and the A6 Scope Interface Assembly (Tombstone) by running built-in self tests.

Some checks may return a failure; however, this does not necessarily indicate that the DCA is broken or giving bad measurement data.

Manual Procedure

1 Touch/click Help, About 86100..., and press Local 5 times. This allows access to the service mode.

2 Touch/click Utilities, Service, Self Test.

3 Pull down the menu drop down and select All Non-interactive

4 Click on “Service Extensions” and then click Start Test.

5 This test runs automatically and reports the status of each test. Wait for the test to complete.

6 Look at test results for all the Non-Interactive tests.

a Non-Volatile SRAM: must pass.

b Video RAM, Video SRAM, and Tri-state Register: cosmetic only. Not a hard failure.

NOTE Video is tested on the A6 Scope Interface assembly (Acq Int Brd) interfaces between the acquired data and the display. Problems with these components can only cause cosmetic problems with the display. They do not affect the measurement results. Perform a visual display check to test for cosmetic problems.

c Timer: must pass.

d Video Control Register: must pass.

e Test Sequencer Memory: must pass.

f Look Thru Memory: Failures on memory pages 4 through 7 can be ignored.

NOTE Look Thru Memory exists on the A13 Acquisition assembly. Look Thru memory provides a mapping between A/D quantization levels and input power levels to calibrate the linearity of the input channel. The self test writes known data patterns to every memory address and verifies the correct value is there. There are 8 pages of Look Thru Memory and the DCA uses 4 of them. The self test tests all 8 pages. Failures on pages 4-7 can be ignored.

g PLDs: must pass.

h Acquisition Cycle: must pass

i PLD (Cnt Brd): must pass

j Sequencer Memory (Cnt Brd): must pass

NOTE The address and data buses run between several assembly. A memory test failure could be caused by component on the bus.

NOTE For any failures that require the replacement of the A13 Acquisition assembly with an exchange (bluestripe) board assembly, please print out the failure results, or write them on a piece of paper, and send it along with the returned A13 Acquisition assembly

Software Prompt user to execute the manual procedure. Query the user for when this step is completed (yes/no). Default should be no.

Data Storage Store Pass and Fail based on the user input. Store the date and time the test was completed.

Internal Temperature Check

The purpose of this test is to verify that the internal temperature of the DCA is within the test limits before performance verification data is collected.

Manual Procedure

1 Using the touchscreen click on the Help drop down menu then select About 86100…

2 In the window that pops up look at the internal temperature inside the system configuration.

3 Compare the temperature of the DCA to the test limits of 20 to 40 degrees C.

Software Query the temperature of the DCA and compare temperature to the test limits.

Data Storage Store the temperature of the DCA and identify it with the date and time the test was run.

Trigger Port Check

Check the functionality the internal trigger switch for the 86100A/B/C mainframe. This switch is used to direct free run, left module, right module, and front panel trigger sources to the trigger circuitry of the mainframe. This is a functional check of the switch with a pass or fail result.

NOTE The Trigger Port Check is only required when your normal measurements are performed using an 54750-series module, 83480-series module, 83490-series module, or an 86108A module. If you do not have one of these modules or if you use a different module, such as an 86117A, it is recommended that you omit this check.

Equipment List

- 83712B 20 GHz Synthesized CW generator opt 1E1, 1E5, 1E8, 1E9
- 11667B Power Splitter
- 83483A Dual Electrical Module

Manual Procedure

1 Connect the output of the 83712B to the input of the 11667B.

2 Connect one output of the 11667B to the channel 2 input of the 83483A.

3 Connect the other output of the 11667B to the right module trigger input of the DCA.

4 Set the 83712B to 2.5 GHz and +2.50 dBm and turn RF output on.

5 Set the DCA to default setup then 50 mV/div, 100 ps/div, and trigger source to freerun.

6 Check to see if the DCA is triggering. This is noticed by about 350 mVp-p noise level on the screen.

7 Set the DCA trigger source to the right module and check to see if the DCA is triggering. This is noticed by the Trig'd light being on and 2.5 cycles of a sine wave on the screen at about 350 mVp-p.

8 Remove the input to the right module trigger input and connect it to the left module trigger input.

9 Set the DCA trigger source to the left module and check to see if the DCA is triggering. This is noticed by the Trig'd light being on and 2.5 cycles of a sine wave on the screen at about 350 mVp-p.

10 Remove the input to the left module trigger input and connect it to the front panel trigger input.

11 Set the DCA trigger source to the front panel and check to see if the DCA is triggering. This is noticed by the Trig'd light being on and 2.5 cycles of a sine wave on the screen at about 350 mVp-p.

Software

1 Verify the Model and Serial number of the DCA.

2 Prompt the user to connect the following Cables:

a “DUT Front Trigger” to the Front panel trigger of the 86100A/B/C.

b “DUT lmod Trigger” to the Left Module trigger of the DUT.

c “DUT rmod Trigger” to the Right Module trigger of the DUT.

d ”DUT Ch 2" to the Channel 2 input of the DUT.

3 Set the 83712B to 2.5 GHz, +2.50 dBm and turn the RF output on.

4 Set the DCA for the following.

a Default Setup.

b Turn off all channels except for channel 2.

c 50 mV/div on Channel 2.

d 100 ps/div.

e Trigger source to freerun.

5 Set the RF switching for DCA triggers Off and RF output to DCA channel 2.

6 Check to see if the DCA is triggering with the TER command.

7 Set the RF switching for RF output to DCA Module Triggers, Set the Trigger source of the DCA to the Right Module. Execute Step 6 again.

8 Set the RF switching for RF output to DCA Module Triggers, Set the Trigger source of the DCA to the Left Module. Execute Step 6 again.

9 Set the RF switching for RF output to DCA Front Panel Trigger output and set the Trigger source of the DCA to front panel. Execute Step 6 again.

10 If all steps are a pass then the whole test is a pass. Otherwise the test is a failure.

Data Storage

- Front Panel Trigger
- Left Module Trigger
- Right Module Trigger
- Freerun mode

Gated Trigger Check

Verify that the BNC connector on the back of the 86100A/B/C mainframe allows for a gated trigger functionality. In Gated Trigger Mode, a BNC short placed on the connector will prevent the mainframe from triggering. When it is removed it should trigger normal

Equipment List

- 83712B 20 GHz Synthesized CW generator opt 1E1, 1E5, 1E8, 1E9
- DCA with the 83483A Dual Electrical Module in the left slot
- 11636B Power Splitter
- BNC Short

Manual Procedure

1 Insert the 83483A module in the left slot of the DCA.

2 Connect the output of the 83712B to the input of the 11636B.

3 Connect one output of the 11636B to the front panel trigger input of the DCA.

4 Connect the other output of the 11636B to channel 2 input of the 83483A.

5 Set the 83712B to 2.5 GHz at –1.51 dBm.

6 Set the DCA for the following in order listed.

a Push the Default Setup Button.

b Trigger on the Front Panel.

c Channel 2 is on and all others are off.

d On 86100C instruments, set the Trigger Bandwidth to DC–3.2 GHz. On 86100A/B instruments (serial prefix below US4051), set the Trigger Bandwidth to DC–2.5 GHz. On 86100A/B instruments (serial prefix US4051 and above), set the Trigger Bandwidth to DC–2.75 GHz.

7 Push the auto scale button.

NOTE If you get a dialog box when using the auto scale then there is something wrong with your connections or your DCA. Check your connections and push the auto scale button again. If it still fails then there is something wrong with your DCA.

8 Verify that it is triggering. (The Trig'd light should be on and you should see a waveform on screen.

9 Place the BNC short on the BNC connector at the back of the DCA.

10 Set DCA to enable Gated Trigger mode.

11 The DCA should not be triggering at this time. (The Trig'd light will be off and you can use the clear screen button to clear the screen which will keep the screen black if the DCA is not triggering).

12 Remove the BNC short.

13 Verify that the DCA is triggering again.

Software

1 Prompt the user to make the following connections.

   a BNC cable labeled “DUT Gated” to the Trigger Gate (TTL) connector on the back of the DUT.

   b RF cable labeled “DUT Channel 2" to the channel 2 input of the DUT (83483A).

   c RF cable labeled “DUT Front Trigger” to the front panel trigger input of the DUT.

2 Set the 83712B to 2.5 GHz at -1.51 dBm.

3 Set the DUT to the following.

   a Default Setup.

   b Trigger on the Front Panel.

   c Channel 2 is on and all others are off.

   d On 86100C instruments, the Trigger Bandwidth is set to DC–3.2 GHz. On 86100A/B instruments (serial prefix below US4051), set the Trigger Bandwidth to DC–2.5 GHz. On 86100A/B instruments (serial prefix US4051 and above), set the Trigger Bandwidth to DC–2.75 GHz.

4 Set the RF and BNC switching for the following.

   a BNC short to Open.

   b 83712B RF output to DUT channel 2 Input.

   c 83712B RF output to DUT Front Panel Trigger.

5 Query to see if the DUT is triggering.

6 Set the BNC switching so that the BNC short connects to the DUT Gated Trigger.

7 Set DUT to enable Gated Trigger mode.

8 Query to see if the DUT is triggering (it should not trigger).

9 Set the BNC switching so that the BNC short is Open.

10 Query to see if the DUT is triggering.

11 If the DUT is triggering for steps 5 and 9 while not triggering for step 7 then the test is a pass. Otherwise the test is a failure.

Data Storage

Store only Pass or Fail information for this test.

Rear Panel 15 Volt Check, 86100A/B

The purpose of this test is to verify that the 15V output on the back of the 86100A/B mainframe provides 15 Volts DC +/- 0.5 Volts.

Equipment List

34401A Digital Multimeter

BNC to dual Banana plug

Limo-to-BNC cable

Manual Procedure

1 Connect the Limo-to-BNC cable to the 15 V output on the back of the DCA.

2 Connect the other end of the Limo-to-BNC cable to the input of the 34401A through the BNC to dual Banana plug.

3 Take a DC voltage measurement on the 34401A.

4 Compare the result with the specifications.

Software

1 Prompt the user to connect “DUT 15V output” to the 15V output on the back of the DUT.

2 Set system switching for DUT 15V output to DMM.

3 Wait 1 second then measure the DC voltage on the 34401A.

4 Compare the measured data with the test line limits listed above and determine pass or fail.

Data Storage

Store the measured voltage and the test status. Include the date and time the test was completed.

Divided Trigger Check, 86100C Option 001

NOTE This test is only valid for the 86100C option 001.

Ensure that the pattern lock and eyeline mode are functioning correctly by testing the divide by 2 and divide by N on the counter board. Using the auto-detect function and selecting specific frequencies will determine if these dividers are working properly. Test Limits.

Table 4-2. Divided Trigger Test Limits

Input Frequency	Input Power	Expected Frequency	Min Test Limits	Max Test Limits
1 GHz	+2 dBm	1 GHz	0.990 GHz	1.010 GHz
2 GHz	+2 dBm	2 GHz	1.980 GHz	2.020 GHz
4 GHz	+2 dBm	4 GHz	3.960 GHz	4.040 GHz
8 GHz	+2 dBm	8 GHz	7.920 GHz	8.080 GHz
13 GHz	+10 dBm	13 GHz	12.870 GHz	13.130 GHz

Equipment List

- 83712B 20 GHz Synthesized CW generator opt 1E1, 1E5, 1E8, 1E9
- 11667B Power Splitter
- 83483A Dual Electrical Module in the left slot of the DCA

Manual Procedure

1 Make Connections.

a Connect the output of the 83712B to the input of the 11667B Power Splitter.

b Connect one output of the 83712B to the front panel trigger input of the DCA.

c Connect the other output of the 11667B to the Channel 2 input of the DCA.

2 Setup the DCA.

a Open the trigger window by selecting the trigger mode button on the bottom of the display.

b Select Pattern trigger mode.

c Select the Pattern setup tab at the top of the window.

d Remove the check box from the auto detect for Divide Ratio and pattern length.

3 Repeat for each frequency point to test.

a Set the 83712B to the frequency and power listed in the table above.

b In the trigger window select the auto detect button.

c After detection is completed verify that the frequency is within the specifications listed above.

4 All points must pass their respective specifications.

Software

1 Make Connections.

a Cable “DUT Channel 2" to the channel 2 input of the DUT.

b Cable “DUT Front Trigger” to the front panel trigger input of the DUT.

2 Setup the DUT.

a Execute a default setup.

b Enable pattern trigger mode with the “:trigger:plock on” command.

c Turn off Pattern length auto detect with the “:trigger:plength:autodetect off” command.

d Turn off divide ratio auto detect with the “:trigger:dcdratio:autodetect off” command.

e Turn on bit rate auto detect With the “:trigger:brate:autodetect on” command.

3 Repeat for each frequency point to test.

a Set the 83712B to the proper frequency at 0 dBm.

b Use the “:trigger:plock:autodetect” command to auto detect the bit rate.

c Query the bit rate/frequency with the “:trigger:brate?” command.

4 All points must pass their respective specifications.

Data Storage

Store the input frequency and corresponding detected frequency. The test result should also include the serial number and date and time the test was performed.

Module Calibration Check

Calibrate a known good module in the left slot and right slot. This ensures that there are no problems in the mainframe preventing the module calibration from passing.

Equipment List

- Two 83483A Dual Electrical Module

Manual Procedure

1 Insert a module into the left or right slot.

2 Touch/click Calibrations drop-down menu.

3 Select All Calibrations.

4 Select the Modules tab and Calibrate the left or right module as appropriate.

5 Wait for the calibration to complete.

6 Repeat the procedure until both slots have been checked and that module calibration passed.

Time Base Accuracy Test

Measure the accuracy of the time base circuitry. There is a 4 ns ramp circuit that does not always line up with the 250 MHz oscillator and causes discontinuities in the waveforms measured. The discontinuities are reduced to be within spec by performing a time base adjustment.

Table 4-3. Timebase Test Limits

Source Frequency	Source Power	Horizontal Scale/div	Horizontal Delay	Expected Result	Min Test Limits	Max Test Limits
19.98 GHz	-8 dBm	10 ps	24 ns	50 ps	41.95 ps	58.05 ps
19.98 GHz	-8 dBm	10 ps	27.95 ns	50 ps	41.95 ps	58.05 ps
19.98 GHz	-8 dBm	10 ps	35.95 ns	50 ps	41.95 ps	58.05 ps
19.98 GHz	-8 dBm	10 ps	59.95 ns	50 ps	41.95 ps	58.05 ps
10 GHz	-8 dBm	50 ps	24 ns	100 ps	91.9 ps	108.1 ps
5 GHz	-8 dBm	100 ps	24 ns	200 ps	191.8 ps	208.2 ps
2 GHz	-8 dBm	200 ps	24 ns	500 ps	491.5 ps	508.5 ps
1 GHz	-8 dBm	500 ps	24 ns	1 ns	991 ps	1009 ps
500 MHz	-8 dBm	1 ns	24 ns	2 ns	1.99 ns	2.01 ns
200 MHz	-8 dBm	2 ns	24 ns	5 ns	4.987 ns	5.013 ns
100 MHz	-8 dBm	5 ns	24 ns	10 ns	9.982 ns	10.018 ns
50 MHz	-8 dBm	10 ns	24 ns	20 ns	19.972 ns	20.028 ns
20 MHz	-8 dBm	20 ns	24 ns	50 ns	49.942 ns	50.058 ns

Equipment List

- 83712B 20 GHz Synthesized CW generator opt 1E1, 1E5, 1E8, 1E9
- 8133A pulse generator
- 15438A 2000 ps Time Transition Converter
- RF cables and adaptors as necessary
- DCA with an 83483A module in the left slot (86100X unit)

Manual Procedure

Connection Setup:

1 Connect the 10 MHz reference output of the 83712B to the external input of the 8133A.

2 Connect the 15438A to the channel 2 output of the 8133A.

3 Connect the other end of the 15438A to the front panel trigger input of the DCA.

4 Connect the RF output of the 83712B to the channel 2 input of the DCA.

DCA Setup:

5 Push the default setup button.

6 Turn off all channels except for channel 2.

7 Turn on averaging to 64.

8 On 86100C instruments, set the trigger source Front panel, DC–3.2 GHz. On 86100A/B instruments (serial prefix below US4051), set the trigger source Front panel, DC–2.5 GHz. On 86100A/B instruments (serial prefix US4051 and above), set the trigger source Front panel, DC–2.75.

9 For the trigger, set normal Hysteresis, and positive trigger edge.

10 Set the vertical scale to 20 mV/div and the vertical offset to 0 mV.

11 Set channel 2 to the 20 GHz bandwidth setting.

12 Turn on the period measurement function.

8133A Setup:

13 External trigger input with 100 ns period.

14 Set channel 2 output to +2.5V square wave with 0V offset.

15 Enable channel 2 output and disable all other outputs.

Take Measurements:

16 For each data point do the following.

a Set the 83712B to the appropriate frequency and power.

b Set the Horizontal Scale as appropriate.

c Set the Horizontal Delay as appropriate.

d Measure the period.

17 Repeat Step 16 for all data points.

18 Compare each data point with the test line limit listed.

19 All data points must be within specifications for the test to be a pass.

Software

1 Prompt the user to make the proper connections.

a “DUT Channel 2" to channel 2 input of the DUT.

b ”DUT Front Trigger” to the front panel trigger input of the DUT.

2 Set the 8133A for the following.

a External trigger input with 100 ns period.

b Set the channel 2 output to +2.5V square wave with 0V offset.

c Enable the channel 2 output and turn of all others.

3 Set the DUT for the following

a Execute a default setup.

b Turn off all channels except for channel 2

c Turn on averaging to 64.

d On 86100C instruments, set the trigger source Front panel, DC–3.2 GHz. On 86100A/B instruments (serial prefix below US4051), set the trigger source Front panel, DC–2.5 GHz. On 86100A/B instruments (serial prefix US4051 and above), set the trigger source Front panel, DC–2.75.

e For the trigger, set normal Hysteresis, and positive trigger edge.

f Set the vertical scale to 20 mV/div and the vertical offset to 0 mV.

g Set channel 2 to the 20 GHz bandwidth setting.

h Turn on the period measurement function.

4 For each data point do the following.

a Set the 83712B to the appropriate frequency and power.

b Set the Horizontal Scale as appropriate.

c Set the Horizontal Delay as appropriate.

d Measure the period.

5 Repeat Step 4 for all parameters.

6 Compare each measured point with the test line limit.

7 All measured parameters must be within the test to be a pass.

Data Storage

- Frequency
- Horizontal Scale
- Horizontal Delay
- Period measured
- Min Test Limits
- Max Test Limits.

Fine Timebase Accuracy Test, 86100C

NOTE This test is valid for 86100C only.

NOTE On 86100C-H12 instruments, do not perform the following procedures. Instead, refer to the FINE TIMEBASE ACCURACY TEST document, that is included on the 86100C-H12 documentation CD. To locate this document, view the contents of the CD using Window's File Explorer. Double click on the file index.html. On the displayed web page, click the left-side 86100C tab. In the displayed web page, locate the last listing of the Mainframe section, which is Fine Timebase Accuracy Test (.pdf). Use this document to perform the Fine Timebase Accuracy Test.

Calculate the accuracy of the 86100C timebase 4 ns ramp periods. There are discontinuities within 100 ps of the start and end on the ramp, which are excluded from the test results. The test is done with a 10 GHz sinusoidal waveform covering 40 cycles and then is compared to an ideal waveform.

A time reference is calculated for each of the measured and ideal data points. The difference between the two time references is the time error. Since the 86100C uses a 4 ns ramp the measurement must include the full 4 ns range.

The test limit is calculated by looking at the worst time error in a range of resulting data. The range of data selected is based on a dual marker measurement to cover small and large ranges along with different starting and ending points. Test Line Limits

0.9 ps + 0.5% of delta time interval (Maximum Delay is ≤100 ns and delta time does not span across any 28, 32, 36, …, 100 ns delay setting ± 100 ps).

Tested Delay Settings 24ns, 28ns, 40ns, and 64ns

Equipment List

- 83712B 20 GHz Synthesized CW generator opt 1E1, 1E5, 1E8, 1E9
- DCA with an 83483A Dual Electrical module in the left slot
- 11636B Power Splitter
- 8133A Pulse Generator

Manual Procedure

NOTE It is not possible to complete the Fine Timebase test without the algorithms in the test software. Manual procedures are given here to help the user understand the test process.

Connection Setup:

1 Connect the RF output of the 83712B to the channel 2 input of the DCA.

2 Connect 10 MHz reference output of the 83712B to the front panel trigger input of the DCA

DCA Setup:

3 Push the default setup button.

4 Turn off all channels except for channel 2

5 Set the DCA to 10 mV/div, 400 ps/div and 24 ns Delay.

6 Set the trigger source to the front panel.

7 Acquisition points to 4000.

8 Set the delay to 40 ns.

Take Measurements:

9 Set the 83712B to -19 dBm.

10 Adjust the 83712B until you read 20 mVp-p on the DCA. This should be about -19 dBm.

11 Set to DCA for the following.

a Averaging of 1024 points.

b Execute a stop, then clearscreen.

c Execute a run.

12 When the 1024 waveforms have been collected save the waveform data to a floppy disk.

13 Use an external program to process the following tasks with the data:

a Create an ideal sinusoidal waveform at 10 GHz that covers 4 ns (40 periods).

b Plot a single graph that has the measured data and the ideal waveform.

c Calculate the time error for each point by comparing to a ideal sine wave.

d Plot a graph of error in ps verses time.

e Compare each error point in ps to the Test Limits.

14 All points must be a pass for this test to pass.

15 Repeat the test for all the delay settings listed.

Software

NOTE Contact the division for information on the test software.

Data Storage:

- Instrument delay setting
- Timebase setting
- Number of acquisition points
- The data from the waveform collected

Trigger Level Accuracy Check

Verify the accuracy of the trigger level adjustment. The check is done for both the positive and negative trigger slopes. The same signal will be sent to the trigger input and the electrical channel input. As the trigger level is adjusted the voltage at a specific time reference is measured and compared to the specifications. This test does not cover the full range of the trigger level settings of ±1V. This is because this is outside the normal operational range of the 83483A module.

Test Line Limits

$$[2\ mV + (5\%)(Trigger\ Level_{abs})$$

Table 4-4. Trigger Level Accuracy Test Limits

Data Point (V)	Expected Value (V)	Min Test Limits (V)	Max Test Limits (V)
-0.4	-0.4	-0.422	-0.378
-0.32	-0.32	-0.338	-0.302
-0.24	-0.24	-0.254	-0.226
-0.16	-0.16	-0.17	-0.15
-0.08	-0.08	-0.086	-0.074
0	0	-0.002	0.002
+0.08	+0.08	0.074	0.086
+0.16	+0.16	0.15	0.17
+0.24	+0.24	0.226	0.254
+0.32	+0.32	0.302	0.338
+0.4	+0.4	0.378	0.422

Equipment List

- 83712B 20 GHz Synthesized CW generator opt 1E1, 1E5, 1E8, 1E9
- 83483A Dual Electrical module
- 11667B Power splitter

Manual Procedure

1 Place the 83483A module in the left slot of the DCA. After letting it warm up for 1 hour perform module calibration.

2 Connect the output of the 83712B to the input of the 11667B power splitter.

3 Connect one output of the 11667B to the front panel trigger input of the DCA and the other output

to the Channel 2 input of the 83483A.

4 Set the 83712B to the following.

   a 10 MHz

   b +10 dBm

5 Set the DCA to the following.

   a Turn on only channel 2 and set to 100 mV/div with 200 mV offset.

   b Set the timebase to 10 ns/div with 24 ns Delay.

   c Set the trigger source to the front panel.

6 Set the input to be 1Vp-p.

   a Turn on the Vmax function.

   b Adjust the power level of the 83712B until Vmax = 500 mV ± 2 mV.

   c Close the Measurement box.

   d Set the channel 2 offset to 0.

7 Set the DCA to negative slope trigger.

8 Turn on the vertical marker. Adjust the marker until the y value is 0 mV ± 2 mV of the first falling edge.

9 Repeat the following for each data point.

   a Adjust the trigger level to the data point.

   b Set the channel 2 offset to the same as the trigger level.

   c Record the marker Y value.

10 Set the DCA to positive slope trigger.

11 Turn on the vertical marker. Adjust the marker until the Y value is 0 mV ± 2 mV of the first rising edge.

12 Repeat Step 9.

13 Compare each data point to the specs for both the positive and negative slope triggers.

NOTE The specifications for each measured parameter is set up with the expectation that the reference time position is at a zero crossing when the trigger level is set to 0.

Software

1 Place the 83483A module in the left slot of the DUT. After letting it warm up for 1 hour perform module calibration.

2 Connect the output of the 83712B to the input of the 11667B power splitter.

3 Connect one output of the 11667B to the front panel trigger input of the DUT and the other output to the Channel 2 input of the 83483A.

4 Set the 83712B to the following.

   a 10 MHz

   b +10 dBm

5 Set the DUT to the following.

a Turn on only channel 2 and set to 100 mV/div with 200 mV offset.

b Set the timebase to 10 ns/div with 24 ns Delay.

c Set the trigger source to the front panel.

6 Set the input to be 1 V p-p.

a Turn on the Vmax function.

b Use a binary search to adjust the power level of the 83712B until Vmax = 500 mV ± 2 mV.

c Set the channel 2 offset to 0.

7 Set the DUT to negative slope trigger.

8 Using the Tvolt command query the time of the 0 ps location for the first falling edge.

9 Repeat the following for each data point.

a Adjust the trigger level to the data point.

b Set the channel 2 offset to the same as the trigger level.

c Use the Vtime command to read the voltage level. Use the time acquired from Step 8.

10 Set the DUT to positive slope trigger.

11 Using the Tvolt command query the time of the 0 mV location for the first rising edge.

12 Repeat the following for each data point.

a Adjust the trigger level to the data point.

b Set the channel 2 offset to the same as the trigger level.

c Use the Vtime command to read the voltage level. Use the time acquired from Step 11.

13 Compare each data point to the specs for both the positive and negative slope triggers

Data Storage

- Data Point
- Measured Value
- Min Spec
- Max Spec

Calibrator Accuracy Test

Measure the accuracy of the Calibrator output.

Test Limits

Voltage ± (1.5 mV + voltage*0.005)

Table 4-5. Calibrator Output Test Limits

Input Voltage	Min Test Limits	Max Test Limits
- 2 VDC	-2.0115 VDC	-1.9885 VDC
- 1.667 VDC	-1.676835 VDC	-1.65717 VDC
- 1.333 VDC	-1.341165 VDC	-1.32484 VDC
- 1 VDC	-1.0065 VDC	-0.9935 VDC
- 0.667 VDC	-0.671835 VDC	-0.66217 VDC
- 0.333 VDC	-0.336165 VDC	-0.329835 VDC
0 VDC	-0.0015 VDC	0.0015 VDC
+ 0.333 VDC	0.329835 VDC	0.336165 VDC
+ 0.667 VDC	0.662165 VDC	0.967335 VDC
+ 1 VDC	0.9935 VDC	1.0065 VDC
+ 1.333 VDC	1.324835 VDC	1.341165 VDC
+ 1.667 VDC	1.657165 VDC	1.676835 VDC
+ 2 VDC	1.9885 VDC	2.0115 VDC

Equipment List

- 11408C, 50 ohm BNC feed thru
- 34401A, Digital Multi Meter
- Dual Banana Plug

Manual Procedure

1 Connect the Calibrator output of the DCA to the 11408C.

2 Connect the other end of the 11408C to the input of the 34401A with a BNC to dual banana plug.

3 Push the default setup button on the DCA.

4 Using the user interface on the DCA select Calibrate, Front Panel Cal output

5 Set the calibrator output to each of the first data points.

a On the 34401A read the DC voltage and record the value. Compare this value with the specifications listed above.

b Repeat Step 5 for all of the data points.

Software

1 Prompt user to connect the cable labeled “DUT cal output” to the Calibrator output of the DUT.

2 Execute a default setup. Set the calibrator output to the desired measured parameter listed above in the specifications.

3 Take a DC voltage reading on the 34401A

4 Repeat Step 2 until all the data points are completed.

5 Compare the measured and calculated values with the specifications listed above to determine Pass or Fail.

6 Data should be presented in a graphical format with data point on the x-axis and the DMM reading on the y-axis. The calculated parameters should be presented in a tabular format either on the graph or as a separate sheet.

Data Storage

- Parameter setting
- Measured Value
  - Min Spec
  - Max Spec
- Calculated Value
  - Min Spec
  - Max Spec

Trigger Jitter Test, Standard

NOTE

This test must be performed in addition to the "Trigger Jitter Test, Option 001" on page 4-35 for all DCAs with option 001.

Measure the jitter introduced by the DCA. The jitter is measured at 200 mVp-p input signal to the trigger of the DCA. This is done to measure the jitter at this minimum specified trigger input level. This minimum trigger signal corresponds to the worst case jitter of the DCA. There is a 190 mV test condition to help guarantee customer specification. Test Limits.

The histogram function is used to measure the jitter. This method is independent of the built-in jitter RMS function of the DCA

Table 4-6. Test Limits for Standard Trigger Jitter Test

Frequency	Delay	Trigger Sensitivity	Expected RMS Jitter	Max TLL RMS Jitter	Max Spec RMS Jitter	Model
2.5 GHz	24 ns	Normal	0.89 ps	2.25 ps	2.5	86100A (prefix <4051)*
2.5 GHz	200 ns	Normal	1.28 ps	3.1 ps	11.3 ps	86100A (prefix <4051)*
2.5 GHz	24 ns	Normal	0.89 ps	1.3 ps	1.5 ps	86100A/B (prefix ≥4051)**
2.5 GHz	200 ns	Normal	1.28 ps	2.25 ps	10.3 ps	86100A/B (prefix ≥4051)**
2.75 GHz	24 ns	High	1 ps	1.3 ps	1.5 ps	86100A/B (prefix ≥4051)**
2.5 GHz	24 ns	Normal	0.89 ps	1.3 ps	1.5 ps	86100C
2.5 GHz	200 ns	Normal	1.28 ps	2.25 ps	10.3 ps	86100C
2.75 GHz	24 ns	High	1 ps	1.3 ps	1.5 ps	86100C
3.2 GHz	24 ns	Normal	1 ps	1.3 ps	1.5 ps	86100C

*Also for 86100A instrument serial prefix numbers below US4051 without option K10
**Also for 86100A instrument serial prefix numbers below US4051 with option K10

Equipment List

- 83712B 20 GHz Synthesized CW generator opt 1E1, 1E5, 1E8, 1E9
- 11636B Power Splitter
- RF cables and adaptors as necessary
- DCA with an 83483A module in the left slot

Manual Procedure

Connection Setup

1 Connect the 11636B to the RF output of the 83712B.

2 Connect one output of the 11636B to the front panel trigger input of the DCA.

3 Connect the other output of the 11636B to the channel 2 input of the DCA.

DCA Setup

4 Push the default setup button.

5 Turn off all channels except for channel 2.

6 Set the Horizontal Scale to 200 ps/div.

7 Set the trigger source to the front.

Table 4-7. Test Conditions and Data Points for Standard Trigger Jitter Test

Freq	Delay	Horizontal Scale	Vertical Scale	Input Voltage (Vpp)	Trigger Sense	Histogram Height	Histogram Width
2.5 GHz	24 ns	20 ps/div	5 mV/div	193 mV	Normal	± 300 uV	± 100 ps
2.5 GHz	200 ns	20 ps/div	5 mV/div	193 mV	Normal	± 300 uV	± 100 ps
2.75 GHz	24 ns	20 ps/div	5 mV/div	193 mV	High	± 300 uV	± 100 ps
3.2 GHz	24 ns	20 ps/div	5 mV/div	191 mV	Normal	±300 uV	± 100 ps

Take Measurements

8 For each data point, do the following:

9 Set the DCA to 100 mV/div, (0.5 / frequency) ps/div and delay listed in Table 4-7.

10 Set the 83712B to the new frequency.

11 Adjust the 83712B until required input voltage is read on channel 2. Use a binary search to achieve this result to within ± 2 mV.

12 Set the trigger mode as required.

13 Use a marker to find the delay of the 2nd rising edge at 0 V currently on the screen.

14 Set the DCA to listed vertical and horizontal scale settings.

15 Set the DCA to the delay setting from Step 13.

16 Setup the Horizontal Histogram window to measure the RMS jitter in the center of the screen.

Refer to the histogram window information above.

17 Push the stop button, then the clear screen button, followed by the run button.

18 Let the DCA collect histogram data until there are 1000 or more hits.

19 After the 1000 hits have been collected then read the histograms standard deviation (this is the RMS jitter reading).

20 Repeat Step 8 for each parameter in the specifications section above.

21 Compare each parameter with the specifications above.

Software

1 Prompt the user to make the proper connections. The current connections are listed below:

   a “DUT Channel 2" to the channel 2 input of the DUT.

   b “DUT front trigger” to the front panel trigger input of the DUT

2 Set the RF switching for the following:

   a RF source to DUT channel 2.

   b RF source to DUT front trigger.

3 Set the DUT for the following:

   a Execute a default setup.

   b Turn off all channels except for channel 2.

   c Trigger source to front panel.

4 For each data point do the following:

5 Set the DUT to 100 mV/div, (0.5 / frequency) ps/div and delay listed in Table 4-7.

6 Set the 83712B to the new frequency.

7 Adjust the 83712B until required input voltage is read on channel 2. Use a binary search to achieve this result to within ± 2 mV.

8 Set the trigger mode as required.

9 Use the Tvolt command to find the delay of the 2nd rising edge at 0 V currently on the screen.

10 Set the DUT to listed vertical and horizontal scale settings.

11 Set the DUT to the delay setting from Step 9.

12 Setup the Histogram window to measure the RMS jitter in the center of the screen. Refer to the histogram window information above.

13 Push the stop button, then the clear screen button, followed by the run button.

14 Let the DUT collect histogram data until there are 1000 or more hits.

   a After the 1000 hits have been collected then read the histograms standard deviation (this is the RMS jitter reading).

15 Repeat Step 4 for each parameter in the specifications above.

16 Compare each parameter with the Test Limits above.

17 All measured parameters must be within specifications for the test to be a pass.

Performance Verification

Trigger Jitter Test, Standard

Data Storage

- Frequency
- Horizontal Delay
- RMS Jitter
- Max Test Limits
- Date and time the test was completed

Trigger Jitter Test, Option 001

NOTE This test must be performed in addition to the "Trigger Jitter Test, Standard" on page 4-31 for all DCAs with option 001.

Measure the Jitter introduced by the DCA. The jitter is measured with a 200 mV pp signal to the trigger input. This is the minimum specified trigger level input and corresponds to the worst case jitter of the DCA.

Because each module can have different rolloff characteristics, a typical adjustment is made to the input voltage so that there is 200 mV pp at the trigger input.

The histogram function is used to measure the jitter. This method is independent of the built-in jitter RMS function of the DCA.

Test Limits

1.5 ps RMS

Table 4-8. Test Limits for Option 001 Trigger Jitter Test

Frequency	Delay	Trigger Mode	Expected RMS Jitter	Model	Max TLL RMS jitter	Max Spec RMS jitter
2.0 GHz	24 ns	2-12 GHz	1.03 ps	86100A/B/C	1.5 ps	1.7 ps
2.5 GHz	24 ns	2-12 GHz	1.03 ps	86100A/B	1.5 ps	1.7 ps
3.0 GHz	24 ns	2-12 GHz	1.03 ps	86100C	1.5 ps	1.7 ps
5.0 GHz	24 ns	2-12 GHz	913 fs	86100A/B/C	1.5 ps	1.7 ps
8.0 GHz	24 ns	2-12 GHz	900 fs	86100C	1.5 ps	1.7 ps
10 GHz	24 ns	2-12 GHz	912 fs	86100A/B/C	1.5 ps	1.7 ps
12 GHz	24 ns	2-12 GHz	878 fs	86100A/B/C	1.5 ps	1.7 ps
12 GHz	100 ns	2-12 GHz	1.2 ps	86100A/B/C	1.5 ps	1.7 ps
13 GHz	24 ns	2-12 GHz	1.2 ps	86100C	1.5 ps	1.7 ps
14 GHz	24 ns	2-12 GHz	1.2 ps	86100C	1.5 ps	1.7 ps
15 GHz	24 ns	2-12 GHz	1.2 ps	86100C	1.5 ps	1.7 ps
3 GHz	41.1 ns	Pattern Trigger	1.0 ps	86100C	1.5 ps	1.7 ps

Equipment List

- 83712B 20 GHz Synthesized CW generator opt 1E1, 1E5, 1E8, 1E9
- 11667B Power Splitter
- 83483A module in the left slot of the DCA

Manual Procedure

Connection Setup:

1 Connect the RF output of the 83712B to the input of one of the 11667B.

2 Connect one output of the front panel trigger input of the DCA.

3 Connect the other output to the channel 2 input of the 83483A module.

DCA setup:

4 Push the default setup button.

5 Turn off all channels except for channel 2.

6 Electrical channel 2 to 20 GHz BW setting.

7 2-12 GHz trigger BW.

8 Set the DCA to 100 mV/div, 200 ps/div and 24 ns Delay.

9 Set the trigger source to the front panel.

10 Set the trigger sensitivity to normal.

Take Measurements:

Table 4-9. 86100A/B Test Conditions and Data Points for Option 001 Trigger Jitter Test

Frequency	Delay	Horizontal Scale	Vertical Scale	Input Voltage (Vpp)	Trigger Mode	Histogram Height	Histogram Width
2.0 GHz	24 ns	20 ps/div	5 mV/div	194 mV	2-12 GHz	± 300 uV	± 100 ps
2.5 GHz	24 ns	20 ps/div	5 mV/div	193 mV	2-12 GHz	± 300 uV	± 100 ps
5.0 GHz	24 ns	5 ps/div	5 mV/div	189 mV	2-12 GHz	± 300 uV	± 25 ps
10 GHz	24 ns	2 ps/div	5 mV/div	178 mV	2-12 GHz	± 300 uV	± 10 ps
12 GHz	24 ns	2 ps/div	5 mV/div	174 mV	2-12 GHz	± 300 uV	± 10 ps
12 GHz	100 ns	10 ps/div	50 mV/div	174 mV	2-12 GHz	± 300 uV	± 10 ps

Table 4-10. 86100C Test Conditions and Data Points for Option 001 Trigger Jitter Test

Frequency	Delay	Horizontal Scale	Vertical Scale	Input Voltage (Vpp)	Trigger Mode	Histogram Height	Histogram Width
3.0 GHz	24 ns	20 ps/ div	5 mV/div	192 mV	2-12 GHz	± 300 uV	± 100 ps
5.0 GHz	24 ns	5 ps/div	5 mV/div	189 mV	2-12 GHz	± 300 uV	± 25 ps
8.0 GHz	24 ns	5 ps/div	5 mV/div	180 mV	2-12 GHz	± 300 uV	± 25 ps
10 GHz	24 ns	2 ps/div	10 mV/div	356 mV	2-12 GHz	± 600 uV	± 10 ps
12 GHz	24 ns	2 ps/div	10 mV/div	348 mV	2-12 GHz	± 600 uV	± 10 ps
12 GHz	100 ns	10 ps/ div	50 mV/div	348 mV	2-12 GHz	± 600 uV	± 20 ps
13 GHz	24 ns	2 ps/div	10 mV/div	340 mV	2-12 GHz	± 600 uV	± 10 ps
14 GHz	24 ns	2 ps/div	12.5 mV/ div	420 mV	2-12 GHz	± 800 uV	± 10 ps
15 GHz	24 ns	2 ps/div	12.5 mV/ div	415 mV	2-12 GHz	± 800 uV	± 10 ps
3.0 GHz	41.1 ns	20 ps/ div	5 mV/div	192 mV	Pattern Trigger	± 300 uV	± 100 ps

11 For each data point do the following:

12 Set the DCA to 100 mV/div, (0.5 / frequency) ps/div and delay listed in Table 4-9 or Table 4-10 depending on the model number under test.

13 Set the 83712B to the new frequency.

14 Adjust the 83712B until required input voltage is read on channel 2. Use a binary search to achieve this result to within ±2 mV.

15 Set the trigger mode as required.

16 Use a marker to find the delay of the 2nd rising edge at 0 V currently on the screen.

17 Set the DCA to listed vertical and horizontal scale settings.

18 Set the DCA to the delay setting from Step 16.

19 Setup the Histogram window to measure the RMS jitter in the center of the screen. Refer to the histogram window information above.

20 Push the stop button, then the clear screen button, followed by the run button.

21 Let the DCA collect histogram data until there are 1000 or more hits.

22 After the 1000 hits have been collected then read the histograms standard deviation (this is the RMS jitter reading).

23 Repeat Step 11 for each parameter in the specifications above.

24 Compare each parameter with the specifications above.

Software

1. Prompt the user to make the proper connections. The current connections are listed below:
   a. “DUT Channel 2" to the channel 2 input of the DUT.
   b. “DUT front trigger” to the front panel trigger input of the DUT.
2. Set the RF switching for the following:
   a. RF source to DUT channel 2.
   b. RF source to DUT front trigger.
3. Set the DUT for the following:
   a. Execute a default setup.
   b. Turn off all channels except for channel 2.
   c. Trigger source to front panel.
4. For each data point do the following:
5. Set the DUT to 100 mV/div, (0.5 / frequency) ps/div and delay listed in Table 4-8.
6. Set the 83712B to the new frequency.
7. Adjust the 83712B until required input voltage is read on channel 2. Use a binary search to achieve this result to within ± 2 mV.
8. Set the trigger mode as required.
9. Use the Tvolt command to find the delay of the 2nd rising edge at 0 V currently on the screen.
10. Set the DUT to listed vertical and horizontal scale settings.
11. Set the DUT to the delay setting from Step 9.
12. Setup the Histogram window to measure the RMS jitter in the center of the screen. Refer to the histogram window information above.
13. Push the stop button, then the clear screen button, followed by the run button.
14. Let the DUT collect histogram data until there are 1000 or more hits.
15. After the 1000 hits have been collected then read the histograms standard deviation (this is the RMS jitter reading).
16. Repeat Step 4 for each parameter in the specifications above.
17. Compare each parameter with the specifications above.
18. All measured parameters must be within specifications for the test to be a pass.

Data Storage

- Frequency
- Horizontal Delay
- RMS Jitter
- Max Test Limits
- Date and time the test was completed

Pattern Lock Check, 86100C Option 001

NOTE This check is valid only for 86100C option 001.

Verify the functionality of the Pattern Lock in the 86100C mainframe. With a normal clock signal into the DCA trigger port and a data signal into a sampling channel, the DCA will produce a multi-valued waveform on the screen. This results in an eye-diagram that represents a composite of all the ones and zeros. If the pattern length is know and when pattern lock is enabled, the 86100C will convert the clock signal into a pattern lock. With the pattern lock enabled, a single valued waveform can be displayed on the screen with a clock trigger.

By detecting the difference between the multi-valued waveform and the single-valued waveform the validity of pattern lock is determined.

Test Limits

Table 4-11. Pattern Lock Test Limits

Frequency	Pattern Length	Pattern Lock Enabled	Expected Histogram Standard Deviation	Min TLL	Max TLL
2.0 GHz	32 bits	No	0.015	0.1	1.0
3.0 GHz	32 bits	Yes	0.015	—	0.05
3.5 GHz	2^{23}-1	Yes	0.015	—	0.05

Equipment List

- 8133A 3 GHz Pulse Generator with option 002
- 83483A 20 GHz dual electrical module in the left slot of the DCA

Manual Procedure

Connection Setup:

1 Connect the trigger output of the 8133A to the front panel trigger input of the DCA.

2 Connect the channel 2 output of the 8133A to the channel 2 input of the DCA.

DCA Setup:

3 Execute a default setup.

4 Turn off all channels except for channel 2.

5 100 mV/div.

6 500 ps/div and 24 ns Delay.

7 Set the trigger source to the front panel.

8133A Setup:

8 Set the trigger output to 0.5V amplitude.

9 Set the Channel 2 amplitude to 0.5V.

10 Set the frequency to 3 GHz.

11 Enable the channel 2 output and trigger output. Disable all others.

12 Set the bit pattern to the following.

- Bits: 32
- Pattern: 1101 1110 1000 0100 0100 0111 0101 1001

NOTE Spaces in the bit pattern are inserted to make it easier to read the numbers.

Take Measurements:

13 For each data point listed in Table 4-11 do the following:

14 Set the 8133A to the listed pattern length and frequency.

15 Set the DCA Data Rate and Pattern Length; Relative Bit to 1.

16 Measure the time reference of the first rising edge and adjust the delay to this value.

17 Setup a histogram window with the following parameters:

- Centered around [Edge delay +.5*(1/freq)]
- X1 and X2 positions are ±0.02*(1/freq)
- Y1 and Y2 positions are ±400 mV

18 Wait 5 seconds to collect the data and then read the Standard Deviation of the histogram.

19 Compare to the Test Limits listed above.

20 Repeat Step 13 for all the other data points listed in Table 4-11.

21 Compare each data point with the Test Limits. All data points must be a pass for this test to pass.

Software Refer to Manual Procedure

Data Storage

- Frequency
- Pattern Length
- Histograms standard deviation,
- Min Test Limits
- Max Test Limits

Optical Power Check, Slot 1 and 2

Measure the accuracy of the Average Power Monitor circuitry on the DCA. By using an Electrical Tester (ET) in the place of a module, a known electrical signal from the DCA Calibrator is input through the ET to the mainframe's average power monitor circuitry.

Test Limit

Minimum Specification

$$(-8.15\ W/V)(\textit{measured calibrator voltage}) - 0.2W$$

Maximum Specification for Output Voltage ≥ –0.2V

$$(-8.15\ W/V)(\textit{measured calibrator voltage}) + 0.8W$$

Maximum Specification for Output Voltage < –0.2V

$$(-8.15\ W/V)(\textit{measured calibrator voltage}) + 0.2W$$

Equipment List

- ET55457
- BNC Cable
- BNC T
- 34401A DMM

Manual Procedure

1. Insert ET55457 into the left slot of the DCA.
2. Connect the output of the DCA calibrator output to the BNC T.
3. Connect the input to ET-51703B to one end of the BNC T.
4. Connect the other end of the BNC T to the 34401A DMM.
5. Execute a default setup on the DCA.
6. Set the DCA to Freerun
7. Set the DCA to 200 ns delay.
8. Set the DCA to the first Calibrator output voltage.
9. Take a DC voltage reading on the 34401A.
10. Take an Average Power Monitor measurement on channel 1 on the DCA.
11. Repeat steps 5 to 7 for all of the calibrator input voltages.
12. Remove ET55457 from the left slot and insert it into the right slot (channel 3) of the DCA.

13 Repeat steps 2-9.

14 Compare all measured points with the specifications listed above.

Software Refer to Manual Procedure

Data Storage

- DV voltage
- DC Measured Value
- Measured Power
  - Min Spec
  - Max Spec
- Measured Value
  - Min Spec
  - Max Spec

Performance Test Record

Performance Test Record data can be viewed and printed. The Test Record can be included with the instrument when shipping it back to the end user.

Table 3-14 Shows each of the Performance Verification tests and whether or not the resulting data is included in the Performance Test Record

.

Table 4-12. 86100A/B Software Tests and Data Results in Test Record

86100A/B Test List from Software	86100A/B Performance Result Included in Test Record
Fan	No
Floppy Drive	No
CD Drive (B)	No
Front Panel	Yes
Touch Screen	Yes
Non-interactive	No
Temperature	Yes
Trigger Port	Yes
Gated Trigger	Yes
15 Volt Out	No
Module Cal	Yes
Timebase Acc	Yes
Trigger Level	No
Calibrator Acc	Yes
Trigger Jitter	Yes
Trigger Jitter 001	Yes
Optical Power	No
Optical Power 2	No

Table 4-13. 86100C Software Tests and Data Results in Test Record

86100C Test List from Automated Software	86100C Performance Result Included in Test Record
Fan	No
Front Panel	Yes
Touch Screen	Yes
Non-interactive	No
Temperature	Yes
Trigger Port	Yes
Gated Trigger	Yes
Divided Trigger	Yes
Module Cal	Yes
Timebase Acc	Yes
Fine TB 24 ns	Yes
Fine TB 40 ns	Yes
Fine TB 28 ns	No
Fine TB 64 ns	No
Trigger Level	No
Calibrator Acc	Yes
Trigger Jitter	Yes
Trigger Jitter 001	Yes
Pattern Trig 001	Yes
Optical Power	No
Optical Power 2	No

External Monitor

NOTE This procedure is not part of the automated performance verification; it is included here as a troubleshooting tool.

Check the integrity of the VGA output on the External Display port that is on the rear panel of the DCA. Both VGA display outputs on the rear panel of the 86100C need to be verified as functional. Refer to Figure 4-1

Manual Procedure

Connect the cable from the external monitor to the External Display at the DCA rear panel. It is a pass if the external monitor is working properly (i.e. show the same image as in the LCD display).

86100C Only: Connect the cable from the external monitor to the Second Desktop Connection on the rear panel.

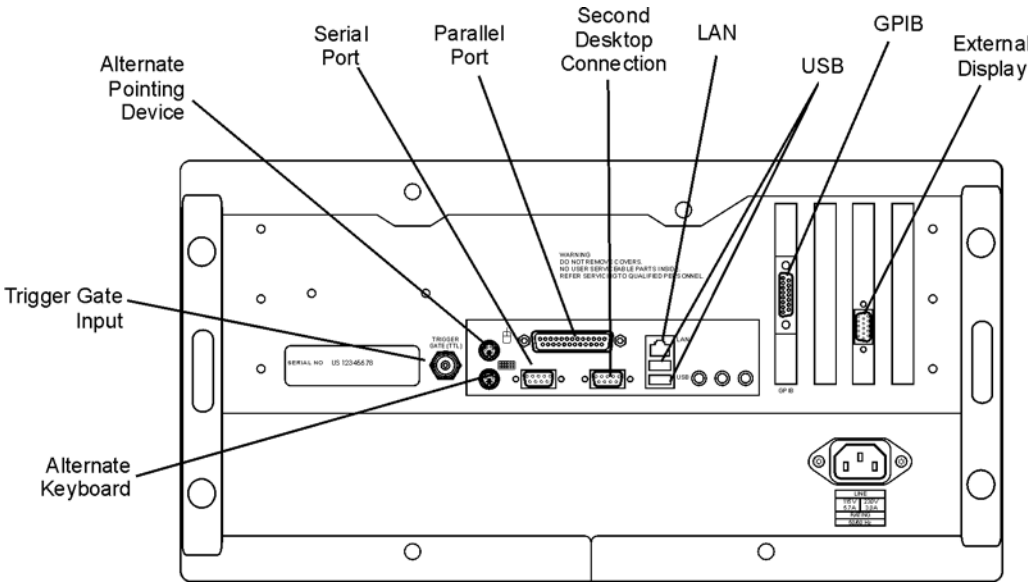
Software

Connect the cable from the external monitor to the display board at the DCA rear panel. It is a pass if the external monitor is working properly. Query the user for when this step is completed (yes/no). Default should be no.

Data Storage

Store Pass and Fail based on the user input. Store the date and time the test was completed.

Figure 4-1. Rear Panel Outputs



Screen/Display

NOTE This procedure is not part of the automated performance verification; it is included here as a troubleshooting tool.

Ensure that the quality of the LCD display meets specifications of no more that five stuck pixels. The built-in self-test routines are used.

Manual Procedure

1. Touch/click Help, About 86100..., and press Local 5 times. This allows access to the service mode.
2. Touch/click Utilities, Service, Self Test.
3. Select Screen and click Start Test. Select each of the five color choices and evaluate the quality of the screen by counting the number of stuck pixels in the entire screen.
4. It is a fail if there are more than 5 stuck pixels on the LCD display.
5. Click Close to exit the tests.

Software Prompt user to execute the manual procedure. Query the user for when this step is completed (yes/no). Default should be no.

Data Storage Store Pass and Fail based on the user input. Store the date and time the test was completed.

5

Instrument Refurbishment

Introduction

Refurbishing (remanufacturing) the DCA readies a previously owned instrument for reselling. The hard drive must be processed or replaced so that there are no user files left on it. Following the procedures ensure that the DCA will perform as close to new as possible.

CAUTION Electrostatic discharge (ESD) can damage or destroy electrostatic components. All work on electronic assemblies should be performed at a static-safe work station.

Drive C Recovery

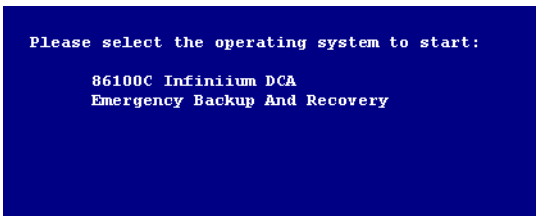
The disk C recovery procedure restores the instrument's hard disk in the event that files and data have been corrupted. This can happen, for example, as a result of inadvertent user changes or a computer virus. On 86100C instruments, the hard disk has two partitions: drive C and drive D. Drive C contains the operating system, the 86100C application, and any factory installed or user installed applications. Drive C also contains factory calibration data and application licenses, which are automatically backed up to drive D. Drive D contains backup files and user files including data files. If you install an application, such as virus protection, it is recommended, but not required, that you install it on drive C.

This hard disk drive recovery re-images the drive-C partition, only. Because the factory backup image resides on the hard disk, no external media is required to recover drive C. After the recovery process is complete, the Infiniium DCA firmware is set to the version installed when the factory image was created. To update to a later version after the recovery is completed, refer to To Upgrade 86100C Instrument Software.

When performing this recovery procedure, all application license files and user files (including data files) are left unchanged. However, in case of a problem, you may want to make a backup of your data before you begin. After the procedure completes, the Windows XP Setup Wizard automatically runs.

1 Connect a keyboard to the instrument.

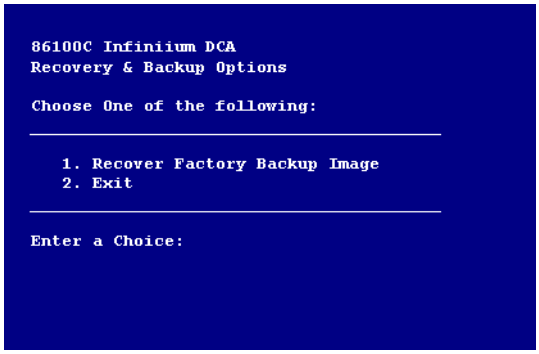
2 Turn on the instrument. After approximately 30 seconds, look for the following displayed text.



3 Immediately, press the down arrow key on the keyboard to select Emergency Backup And

Recovery. Then, press the Enter key.

4 After more text is displayed, press the Enter key to display the following screen.



5 To enter the recovery procedure, press the 1 key.

6 On the next screen press C to recover the hard disk.

7 Another screen is displayed giving you one more chance to enter or exit the procedure. Press C to recover the hard disk.

CAUTION Once the hard drive recovery procedure starts, do not interrupt the procedure with any key presses. The procedure requires about 10 minutes to complete.

8 When the “Recovery Process is complete!” message is displayed, press CLT+ALT+DEL on the keyboard.

9 The Windows XP Setup Wizard automatically starts. Follow the steps listed on the screen to accept the agreement.

Drive D Restoration

Drive D on the 86100C hard disk contains all user files including data files. It also includes backup copies of the factory calibration and application license files that are automatically created from Drive C by the instrument. To restore drive D back to factory defaults, you must reformat the partition using the Windows XP Format utility. Formatting will erase all data on drive D.

CAUTION

Performing a Drive C Recovery (refer to “Drive C Recovery” on page 5-2) immediately after formatting the D partition (without restarting the instrument) results in the loss of factory calibration and any application license files. Always turn off and then restart the instrument after performing the Drive-D Restoration procedure.

1 Click Exit on the File menu to close the 86100C application.

2 Click Start to view Windows Administrator.

3 Click My Computer and select the USER (D:) drive.

4 On the File menu, click Format, Start, and then OK. Do not change the default setup. Leave the Format Options selections unchecked.

5 When the Format Complete dialog box appears, click OK.

6 Click Close

7 Turn off and then restart the 86100C. The 86100C automatically performs the following tasks:

- Creates the original factory folders on drive D
- Creates backup copies of the factory calibration and any application license files that reside on drive C.

Refurbishing an 86100C

The hard drive is replaced with a new one. A new Certificate of Authenticity sticker is installed on the rear panel of the DCA mainframe. All recommended preventative maintenance will be performed. Modifications and service notes should be installed as required. Follow all the adjustment steps in Chapter 3 before performance testing. Complete a full performance verification from Chapter 4.

Complete all the steps to refurbish the 86100C in the order presented below. This will ensure that the DCA will perform as close to new as possible.

Procedure

1 Install a new hard drive. Refer to “To Replace the A9 Hard Drive” on page 7-39 for help with replacing the hard drive.

2 Install a new COA. Refer to “Rear View Identification” on page 10-14 to obtain the part number of the Certificate of Authenticity (COA) label. Refurbishing DCAs with Microsoft Windows XP operating system requires that a new COA label be purchased and installed on the rear panel of the DCA mainframe. Remove the old label before installing the new one.

3 Install a new serial number tag. Recreate the serial number tag to reflect the shipping options e.g. remove 86100C options 001, 100 replace with 86100C option 001.

4 Perform preventative maintenance. Refer to “Preventative Maintenance, 86100A/B/C” on page 1-12.

5 Complete All Adjustments. Refer to “Adjustments” on page 3-1.

6 Complete Performance Verification. Refer to “Performance Verification” on page 4-1.

Re-seal the OS
Re-sealing the OS prepares the operating system for the customer first run experience. This allows the new owner of the DCA to properly license Windows XP the next time the DCA is turned on.

7 In the DCA click Exit on the File menu to close the 86100C application.

8 When asked “are you sure you want to exit 86100C”, click Yes.

9 Click “Start” and select “Run...”.

10 Type the following in the Run window:

```
c:\windows\i386\$OEM$\reseal.bat
```

11 Click OK.

12 Open (Run) the batch file.

13 At the completion of the batch file run, the DCA will shut down.

Create New Backup Image of Drive C
Creates a backup copy of the C partition with all the recently created files, and stores it on a hidden partition.

14 Connect a keyboard to the instrument.

15 Turn the instrument on.

16 Repeatedly press the function key F8 as it boots up.

17 If done correctly the Windows Advanced Options Menu will eventually be displayed as shown below:

Windows Advanced Options Menu
Please select an option

Safe Mode
Safe Mode with Networking
Safe Mode with Command Prompt

Enable Boot Logging
Enable VGA Mode
Last Known Good Configuration (your most recent settings that worked)
Directory Services Restore Mode (Windows domain controllers only)
Debugging Mode
Disable automatic restart on system failure

Start Windows Normally
Reboot
Return to OS Choices Menu

Use the up and down arrow keys to move the highlight your choice.

18 Select “Return to OS Choices Menu” and hit Enter.

NOTE If instead you see the “Welcome to the Windows XP Setup Wizard”, click Next and do not accept the agreement. Click Next, Exit the Setup, Close the Fatal Error dialog box and start the process over by going to Step 7 and repeating the procedure.

19 The following text will be displayed:

Please select the operating system to start:

86100C Infiniium DCA
Emergency Backup And Recovery

20 Press the down arrow key on the keyboard to select Emergency Backup And Recovery. Then, press the Enter key. “The FreeDOS Project” copyright message and the prompt: “Press Any Key to Continue...” will be displayed.

21 Pressing any key will display the following text:

86100C Infiniium DCA
Recovery Options

Choose One of the Following:
1.Recover Factory Backup Image
2.Exit

Enter a Choice:

22 Press F at this point to create a factory backup image file.

NOTE F is not a choice that is displayed on the screen, it is a hidden function used only in the factory and field to create a new backup image of the C partition.

NOTE The system will perform a quick integrity check of the file structure on the C: partition. It will then copy the C: partition to an image file and store it on the System Recovery partition. This process will overwrite the original Factory Recovery Image.

23 Press C to continue or E to exit. Read the on-screen message then press C to continue or E to exit one more time.

24 Wait for the factory image backup process to complete.

25 Even though the on-screen instructions say to press CLT+ALT+DEL, don't do it. Power off the DCA using power button.

NOTE DO NOT press CLT+ALT+DEL to restart the DCA.

CAUTION Do not attempt to power up the DCA again. Doing so would nullify the Re-Seal OS process which prepares the OS for the first customer run experience and potentially violate the license agreement with Microsoft. The new owner should power up the DCA for the first time so that they can agree to the licensing requirements of Windows XP.

Cancel License Entry at Agilent Software Licensing

NOTE If the refurbished DCA held software licenses before the hard drive was replaced, then the entries for these software licenses need to be cancelled at the Agilent Software Licensing web site.

26 To cancel the license entry, refer to "Cancel ASL License Entry" on page 1-20.

Refurbishing an 86100C (Alternate Method)

NOTE

The process to clear the hard drive for instrument re-sale is very time consuming; therefore, performing the procedure "Refurbishing an 86100C" on page 5-5, is the recommended method which involves replacing the hard drive with a new one.

On the 86100C all software option license files, such as Option 100, Option 200, and Option 201 must be removed from the hard drive. A new backup disk image is created, based on the latest data from the Factory.

The latest firmware will be installed. All recommended preventative maintenance will be performed. Modifications and service notes should be installed as required. Follow all the adjustment steps in Chapter 3 before performance testing. Complete a full performance verification from Chapter 4.

The hard drive recovery procedure restores the instrument's hard disk to Factory condition.

Procedure

Complete all the steps to refurbish the 86100C in the order presented below. This ensures that the recovery image stored on the hard drive is the same as a new instrument from the factory.

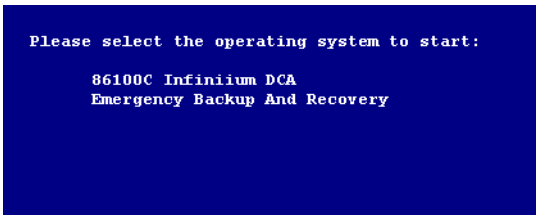
1 Factory Recondition the 86100C Hard Disk Drive. On 86100C instruments, the hard disk drive has four partitions:

- Infiniium drive C contains the operating system, the 86100C application, timebase calibration file, serial number, and software license files.
- The User Drive D contains customer data files. It also contains automatically backed up duplicates of the timebase calibration file, serial number, and software license files.
- A hidden un-named partition contains the recovery image.
- Another hidden un-named partition contains a bootable DOS file.

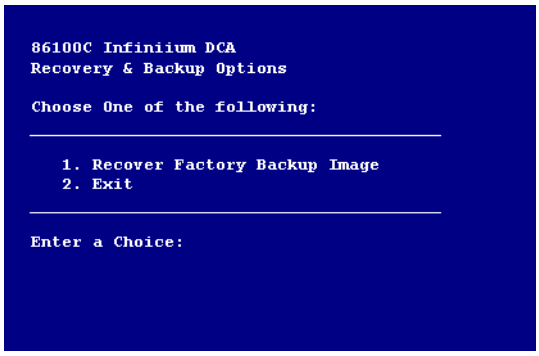
Drive C Recovery

2 Connect a keyboard to the instrument.

3 Turn on the instrument. After approximately 30 seconds, look for the following displayed text. Immediately, press the down arrow key on the keyboard to select Emergency Backup And Recovery. Then, press the Enter key.



4 After more text is displayed, press the Enter key to display the following screen:



5 To enter the recovery procedure, press the 1 key.

6 On the next screen press C to recover the hard disk.

7 Another screen is displayed giving you one more chance to enter or exit the procedure. Press C to recover the hard disk.

CAUTION Once the hard drive recovery procedure starts, do not interrupt the procedure with any key presses. The procedure requires about 10 minutes to complete.

8 When the “Recovery Process is complete!” message is displayed, press CLT+ALT+DEL on the keyboard.

9 The Windows XP Setup Wizard automatically starts. Follow the steps listed on the screen to accept the agreement.

Format the D partition

10 Click Exit on the File menu to close the 86100C application.

11 Click Start to view Windows Administrator.

12 Click My Computer and select the USER (D:) drive.

13 On the File menu, click Format, Start, and then OK.

CAUTION Do not change the default setup. Leave the Format Options selections unchecked.

14 When the Format Complete dialog box appears, click OK.

15 Click Close.

16 Power off the DCA and turn it back on.

17 Wait for boot up to complete then delete the software licenses, refer to “Delete Licenses From the DCA” on page 1-19:

18 Upgrade the firmware.

Follow the procedure in the DCA’s on line help for obtaining and installing the latest version of firmware. Ensure that the most recent shipping firmware is installed in the product. Go to the DCA web firmware upgrade web site to order or download the latest firmware.

www.agilent.com/comms/dca

19 Install the Recommended Windows XP Updates. Install all updates and service packs for Microsoft Windows XP. You must be connected to the Internet before proceeding.

20 On the DCA click Exit on the File menu to close the 86100C application.

21 When asked “are you sure you want to exit 86100C”, click Yes.

22 Click “Start”.

23 Select Windows Update.

24 Install all the recommended updates and service packs.

NOTE

Updating Windows XP will require access to the Internet. Consult with your IT department for help setting up the DCA’s Internet connections. Care should be used when accessing the Internet due to software viruses. Check with your factory support contact for the latest information on Windows XP licensing requirements with Agilent equipment. Some customers require that the networking setting be in a new state and that there are no remnants of any networking activity on the DCA.

25 Install a new COA.

Refer to “Rear View Identification” on page 10-14 to obtain the part number of the Certificate of Authenticity (COA) label. Refurbishing DCAs with Microsoft Windows XP operating system requires that a new COA label be purchased and installed on the rear panel of the DCA mainframe. Remove the old label before installing the new one.

26 Install a new serial number tag. Recreate the serial number tag to reflect the shipping options. For example, remove 86100C options 001, 100 replace with 86100C option 001.

27 Perform Preventative Maintenance. Refer to “Preventative Maintenance, 86100A/B/C” on page 1-12.

28 Complete all adjustments. Refer to “Adjustments” on page 3-1.

29 Complete performance verification. Refer to “Performance Verification” on page 4-1.

Re-seal the OS

Re-sealing the OS prepares the operating system for the customer first run experience. This allows the new owner of the DCA to properly license Windows XP the next time the DCA is turned on.

30 On the DCA click Exit on the File menu to close the 86100C application.

31 When asked “are you sure you want to exit 86100C”, click Yes.

32 Click “Start” and select “Run...”.

33 Type the following in the Run window:

```
c:\windows\i386\$OEM$\reseal.bat
```

34 Click OK.

35 Open (Run) the batch file.

36 wAt the completion of the batch file run, the DCA will shut down.

Create New Backup Image of Drive C

Creates a backup copy of the C partition with all the recently created files, and stores it on a hidden partition.

37 Connect a keyboard to the instrument.

38 Turn the instrument on.

39 Repeatedly press the function key F8 as it boots up.

40 If done correctly the Windows Advanced Options Menu will eventually be displayed as shown below:

Windows Advanced Options Menu
Please select an option

Safe Mode
Safe Mode with Networking
Safe Mode with Command Prompt

Enable Boot Logging
Enable VGA Mode
Last Known Good Configuration (your most recent settings that worked)
Directory Services Restore Mode (Windows domain controllers only)
Debugging Mode
Disable automatic restart on system failure

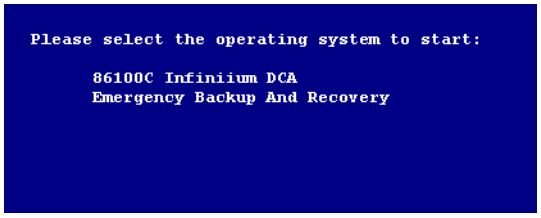
Start Windows Normally
Reboot
Return to OS Choices Menu

Use the up and down arrow keys to move the highlight your choice.

41 Select “Return to OS Choices Menu” and hit Enter.

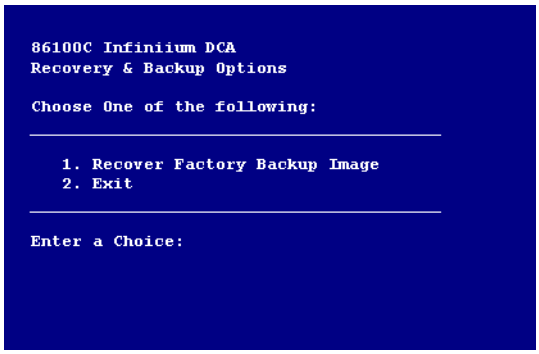
NOTE If instead you see the “Welcome to the Windows XP Setup Wizard”, click Next and do not accept the agreement. Click Next, Exit the Setup, Close the Fatal Error dialog box and start the process over by going to Step 30 and repeating procedure.

42 The following text will be displayed:



43 Press the down arrow key on the keyboard to select Emergency Backup And Recovery. Then, press the Enter key. “The FreeDOS Project” copyright message and the prompt: “Press Any Key to Continue...” will be displayed.

44 Pressing any key will display the following text:



45 Press F at this point to create a factory backup image file.

NOTE F is not a choice that is displayed on the screen, it is a hidden function used only in the factory and field to create a new backup image of the C partition.

NOTE The system will perform a quick integrity check of the file structure on the C: partition. It will then copy the C: partition to an image file and store it on the System Recovery partition. This process will overwrite the original Factory Recovery Image.

46 Press C to continue or E to exit. Read the on-screen message then press C to continue or E to exit one more time.

47 Wait for the factory image backup process to complete.

48 Even though the on-screen instructions say to press CLT+ALT+DEL, don't do it. Power off the DUT using power button.

NOTE DO NOT press CLT+ALT+DEL to restart the DCA.

CAUTION Do not attempt to power up the DCA again. Doing so would nullify the Re-Seal OS process which prepares the OS for the first customer run experience and potentially violate the license agreement with Microsoft. The new owner should power up the DCA for the first time so that they can agree to the licensing requirements of Windows XP.

49 Cancel License Entry at Agilent Software Licensing. Refer to "Cancel ASL License Entry" on page 1-20.

NOTE If the refurbished DCA held software licenses before the hard drive was replaced, then the entries for these software licenses need to be cancelled at the Agilent Software Licensing web site.

Refurbishing an 86100A/B

Refurbishing (remanufacturing) the DCA readies a previously owned instrument for reselling. The hard drive must be processed so that there are no user files left on it.

The latest firmware will be installed. All recommended preventative maintenance will be performed. Modifications and service notes should be installed as required. Follow all the adjustment steps in Chapter 3 before performance testing. Complete a full performance verification from Chapter 4.

Following the procedures below will ensure that the DCA will perform as close to new as possible. The hard drive recovery procedure restores the instrument's hard disk to Factory condition.

Procedure

1 Factory Recondition the 86100A/ B Hard Disk Drive.

The Infiniium DCA hard disk drive recovery system consists of one floppy disk, one CD-ROM (for the 86100B), and instructions. The recovery process will re-image the internal disk drive on the instrument. After the recovery process is complete, the Infiniium DCA firmware is set to the latest revision as indicated on the recovery disks.

All user files and the user network configuration settings will be lost during the recovery process. To order a hard drive recovery package, visit:

http://www.agilent.com/comms/dca

2 Upgrade the firmware.

Follow the procedure in the DCA's on line help for obtaining and installing the latest version of firmware. Ensure that the most recent shipping firmware is installed in the product. Go to the DCA web firmware upgrade web site to order or download the latest firmware

3 Perform preventative Maintenance. Refer to "86100A Instruments" on page 6-17.

4 Complete all adjustments. Refer to "Adjustments" on page 3-1.

5 Complete performance verification. Refer to "Performance Verification" on page 4-1.

6

Instrument Modifications

Introduction

This chapter lists the hardware and software changes that have been made to the 86100A/B/C instruments during the years. This includes information and procedures in service notes. To locate a major instrument assembly, refer to the following figures:

- For the 86100A, refer to Figure 8-1 on page 8-5
- For the 86100B, refer to Figure 9-1 on page 9-5
- For the 86100C, refer to Figure 10-1 on page 10-6

CAUTION Electrostatic discharge (ESD) can damage or destroy electrostatic components. All work on electronic assemblies should be performed at a static-safe work station.

86100B/C Instruments

Replacing A7A2, A8, or A9 Assemblies

- A7A2 Touch Screen
- A8 Touch Screen Interface Controller
- A9 Hard Drive

Service Note

86100C-06

Description

Instruments with serial number MY45031518 and below, have older designs of the A7A2 Touch Screen and A8 Touch Screen Interface Controller that are no longer available. In addition, the touch screen software drivers on the A9 Hard Drive are incompatible with newer A7A2 and A8 designs. Replacing either A7A2 or A8 requires that you perform the following tasks:

- Replace A7A2 Touch Screen (order p/n 0960-2632)
- Replace A8 Touch Screen Interface Controller (order p/n 0960-2590)
- Install the Touch Screen Controller Replacement Kit (order p/n 86100-60134)
- Update the touch screen drivers

  The new touch screen software drivers and redirect files can be obtained from the DCA support web page:

  http://lwd.marketing.agilent.com/Service_Support/Product_Support/86100/touch_screen.htm

Serial Numbers

Install on instruments having serial numbers below MY46520101.

Required Tools and Files

? Touch Screen Controller Replacement Kit (86100-60134)
? T-8, T-10, T-15, and T-20 Torx drivers
? Torque Wrench
? USB Memory Stick
? Keyboard and Mouse
? MT7.11.2Win32.zip file
? Redirect.exe file

Procedure

1 Refer to Table 6-1 on page 6-4 to confirm that all of the parts have been provided with the kit.

2 Disconnect the power cord from the instrument.

WARNING

Opening covers or removing parts is likely to expose dangerous voltages. Disconnect the instrument from all voltages before it is opened.

Table 6-1. Contents of Touch Screen Controller Replacement Kit (86100-60134)

Ref. Des.	Description	Additional Information	Qty	Part Number
A8	Touch Screen Controller	Replaces Previous TS Controller, 1150-7826	1	0960-2590
MP1	Bracket, Touch Screen	New part to transition from old mounting holes on chassis to the new touch screen board assembly	1	86100-00052
MP2	Screws	—	2	0515-0367
W1	Cable, Touch Screen Power	P/O W33; from A18P1 to A8JP4, replaces 86100-60073	1	86100-60132
W2	Cable, Touch Screen Serial	from A8JP7 to A4CN7 COM2, replaces 86100-60033	1	86100-60130
W6	Cable, Touch Screen	from A8JP5 To A7A2, replaces 86100-60002	1	86100-60131

3 Use a T-20 TORX driver to remove the four screws that attach the two rubber feet to the instrument's rear panel, as shown in Figure 6-1.

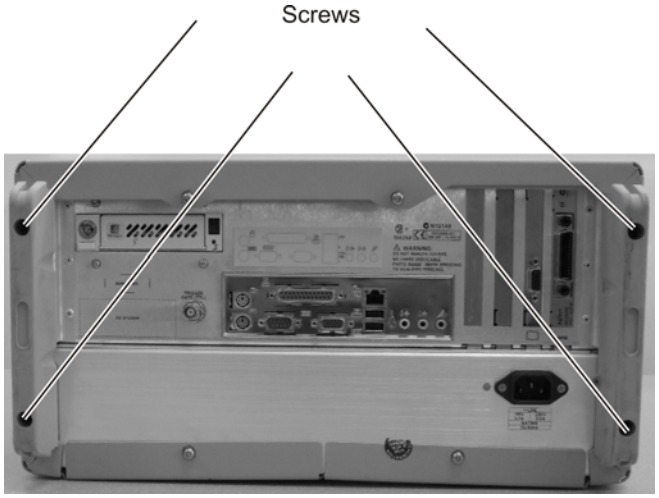


Figure 6-1. Removing the Rubber Feet

4 Use a T-20 TORX driver to remove the four screws that fasten the cover to the instrument's rear panel, as shown in Figure 6-2.

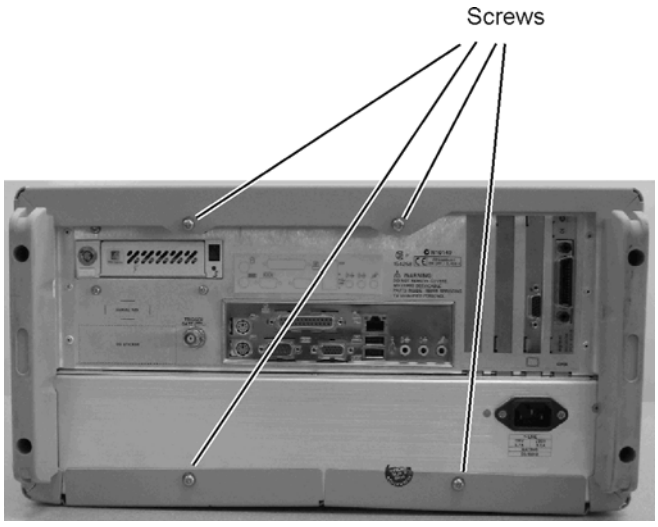


Figure 6-2. Removing the Cover Screws

Remove the two T-15 screws that secure each handle to the sides of the instrument, as shown in Figure 6-3.

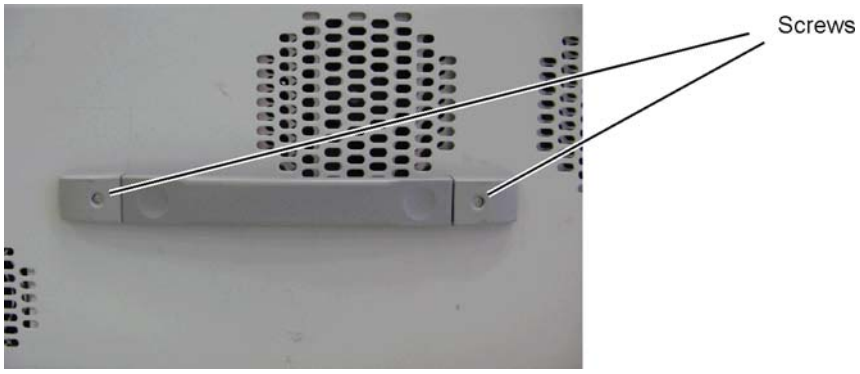


Figure 6-3. Removing the Side Handles

5 Turn the instrument upside down on the bench. Remove the calibration sticker that covers the access plug on the bottom of the instrument. See Figure 6-3.

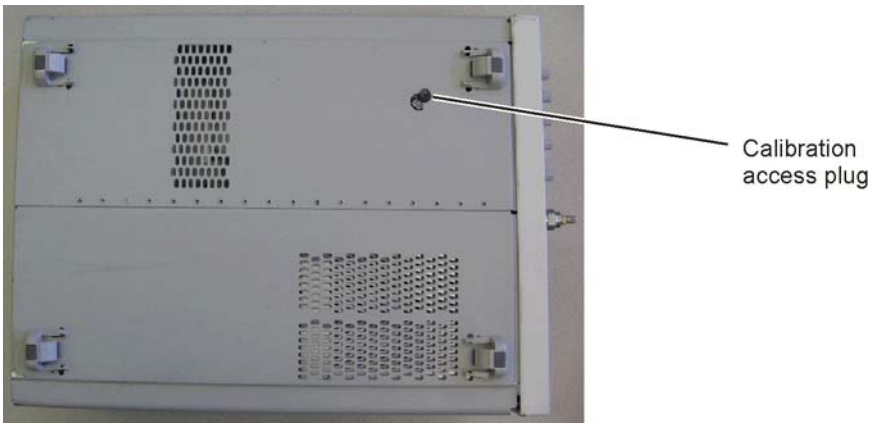


Figure 6-4. Calibration Access Plug

6 Place the instrument in its normal operating position with the front extended five or six inches over the edge of the bench. Reach up and turn the calibration access plug until it becomes loose (a tab on the plug lines up with a notch in the cover). Gravity will help you to remove the plug.

7 From the rear panel, place your hands on each side of the cover, and use your thumbs to push the instrument out the front of the cover.

NOTE For the following steps, refer to Figure 6-5 on page 6-7 for cable and assembly locations.

8 Locate W33 that connects the A18 ATX Interface Assembly to the A4 PC Motherboard.

9 Carefully remove the cable ties.

10 Disconnect W33 from the A18 ATX Power Supply Interface assembly.

11 Disconnect the other end of W33 from the A4 PC Motherboard

12 Disconnect W1 Touch Screen Controller Power from the A8 Touch Screen Controller Interface assembly.

13 Remove the W1/W33 cable assembly from the chassis and discard.

NOTE Be careful when removing the W1 cable as it is part of the W33 that plugs into the A18 ATX assembly.

14 Disconnect W2 Touch Screen Controller Serial Data from the A8 Touch Screen Controller Interface assembly.

15 Disconnect the other end of the W2 Cable from the A4 PC Motherboard, remembering where the serial connection is on the motherboard.

16 Remove the W2 cable from the chassis and discard.

17 Disconnect W6 Touch Screen Controller Cable from the A8 Touch Screen Controller assembly

18 Disconnect the other end of W6 from the A7A2 Touch Screen Controller assembly.

19 Remove cable W6 from the chassis and discard.

20 Using a small Torx driver, unscrew the fasteners that hold the A8 assembly to the chassis and discard.

NOTE Use a short handled T8 or T10 Torx driver to loosen the screws. A right angled T10 Torx would be best.

21 Remove the A8 Touch Screen Controller assembly and discard.

22 Using the supplied screws, attach the new Touch Screen Controller bracket to the chassis as shown in Figure 6-6 on page 6-8. Use a T10 Torx with a 5 inch-pounds torque wrench.

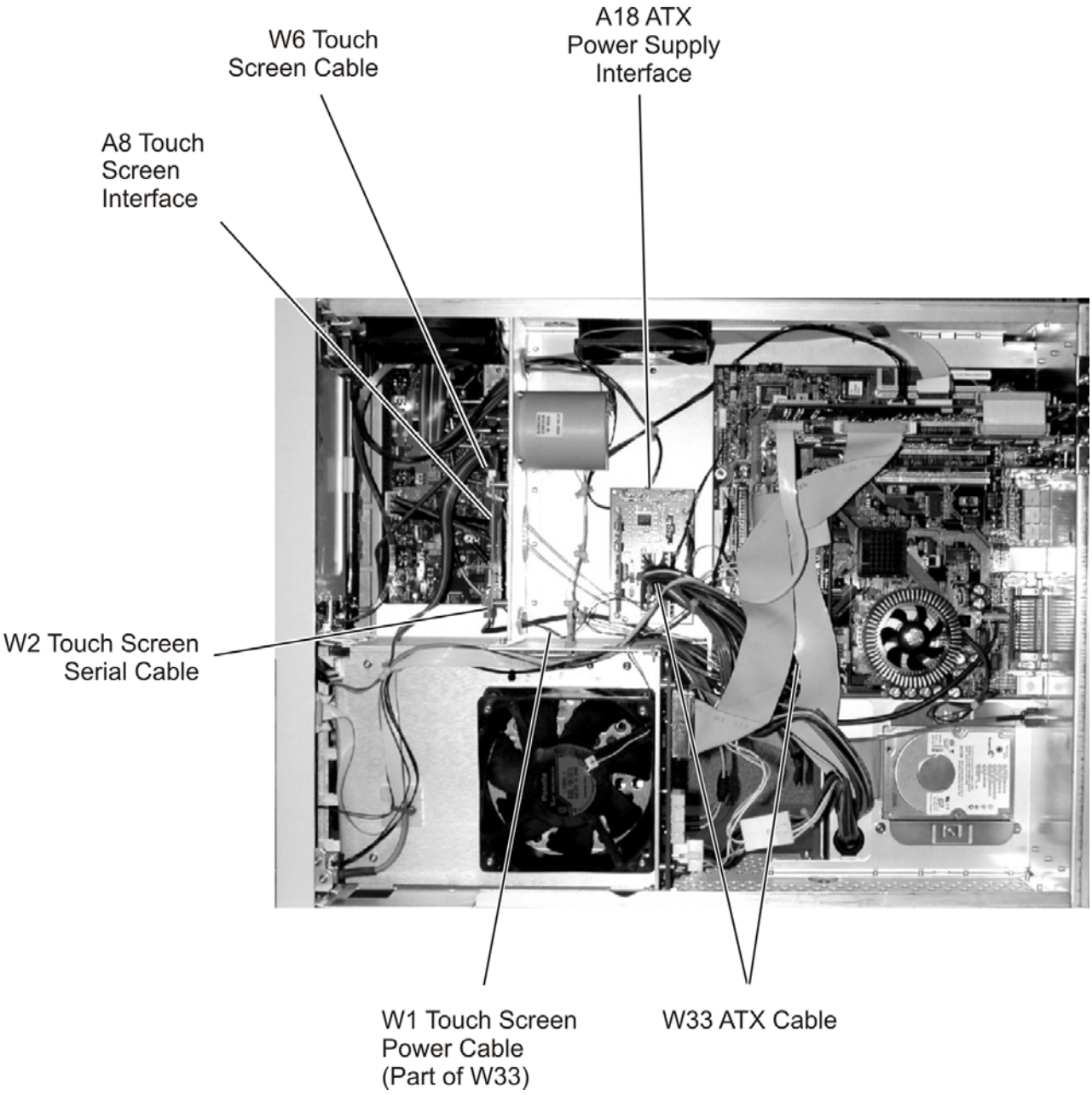


Figure 6-5. Cable and Assembly Locations

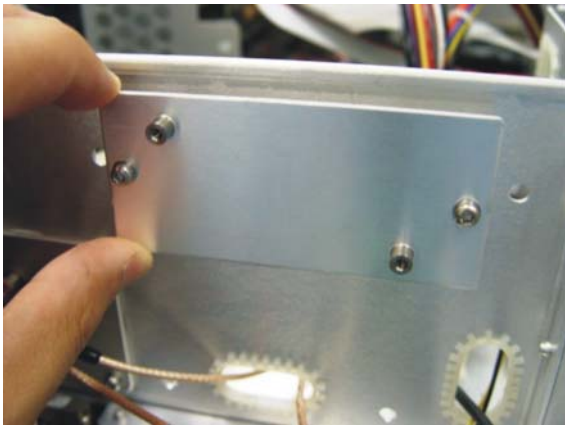


Figure 6-6. Touch Screen Controller Bracket

23 Attach the new A8 Touch Screen Interface to the bracket using the supplies screws as shown in figure 7. Us a T8 Torx with a 5 inch-pounds torque wrench.

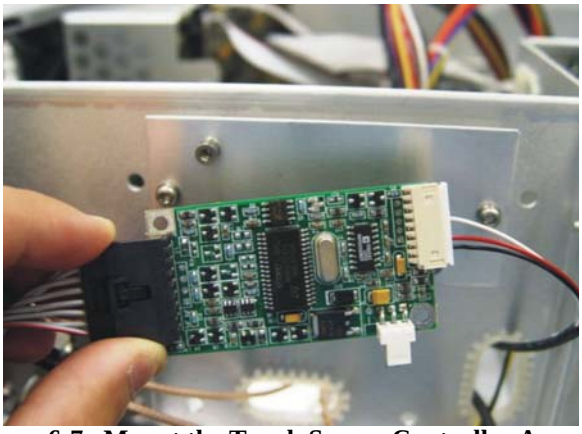


Figure 6-7. Mount the Touch Screen Controller Assembly

24 Connect the new W2 Touch Screen Controller Serial Cable from A8JP7 to A4CN7 COM2

25 Connect the new W6 Touch Screen Controller Cable from A8JP5 To A7A2.

26 Connect the new W1 Touch Screen Controller Power Cable from A18P1 to A8JP4.

27 Connect the end of W33 that includes W1 Touch Screen Controller power to A18 P1 and the other end of W33 to A4 CN 11.

28 Install tie wraps around W33/W1 and W35 as shown in Figure 6-8.

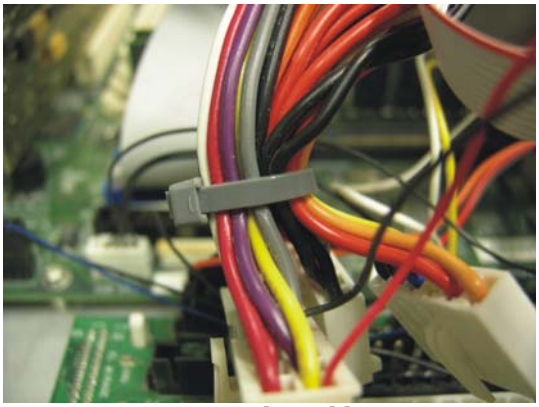


Figure 6-8. Tie Wrapping the Cables

NOTE The tie wrap should be installed after the cables are connected.

29 Check that all connections are secure and that all newly installed cables are routed through existing chassis cable ties.

To add new Touch Screen Controller drivers and remove the old ones

NOTE Make sure that the new hardware is installed before continuing with this software installation.

30 Connect a keyboard and mouse to the DCA.

31 Turn on the instrument.

32 After the DCA is booted, exit the DCA application by clicking File, Exit.

NOTE When the “Found New Hardware” message appears for the new touchscreen -- before you install the touch screen drivers -- simply cancel the dialog and continue with the software installation as described below.

NOTE You may also see “Found New Hardware” message for the 82350B GPIB PCI card. Just accept the new hardware.

33 Download the new drivers from the following web site:

http://lwd.marketing.agilent.com/Service_Support/Product_Support/86100/infiniiumdca.htm

NOTE To get the new touch screen drivers, use a PC connected to the network and unzip the files into a USB memory stick

34 Download MT7.11.2Win32.zip from the support web site.

35 Unzip the file into a USB memory stick or other temporary memory location.

36 Connect the memory stick to the DCA’s USB port.

37 Using Windows Explorer on the DCA, open the directory where the unzipped files are located.

38 Double-click Setup.exe to install the new Touch Screen Controller drivers in the DCA.

39 Follow the instructions to install the MT 7.11 SR2 software. Accept the terms of the license agreement.

40 Remove the old drivers: click START. Select Control Panel then Add Remove Programs.

41 Locate the Universal Pointer Device Driver and remove it from the DCA.

Copy re-direct files to DCA hard drive

42 Download Redirect.exe from the support web site to a temporary memory location such as a USB memory stick.

43 Double click on Redirect.exe. This is a self extracting archive; by executing the file, it will automatically copy the redirect files listed below to C:\scope\touchscreen on the DCA. During the file copy process, it will overwrite the existing tbmorph.exe file.

- Microsoft.VC80.CRT.manifest
- msvcm80.dll
- msvcp80.dll
- msvcr80.dll
- tbmorph.exe

44 Reboot the DCA by clicking on Start, Turn Off Computer, Restart.

Touch Screen Calibration:

45 After the DCA is re-booted, click on Utilities, Touch Screen Config...

46 You should see the screen as shown in Figure 6-9. If you see the old configuration screen as shown in Figure 6-10, then you may have to repeat the process to reinstall the new drives and redirect files.

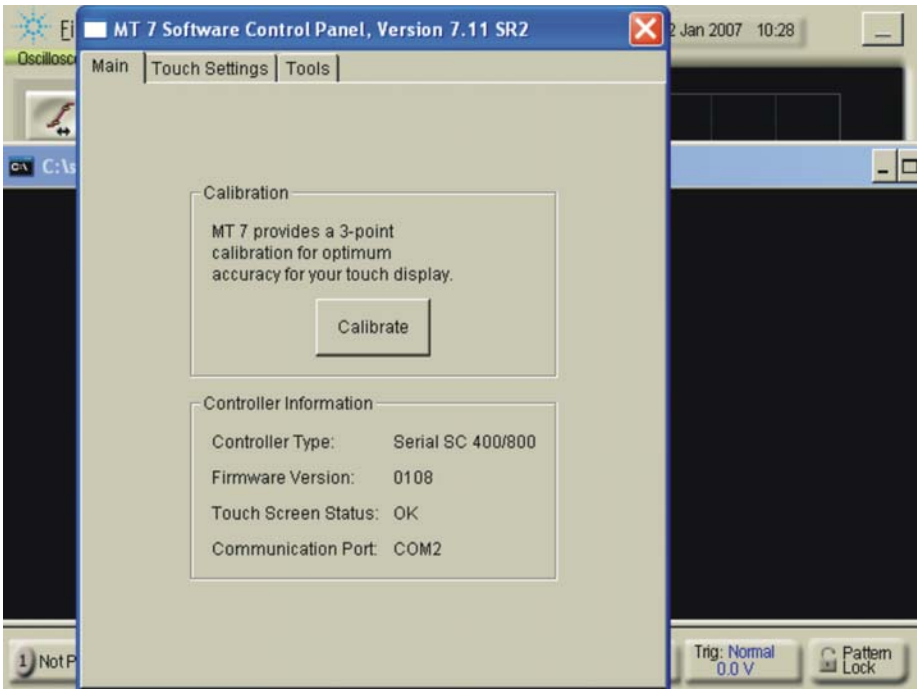


Figure 6-9. Touch Screen Driver for the 0960-2590 TS Controller

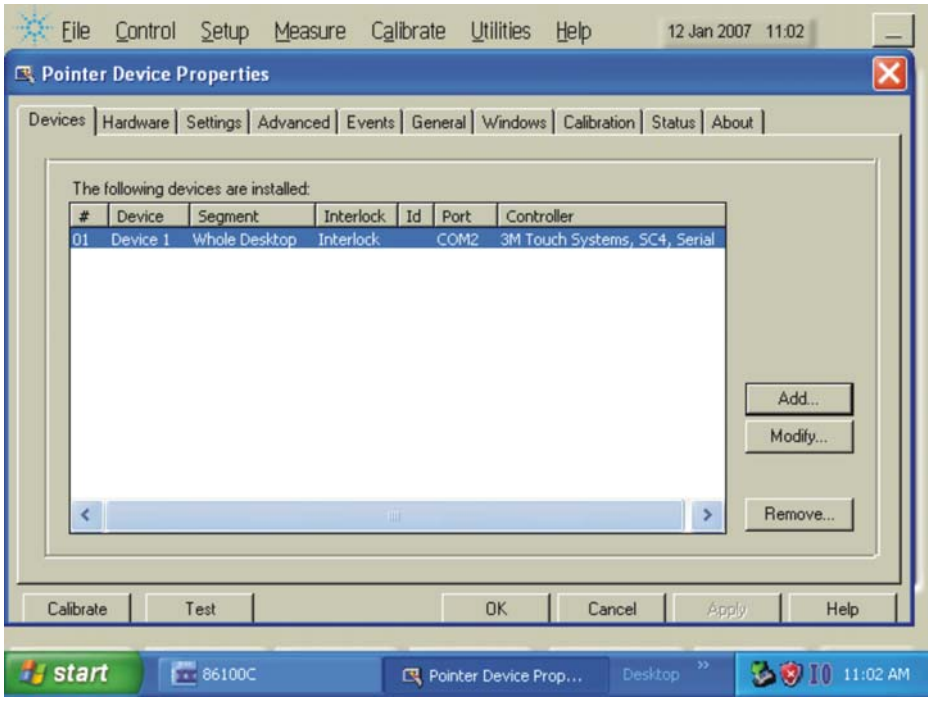


Figure 6-10. Touch Screen Driver for the older 1150-7826 TS Controller

47 Perform a Touch Screen Calibration.

48 Refer to Service Note 86100C-06 for touch screen support information.

49 Instrument functionality testing should be performed after installing this kit. Refer to the 86100A/B/C Service Guide, part number 86100-90075 for more information.

NOTE

After the completion of the touch screen controller retrofit, the A9 hard drive must have a recovery image created on the hidden partition. This is because of the new software drivers that were installed.

Create New Backup Image of Drive C

Creates a backup copy of the C partition with all the recently created files, and stores it on a hidden partition.

1 Connect a keyboard to the instrument.

2 Turn the instrument on.

3 Repeatedly press the function key F8 as it boots up.

4 If done correctly the Windows Advanced Options Menu will eventually be displayed as shown below:

Windows Advanced Options Menu
Please select an option

Safe Mode
Safe Mode with Networking
Safe Mode with Command Prompt

Enable Boot Logging
Enable VGA Mode
Last Known Good Configuration (your most recent settings that worked)
Directory Services Restore Mode (Windows domain controllers only)
Debugging Mode

Disable automatic restart on system failure

Start Windows Normally
Reboot
Return to OS Choices Menu

Use the up and down arrow keys to move the highlight your choice.

5 Select “Return to OS Choices Menu” and hit Enter.

NOTE If instead you see the “Welcome to the Windows XP Setup Wizard”, click Next and do not accept the agreement. Click Next, Exit the Setup, Close the Fatal Error dialog box and start the process over by going to Step 1 and repeating the procedure.

6 The following text will be displayed:

Please select the operating system to start:

86100C Infiniium DCA
Emergency Backup And Recovery

7 Press the down arrow key on the keyboard to select Emergency Backup And Recovery. Then, press the Enter key. “The FreeDOS Project” copyright message and the prompt: “Press Any Key to Continue...” will be displayed.

8 Pressing any key will display the following text:

86100C Infiniium DCA
Recovery Options

Choose One of the Following:
1.Recover Factory Backup Image
2.Exit

9 ---

Enter a Choice:

10 Press F at this point to create a factory backup image file.

NOTE F is not a choice that is displayed on the screen, it is a hidden function used only in the factory and field to create a new backup image of the C partition.

NOTE The system will perform a quick integrity check of the file structure on the C: partition. It will then copy the C: partition to an image file and store it on the System Recovery partition. This process will overwrite the original Factory Recovery Image.

11 Press C to continue or E to exit. Read the on-screen message then press C to continue or E to exit one more time.

12 Wait for the factory image backup process to complete.

13 Even though the on-screen instructions say to press CLT+ALT+DEL, don’t do it. Power off the DCA using power button.

NOTE DO NOT press CLT+ALT+DEL to restart the DCA.

Preventing ESD Damage with A15 Diode Limiter

Service Note 86100C-04

Description 86100C instruments built after June 1, 2006, include the A15 Diode Limiter. Adding A15 to the input of A14 improves reliability, because the A14 Counter Assembly on 86100C Option 001 instruments is susceptible to electrical overstress through the front-panel Trigger port. Add A15 only in situations where A14 has been damaged through electrical overstress.

Serial Numbers Install on 86100C instruments having the following serial numbers:

- MY45031040 and below (*except MY45031048 & MY45031049*)
- SG45030118 and below

Required Parts

A15 . . . . . N9355-66002
Cable, SW2 to A15P1 86100-20082

Procedure

1 Remove the instrument cover, calibration access plug, rear-panel feet, and side handles.

2 Remove the A13/A14 assemblies as shown in "To Replace the A13 Acquisition and 86100C A14 Counter Assembly (Option 001)" on page 7-45. Position A13/A14 as shown in Figure 6-11.

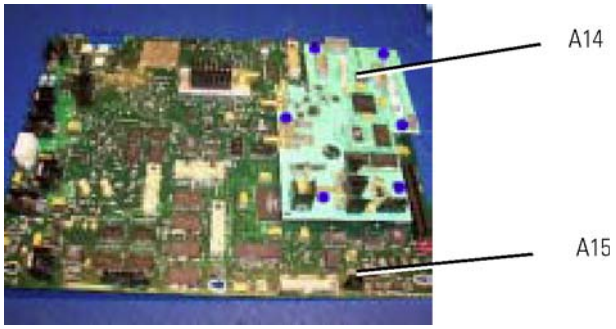


Figure 6-11. A13/A14 Assemblies

3 Remove the existing cable W31, part number 86100-20053, from the A14J2 INPUT and discard. See Figure 6-12.

4 Connect the new W31, part number 86100-20082, to A14J2 INPUT. The W32 cable remains connected to the A14J3 OUTPUT.

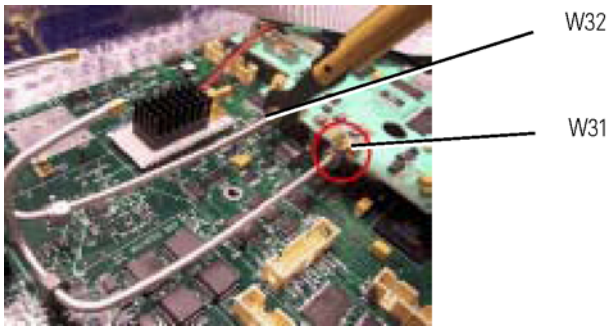


Figure 6-12. Cables W32 and W31 (circled)

5 Install the A13 Acquisition Assembly and the A14 Counter Assembly into the DCA chassis.

6 Connect cable W32 (from A14J3) to SW2P1 as shown in Figure 6-13. Torque the 5/16” connector to 8 in-lbs.

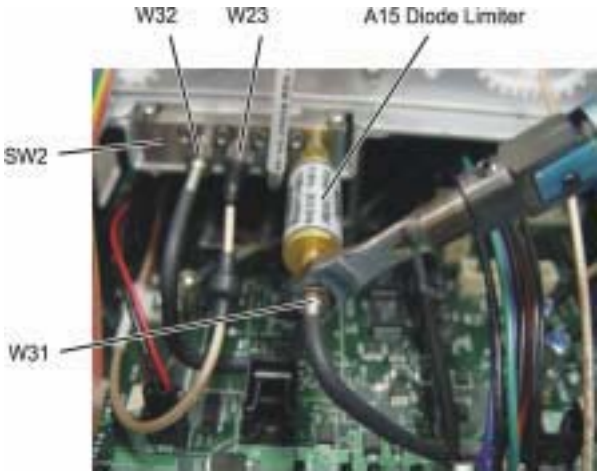


Figure 6-13. A15 Diode Limiter and SW2 Cable Connections

7 Connect the A15 Diode Limiter to SW2P4 as shown in Figure 3 above. Torque the connector to 8 in-lbs using a 5/16” torque wrench.

8 Locate W31 from A14J2 and connect it to the A15 diode limiter.

CAUTION When connected, do not allow W32 and W32 to touch the A13 Acquisition Assembly.

9 Re-install the instrument cover, calibration access plug, rear-panel feet, and side handles.

10 Turn on the instrument, and allow it to warm up for 1 hour.

11 Perform the timebase adjustment. Refer to “Timebase Adjustment” on page 3-3.

12 Perform the verification procedures, including the Option 001 tests, using the VISION test software and equipment. These tests cannot be done manually.

A4 Motherboard BIOS Flash

Service Note 86100C-03

Description This procedure flashes the BIOS on the instrument's motherboard and is usually performed as part of replacing the A4 Motherboard assembly. When replacing A4, refer to the complete procedure "To install the motherboard" on page 7-31. Older design motherboards (0960-2481 and 0960-2521) have been replaced with the new motherboard design (0960-2568). When installing this newer design motherboard, the BIOS must be flashed. The older design motherboards have four PCI slots; the new design has three PCI slotes and one AGP slot.

Serial Numbers 86100C instruments with serial number MY45030386 and earlier were shipped with the older design motherboards.

Required Equipment

? USB 3.5-inch disk drive
? Non-USB keyboard
? Non-USB mouse

Procedure

Create a Boot Disk

1 On the Test System's controller (or other computer) insert a 3.5-inch disk for use a boot disk. Format the disk.

2 On the Agilent Intranet, go to the following web page. If you are unable to access this URL, contact dsa_support@agilent.com for more information.

http://lwd.marketing.agilent.com/Service_Support/Product_Support/86100/mainframe_support_ information.htm

3 On the web page, locate the 86100B/C BIOS FLASH for 0960-2521 AND 0960-2568 section that includes links for the following three files:

815gag10.bin
AUTOEXEC.BAT
AWDFLASH.EXE

4 Right-click each of these three files and select Save Target As to save the files to 3.5-inch boot disk.

Flash the Bios

5 Connect an external USB 3.5-inch drive to the instrument's front panel (86100C) or rear panel (86100B).

6 Insert the 3.5-inch BIOS disk that you created into the external USB drive and turn on the instrument. The instrument automatically starts the boot process from the external disk.

CAUTION Do not turn off power or reset the system during this process.

7 When the process completes, the instrument automatically restarts. Remove the external 3.5-inch drive.

8 When the instrument's displays the entry screen, you will see DEL to enter SETUP on the bottom of the screen, press the Delete key. This enters the CMOS Setup Utility, which is shown in Figure 6-14.

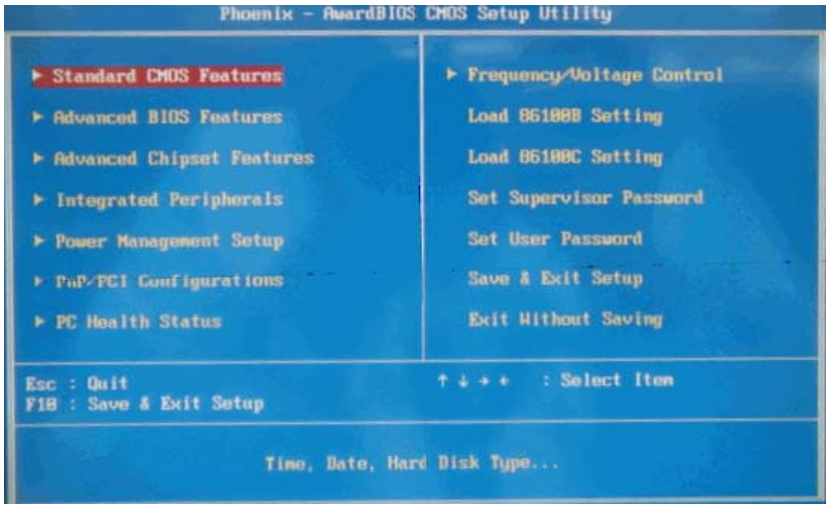


Figure 6-14. Press Delete to start CMOS Setup Utility

9 Use the arrow keys to select Load 86100C Setting as shown in Figure 6-15. Select Load 86100B Setting is you are setting up an 86100B instrument. Press the Enter key and then the Y key to begin the load process.

10 When the load process completes, press F10. When the message shown in Figure 6-16 appears, press the Y key followed by the Enter key. This exits the CMOS Setup Utility.

11 Reboot the instrument to complete the BIOS flash process.

Figure 6-15. Loading the 86100C Settings

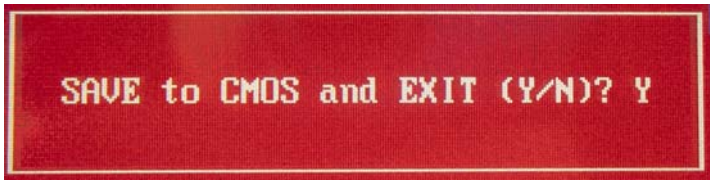


Figure 6-16. Exiting the CMOS Setup Utility

86100A Instruments

Verify that the modifications listed below have been installed on the 86100A DCA. After the modification is complete, a label is placed on the rear panel indicating that the instrument has had the modification.

Intermittent Front-Panel Keypads

Service Note 86100A-01

Serial Number: US4032 and below

Early production units had keypad assemblies with carbon ink on the printed circuit boards together with silver contacts on the rubber keypads. Over time resistance builds up on the contacts. Newer keypads have carbon contacts.

The modification involves replacing the rubber keypads on the A7 Front-Panel Assembly. Refer to “To Replace the A7 Front-Panel Keyboard” on page 7-35 for instructions on keypad replacement. Refer to “Front Inside Panel Identification” on page 10-12 for the part numbers of the three keypads.

Intermittent or Slow Floppy Disk Reads

Service Note 86100A-02A

Serial Number: US4106 and below

On early 86100A mainframes, the LS-120 disk drive would occasionally experience difficulty with read and write operations. A new ground connection was added on the A16 LS-120 Adapter Board Assembly. If needed, replace the A16 (part number 86100-66505) with the newer assemblies as described in “LS-120 Disc Drive Modification” on page 6-19.

Optionally you may modify the existing A16 LS-120 Adapter Assembly by adding a ground clip, Agilent Part number 5021-4312, between pin 2 of the 44 pin connector and the adjacent screw hole. Solder the ground clip to pin 2 so that the hole aligns with the screw hole. Re-label the assembly to 86100-66514.

Intermittent Problems with Vertical Calibrations or Vertical Trace

Service Note 86100A-03

Serial Number: US4032 and below

On early 86100A mainframes, the PLDs on the A13 Acquisition Assembly would occasionally go into a write mode on power up. This causes various symptoms such as vertical cal failure, vertical trace at top or bottom screen, and loss of control of the vertical trace. Sometimes the DCA

fails to completely boot up leaving just the splash screen and the DCA buttons displayed. Rebooting the DCA fixes the problem. If the DCA boots up properly, the problem will not appear again.

Installing a PLD header plug on a connector on the A13 Acquisition Assembly can solve the PLD lockup problem as described in "A13 Acquisition Board PLD Header Modification (86100A Only)" on page 6-20.

Plug-in Modules Not Recognized by the DCA Mainframe

Service Note 86100A-04

Serial Numbers below US4017:

On early 86100A mainframes, some modules are not recognized by the DCA. Usually the problem occurs when a clock recovery module is installed together with another module.

Various modifications were performed on the A13 Acquisition board assembly to solve this problem. The modifications are not possible in the field.

To determine whether the A13 Acquisition board assembly has been modified, remove it from the mainframe and examine U55 (see Figure 6-17). If U55 is a Motorola part, the board assembly has not been modified and must be replaced.

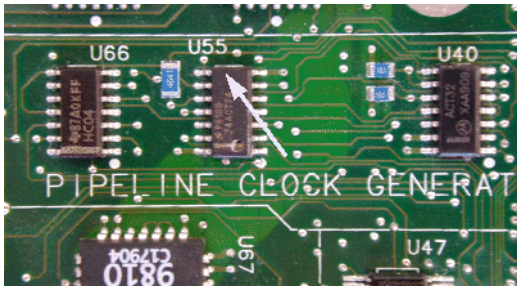


Figure 6-17. U55 location

Replace the entire A13 Acquisition board assembly with the A13 exchange assembly. DCAs with option 001 (divided trigger) will need to have the option 001 replacement assembly. Look at the serial tag on the rear panel to see if option 001 is installed.

Refer to "To Replace the A13 Acquisition and 86100C A14 Counter Assembly (Option 001)" on page 7-45 as applicable.

Module Communication Error/Modules Not Recognized by the Mainframe

Service Note 86100A-06

Serial Numbers: All

The clock line to the two modules does not have adequate isolation so reflections sometimes cause errors in read and write operations. The symptoms are that the modules are intermittently not recognized by the mainframe and that occasionally a module communications error is displayed on the DCA.

Solution: Replace the A12 Distribution Assembly with the preferred replacement, Agilent Part number 86100-66518. Refer to "To Replace the A12 Distribution Assembly" on page 7-42.

LS-120 Disc Drive Modification

1 Follow the instructions for removing the instrument cover, on page 7-3.

2 Place the instrument so the top is facing up.

3 Using a T-10 TORX driver, remove the two screws that secure the A16 LS-120 board to the rear of the A10 floppy drive. Refer to Figure 6-18.

4 Remove the ribbon cable, W9 and the board assembly. Refer to Figure 6-18.

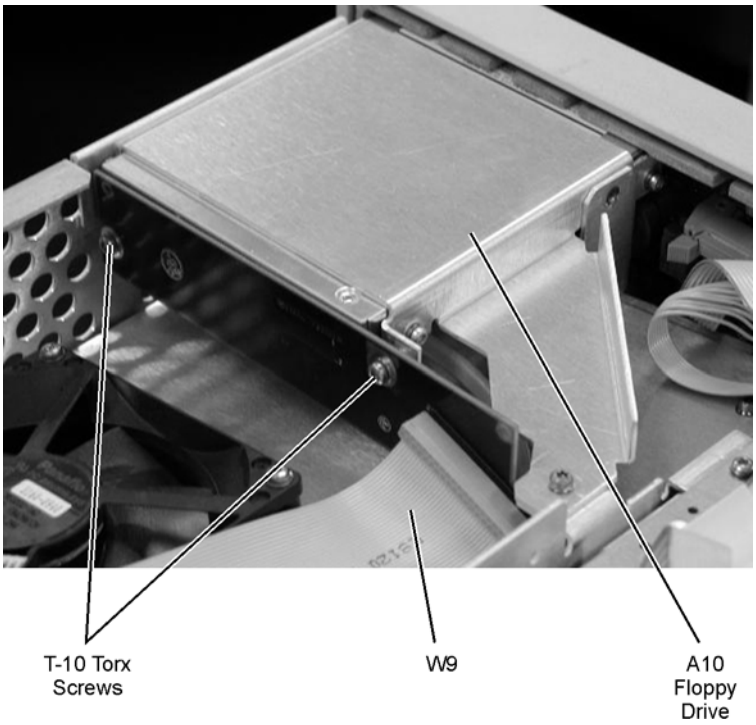


Figure 6-18. LS-120 and A-10 Floppy Drive

5 Modify the A16 LS-120 board by installing a ground strap from pin 2 to the mounting hole. Refer to Figure 6-19.

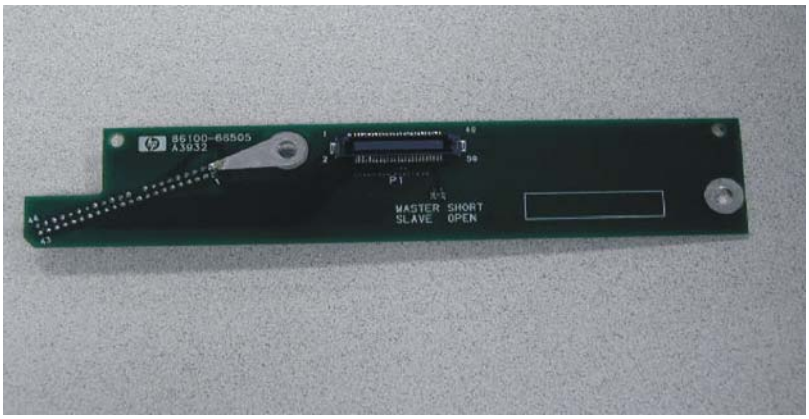


Figure 6-19. A16 LS-120 Board shown with Added Ground Strap

6 Secure the A16 LS-120 Board to the A10 Floppy Drive with two, T-10 Torx Screws. Refer to Figure 6-18.

7 Secure the ribbon cable W9 to the A16 LS-120 Board. Refer to Figure 6-18.

NOTE Ensure that the red stripe on the ribbon cable, W9 is towards the fan assembly when connection the cable to LS-120.

8 Reassemble the Mainframe Cover.

9 Perform a Read/Write test of the Floppy Drive.

- Power on the instrument, and insert any 3.5 floppy disk into the floppy drive.
- At the touchscreen select the File pull-down menu, and select “Save, Instrument Setup.”
- Select “Look In” 3.5 Floppy (A:), touch/click Save.
- Select “Open Instrument Setup” and recall the file that was just saved.
- The saved setup should be recovered properly.

A13 Acquisition Board PLD Header Modification (86100A Only)

1 Remove the instrument cover. Refer to “To Remove the Instrument Cover” on page 7-3.

2 Remove the A13 Acquisition Board. Refer to “To Replace the A13 Acquisition and 86100C A14 Counter Assembly (Option 001)” on page 7-45.

3 Place the jumper, shown in Figure 6-20, on P12 so that the resistors are connected to pins 1, 4, and 5, shown in Figure 6-21. The jumper key should face towards the front panel.

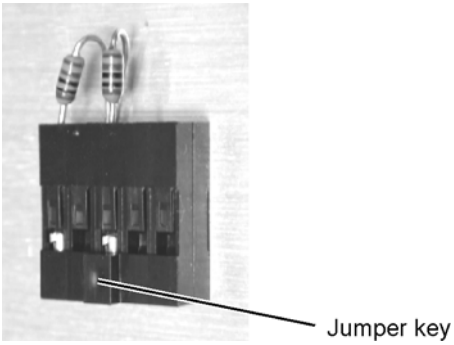


Figure 6-20. Jumper, E2660-01201

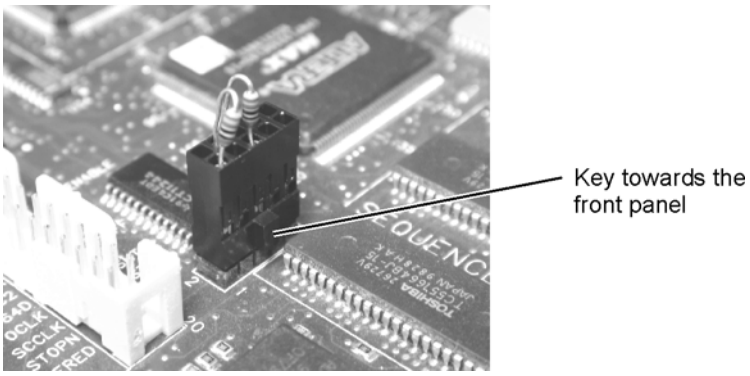


Figure 6-21. Placement of the Jumper on P12

4 Reassemble the A13 Acquisition Board in reverse order of removal.

5 Reassemble the Mainframe Cover in reverse order of removal.

7

Assembly Replacement

Introduction

This chapter provides step-by-step procedures to remove most of the replaceable components of the 86100A/B/C mainframes. Unless specified, the replacement procedures are the reverse of the removal procedures. To locate an assembly, refer to the following figures:

- For the 86100A, refer to Figure 8-1 on page 8-5
- For the 86100B, refer to Figure 9-1 on page 9-5
- For the 86100C, refer to Figure 10-1 on page 10-6

NOTE The photos in these procedures reference the 86100A mainframe; however, the information in this chapter can be used to help with assembly replacement on the 86100B/C.

ESD Precautions

When using any of the procedures in this chapter you must use proper ESD precautions. As a minimum you must place the instrument on a properly grounded ESD mat and wear a properly grounded ESD wrist strap.

CAUTION Failure to implement proper antistatic measures may result in damage to the instrument.

Tools Required

The following tools are required for these procedures.

- T10 and T15 Torx drivers
- Medium size (3/16-in) flat-blade screwdriver
- Open-end wrench: 5/16-in.

CAUTION Do not remove or replace any circuit board assemblies in this instrument while power is applied. The assemblies contain components which may be damaged if the assembly is removed or replaced while power is connected to the instrument.

CAUTION SHOCK HAZARD. To avoid electrical shock, adhere closely to the following procedures. Hazardous voltages exist.

To Remove the Instrument Cover

CAUTION Electrostatic discharge (ESD) can damage or destroy electrostatic components. All work on electronic assemblies should be performed at a static-safe work station. See "Electrostatic Discharge Information" on page 1-8 for more information on preventing ESD.

1 Disconnect the power cord from the instrument.

WARNING Opening covers or removing parts is likely to expose dangerous voltages. Disconnect the instrument from all voltages before it is opened.

2 Position the mainframe so that you have access to the back of the instrument, as shown in Figure 7-1.

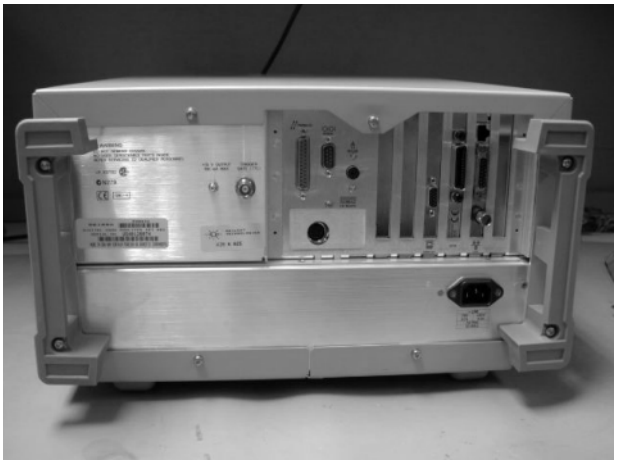


Figure 7-1. Accessing the Back of the Mainframe

3 Use a T-15 TORX driver to remove the four screws that attach the rubber feet to the back of the instrument, as shown in Figure 7-2.

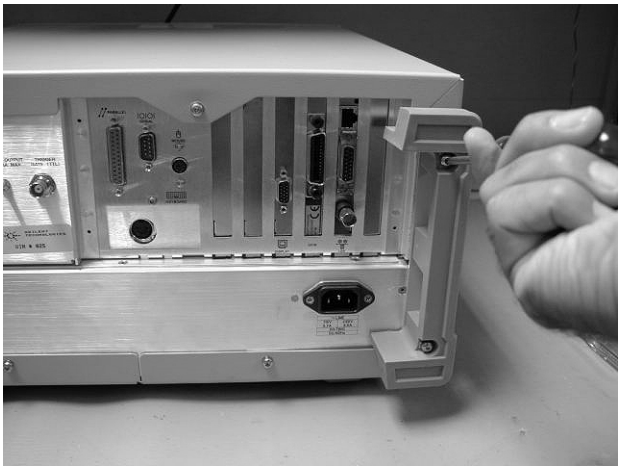


Figure 7-2. Removing the Rubber Feet

4 Remove the remaining four screws that fasten the cover to the instrument's rear panel, as shown in Figure 7-3.

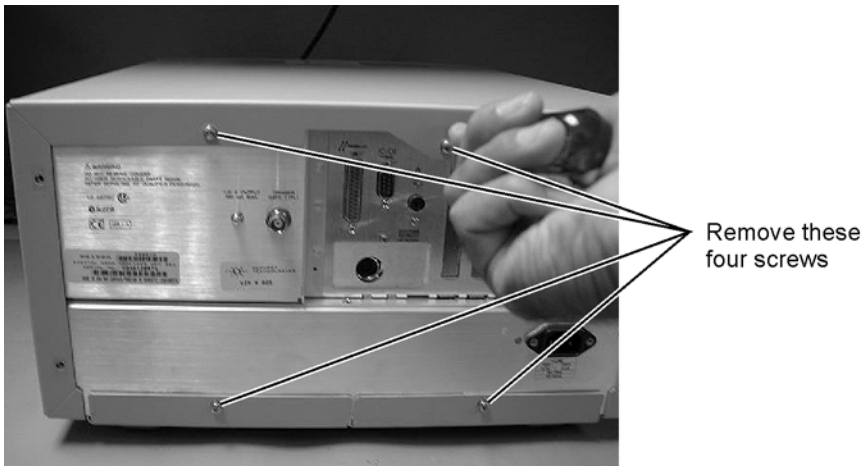


Figure 7-3. Removing Screws from Back of Mainframe

5 Remove the two screws that secure each handle to the side of the mainframe, as shown in Figure 7-4.

6 Remove the hole plug on the bottom of the frame to avoid damaging the plug.

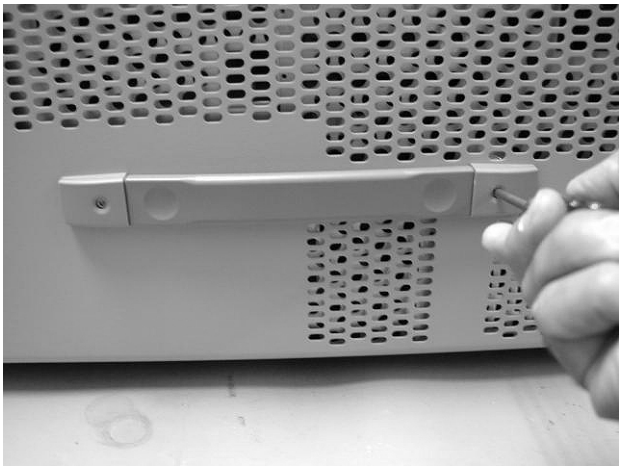


Figure 7-4. Removing the Side Handles

7 To slide the cover off the mainframe, first turn the mainframe upside down on the bench. Place your hands on each side of the cover, and using your thumbs, push the instrument out the front of the cover.

8 Once the mainframe has begun to slide forward, you can then set the instrument on its side (see Figure 7-5) and slide the cover off completely.

Figure 7-5. Sliding Cover off Mainframe

9 To re-install the cover, perform the above steps in the reverse order.

To Remove the Front Panel

CAUTION Electrostatic discharge (ESD) can damage or destroy electrostatic components. All work on electronic assemblies should be performed at a static-safe work station. See ”Electrostatic Discharge Information” on page 1-8 for more information on preventing ESD.

1 Disconnect the power cord from the instrument.

WARNING Opening covers or removing parts is likely to expose dangerous voltages. Disconnect the instrument from all voltages before it is opened.

2 Remove the trim strips from both sides of the front panel, as shown in Figure 7-6.

Figure 7-6. Removing the Trim Strips

3 Use the T-15 TORX driver to remove the four screws (two on each side) that secure the front panel to the mainframe, as shown in Figure 7-7.

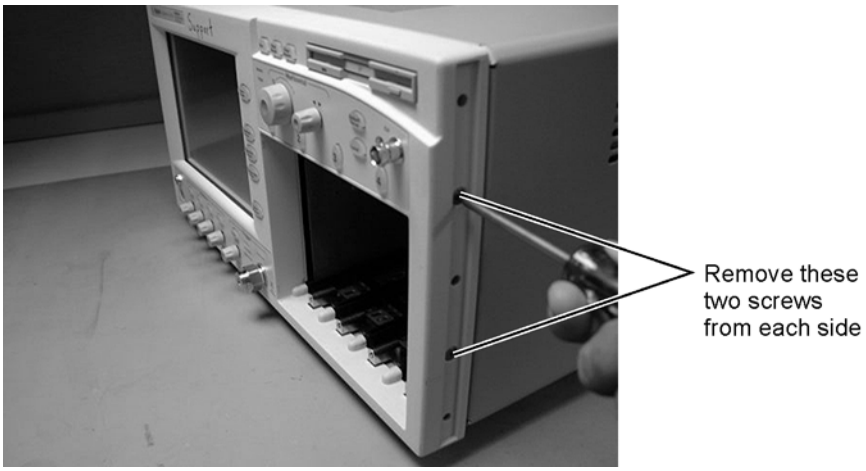


Figure 7-7. Removing the Front Panel Screws

4 Slide the front panel a few inches away from the mainframe, as shown in Figure 7-8.

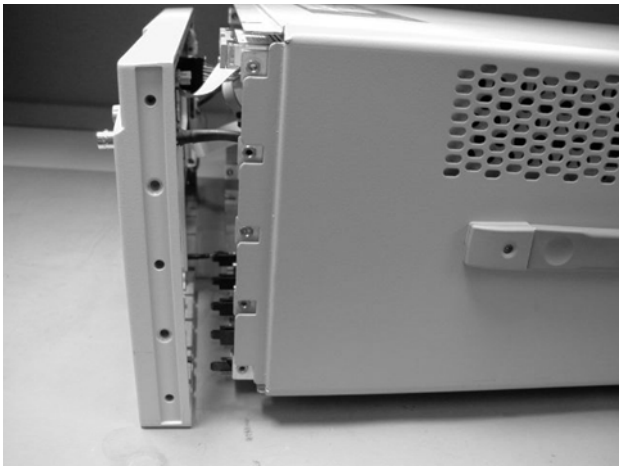


Figure 7-8. Sliding Front Panel Away From Mainframe

5 Use a T-10 TORX driver to remove the two screws that secure the Cal connector to the front panel, as shown in Figure 7-9.

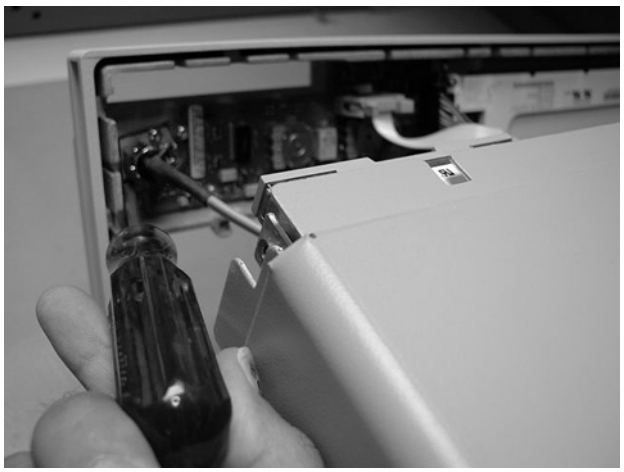


Figure 7-9. Removing Screws that Secure the Cal Connector

6 Disconnect the W5 and W6 ribbon cables, shown in Figure 7-10.

Figure 7-10. Removing the W5 and W6 Ribbon Cables

7 Disconnect the W3 mylar flex cable, shown in Figure 7-11. Pry up the retainer slightly at either end of the connector, using a small flat-blade screwdriver. Do not force the retainer; it should remain attached to the body of the socket.

CAUTION Take great care when you disconnect and reconnect the mylar flex cable from the touch screen to the display board, as the cable is fragile and is only good for a few insertions.

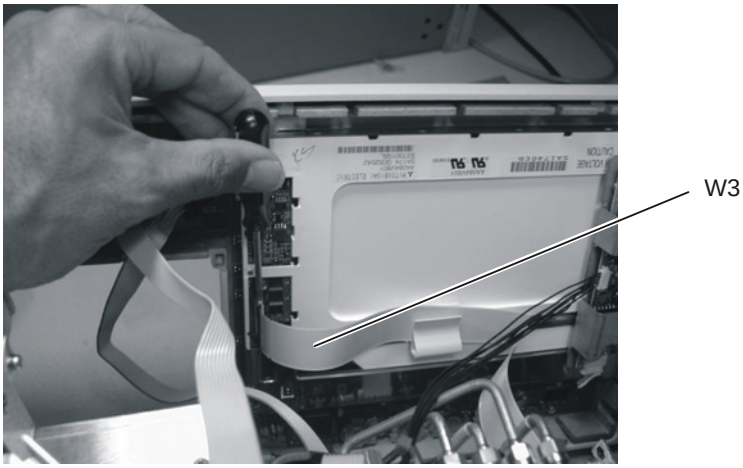


Figure 7-11. Disconnecting the W3 Mylar Flex Cable

8 Disconnect the W4 cable from the A3 Backlight Inverter board, as shown in Figure 7-12.

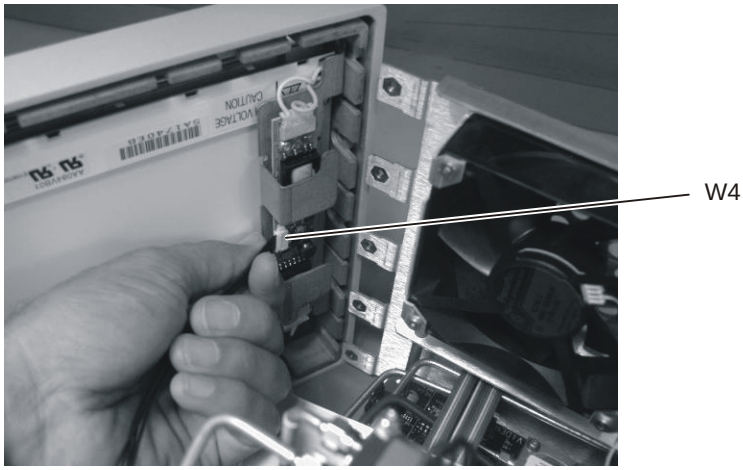


Figure 7-12. Disconnecting the W4 Cable from the A3 Backlight Inverter Board

9 Use a 5/16 inch wrench to remove the W22 cable from the front panel trigger input, as shown in Figure 7-13.

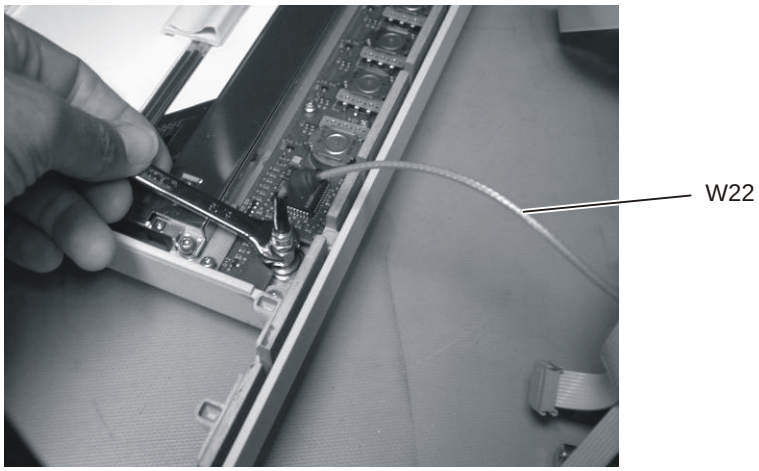


Figure 7-13. Removing the Front Panel Trigger Cable

10 To re-install the front panel, perform the above steps in the reverse order.

CAUTION When replacing the front panel, be careful that the two ribbon cables, the front panel trigger cable, and the Cal cable do not become pinched.

To Replace the Front Panel Trigger Input

CAUTION Electrostatic discharge (ESD) can damage or destroy electrostatic components. All work on electronic assemblies should be performed at a static-safe work station. See "Electrostatic Discharge Information" on page 1-8 for more information on preventing ESD.

1 Disconnect the power cord from the instrument.

WARNING Opening covers or removing parts is likely to expose dangerous voltages. Disconnect the instrument from all voltages before it is opened.

2 Remove the trim strips from both sides of the front panel, as shown in Figure 7-14.

Figure 7-14. Remove the Trim Strips

3 Use the T-15 TORX driver to remove the four screws (two on each side) that secure the front panel to the mainframe, as shown in Figure 7-15.

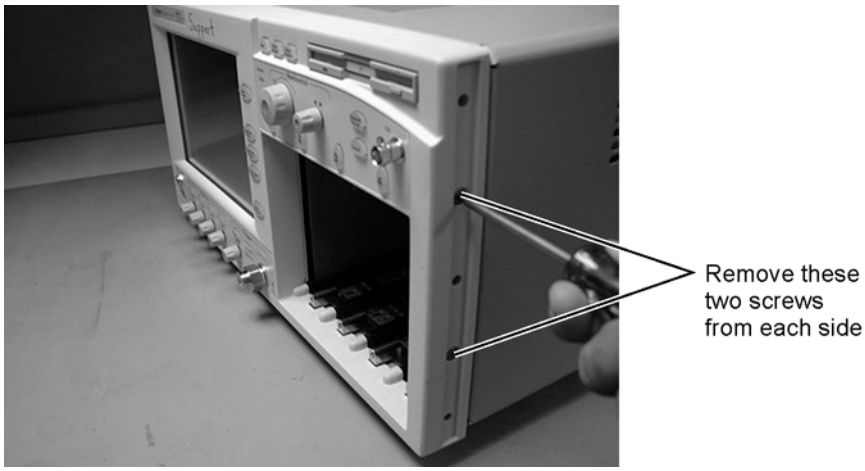


Figure 7-15. Remove the Front Panel Screws

4 Slide the front panel a few inches away from the mainframe, as shown in Figure 7-16.

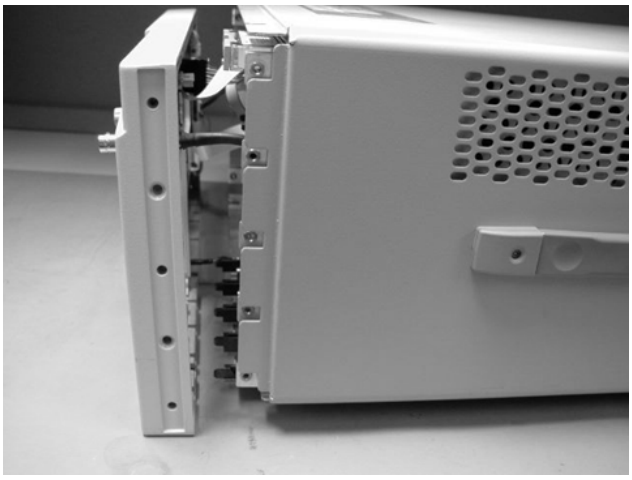


Figure 7-16. Slide Front Panel Away From Mainframe

5 Use a 5/16 inch wrench to remove the W22 cable from the front panel trigger input.

6 Use a 9/16 inch wrench to remove the front panel trigger input connector.

7 To re-install the Trigger input, perform the above steps in the reverse order.

To Replace the Batteries

The 86100A/B/C uses two batteries, one on the A4 PC Motherboard and one on the A6 Scope Interface Assembly.

To replace the A6 assembly battery

1 Follow procedures to remove the instrument cover, PCI bracket (86100C only), instrument support bar (86100A only). For help removing the A6 Scope Interface Assembly, refer to “To Replace the A4 PC Motherboard” on page 7-24.

2 Disconnect W5 and W13 from the A6 Scope Interface Board Assembly.

3 Remove the A6 assembly.

NOTE The battery, Agilent Part Number 1420-0390, is soldered to the A6 board assembly.

4 Using an approved workstation, remove the old battery and replace it with a new one.

NOTE Do not throw batteries away but collect as small chemical waste.

WARNING Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended. Discard used batteries according to manufacturer’s instructions.

To replace the A4 assembly battery

It is not possible to replace the battery in the 86100A PC Motherboard. Instead replace the A4 PC Motherboard. The 86100B and 86100C use a replaceable Lithium 3V battery, Agilent part number 1420-0356. To replace the battery on the A4 motherboard, follow the procedure below:

1 Remove the instrument cover and PCI bracket (86100C only). Refer to “To Replace the A4 PC Motherboard” on page 7-24.

2 Remove the A6 Scope Interface Board Assembly and A5 Display Adapter Board Assembly as a unit. It is not necessary to remove any of the cables.

3 Place both assemblies on a soft antistatic surface, being careful not to damage the board assemblies.

4 Use a flat-edge tool to gently push on the retaining clip. The battery should pop up.

5 Remove the battery and dispose of it properly.

6 To install a new battery, carefully place the battery on the holder and push down. The battery should seat itself. Make sure that it is seated in its carrier.

NOTE Do not throw batteries away but collect as small chemical waste.

WARNING Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended. Discard used batteries according to manufacturer's instructions.

7 After reassembling the DCA, power it up and follow the procedure from the on-line help to reset the time and date.

To Replace the Display Backlights

1 Follow the instructions for removing the front panel on page 7-6, and the display on page 7-20.

2 Disconnect the cables from the A3 Backlight Inverter shown in Figure 7-17.

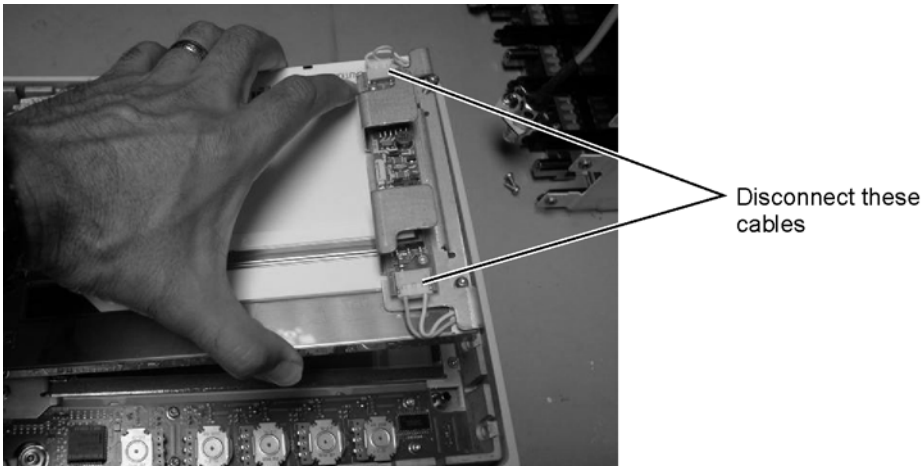


Figure 7-17. Disconnecting the Cables from the A3 Backlight Inverter

3 At the top of the display, push the locking tab to release the top backlight, as shown in Figure 7-18.

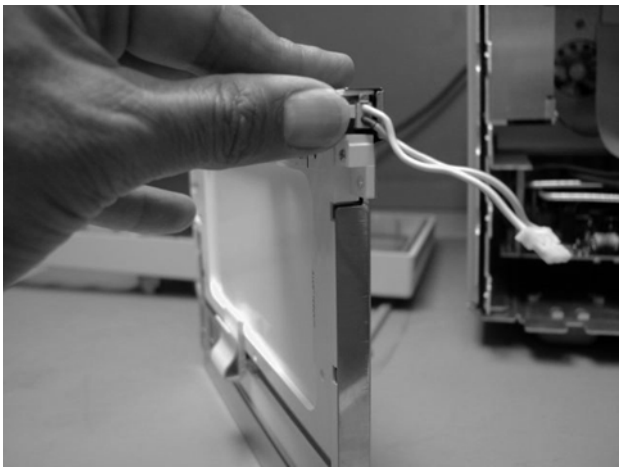


Figure 7-18. Release the Backlight Tab

4 Remove the top backlight, as shown in Figure 7-19.

Figure 7-19. Removing the Backlight

NOTE Pay attention to the orientation of the backlight as you remove it, to ensure correct replacement.

5 Repeat steps 3 and 4 to remove the bottom backlight.

6 To re-install the backlights, perform the above steps in the reverse order.

To Replace the A1 Power Supply

WARNING The following label warns you about hazardous voltages present on the A1 power supply. Use extreme caution. Disconnect the instrument from all voltages before it is opened.

1 Follow the instructions for removing the mainframe cover, on page 7-3.

2 Use a T-15 TORX driver to remove the two screws that secure the mainframe to the top of the A1 Power Supply, as shown in Figure 7-20.

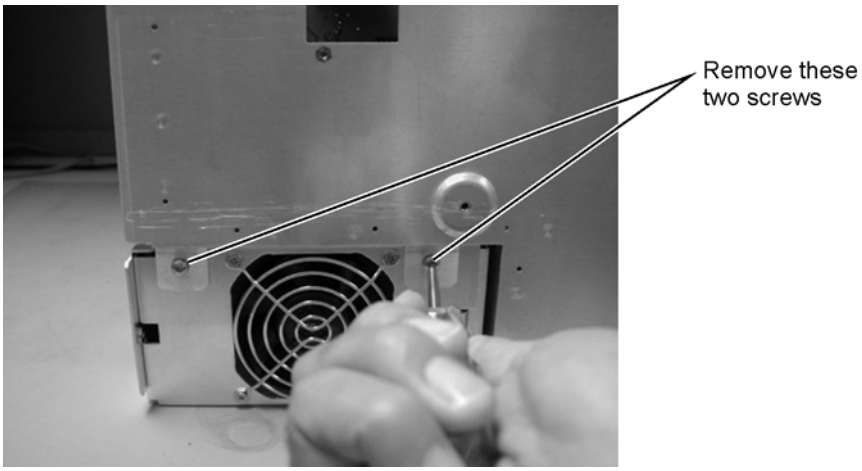


Figure 7-20. Removing the Screws Securing the Power Supply

3 Remove the two screws located on either side of the hard drive, as shown in Figure 7-21.

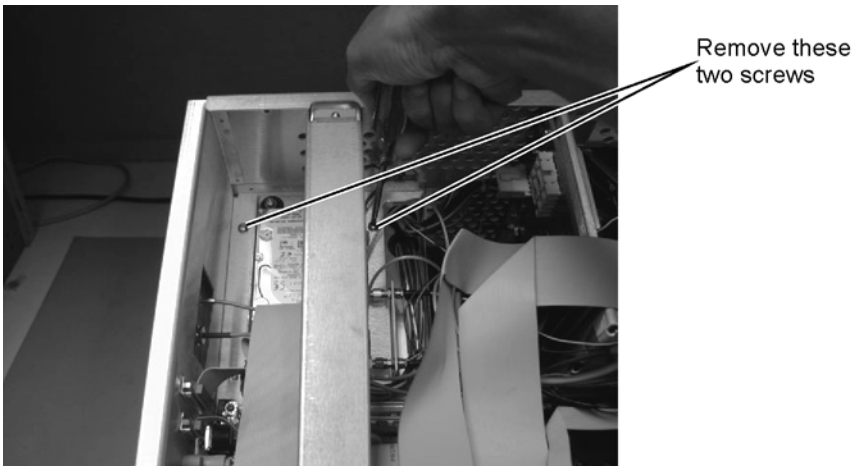


Figure 7-21. Removing the Screws on Top of the Hard Drive

4 Disconnect all cables from the power supply.

NOTE You may need to remove the cable from the A9P2 Hard Drive connector on the A15 Disk Drive Interface to access cables on the A4 PC Motherboard.

5 Rout the cables out of the instrument when you are removing the A2 Power Supply.

6 Refer to Figure 7-22 through Figure 7-24 for cable connections.

7 To re-install the power supply, perform the above steps in the reverse order.

Figure 7-22. A12P2 Connection

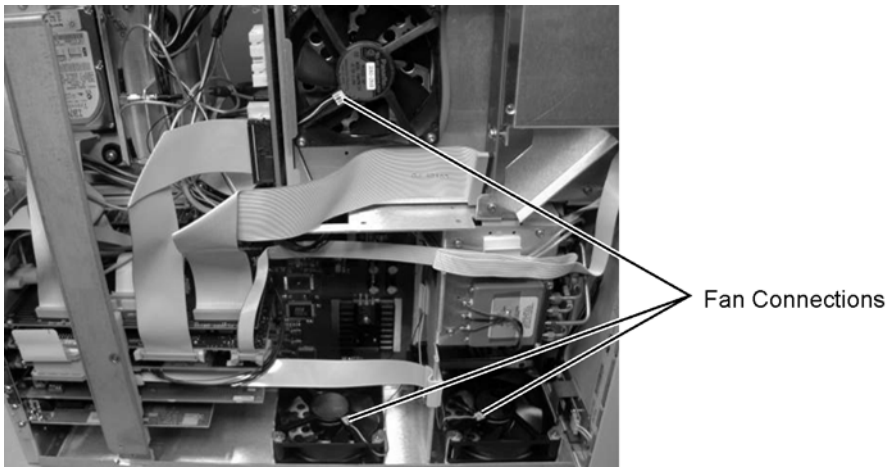


Figure 7-23. Fan Connections

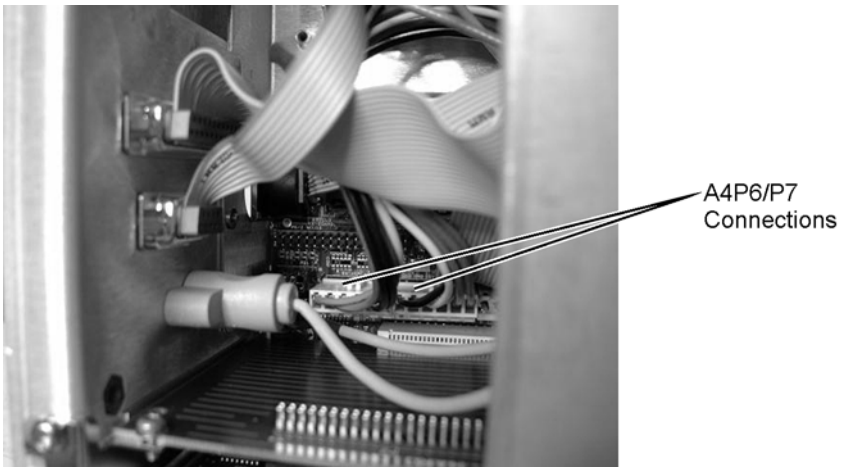


Figure 7-24. A4P6/P7 Connections

To Replace the A2 Flat Panel Display

1 Follow the instructions for removing the front panel on page 7-6.

2 Use a T-10 TORX driver to remove the four screws that secure the display to the front panel, as shown in Figure 7-25.

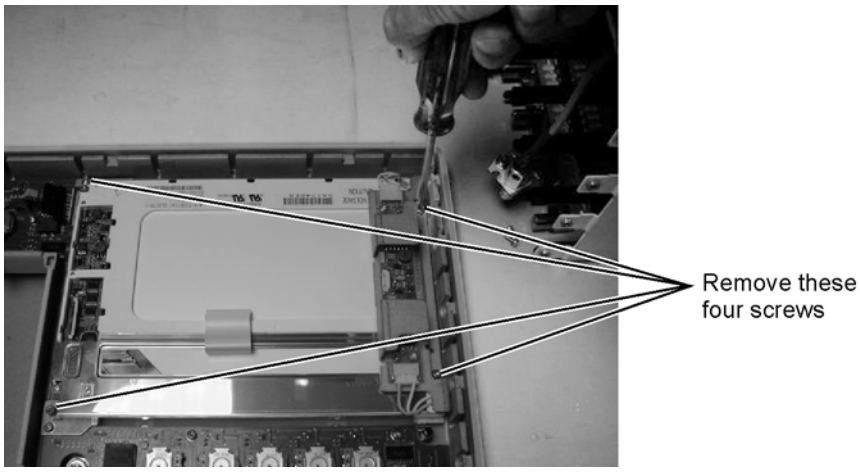


Figure 7-25. Removing the Display Screws

3 Carefully lift the display out of the front panel.

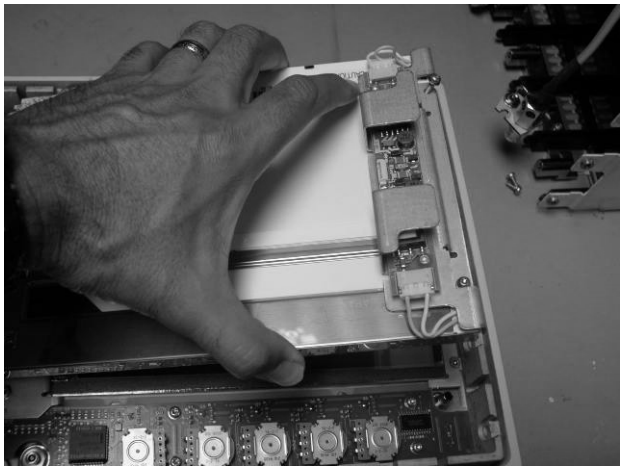


Figure 7-26. Removing the Display

4 To re-install the display, perform the above steps in the reverse order.

To Replace the A3 Backlight Inverter

CAUTION Electrostatic discharge (ESD) can damage or destroy electrostatic components. All work on electronic assemblies should be performed at a static-safe work station. See ”Electrostatic Discharge Information” on page 1-8 for more information on preventing ESD.

1 Disconnect the power cord from the instrument.

WARNING Opening covers or removing parts is likely to expose dangerous voltages. Disconnect the instrument from all voltages before it is opened.

2 Remove the trim strips from both sides of the front panel, as shown in Figure 7-27.

Figure 7-27. Removing the Trim Strips

3 Use the T-15 TORX driver to remove the four screws (two on each side) that secure the front panel to the mainframe, as shown in Figure 7-28.

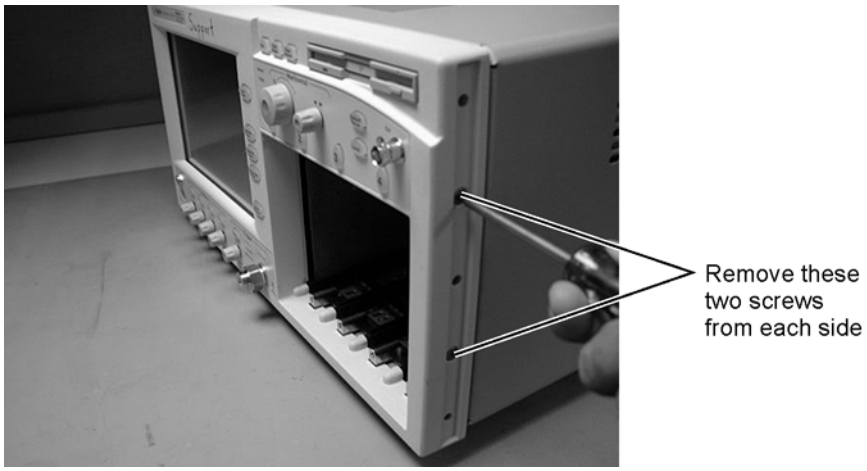


Figure 7-28. Removing the Front Panel Screws

4 Slide the front panel a few inches away from the mainframe as show in Figure 7-29.

Figure 7-29. Accessing the Inverter Board

5 Disconnect the three cables, as shown in Figure 7-30

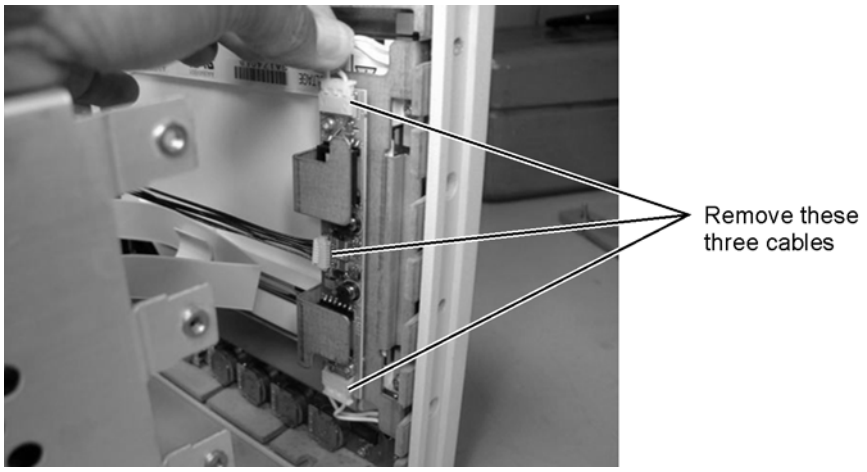


Figure 7-30. Removing the Cables from the Inverter Board

6 Use a T-10 TORX driver to remove the two screws that secure the board to the display.

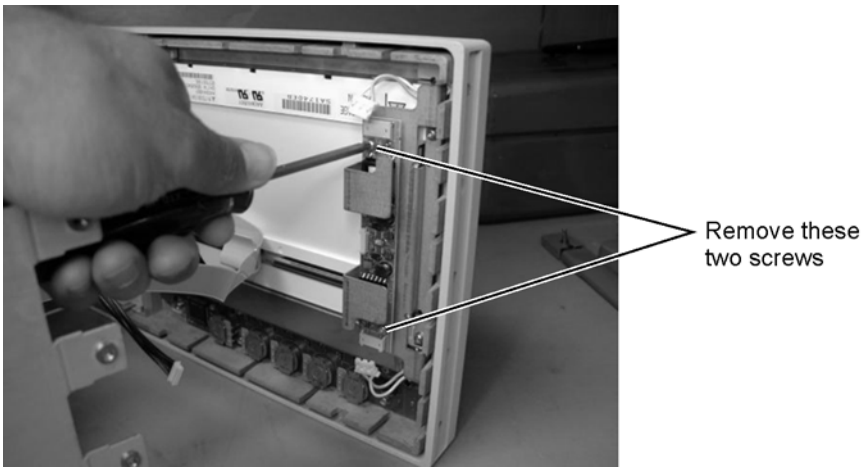


Figure 7-31. Removing the Keyboard Panel Screws

CAUTION When replacing the front panel be careful that the two ribbon cables, the front panel trigger cable, and the Cal cable do not become pinched.

7 To re-install the backlight inverter, perform the above steps in the reverse order.

To Replace the A4 PC Motherboard

Photographs of the 86100A are used in the following steps. Although some of the components are different in the 86100B/C, the removal procedure is virtually identical. Removing the A4 assembly in the 86100C does not require the removal of the fan.

When replacing the A4 assembly with a new version, be sure to follow the instructions at the end of this replacement procedure. Refer to “To install the motherboard” on page 7-31.

Replacement of the A4 PC Motherboard will require that any installed software license be “keyed” to the new motherboard. Option 200, Enhanced Jitter Software, is an example of a software option. The motherboard contains a unique Host ID number which is used in the license key generation process. Refer to “Software License Maintenance, 86100C” on page 1-16 for instructions on regenerating a software license file after a motherboard replacement.

1 Remove the instrument’s cover. Refer to “To Remove the Instrument Cover” on page 7-3.

2 Remove four T-10 TORX screws that secure the fan, as shown in Figure 7-32, then lift the fan out of the mainframe.

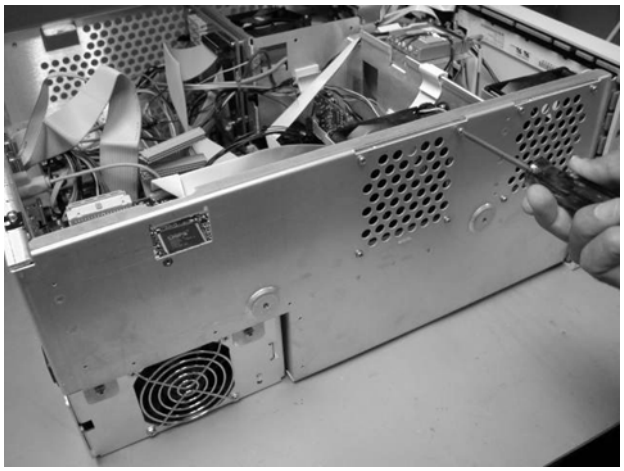


Figure 7-32. Removing the Fan (86100A/B Only)

3 Remove two T-10 TORX screws that secure the bar to the mainframe, as shown in Figure 7-33.

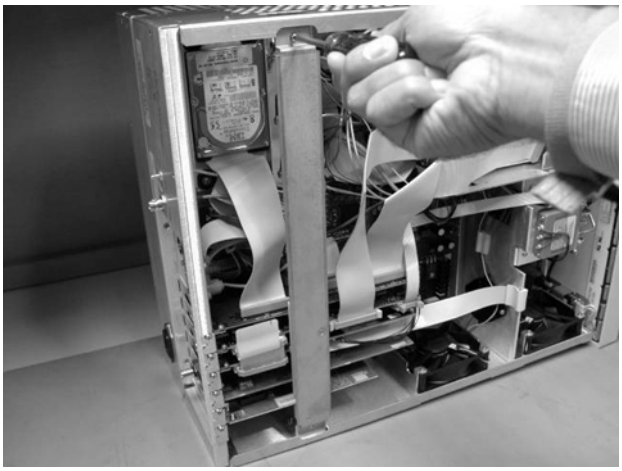


Figure 7-33. Removing the Bar (86100A only)

4 Use a T-15 TORX driver to remove all of the circuit boards from the PC slots, as shown in Figure 7-34.

NOTE The W10 ribbon cable connecting the A5 SVGA Adapter and the A6 Interface can be left connected, and the boards pulled out together, as shown in Figure 7-35.

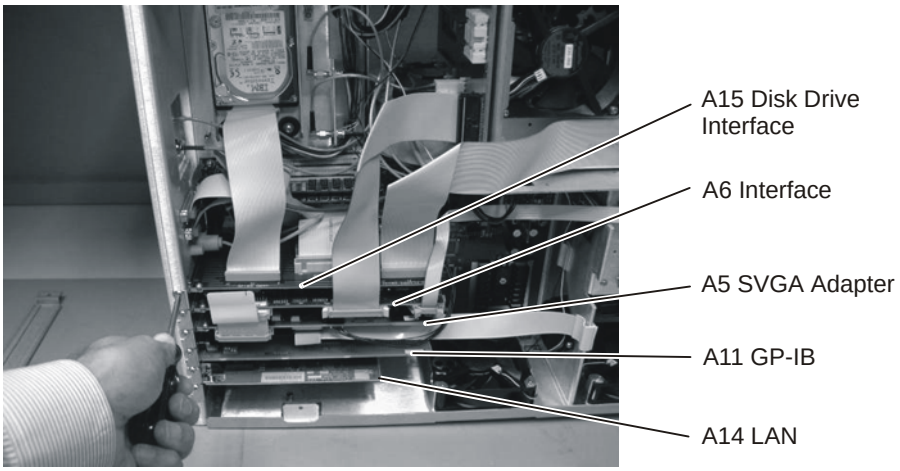


Figure 7-34. Removing the Circuit Boards from the Motherboard

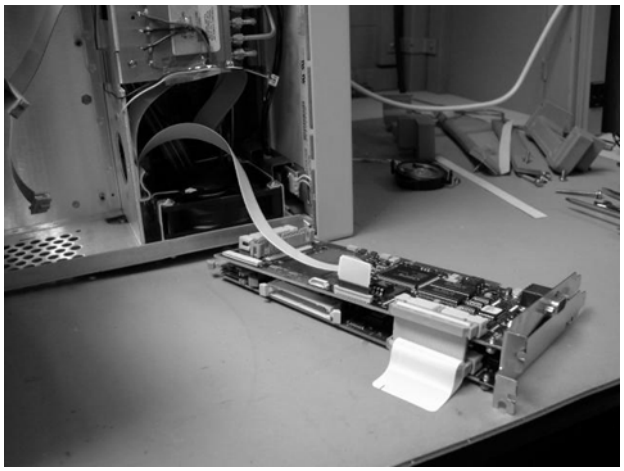


Figure 7-35. Removing the A5 and A6 Boards

5 Use a T-10 TORX driver remove one screw that secures the speaker, as shown in Figure 7-36. Then disconnect the speaker cable, as shown in Figure 7-37, and remove the speaker.

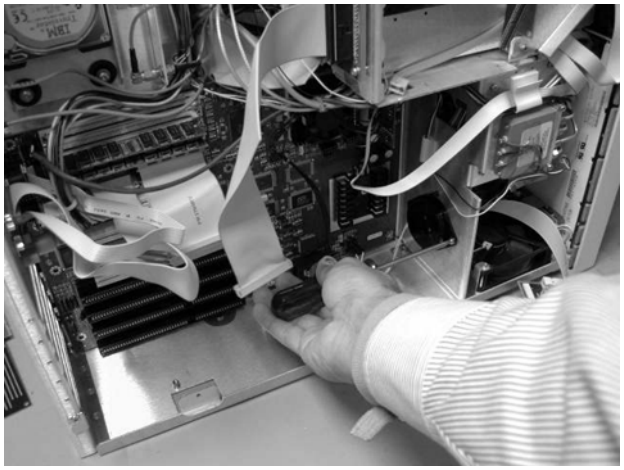


Figure 7-36. Removing the Speaker Screw

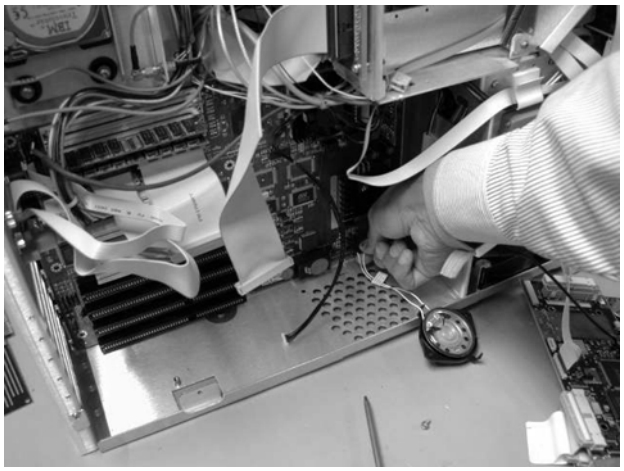


Figure 7-37. Disconnecting the Speaker Cable

6 Use a T-10 TORX driver to remove nine screws that secure the motherboard, as shown in Figure 7-38.

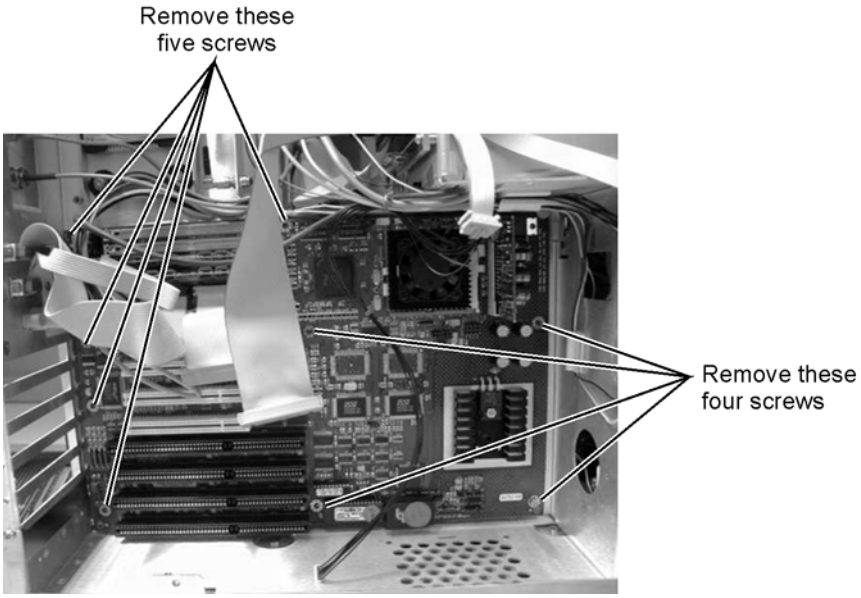


Figure 7-38. Removing the Screws from the Motherboard

7 Slide the bottom of the motherboard out to clear the white tab, as shown in Figure 7-39, then pull the motherboard out the right side, as shown in Figure 7-40.

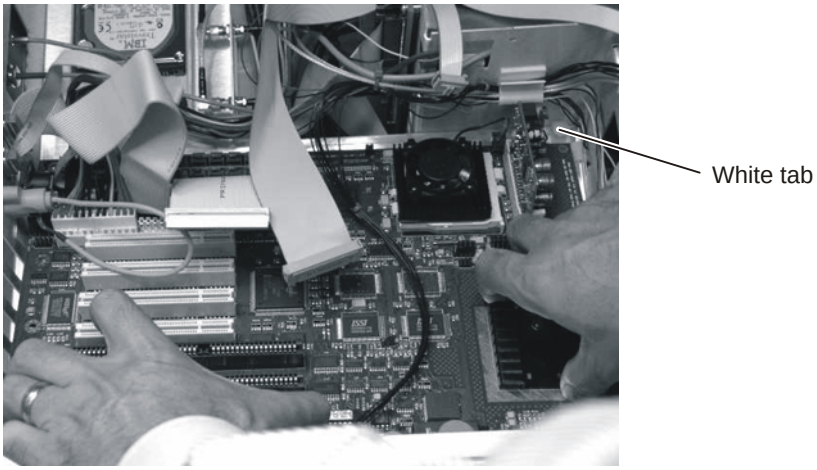


Figure 7-39. Slide the Motherboard Down to Clear the White Tab

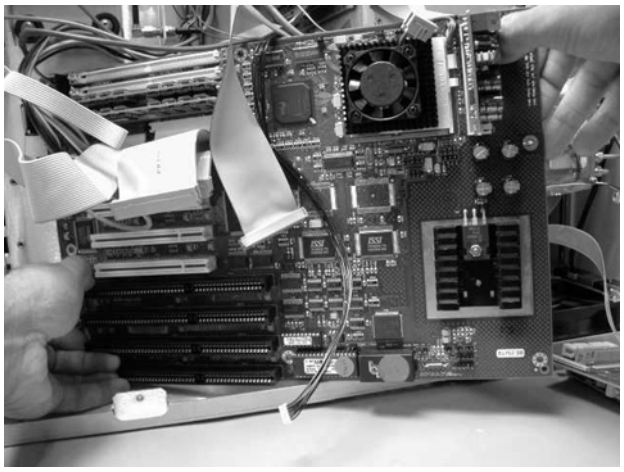


Figure 7-40. Pull the Motherboard out the Right Side

CAUTION Ensure that the cables that are routed on the upper right corner can clear the board so that you are not pulling on the cables as you remove the board.

8 Label any cables that are still connected to the motherboard, then disconnect them.

9 Remove the RAM from the motherboard, as shown Figure 7-41.

Figure 7-41. Removing the RAM

10 Remove any ribbon cables attached to the motherboard.

11 Refer to Figure 7-42 through Figure 7-45 for cable connections.

12 To re-install the A4 motherboard, refer to “To install the motherboard” on page 7-31.

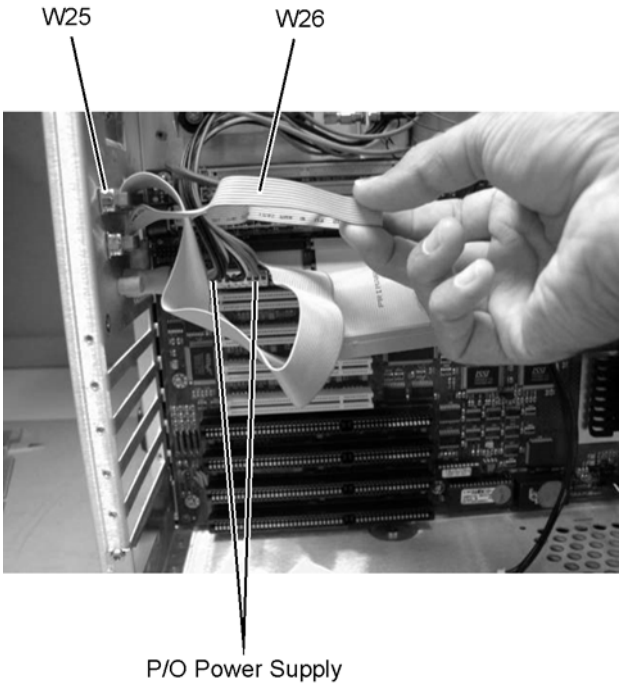


Figure 7-42. W25, W26, and Power Supply Cables

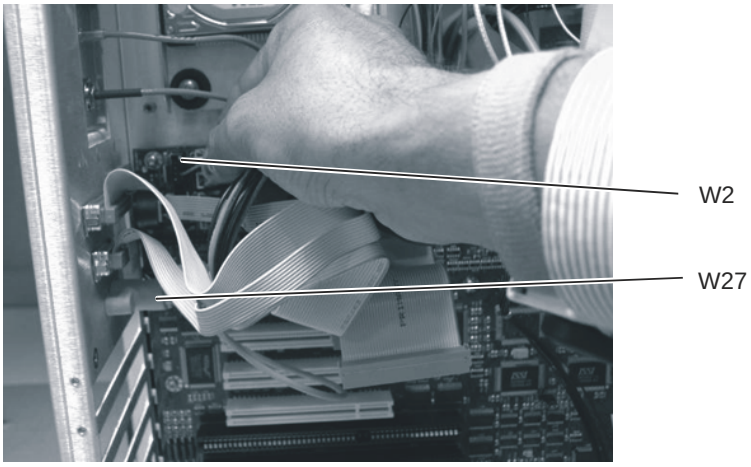


Figure 7-43. W2 and W27 Cables

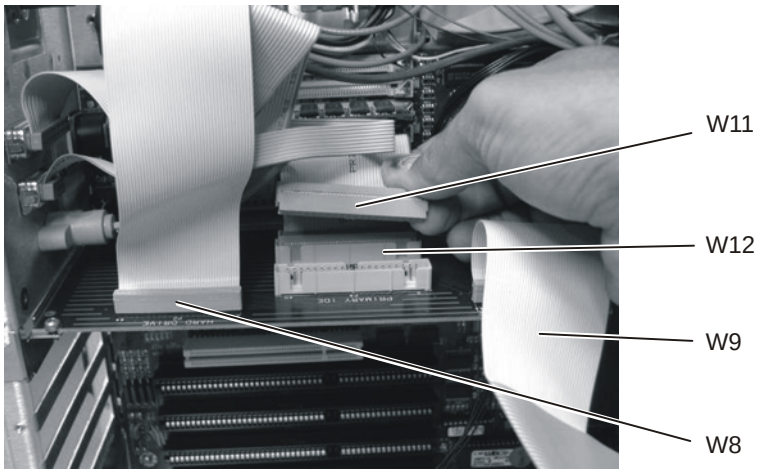


Figure 7-44. W8, W9, W11, and W12 Cables

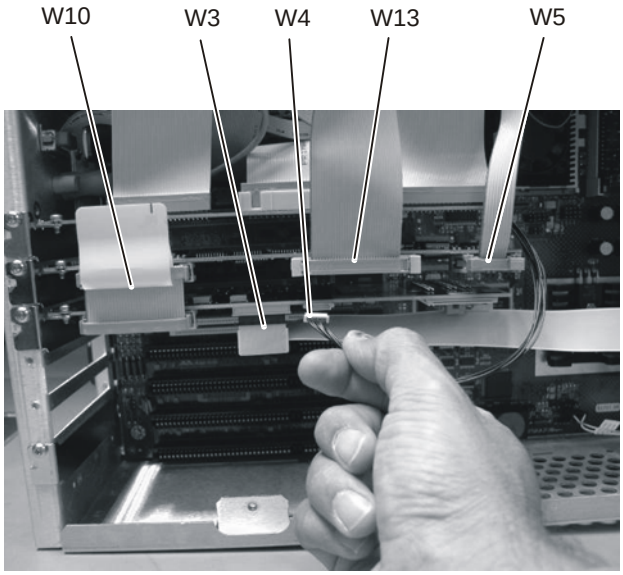


Figure 7-45. W3, W4, W5, W10, and W13 Cables

To install the motherboard

To re-install the A4 motherboard that you removed from the instrument, perform the above steps in the reverse order. If you installed a new motherboard (P/N 0960-2568) into the instrument, complete the following procedure to install the PCI cards, change the default monitor, and to flash the BIOS. You will use the Test System's controller (or other computer) to create a 3.5-inch boot disk. The boot disk will be made available to the instrument using an external USB 3.5-inch disk drive.

NOTE

Refer to service notes 86100B-02A and 86100C-03 ("A4 Motherboard BIOS Flash" on page 6-15).

1 Install the A11 GPIB assembly into PCI slot 3 (right hand slot when viewed from the rear panel). There is no change to the A5/A6 assembly locations. The latest motherboards include three PCI slots and one unused AGP slot. (Older motherboards have four PCI slots.) When replacing an older motherboard with a new one, the A11 GPIB assembly must be moved to a different PCI slot position as shown Figure 7-46.

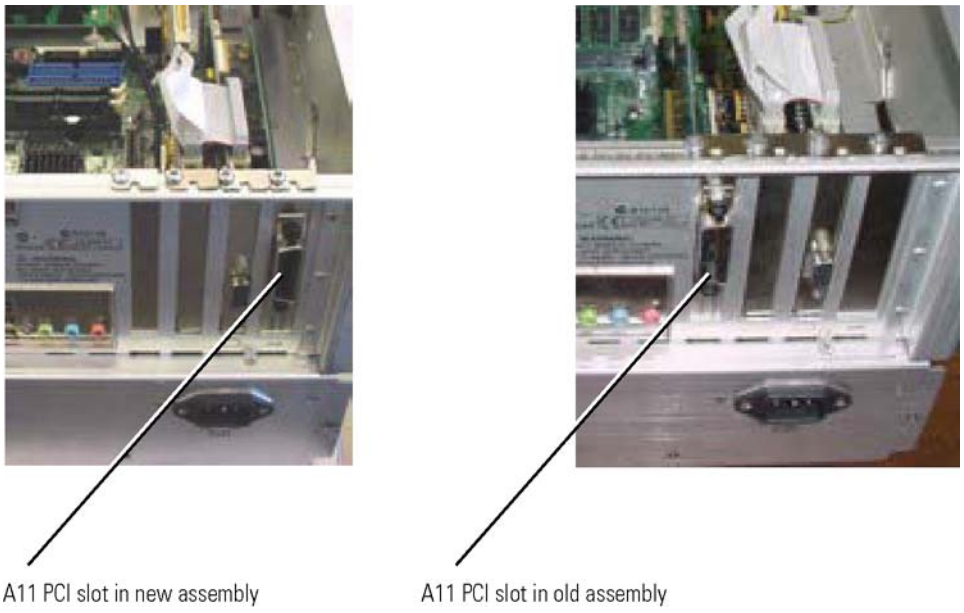


Figure 7-46. A11 Location in A4 Assembly PCI Slots

Change the Default Monitor

2 Connect an external monitor to the A4 motherboard's VGA output. Do not use the A5 El Mirage display adapter output.

3 Connect a non-USB keyboard and non-USB mouse to the instrument.

4 Power on the instrument. The external video display will be active.

5 Allow the instrument to go through the boot sequence. During this time you will be prompted to install drivers for the new hardware that is found. This is normal; install all the drivers when asked.

6 Close or minimize the instrument's DCA application by clicking File, Exit or clicking the buttons located in the upper-right corner of the display.

7 Right click on the instrument's desktop to bring up the display properties.

8 Click Properties and then Settings.

9 Set the 86100B/C to use the internal monitor (#1):

The Digital Flat Panel (640x480) on Chips and Technologies is the instrument's built-in monitor and is identified as monitor number 1. The Default Monitor on Intel Graphics Controller is the external monitor connected directly to the PC Motherboard. It is identified as monitor number 2.

10 Click on the Blue Box representing monitor 1 (labeled "1").

11 Select Extend my Windows desktop onto this monitor.

12 Select Use this device as the primary monitor, and click Apply.

13 Click on the Blue Box labeled "2".

14 Deselect Extend my Windows desktop onto this monitor to disable the external monitor.

15 Click Apply.

16 Click Advanced, Adaptor, and then List All Modes.

17 Select 640x480, True Color (24 bit) 60 Hz.

18 Click OK, OK, and OK to close the dialog box.

19 Turn off the instrument.

Create a Boot Disk

20 On the Test System's controller (or other computer) insert a 3.5-inch disk for use a boot disk. Format the disk.

21 On the Agilent Intranet, go to the following web page. If you are unable to access this URL, contact dsa_support@agilent.com for more information.

http://lwd.marketing.agilent.com/Service_Support/Product_Support/86100/mainframe_support_ information.htm

22 On the web page, locate the 86100B/C BIOS FLASH for 0960-2521 AND 0960-2568 section that includes links for the following three files:

815gag10.bin
AUTOEXEC.BAT
AWDFLASH.EXE

23 Right-click each of these three files and select Save Target As to save the files to 3.5-inch boot disk.

Flash the Bios

24 Connect an external USB 3.5-inch drive to the instrument's front panel (86100C) or rear panel (86100B).

25 Insert the 3.5-inch BIOS disk that you created into the external USB drive and turn on the instrument. The instrument automatically starts the boot process from the external disk.

CAUTION Do not turn off power or reset the system during this process.

26 When the process completes, the instrument automatically restarts. Remove the external 3.5-inch drive.

27 When the instrument's displays the entry screen, you will see DEL to enter SETUP on the bottom of the screen, press the Delete key. This enters the CMOS Setup Utility, which is shown in Figure

7-47.

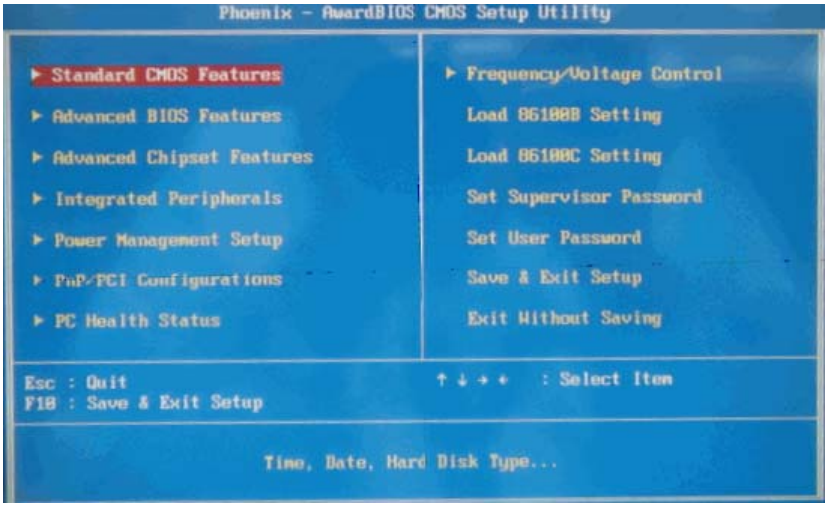


Figure 7-47. Press Delete to start CMOS Setup Utility

28 Use the arrow keys to select Load 86100C Setting as shown in Figure 7-48. Select Load 86100B Setting is you are setting up an 86100B instrument. Press the Enter key and then the Y key to begin the load process.

29 When the load process completes, press F10. When the message shown in Figure 7-49 appears, press the Y key followed by the Enter key. This exits the CMOS Setup Utility.

30 Reboot the instrument to complete the BIOS flash process.

Figure 7-48. Loading the 86100C Settings

To install the motherboard

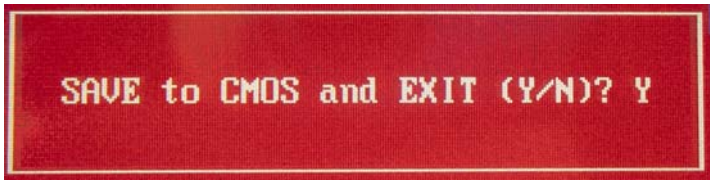


Figure 7-49. Exiting the CMOS Setup Utility

To Replace the A7 Front-Panel Keyboard

1 Follow the instructions for removing the front panel on page 7-6, and the display on page 7-20.

2 Turn the front panel face up.

3 Pull off all knobs, as shown in Figure 7-50.

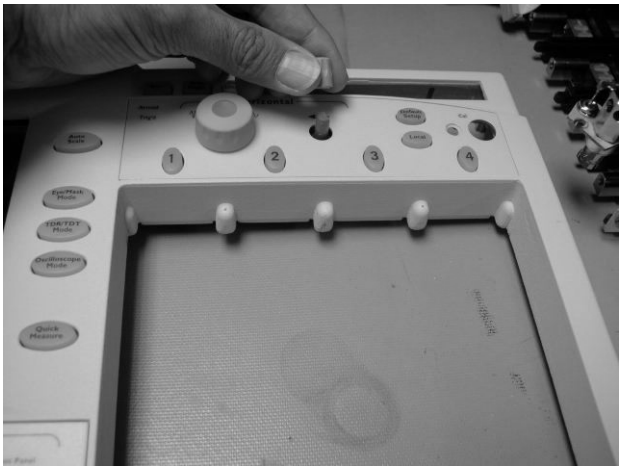


Figure 7-50. Removing the Knobs

4 Turn the panel face down.

5 Use a T-10 TORX driver to remove the two screws from the touch screen board, as shown in Figure 7-51, then lift bracket out of front panel.

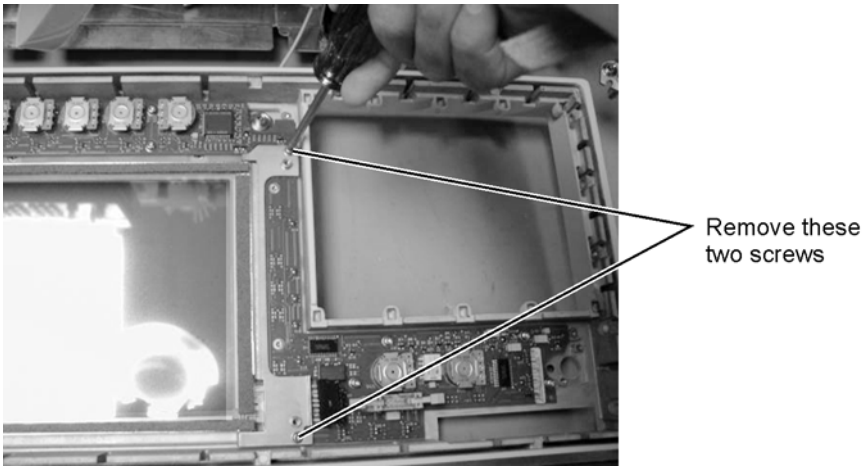


Figure 7-51. Removing the Touch Screen Screws

6 Remove the eight screws that secure the keyboard to the front panel, as shown in Figure 7-52.

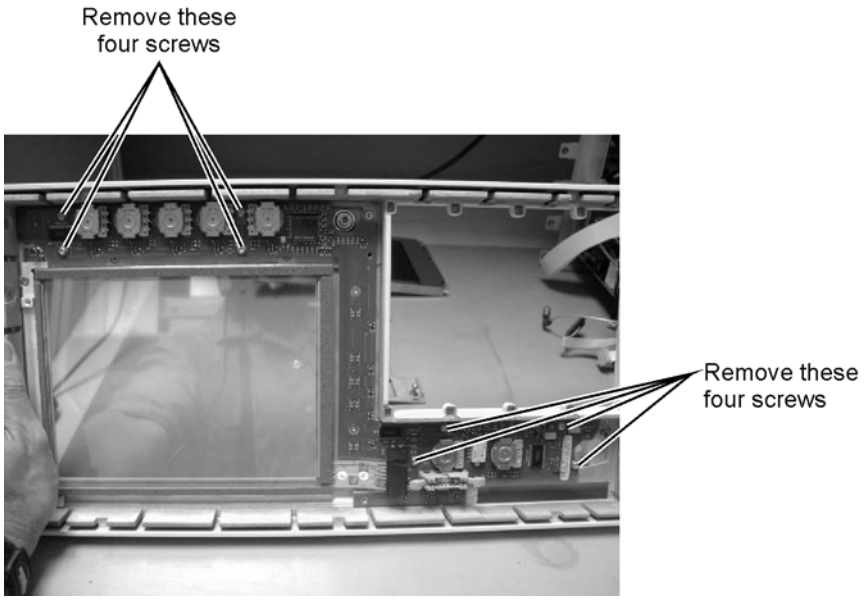


Figure 7-52. Removing the Keyboard Panel Screws

7 Lift the board out of the front panel.

NOTE During reassembly, when replacing the keyboard be sure that all of the buttons come through the front panel properly. If they are not aligned properly, the buttons may remain stuck behind the panel.

CAUTION When replacing the front panel, be careful that the two ribbon cables, the front panel trigger cable, and the Cal cable do not become pinched.

8 To re-install the keyboard, perform the above steps in the reverse order.

To Replace the A7A2 Touch Screen

Before replacing the A7A2 assembly, refer to refer to “Replacing A7A2, A8, or A9 Assemblies” on page 6-3.

1 Follow the instructions for removing the front panel on page 7-6, and the display on page 7-20.

2 Using a T-10 TORX driver, remove two screws that secure the touch screen board bracket, as shown in Figure 7-53.

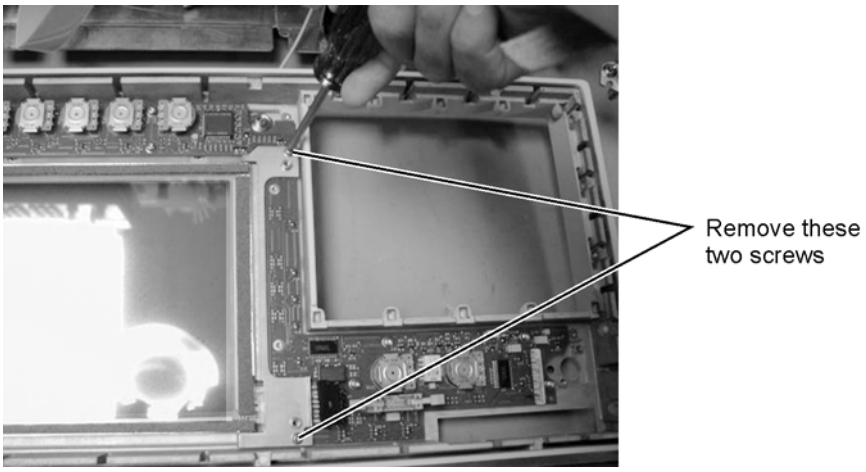


Figure 7-53. Removing the Touch Screen Screws

3 Lift the touch screen out of the display assembly, as shown in Figure 7-54.

Figure 7-54. Lifting out the Touch Screen

4 To re-install the touch screen, perform the above steps in the reverse order.

To Replace the A8 Touch Screen Controller

Replacing the A8 touch screen controller assembly on 86100C instruments with serial number above MY45031518 is simple and no procedure is provided. Replacing the A8 assembly on instruments with serial number MY45031518 and below, involves the A7A2 and A9 assemblies. Refer to ”Replacing A7A2, A8, or A9 Assemblies” on page 6-3.

To Replace the A9 Hard Drive

Before replacing the A9 assembly, refer to refer to “Replacing A7A2, A8, or A9 Assemblies” on page 6-3.

If you suspect that there is something wrong with the A9 hard drive, first perform a hard drive recovery. Refer to “Drive C Recovery” on page 5-2. If that fails to correct the problem, replace the drive.

In the case of performing Declassification, where the hard drive must be replaced, follow Step 1 and Step 2 to recover the Factory Cal file and any License files from the old hard drive.

1 If possible, copy the factory cal file C:\scope\FrameCal.dat from the DCA and put it on external media such as a floppy disk or USB memory stick

2 86100C only: Copy all of the License Files (*.lic) from C:\scope\LicenseFiles and put them on a USB memory stick or USB CDR drive.

3 Refer to the 86100A, 86100B, or 86100C Replaceable Parts chapter to find the part number of the A9 hard drive and order a new one.

4 Remove the hard drive and hard drive bracket from the DCA.

NOTE 86100B requires the removal of the CD ROM Drive first.

5 Separate the hard drive from the hard drive bracket.

6 Install the new drive on the bracket.

7 Install the completed assembly on the instrument chassis.

8 While facing the front of the DCA, carefully seat the cable connector on the left-hand set of hard drive pins. The red strip, indicating wire 1, should be to your right and should line up with pin number 1 of the hard drive. After insertion, there should be a group of four pins on right-hand side exposed.

CAUTION The hard drive should be handled with care. Do not apply pressure to the case of the hard drive.

9 Power up the DCA. Ensure that the disk drive is functioning properly.

10 Copy the factory calibration file from the backup media to the new hard drive.

NOTE If you are unable to recover the factory calibration file, perform all the adjustments. Refer to “Introduction” on page 3-2.

11 Install licenses using the License Installation Tool under the 86100 Utilities pull down menu. Refer to “Software License Maintenance, 86100C” on page 1-16.

12 Update firmware to the latest or desired version.

Create New Backup Image of Drive C

If the hard disk drive was replaced, a new backup image of drive C should be created. This creates a backup copy of the C partition with all the recently created files and stores it on a hidden partition.

13 Connect a keyboard to the instrument.

14 Turn the instrument on.

15 Repeatedly press the function key F8 as it boots up.

16 If done correctly the Windows Advanced Options Menu will eventually be displayed as shown below:

Windows Advanced Options Menu
Please select an option

Safe Mode
Safe Mode with Networking
Safe Mode with Command Prompt

Enable Boot Logging
Enable VGA Mode
Last Known Good Configuration (your most recent settings that worked)
Directory Services Restore Mode (Windows domain controllers only)
Debugging Mode
Disable automatic restart on system failure

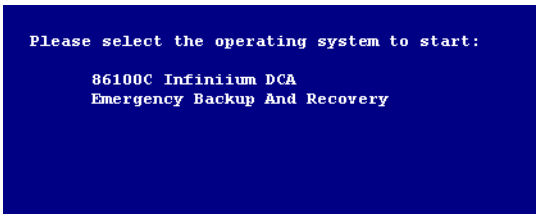
Start Windows Normally
Reboot
Return to OS Choices Menu

Use the up and down arrow keys to move the highlight your choice.

17 Select “Return to OS Choices Menu” and hit Enter.

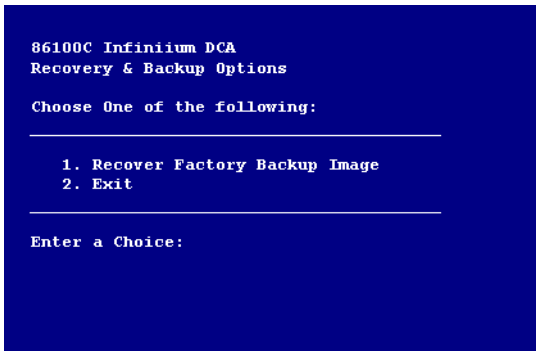
NOTE If instead you see the “Welcome to the Windows XP Setup Wizard”, click Next and do not accept the agreement. Click Next, Exit the Setup, Close the Fatal Error dialog box and start the process over by going to Step 13 and repeating procedure.

18 The following text will be displayed:



19 Press the down arrow key on the keyboard to select Emergency Backup And Recovery. Then, press the Enter key. “The FreeDOS Project” copyright message and the prompt: “Press Any Key to Continue...” will be displayed.

20 Pressing any key will display the following text:



21 Press F at this point to create a factory backup image file.

NOTE F is not a choice that is displayed on the screen, it is a hidden function used only in the factory and field to create a new backup image of the C partition.

NOTE The system will perform a quick integrity check of the file structure on the C: partition. It will then copy the C: partition to an image file and store it on the System Recovery partition. This process will overwrite the original Factory Recovery Image.

22 Press C to continue or E to exit. Read the on-screen message then press C to continue or E to exit one more time.

23 Wait for the factory image backup process to complete.

24 Even though the on-screen instructions say to press CLT+ALT+DEL, don’t do it. Power off the instrument using power button.

NOTE DO NOT press CLT+ALT+DEL to restart the DCA.

CAUTION Do not attempt to power up the DCA again. Doing so would nullify the Re-Seal OS process which prepares the OS for the first customer run experience and potentially violate the license agreement with Microsoft. The new owner should power up the DCA for the first time so that they can agree to the licensing requirements of Windows XP.

NOTE If the refurbished DCA held software licenses before the hard drive was replaced, then the entries for these software licenses need to be cancelled at the Agilent Software Licensing web site.

NOTE The 86100A/B replacement drives are programmed to Firmware Revision A.03.05. Upgrade the firmware to the latest or desired version.

NOTE Refer the DCA online help for information on upgrading firmware or software in the DCA.

NOTE For more information, refer to service notes 86100C-05, 86100C-06, and 86100C-07.

To Replace the A12 Distribution Assembly

1 Follow the instructions on page 7-3 for removing the mainframe cover.

2 Use a T-10 TORX driver to remove the two screws that secure the assembly, as shown in Figure 7-55.

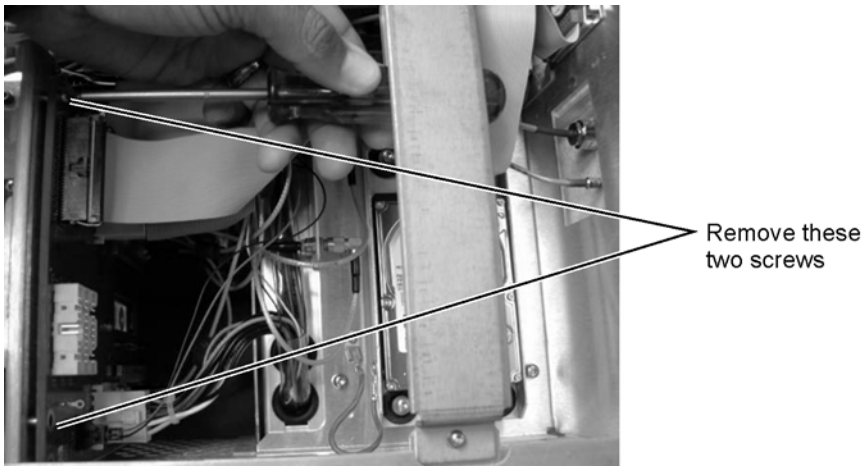


Figure 7-55. Disconnecting Screws from A6 Board

3 Remove the cables that you can access from this side of the instrument.

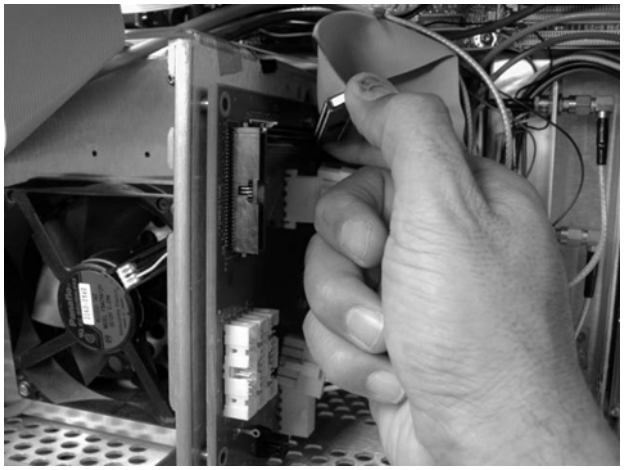


Figure 7-56. Disconnecting the Cables

4 Use a T-10 TORX driver to remove four screws from the connectors in the module drawer as shown in Figure 7-57.

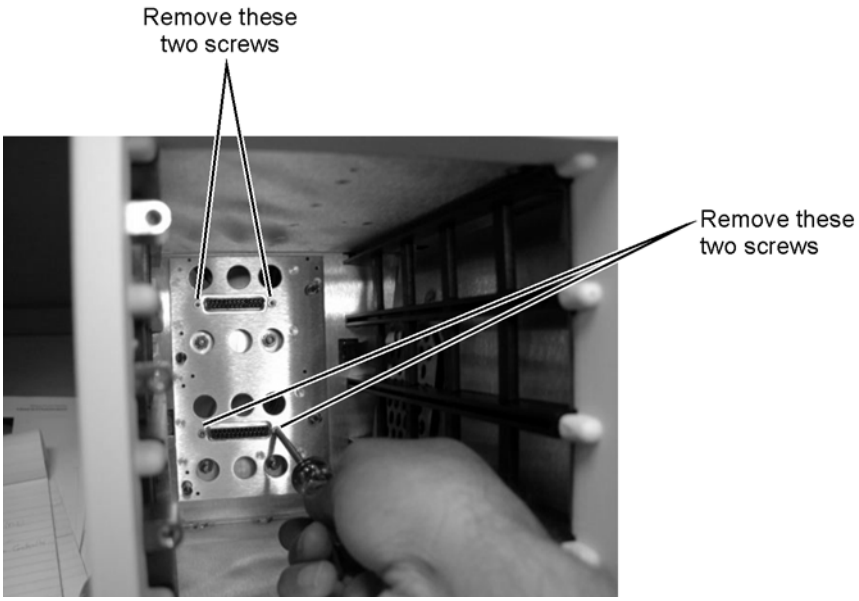


Figure 7-57. Removing Screws from Connectors in Module Drawer

5 Pull the A6 Distribution assembly away from the mainframe, as shown in Figure 7-58.

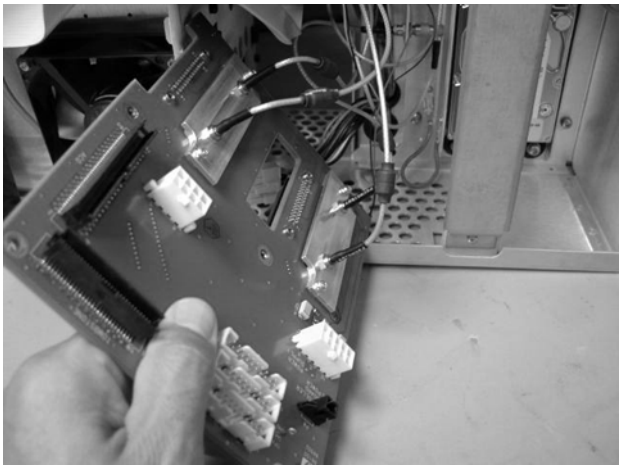


Figure 7-58. Pulling Out the A6 Distribution Assembly Board

6 Access the side of the instrument, and pull the board out far enough so that you can access the brackets that secure the cables.

7 Remove the two screws that secure each bracket, as shown in Figure 7-59.

8 To re-install the A12 Distribution assembly, perform the above steps in the reverse order.

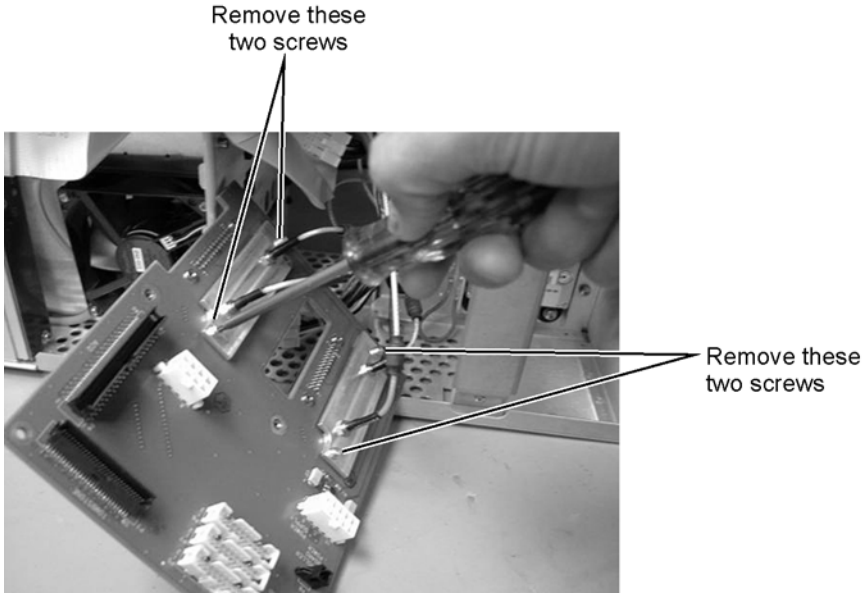


Figure 7-59. Removing the Screws from the A6 Bracket

To Replace the A13 Acquisition and 86100C A14 Counter Assembly (Option 001)

NOTE The 86100C A14 Counter Assembly is mated to the top of the A13 Acquisition assembly. Use the procedure below to remove the A14 Counter.

NOTE When replacing the A14 assembly on 86100C Option 001 instruments, add the A15 Limiter as described in ”Preventing ESD Damage with A15 Diode Limiter” on page 6-13. See Figure 7-61.

1 Follow the instructions for removing the mainframe cover, on page 7-3.

2 Use a 5/16 inch wrench to remove the three cables labeled: W30, W31, and W32, shown in Figure 7-60.

Figure 7-60. Removing the Cables from SW2 Transfer Switch

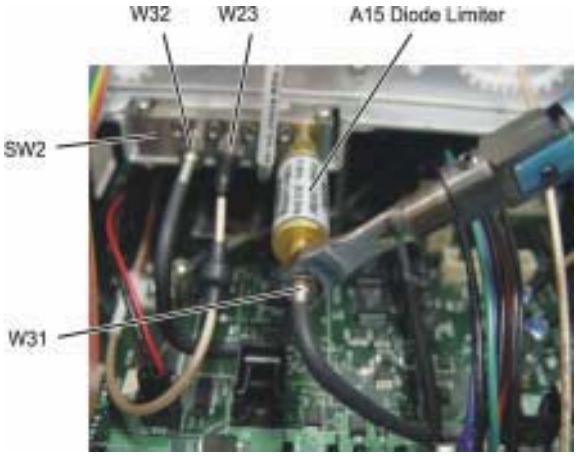


Figure 7-61. A15 Diode Limiter on 86100C Option 001 instrument

NOTE On the 86100C the switch is located closer to the Acquisition assembly; however, the same cables should be removed.

3 Turn the instrument on its side so that you can access the screws that secure the A13 Acquisition board, then remove the two screws, as shown in Figure 7-62.

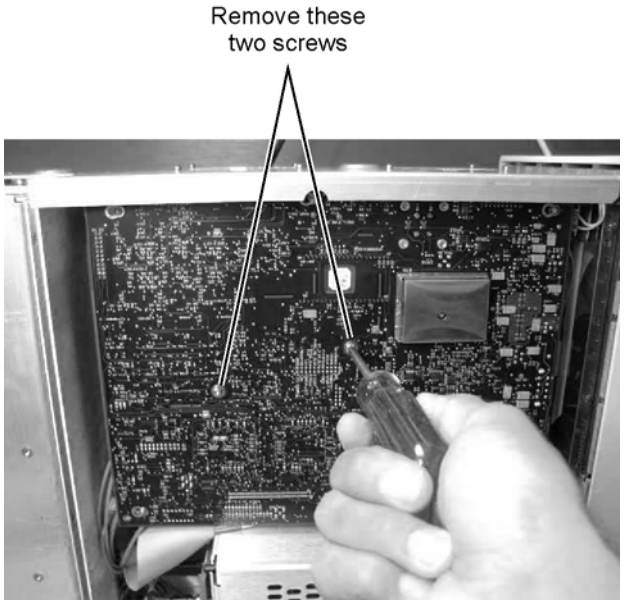


Figure 7-62. Removing the A13 Acquisition Board Screws

4 Slide the board to the right to free it from the locking posts.

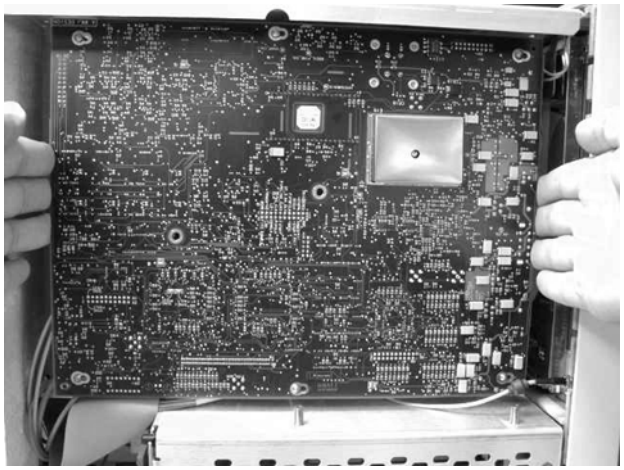


Figure 7-63. Sliding the Board to the Right

5 Pull the board out a few inches, then disconnect the W24 ribbon cable and the cable from the SW2 Transfer Switch, as shown in Figure 7-64 and Figure 7-65.

Figure 7-64. Removing the W24 Ribbon Cable from P24 SRC_SEL

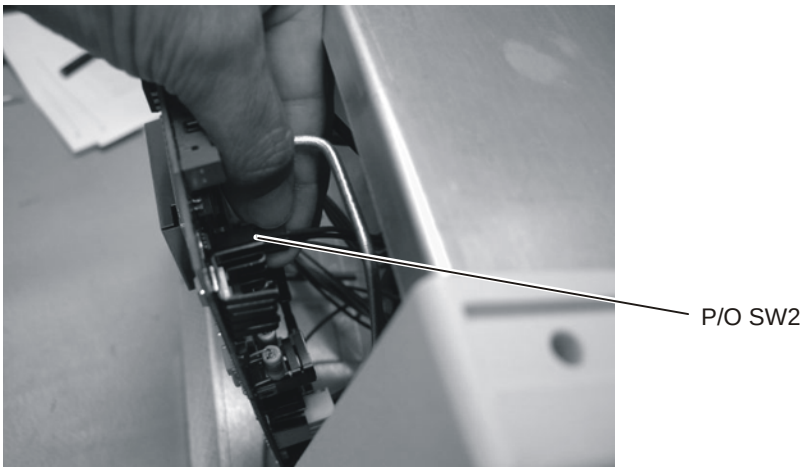


Figure 7-65. Removing the SW2 Cable from P19 Connector

6 Remove the board, as shown in Figure 7-66.

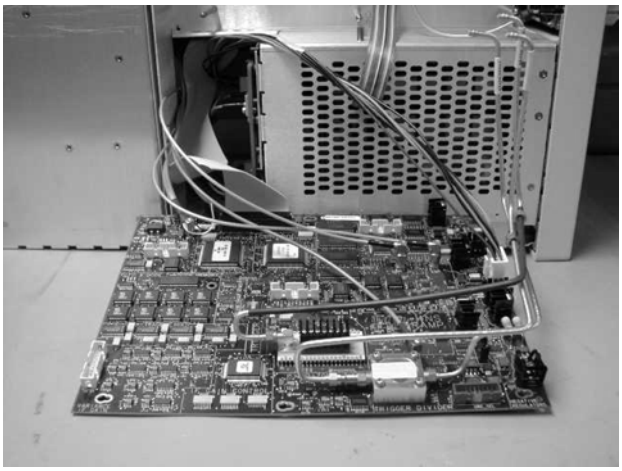


Figure 7-66. Removing the A13 Acquisition Board

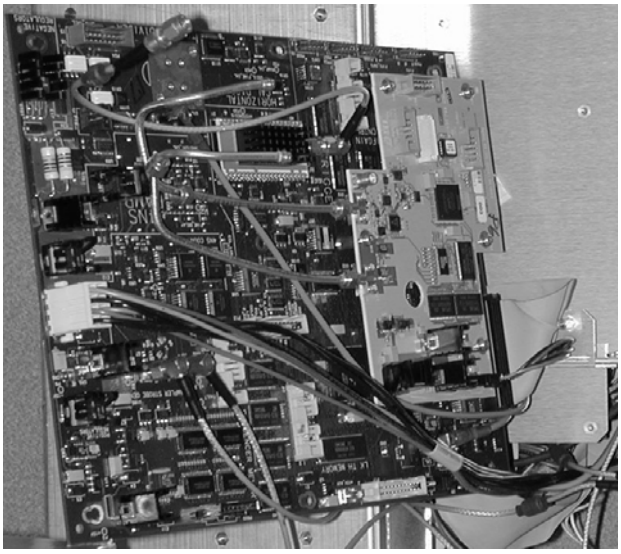


Figure 7-67. 86100C A13 Acquisition Assembly and A14 Counter Assembly

7 Disconnect all of the remaining cables.

8 Refer to Figure 7-68 and Figure 7-69 for cable connections.

NOTE The left and right strobe cables are interchangeable.

9 To re-install the assemblies, perform the above steps in the reverse order.

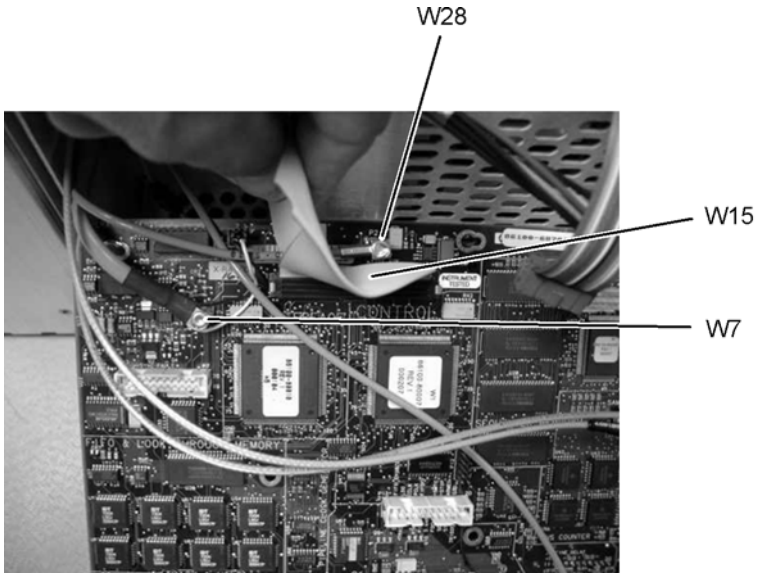


Figure 7-68. W28, W7, and W15 Cables from the A13 Acquisition Board

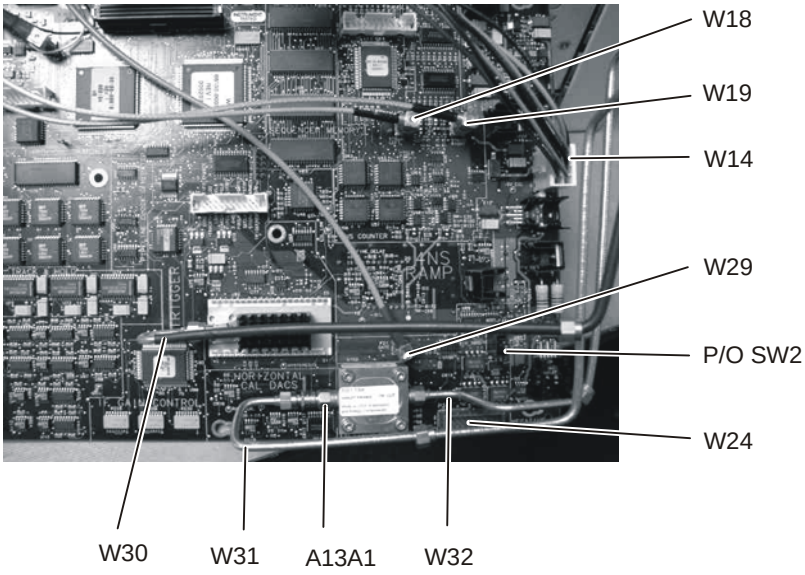


Figure 7-69. Cables from the A13 Acquisition Board (option 001)

8

Replaceable Parts—86100A

Introduction

In this section, you'll find tables that identify each mechanical and electrical assembly in the Agilent 86100A mainframe. An Agilent part number is provided for each available part.

Part Ordering Information
Only major assemblies can be replaced. To order an assembly, quote the Agilent part number, and indicate the quantity required.

Assemblies can be ordered from the nearest Agilent office. Customers within the USA can also use either the direct mail-order system or the direct phone-order system described below. The direct phone-order system has a toll-free phone number available.

Direct Mail-Order System
Within the USA, Agilent can supply parts through a direct mail-order system. Advantages of using the system are as follows:

- Direct ordering and shipment from Agilent
- No maximum or minimum on any mail order. (There is a minimum order amount for parts ordered through a local Agilent office when the orders require billing and invoicing.)
- Prepaid transportation. (There is a small handling charge for each order.)
- No invoices

To provide these advantages, a check or money order must accompany each order. Mail-order forms and specific ordering information are available through your local Agilent office.

Direct Phone-Order System
The toll-free phone number, (800) 227-8164, is available Monday through Friday, 6 am to 5 pm (Pacific time). Regular orders have a 4-day delivery time.

Major Assembly and Cable Location

NOTE The 86100A is obsolete. Some replacement parts are no longer available.

Table 8-1. Major Assembly and Cable Identification (1 of 2)

Ref Des	Description	Agilent Part Number
A1	Power Supply	0950-3499
A2	Flat Panel Display	2090-0396
A2DS1, DS2	Backlight Bulb	2090-0365
A3	Backlight Inverter	0950-3235
A4	PC Motherboard	E2660-68701
A4A1	Microprocessor	1821-4976
A4A2	D-RAM SIMM	1818-7682
A4A3	D-RAM SIMM	1818-7682
A4A4	Voltage Regulator Module	0950-3399
A5	Display Adapter (El Mirage)	54810-66525
A5J103	Zip Cable Clip (part of J103 and W3)	1253-5093
A6	Scope Interface (Tombstone)	54810-66529
A6B1	Battery	1420-0390
A7	Front Panel Assembly	86100-60001
A7	Front Panel Assembly Rebuilt	86100-69001
A7A1	Front Panel Keyboard (Z Board)	86100-66504
A7A2	Touch Screen	1000-1013
A8	Touch Screen Interface	0960-1046
A9	Hard Drive A.03.05	86100-10025
A10	LS-120 Floppy Drive	0950-3931
A11	GP-IB	E2072-66502
A12	Distribution Assembly	86100-66518
A13	Acquisition (Standard) Discontinued	E2660-60702
A13	Acquisition (Standard)	E2660-60703
A13	Acquisition Rebuilt (Standard)	E2660-69702
A13	Acquisition (Option 001)	E2660-68709
A13	Acquisition Rebuilt (Option 001)	E2660-69709

Table 8-1. Major Assembly and Cable Identification (2 of 2)

Ref Des	Description	Agilent Part Number
A13A1	6dB Attenuation (Option 001)	0955-0243
A14	LAN	0960-1232
A15	Disk Drive Interface	86100-66506
A16	LS-120 Adapter	86100-66515
W1	Touch Screen Cable (from A8H1 to A12P8)	86100-60010
W2	Touch Screen Cable (from A8H2 to A4SER1)	86100-60009
W3	LCD Signal Cable (from A5J103 to A2)	86100-60017
W4	LCD Power Cable (from A5J1 to A3	86100-60020
W5	Tombstone Cable (from A6J3 to A7A1P1)	86100-60008
W6	Cable (from A8H5 to A7A2)	86100-60021
W7	Cable (from A13P5/P1 to CAL connector)	86100-60002
W8	IDE Cable (from A15P2 to A9 Hard Drive)	86100-60027
W9	Cable (from A15P1 to A10 Floppy Drive)	86100-60023
W10	Cable (from A5J118 to A6J1) (Tombstone to Mirage)	54801-61624
W11	Cable, IDE (from A15 Primary IDE to A4P5)	86100-60025
W12	Cable (from A15 Secondary IDE to A4P9)	86100-60026
W13	Tombstone Cable (from A6J2 to A12P3)	86100-60007
W14	Cable (from A12P1 to A13P11)	86100-60003
W15	Cable (from A12P4 to A13P4)	86100-60004
W16	Cable (from RF bulkhead to A13 Strobe left)	86100-20020
W17	Cable (from RF bulkhead to A13 Strobe right)	86100-20020
W18	Cable (from RF bulkhead to lower A12 mod strobe)	86100-20007
W19	Cable (from RF bulkhead to lower A12 mod strobe)	86100-20007
W20	Cable (from SW1 port 2 to upper A12)	86100-20029
W21	Cable (from SW1 port 3 to upper A12)	86100-20029
W22	Cable (from SW1 port 5 to front panel trigger)	86100-20008
W23	Cable, A13 TRG IN to SW1 center (SW2 P2 on Option 001)	86100-20009
W24	Cable (from SW1 to A13P24 SRC SEL)	86100-60011
W25, W26	Cable kit (from A4 parallel and serial to rear panel–both cables)	54810-66524
W27	Cable (from A4 mouse to rear panel)	86100-60019
W28	Cable (from A13P2 to rear panel +15V output)	8120-5038
W29	Cable (from A13P21 to rear panel trigger gate)	86100-20013
W30	Cable, SW1 center to SW2 P3 (Option 001)	86100-20012
W31	Cable (from SW2 to A14) (Option 001)	86100-20010
W32	Cable (from SW2 to A13U102) (Option 001)	86100-20011

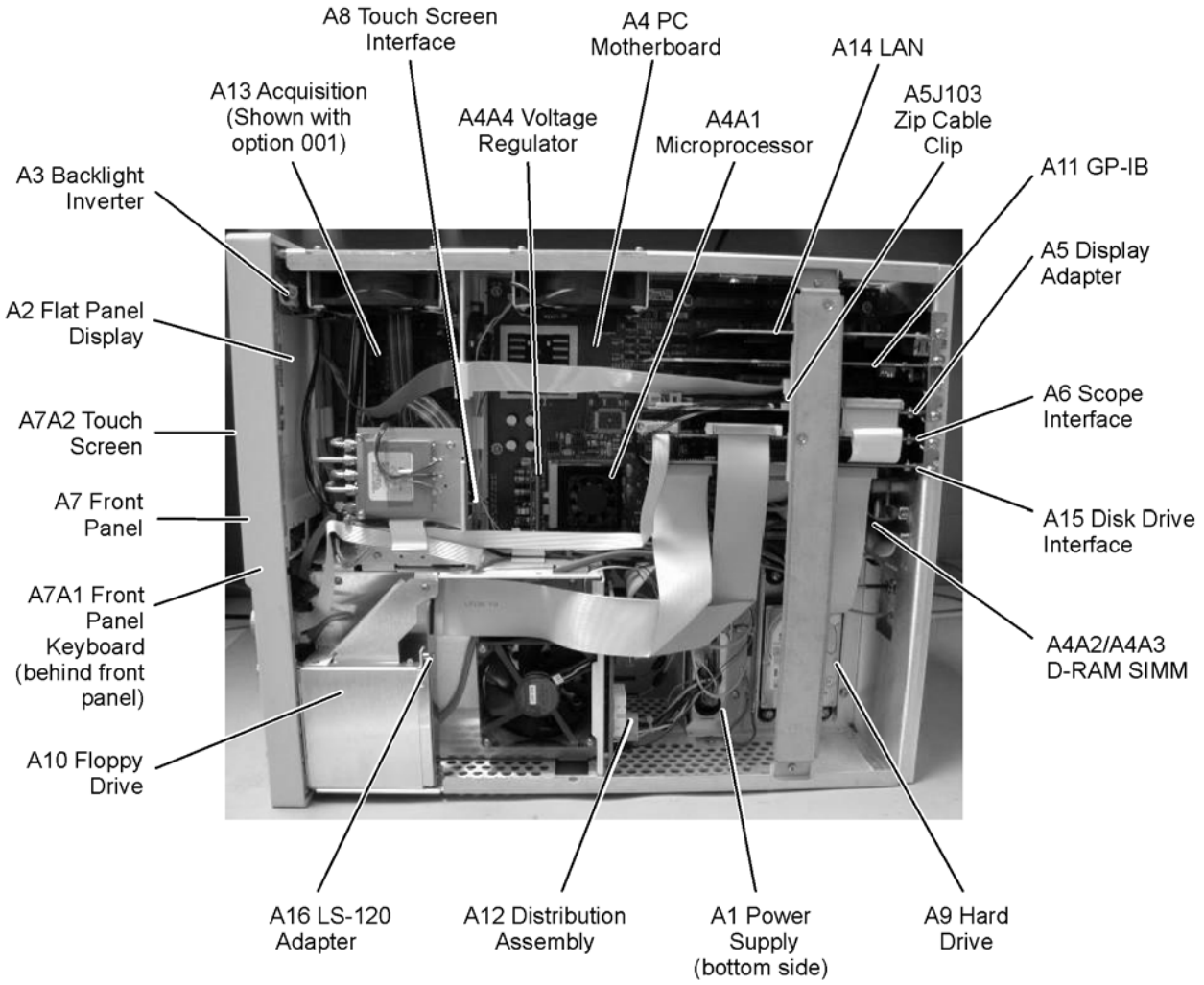
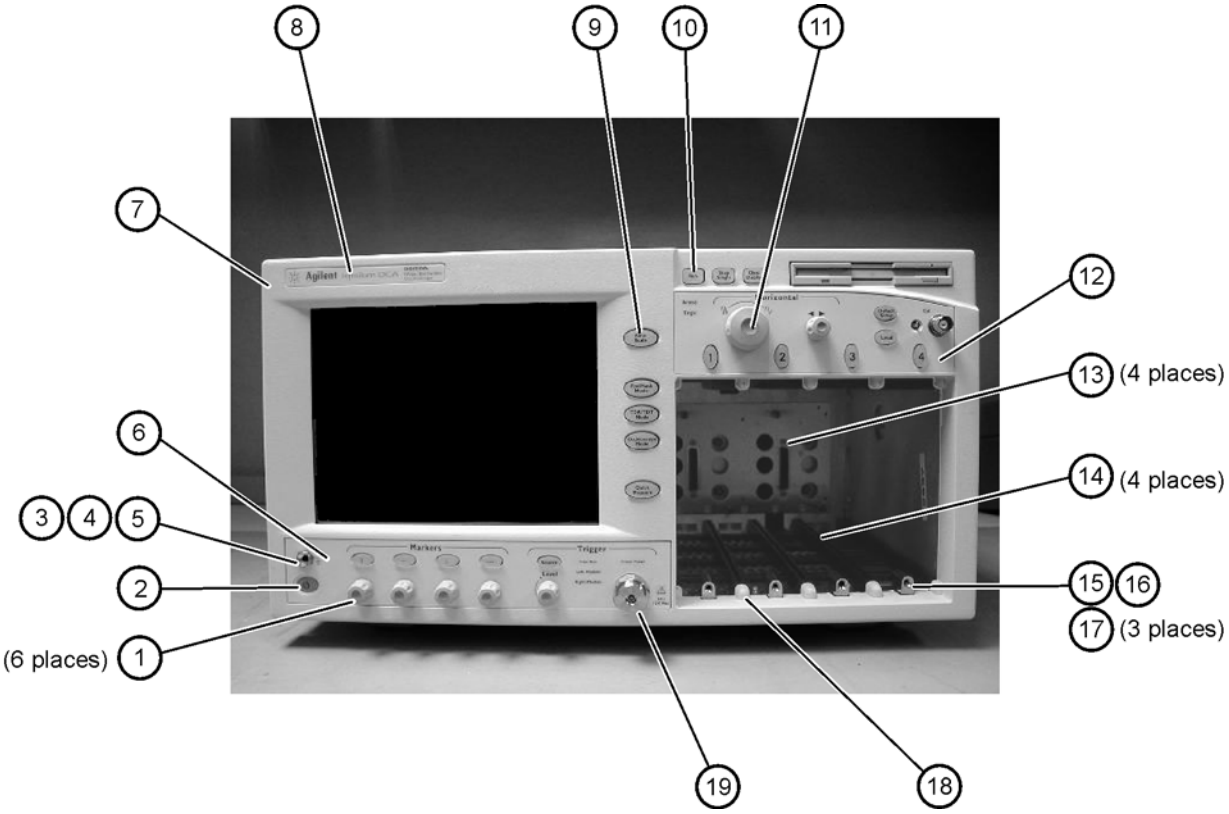


Figure 8-1. 86100A Major Assembly and Cable Location

Front View Identification

Table 8-2. Front View Identification

Item	Description	Quantity	Agilent Part Number
1	Knob, 12 mm	6	86100-47402
2	Lower cursor keypad	1	86100-40002
3	Ground lug	1	54542-26101
4	Washer	1	2190-0027
5	Nut	1	2950-0072
6	Lower front panel	1	86100-60015
7	Front frame	1	86100-20002
8	Nameplate	1	86100-80011
9	Middle cursor keypad	1	86100-40003
10	Upper cursor keypad	1	86100-40001
11	Knob, 24 mm	1	86100-47401
12	Upper front panel	1	86100-60014
13	Screw	4	0515-2035
14	Module rail	2	54710-43101
15	Copper spring	1	86100-20028
16	Module anchor	1	86100-20004
17	Screw	3	0515-0430
18	Filler Panel	2	86101-60005
19	SM 3.5 mm connector	1	5062-1247


8
9
10
11
7
12
13 (4 places)
6
14 (4 places)
3
4
5
2
15
16
17 (3 places)
(6 places)
1
19
18

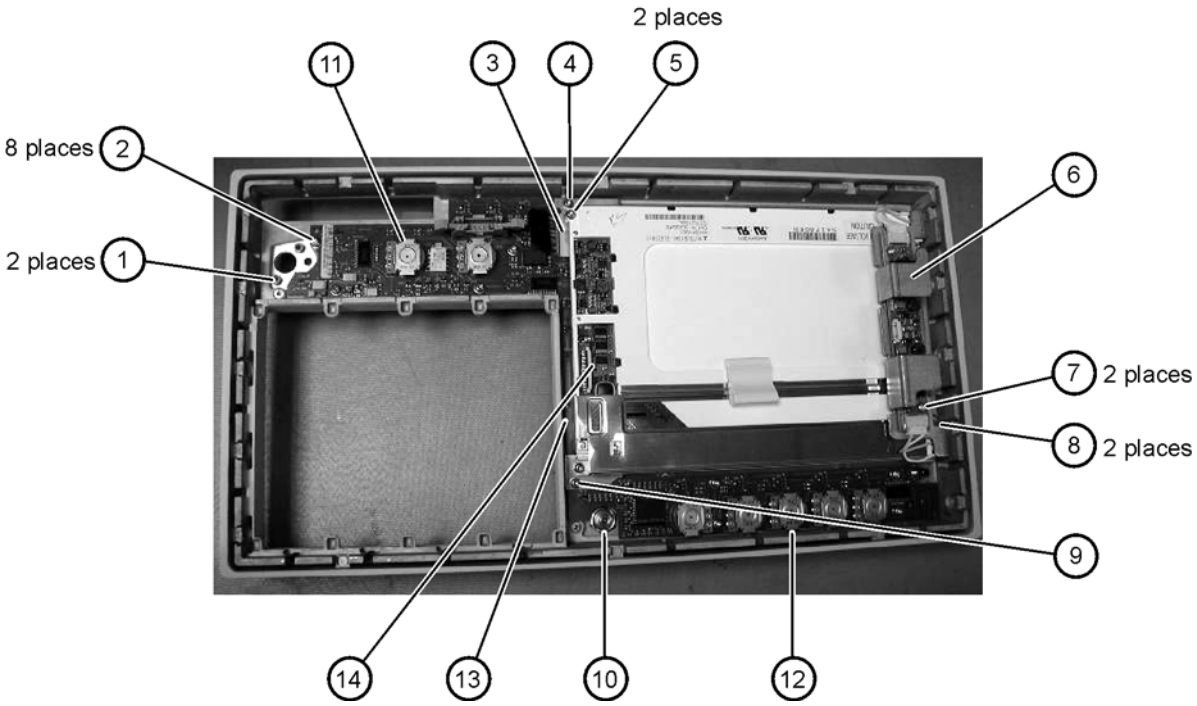

Filler
Panel

Front Inside Panel Identification

Table 8-3. Front Inside Panel Identification

Item	Description	Quantity	Agilent Part Number
1	Screw	2	0515-0372
2	Screw	8	0515-0372
3	Bracket, Touch Screen	1	86100-00007
4	Screw	1	0515-0372
5	Screw	2	0515-0430
6	Bracket, Inverter	1	86100-00016
7	Screw	2	0515-1246
8	Screw	2	0515-0664
9	Screw	1	0515-0664
10	RF Connector	1	5062-1247
11	Keypad Upper	1	86100-40001
12	Keypad Lower	1	86100-40002
13	Keypad Middle	1	86100-40003
14	Zip Cable Clip	1	1253-5093

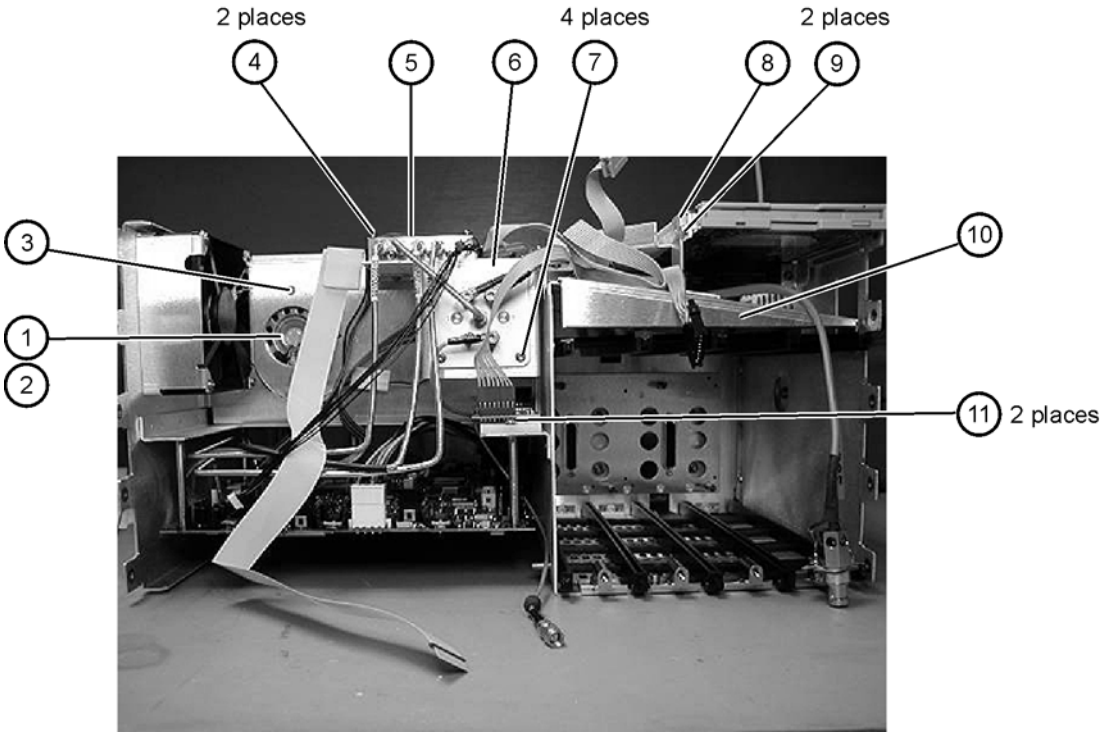
CAUTION The keypads are underneath the A7A1 keyboard.


2 places
11
3
4
5
8 places
2
6
2 places
1
7
2 places
8
2 places
9
14
13
10
12

Front View, Front Panel Removed, Identification

Table 8-4. Front View, Front Panel Removed, Identification

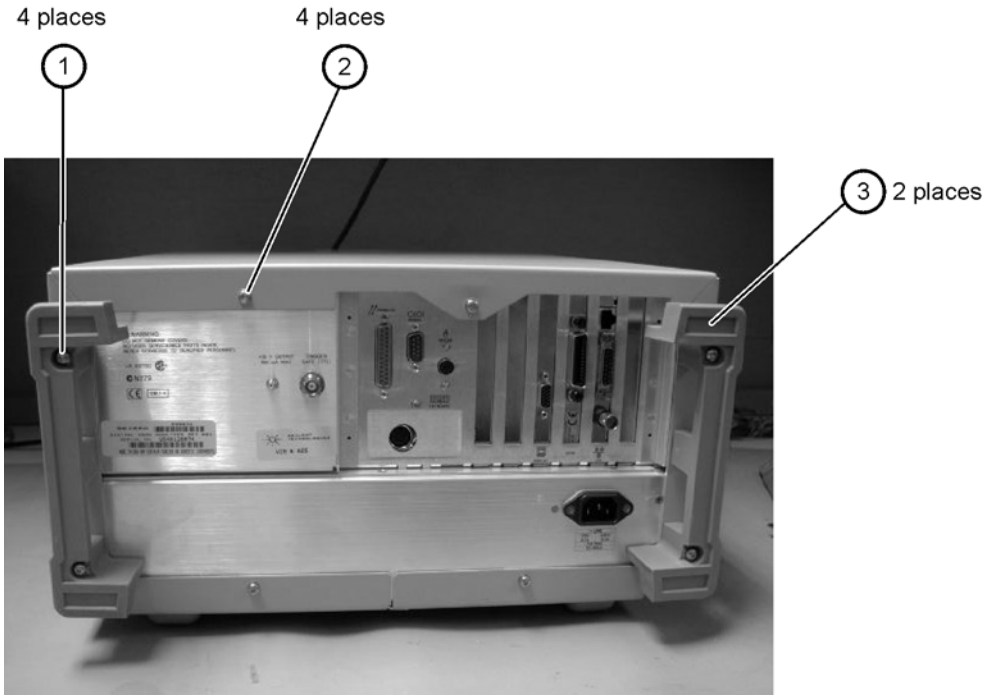
Item	Description	Quantity	Agilent Part Number
1	Speaker	1	86100-60022
2	Cover, Speaker	1	A2095-00009
3	Screw	1	0515-0372
4	Screw	2	0515-1410
5	Switch, 4PT, 3.5 mm 15V (Option 001 only)	1	E2660-68707
6	Switch, Trigger Select	1	87104-60001
7	Screw (Option 001 only)	4	0515-0372
8	Screw	1	0515-0663
9	Screw	2	0515-2691
10	Bracket, Fan	1	86100-00005
11	Screw	2	0515-0372


2 places
4 places
2 places
4
5
6
7
8
9
3
10
1
2
11
2 places

Rear View Identification

Table 8-5. Rear View Identification

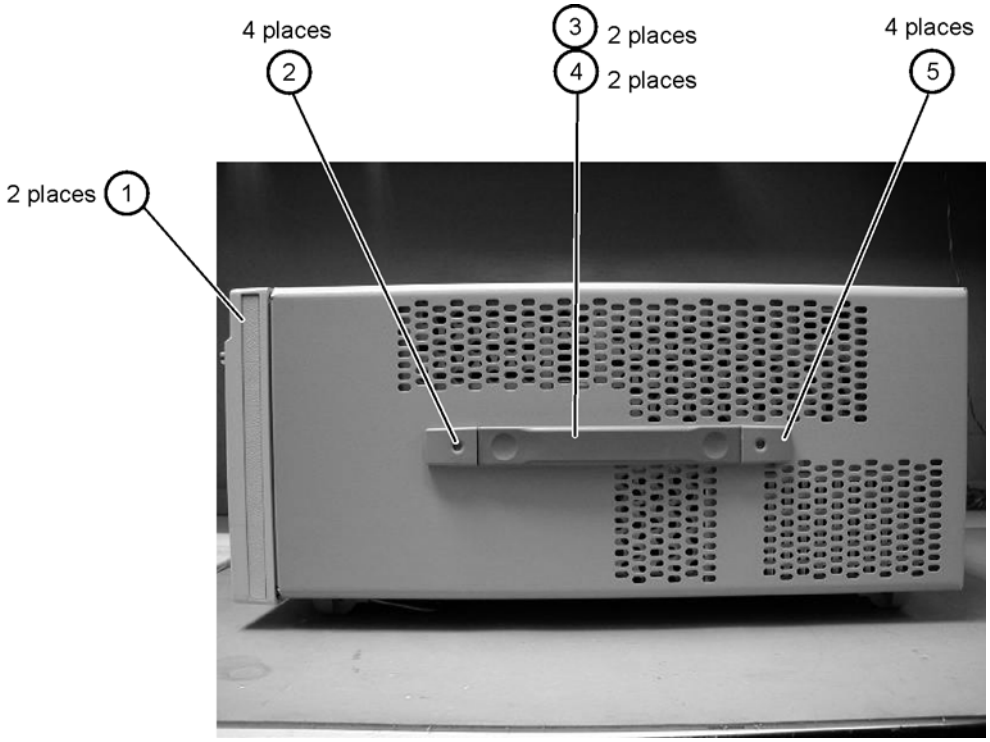
Item	Description	Quantity	Agilent Part Number
1	Screw	4	0515-2195
2	Screw	4	0515-0433
3	Foot	2	5042-1753


4 places
4 places
1
2
3
2 places

Left and Right Side Identification

Table 8-6. Left and Right Side Identification

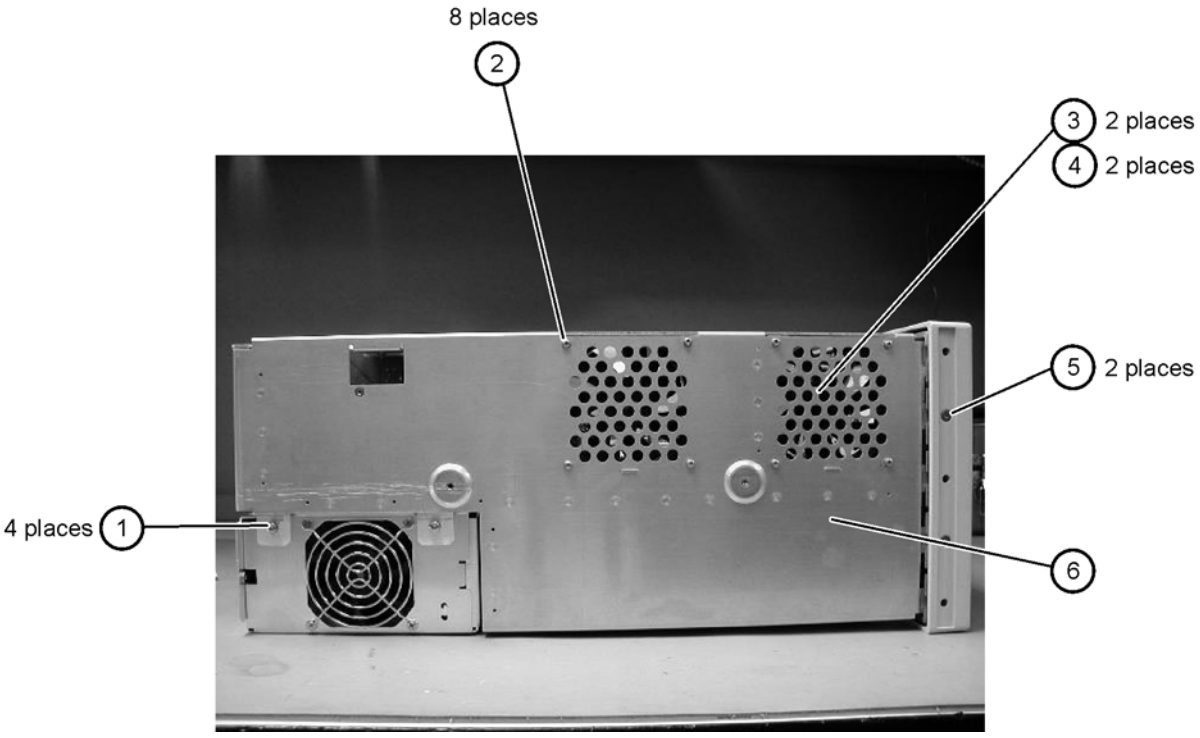
Item	Description	Quantity	Agilent Part Number
1	Trim Strip	2	5041-9173
2	Screw	4	5021-4308
3	Molded Handle	2	54810-44901
4	Retainer Strip	2	54801-24702
5	Handle End Cap	4	54810-45001


4 places
2
3
2 places
4
2 places
4 places
5
2 places
1

Left Side, Cover Removed, Identification

Table 8-7. Left Side, Cover Removed, Identification

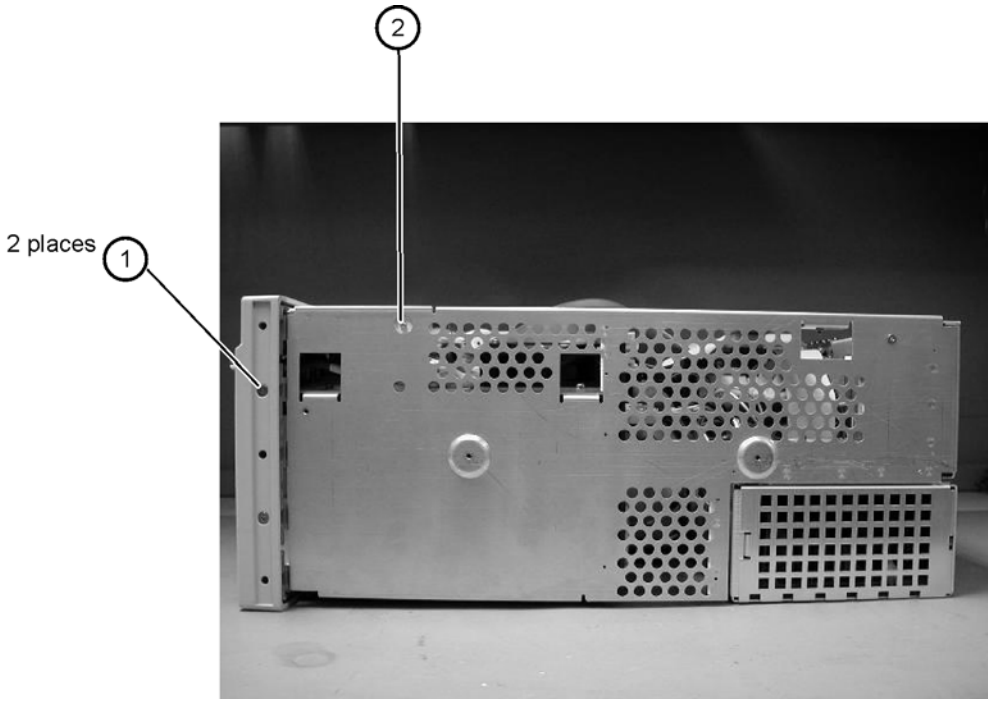
Item	Description	Quantity	Agilent Part Number
1	Screw	4	0515-0380
2	Screw	8	0515-1352
3	Fan Shroud	2	86100-00014
4	Fan, Low Speed	2	3160-0921
5	Screw	2	0515-2044
6	Chassis	1	86100-0001


8 places
2
3 2 places
4 2 places
5 2 places
4 places
1
6

Right Side, Cover Removed, Identification

Table 8-8. Right Side, Cover Removed, Identification

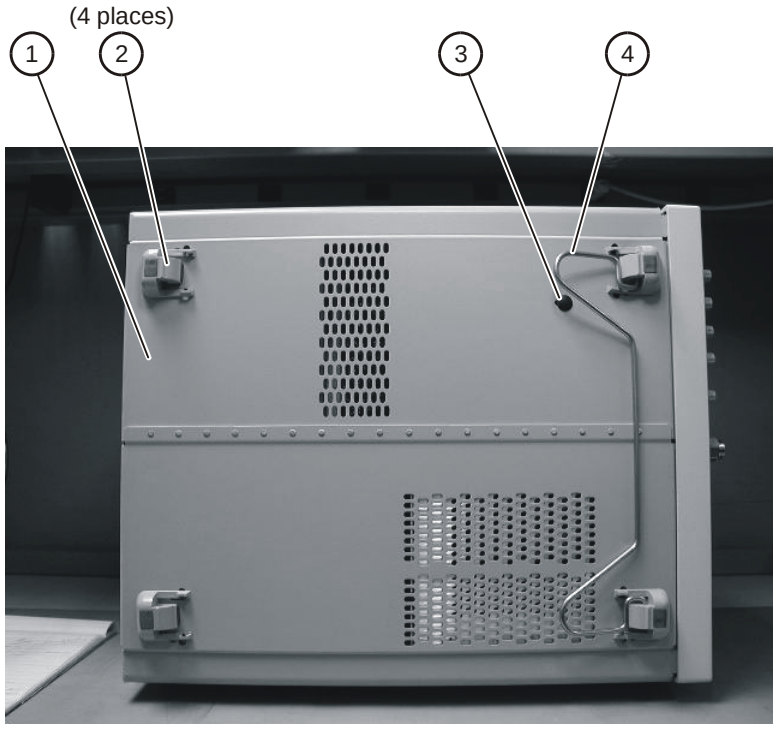
Item	Description	Quantity	Agilent Part Number
1	Screw	2	0515-2044
2	Screw	1	0515-2691


2
2 places
1

Bottom View Identification

Table 8-9. Bottom View Identification

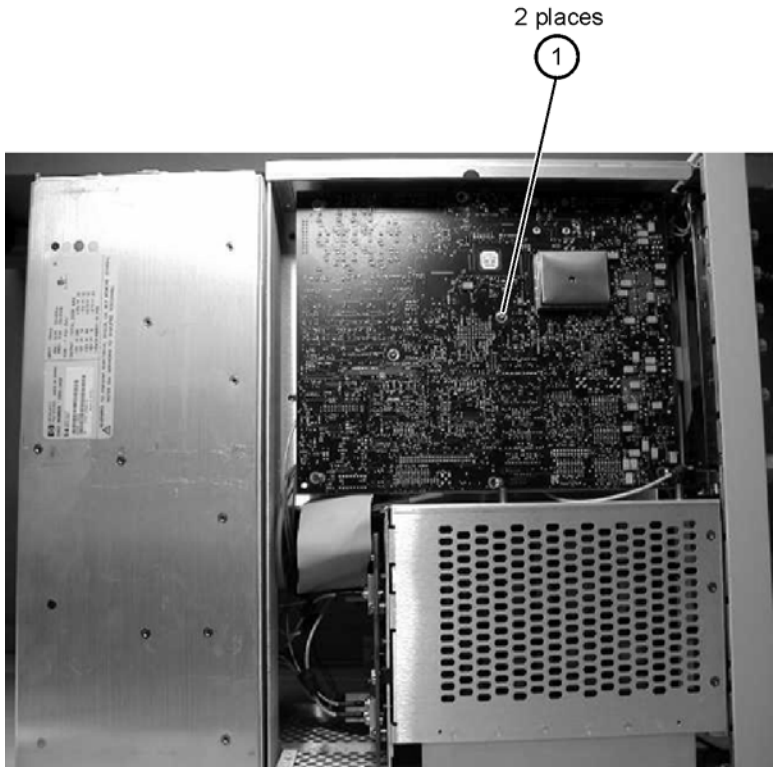
Item	Description	Quantity	Agilent Part Number
1	Cover	1	86100-00002
2	Foot	4	54810-61001
3	Hole Plug	1	86100-60024
4	Tilt Stand	1	86100-20030


(4 places)
1
2
3
4

Bottom View, Cover Removed, Identification

Table 8-10. Bottom View, Cover Removed, Identification

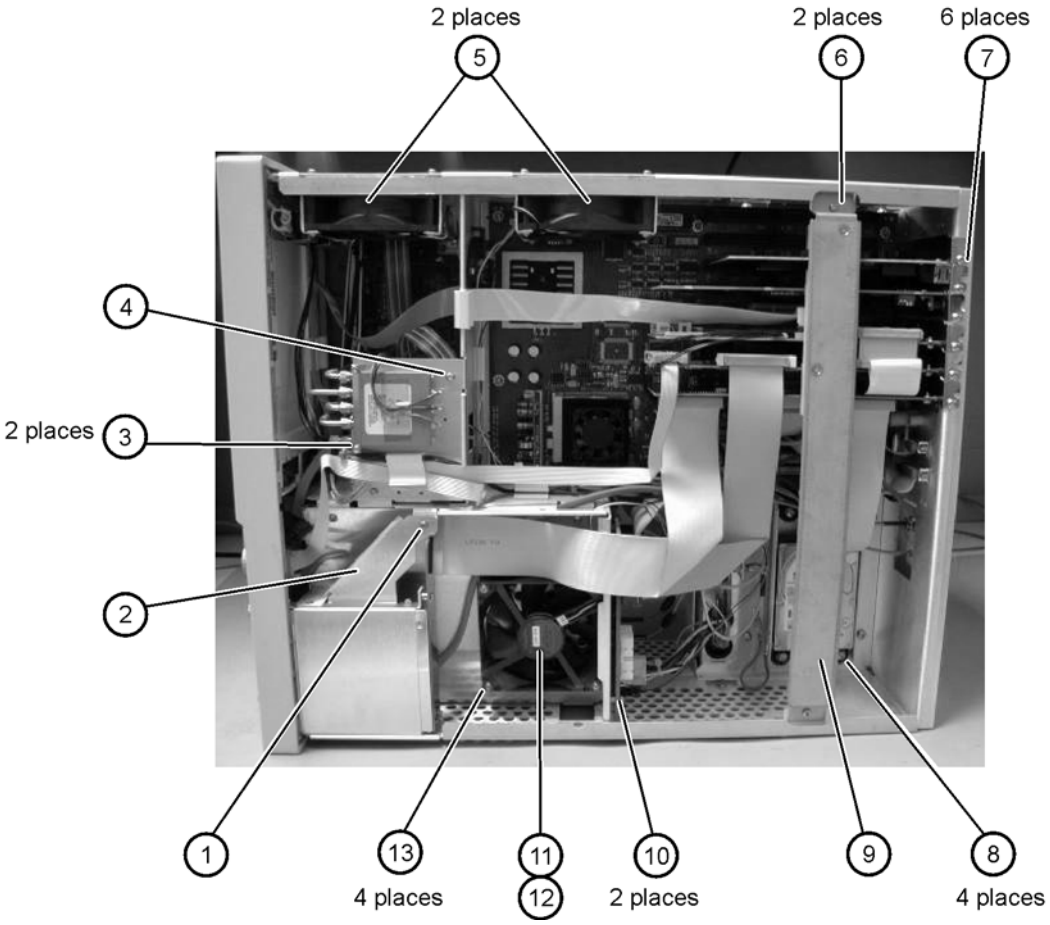
Item	Description	Quantity	Agilent Part Number
1	Screw	2	0515-0372


2 places
1

Top View, Cover Removed, Identification

Table 8-11. Top View, Cover Removed, Identification

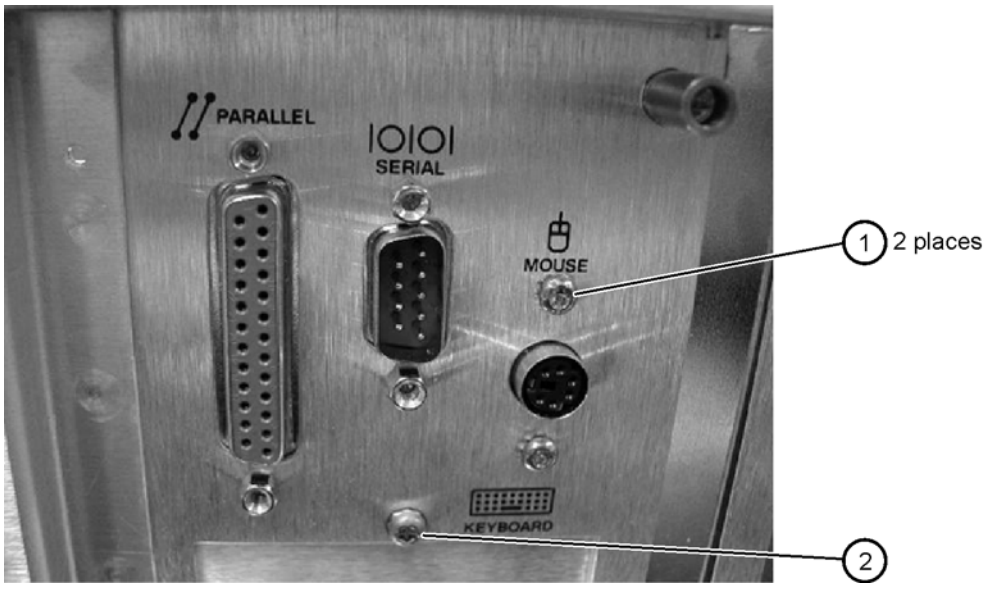
Item	Description	Quantity	Agilent Part Number
1	Screw	1	0515-0430
2	Floppy Disk Bracket	1	86100-00019
3	Screw	2	0515-1410
4	Screw	1	0515-0372
5	Fan, Low Speed	2	3160-0921
6	Screw	2	0515-0372
7	Screw	6	0624-1059
8	Screw	4	0515-0383
9	Card Strap	1	86100-60038
10	Screw	2	0515-0372
11	Fan, High Speed	1	3160-0940
12	Fan Shroud	1	86100-00014
13	Screw	4	0515-1349


2 places
5
2 places
6
6 places
7
4
2 places
3
2
1
13
4 places
11
12
10
2 places
9
8
4 places

Rear Panel Identification

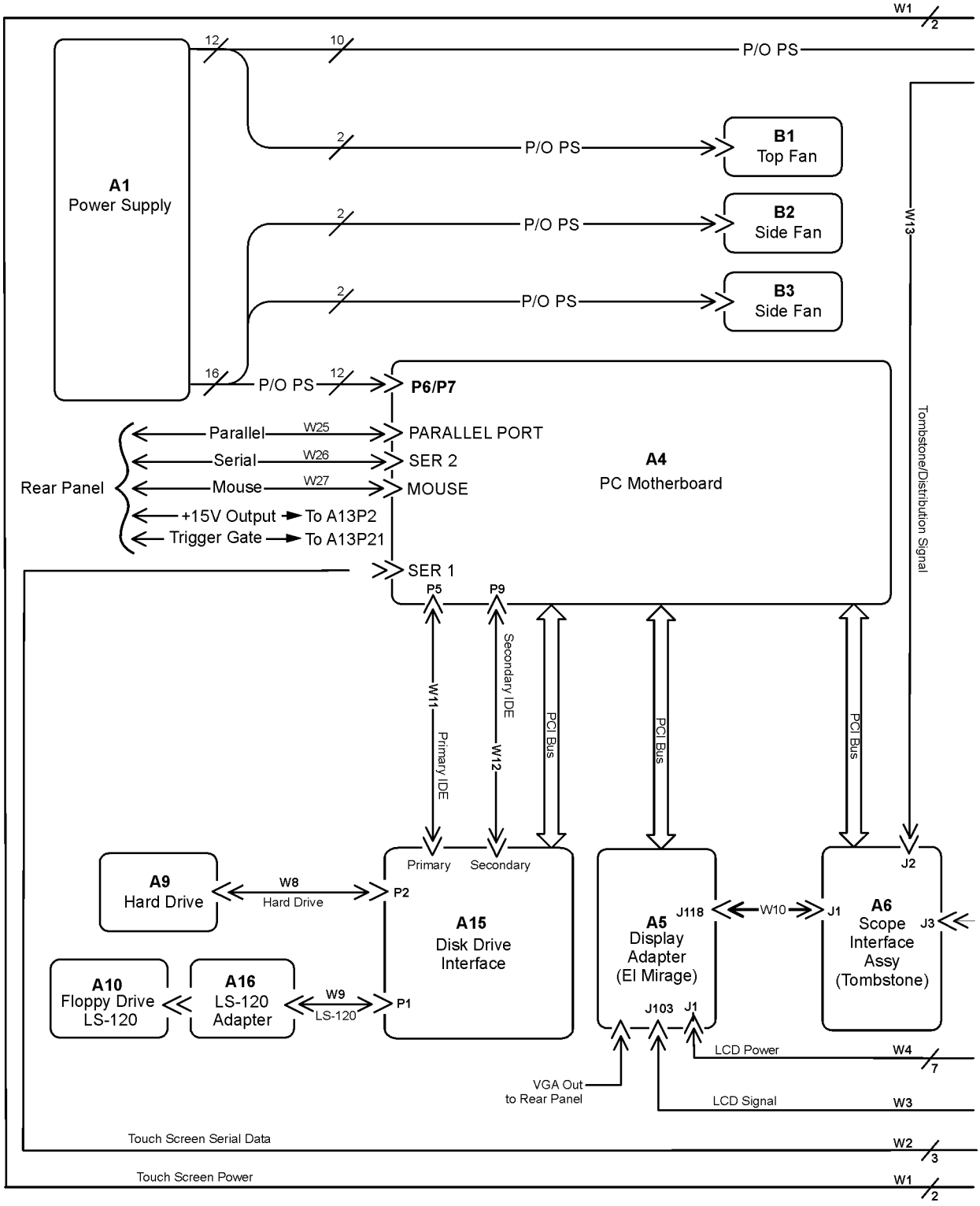
Table 8-12. Rear Panel Identification

Item	Description	Quantity	Agilent Part Number
1	Screw	2	2200-1271
2	Screw	1	0515-0430

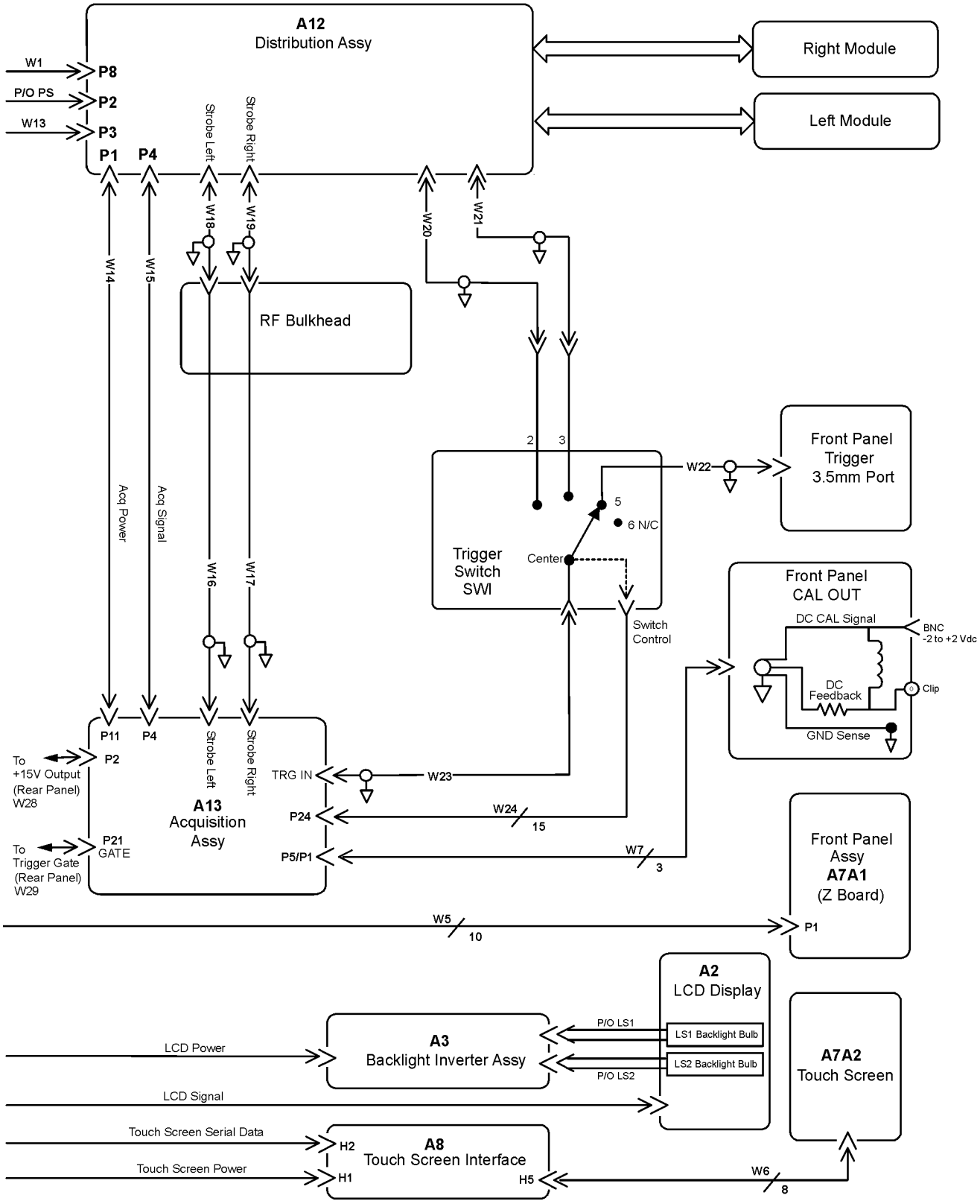


Block Diagrams

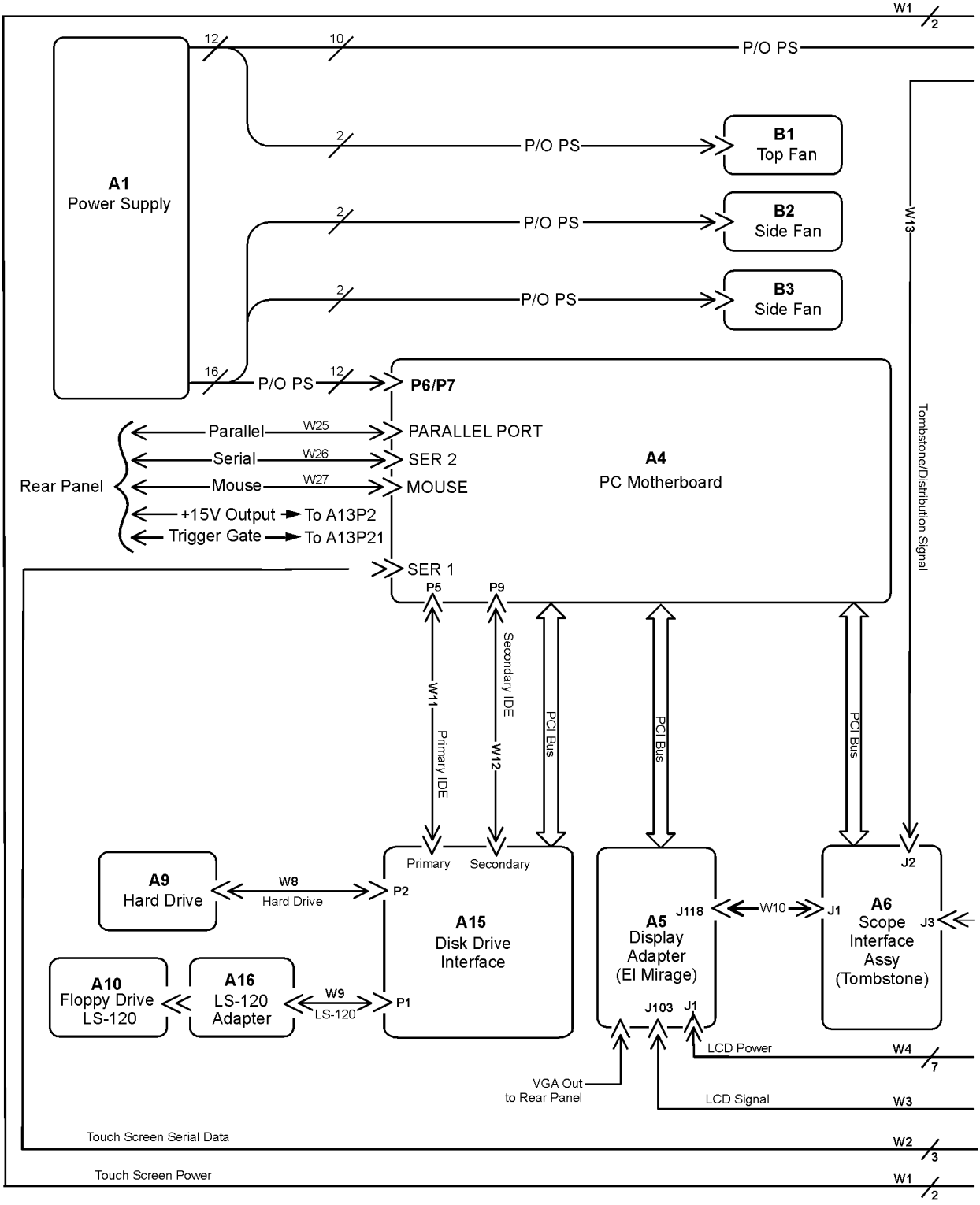
The following pages contain block diagrams of both the Standard and the Option 001 86100A Digital Communications Analyzer.



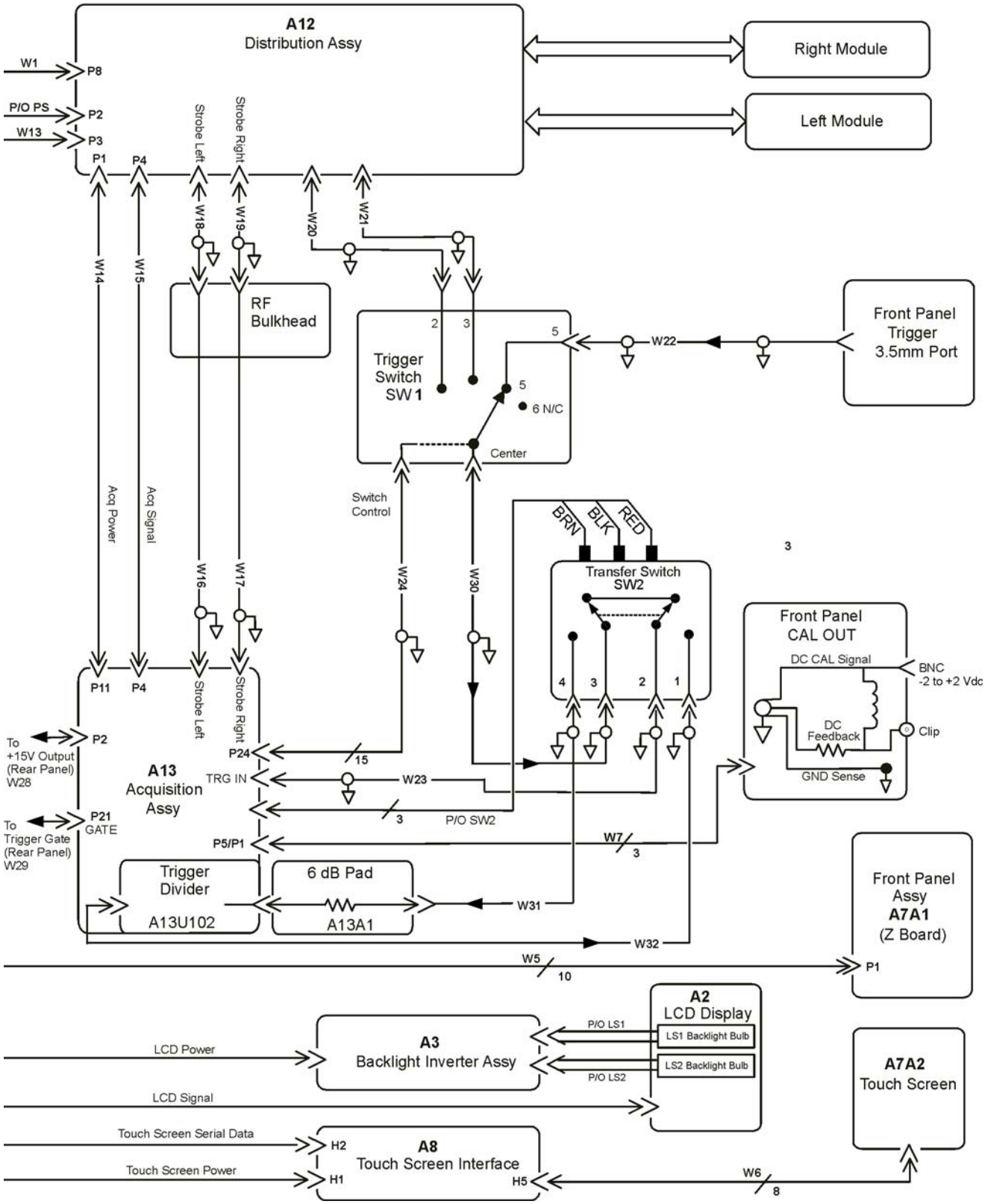
86100A Block Diagram (1 of 2)



86100A Block Diagram (2 of 2)



86100A Option 001 Block Diagram (1 of 2)



86100A Option 001 Block Diagram (2 of 2)

9

Replaceable Parts—86100B

Introduction

In this section, you'll find tables that identify each mechanical and electrical assembly in the Agilent 86100B mainframe. An Agilent part number is provided for each available part.

NOTE The 86100A is shown in some of the following identification diagrams. Although some of the components are not the same as the 86100B, part and assembly locations are virtually identical.

Part Ordering Information
Only major assemblies can be replaced. To order an assembly, quote the Agilent part number, and indicate the quantity required.

Assemblies can be ordered from the nearest Agilent office. Customers within the USA can also use either the direct mail-order system or the direct phone-order system described below. The direct phone-order system has a toll-free phone number available.

Direct Mail-Order System
Within the USA, Agilent can supply parts through a direct mail-order system. Advantages of using the system are as follows:

- Direct ordering and shipment from Agilent
- No maximum or minimum on any mail order. (There is a minimum order amount for parts ordered through a local Agilent office when the orders require billing and invoicing.)
- Prepaid transportation. (There is a small handling charge for each order.)
- No invoices

To provide these advantages, a check or money order must accompany each order. Mail-order forms and specific ordering information are available through your local Agilent office.

Direct Phone-Order System
The toll-free phone number, (800) 227-8164, is available Monday through Friday, 6 am to 5 pm (Pacific time). Regular orders have a 4-day delivery time.

Major Assembly and Cable Location

Table 9-1. Major Assembly and Cable Identification

Ref Des	Description	Agilent Part Number
A1	Power Supply	0950-3499
A2	Flat Panel Display	2090-0396
A2DS1, DS2	Backlight Bulb	—
A3	Backlight Inverter	0950-3235
A4	PC Motherboard	0960-2568
A4B1	Battery	1420-0356
A4A1,2	Motherboard Memory	1818-8783
A4F1	Microprocessor Fan Assembly with Heat Sink	3160-4122
A5	Display Adapter (El Mirage)	54810-66525
A5J103	Zip Cable Clip (part of J103 and W3)	1253-5093
A6	Scope Interface (Tombstone)	54810-66529
A6B1	Battery	1420-0390
A7	Front Panel Assembly	86100-60043
A7A1	Front Panel Keyboard (Z Board)	86100-66504
A7A2	Touch Screen	1000-1013
A8	Touch Screen Interface	0960-1046
A9	Hard Drive, with A.03.05 software	86100-10029
A10	3.5” Floppy Drive	0950-2782
A11	GP-IB	82350A option 002
A12	Distribution	86100-66518
A13	Acquisition (Standard) Discontinued	E2660-60702
A13	Acquisition (Standard)	E2660-60703
A13	Acquisition Rebuilt (Standard)	E2660-69709
A13	Acquisition (Option 001)	E2660-68709
A13	Acquisition Rebuilt (Option 001)	E2660-69709
A13A1	6dB Attenuation (Option 001)	0955-0243
A16	CD-ROM adapter	86100-66517
A17	CD-ROM drive	0950-4864
A18	ATX Power Supply Interface	86100-66516

Table 9-1. Major Assembly and Cable Identification

Ref Des	Description	Agilent Part Number
W1	Cable (from A8H1 to A12P8) (Touch Screen Power)	part of W33
W2	Cable (from A8H2 to A4SER1) (Touch Screen Serial)	86100-60033
W3	Cable (from A5J103 to A2) (LCD Signal)	86100-60017
W4	Cable (from A5J1 to A3) (LCD Power)	86100-60020
W5	Cable (from A6J3 to A7A1P1) (Tombstone to Front Panel)	86100-60008
W6	Cable (from A8H5 to A7A2)	86100-60021
W7	Cable (from A13P5/P1 to front panel CAL connector)	86100-60002
W8	Cable, IDE (from A15P2 to A9 Hard Drive)	86100-60035
W9	Cable, Floppy (from A15P1 to A10 Floppy Drive)	86100-60034
W10	Cable (from A5J118 to A6J1) (Tombstone to Mirage)	54801-61624
W11	Cable, IDE (from A15 Primary IDE to A4P5)	86100-60037
W13	Cable, Tombstone (from A6J2 to A12P3)	86100-60032
W14	Cable (from A12P1 to A13P11)	86100-60003
W15	Cable (from A12P4 to A13P4)	86100-60004
W16	Cable (from RF bulkhead to A13 Strobe left)	86100-20029
W17	Cable (from RF bulkhead to A13 Strobe right)	86100-20029
W20	Cable (from SW1 port 2 to upper A12)	86100-20029
W21	Cable (from SW1 port 3 to upper A12)	86100-20029
W22	Cable (from SW1 port 5 to front panel trigger)	86100-20008
W23	Cable, A13 TRG IN to SW1 center (SW2 P2 on Option 001)	86100-20009
W24	Cable (from SW1 to A13P24 SRC SEL)	86100-60011
W28	Cable (from A13P2 to rear panel +15V output)	8120-5038
W29	Cable (from A13P21 to rear panel trigger gate)	86100-20013
W30	Cable, SW1 center to SW2 P3 (Option 001)	86100-20012
W31	Cable (from SW2 to A14) (Option 001)	86100-20010
W32	Cable (from SW2 to A13U102) (Option 001)	86100-20011
W33	ATX Power	86100-20036
W34	ATX Adapter	86100-60041
W35	Power Control	86100-60042
W36	5V Power	86100-20037

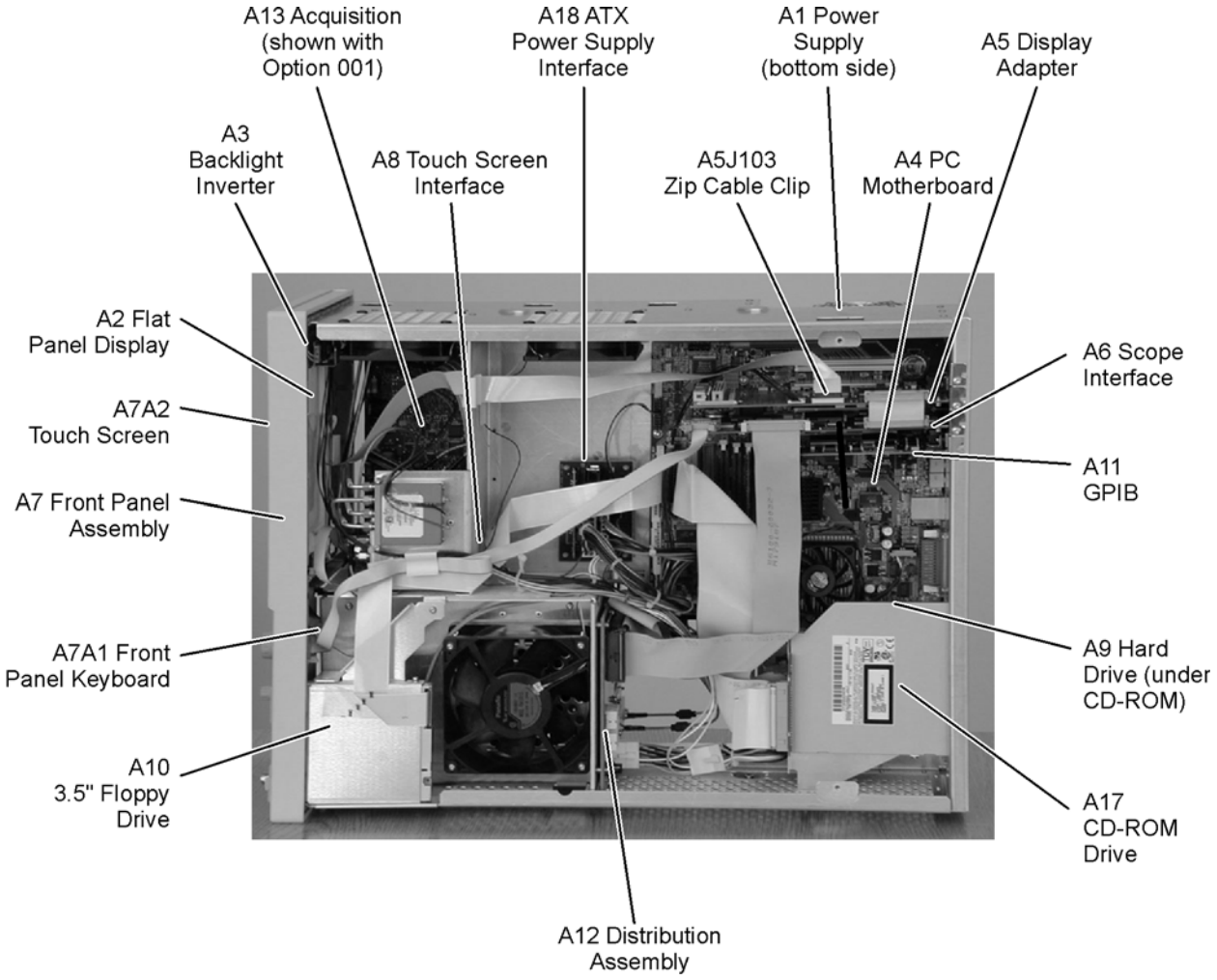
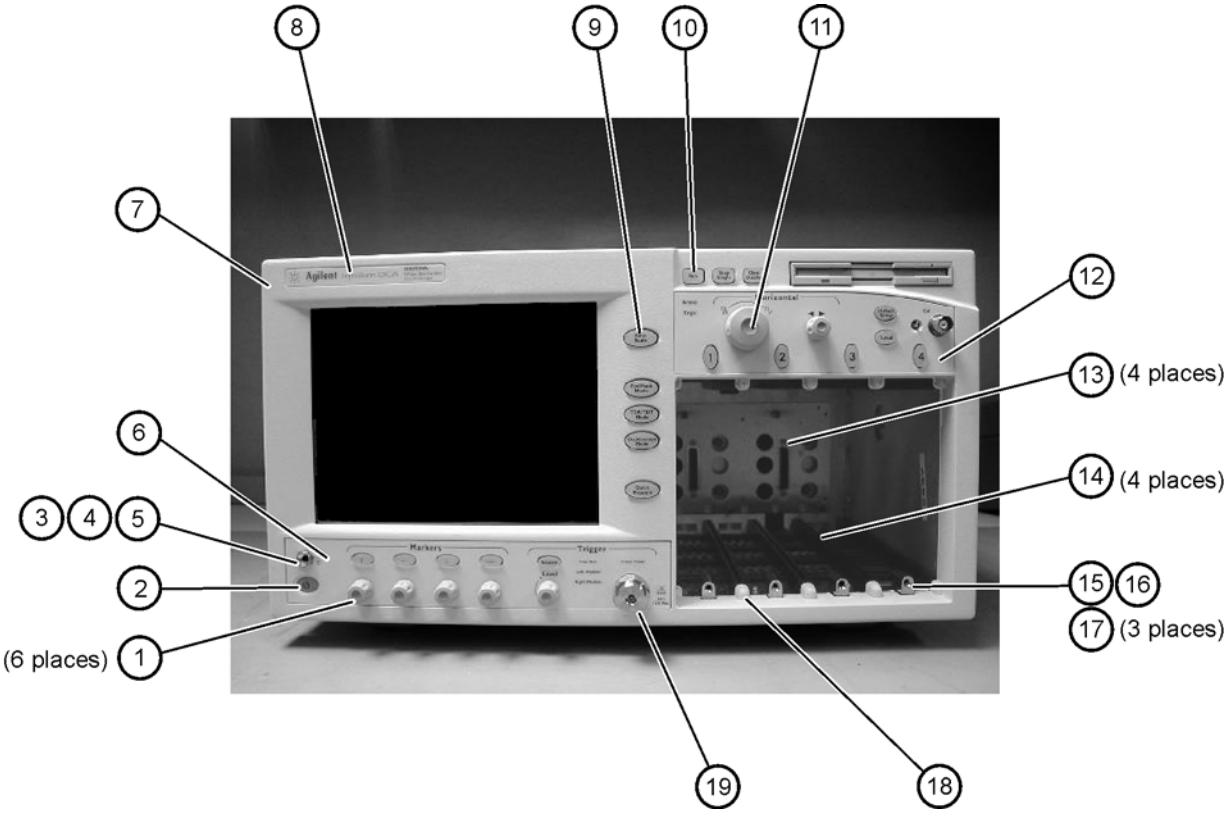


Figure 9-1. 86100B Major Assembly and Cable Location

Front View Identification

Table 9-2. Front View Identification

Item	Description	Quantity	Agilent Part Number
1	Knob, 12 mm	6	86100-47402
2	Lower cursor keypad	1	86100-40002
3	Ground lug	1	54542-26101
4	Washer	1	2190-0027
5	Nut	1	2950-0072
6	Lower front panel	1	86100-60015
7	Front frame	1	86100-20002
8	Nameplate	1	86100-80017
9	Middle cursor keypad	1	86100-40003
10	Upper cursor keypad	1	86100-40001
11	Knob, 24 mm	1	86100-47401
12	Upper front panel	1	86100-60014
13	Screw	4	0515-2035
14	Module rail	2	54710-43101
15	Copper spring	1	86100-20028
16	Module anchor	1	86100-20004
17	Screw	3	0515-0430
18	Filler Panel	2	86101-60005
19	SM 3.5 mm connector	1	5062-1247


8
9
10
11
7
12
13 (4 places)
6
14 (4 places)
3
4
5
2
15
16
17 (3 places)
(6 places)
1
19
18

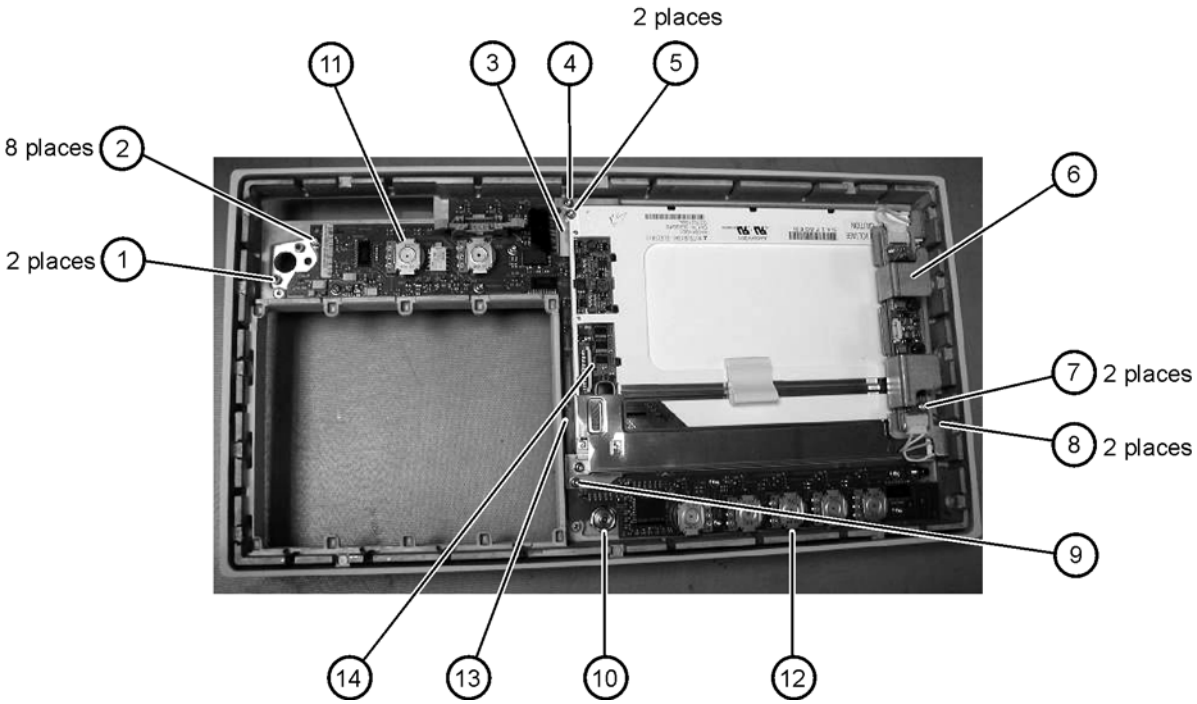

Filler
Panel

Front Inside Panel Identification

Table 9-3. Front Inside Panel Identification

Item	Description	Quantity	Agilent Part Number
1	Screw	2	0515-0372
2	Screw	8	0515-0372
3	Bracket, Touch Screen	1	86100-00007
4	Screw	1	0515-0372
5	Screw	2	0515-0430
6	Bracket, Inverter	1	86100-00016
7	Screw	2	0515-1246
8	Screw	2	0515-0664
9	Screw	1	0515-0664
10	RF Connector	1	5062-1247
11	Keypad Upper	1	86100-40001
12	Keypad Lower	1	86100-40002
13	Keypad Middle	1	86100-40003
14	Zip Cable Clip	1	1253-5093

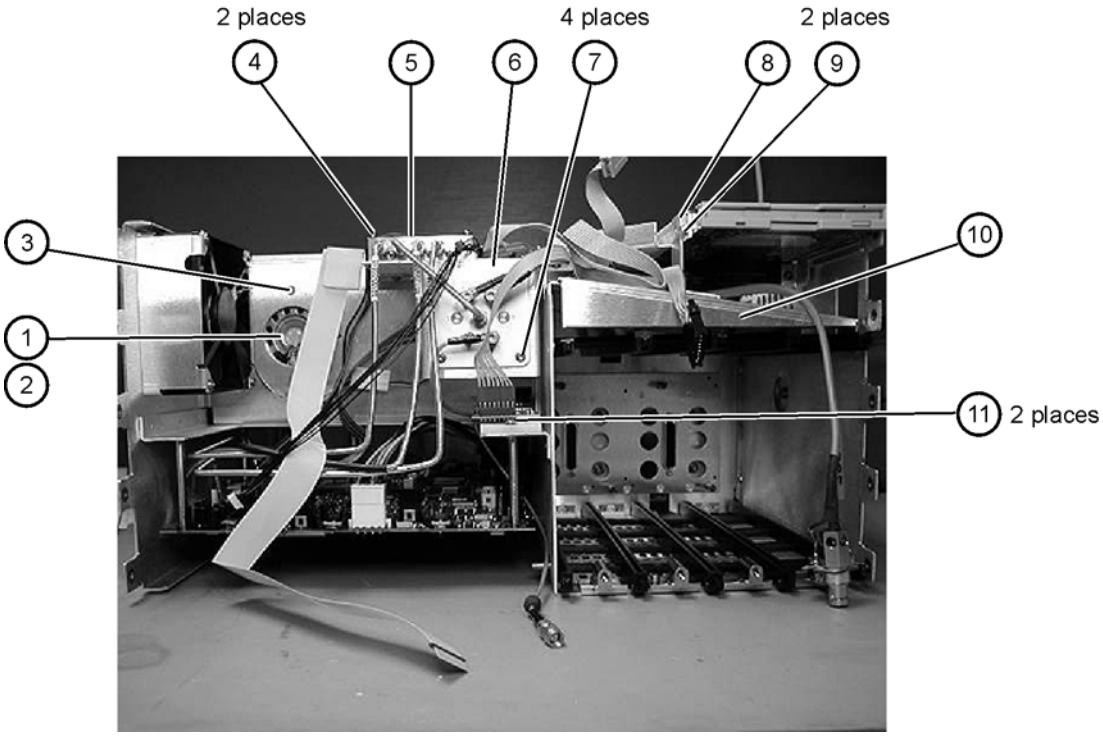
CAUTION The keypads are underneath the A7A1 keyboard.


2 places
11
3
4
5
8 places
2
6
2 places
1
7
2 places
8
2 places
9
14
13
10
12

Front View, Front Panel Removed, Identification

Table 9-4. Front View, Front Panel Removed, Identification

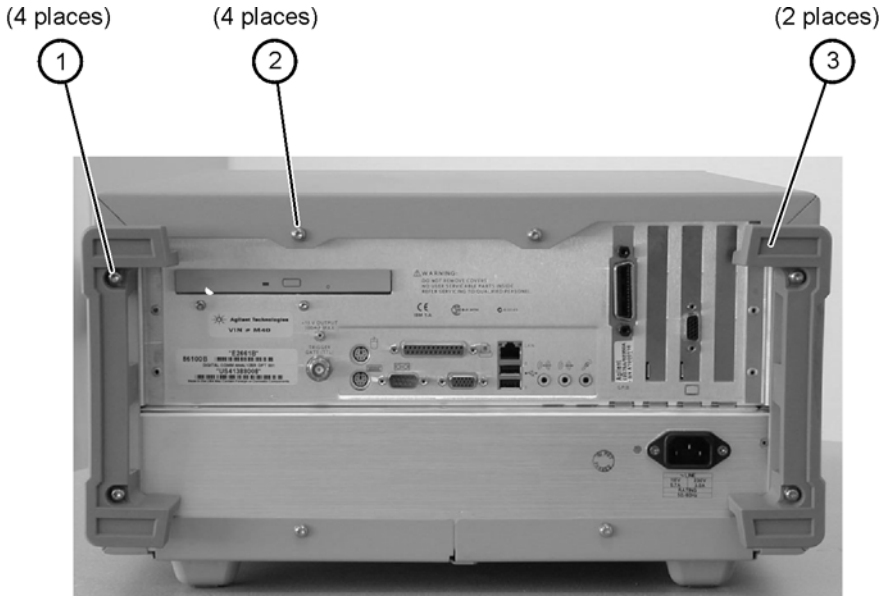
Item	Description	Quantity	Agilent Part Number
1	Speaker	1	86100-60022
2	Cover, Speaker	1	A2095-00009
3	Screw	1	0515-0372
4	Screw	2	0515-1410
5	Switch, 4PT, 3.5 mm 15V (Option 001 only)	1	E2660-68707
6	Switch, Trigger Select	1	87104-60001
7	Screw (Option 001 only)	4	0515-0372
8	Screw	1	0515-0663
9	Screw	2	0515-2691
10	Bracket, Fan	1	86100-00005
11	Screw	2	0515-0372


2 places
4 places
2 places
4
5
6
7
8
9
3
10
1
2
11
2 places

Rear View Identification

Table 9-5. Rear View Identification

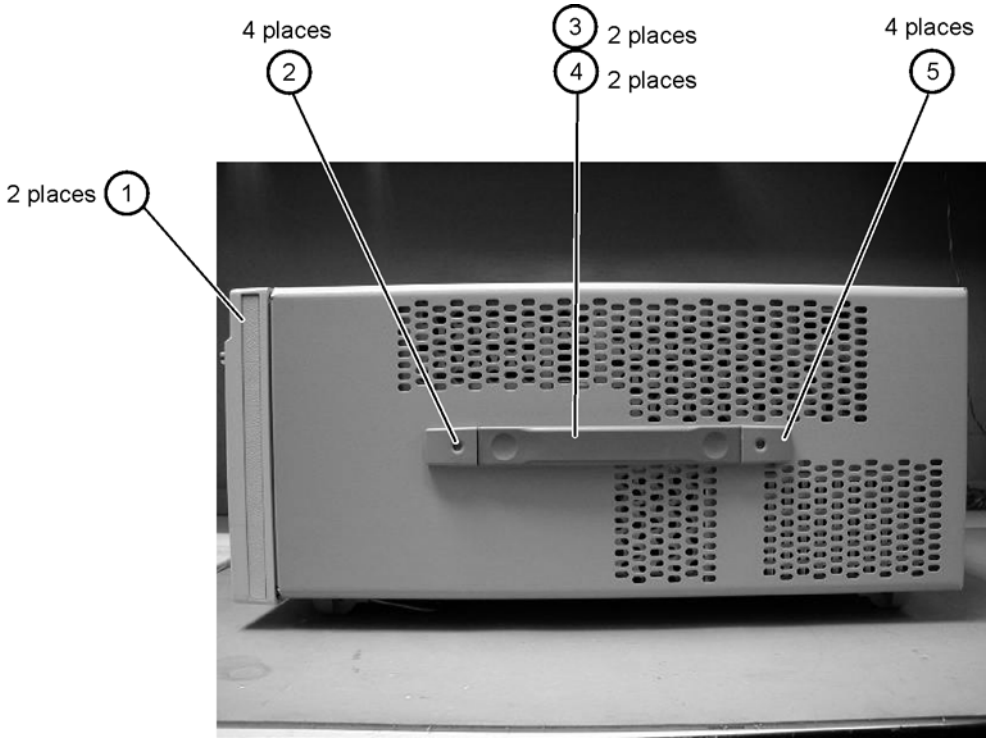
Item	Description	Quantity	Agilent Part Number
1	Screw	4	0515-2195
2	Screw	4	0515-0433
3	Foot	2	5042-1753



Left and Right Side Identification

Table 9-6. Left and Right Side Identification

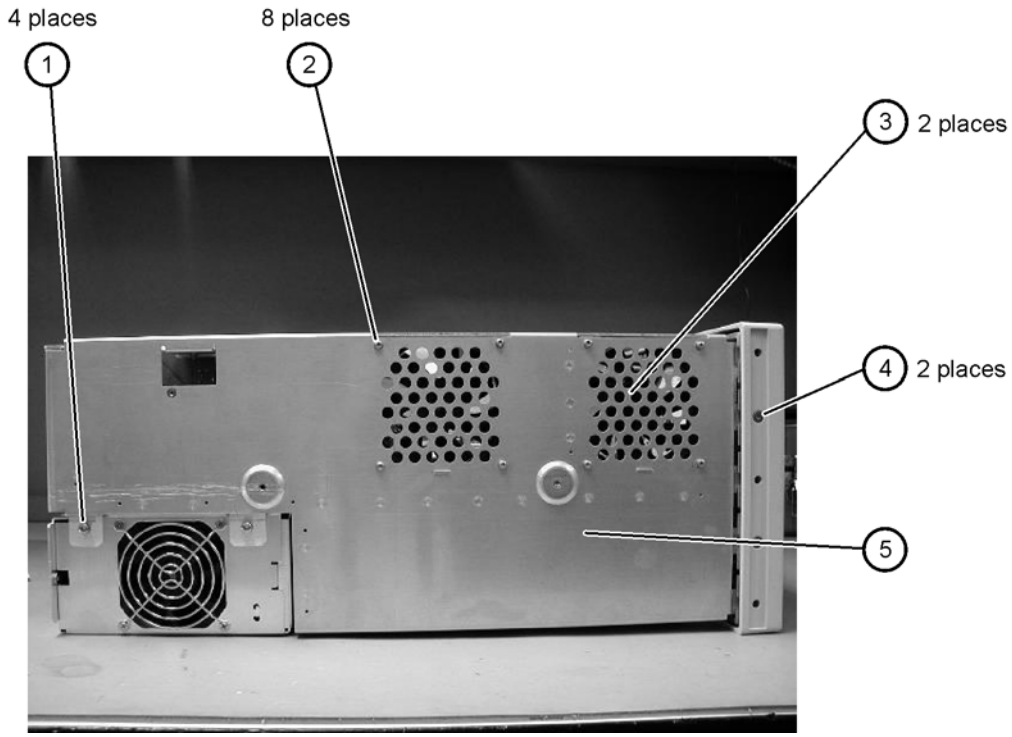
Item	Description	Quantity	Agilent Part Number
1	Trim Strip	2	5041-9173
2	Screw	4	5021-4308
3	Molded Handle	2	54810-44901
4	Retainer Strip	2	54801-24702
5	Handle End Cap	4	54810-45001



Left Side, Cover Removed, Identification

Table 9-7. Left Side, Cover Removed, Identification

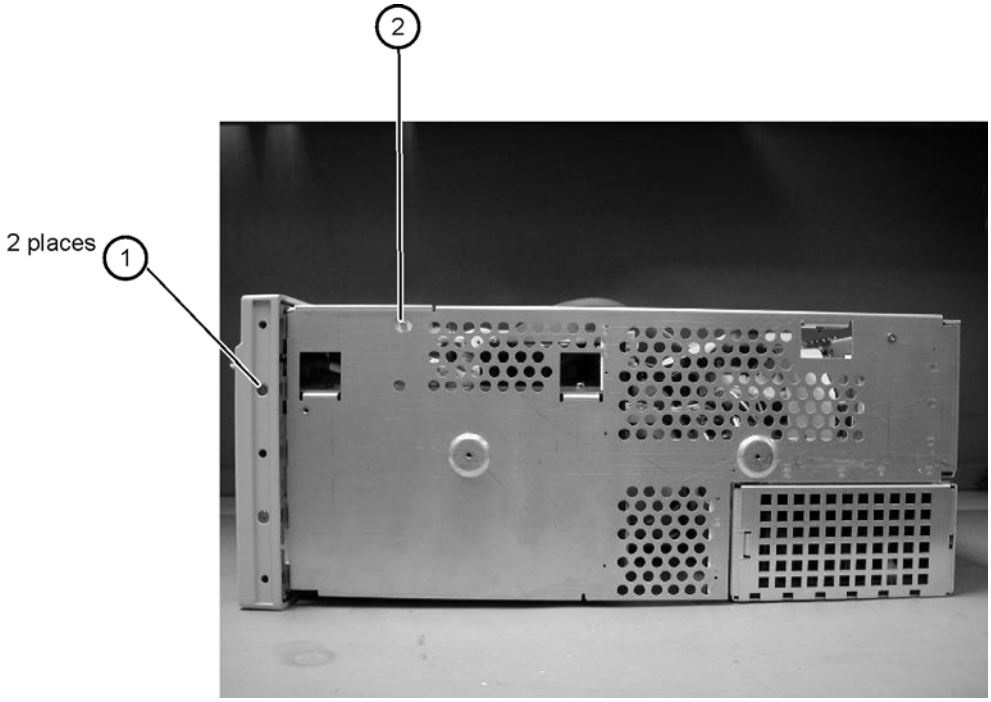
Item	Description	Quantity	Agilent Part Number
1	Screw	4	0515-0380
2	Screw	8	0515-1352
3	Fan, 90 mm	2	3160-4132
4	Screw	2	0515-2044
5	Chassis	1	86100-00031



Right Side, Cover Removed, Identification

Table 9-8. Right Side, Cover Removed, Identification

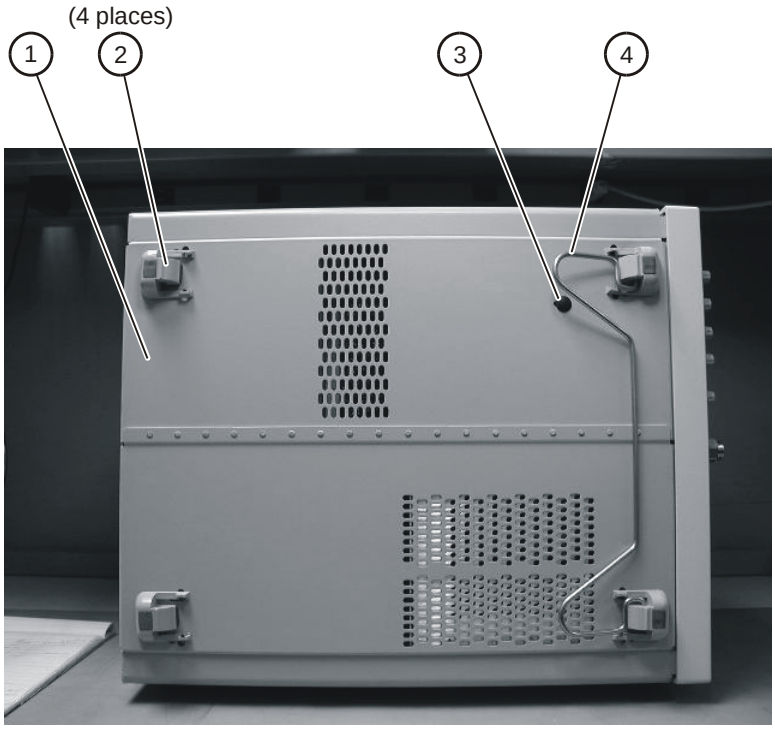
Item	Description	Quantity	Agilent Part Number
1	Screw	2	0515-2044
2	Screw	1	0515-2691



Bottom View Identification

Table 9-9. Bottom View Identification

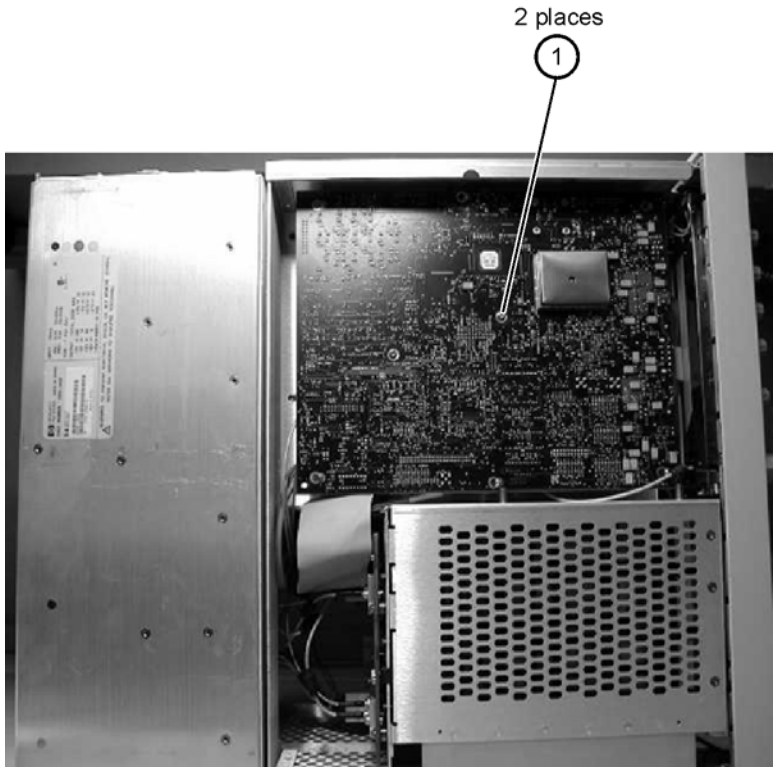
Item	Description	Quantity	Agilent Part Number
1	Cover	1	86100-00032
2	Foot	4	54810-61001
3	Hole Plug	1	86100-60024
4	Tilt Stand	1	86100-20030



Bottom View, Cover Removed, Identification

Table 9-10. Bottom View, Cover Removed, Identification

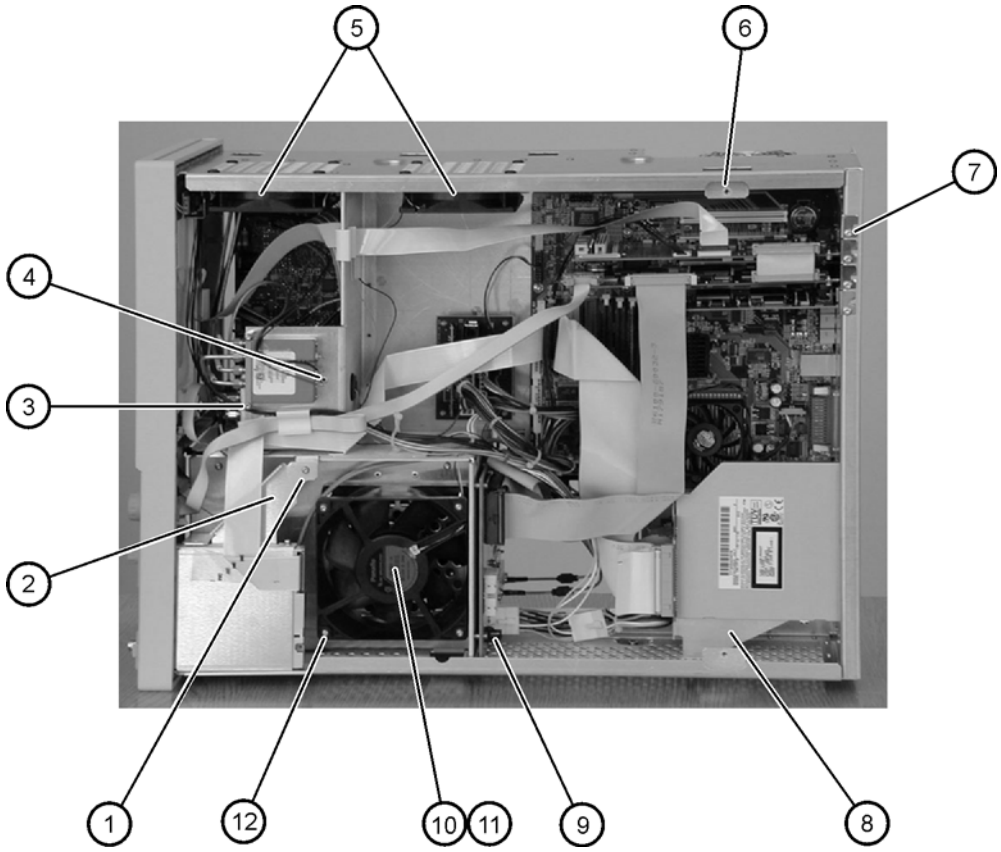
Item	Description	Quantity	Agilent Part Number
1	Screw	2	0515-0372



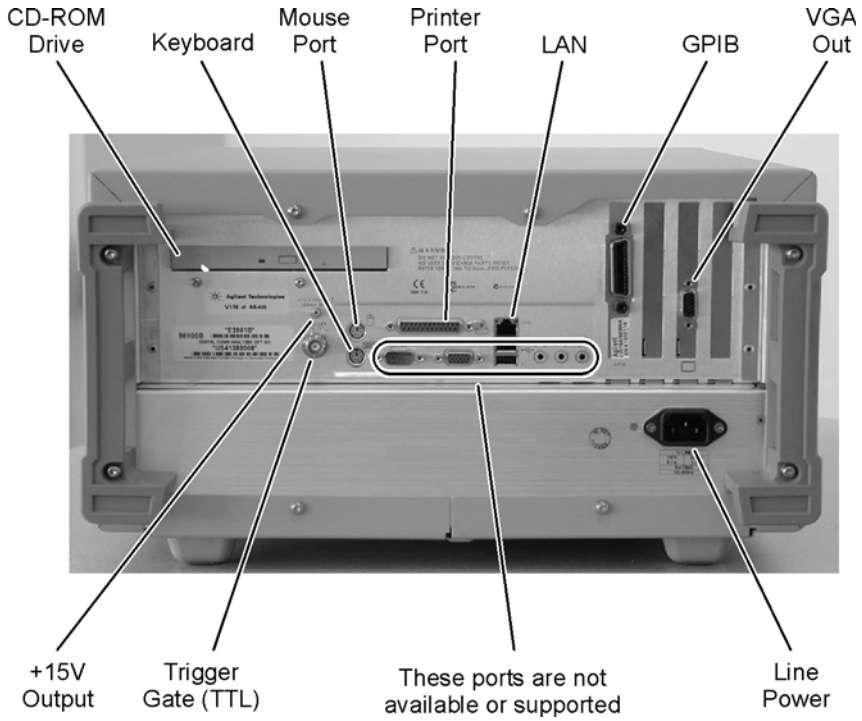
Top View, Cover Removed, Identification

Table 9-11. Top View, Cover Removed, Identification

Item	Description	Quantity	Agilent Part Number
1	Screw	1	0515-0430
2	Floppy Disk Bracket	1	86100-00028
3	Screw	2	0515-1410
4	Screw	1	0515-0372
5	Fan, 90 mm	2	3160-4132
6	Screw	2	0515-0372
7	Screw	4	0624-0643
8	CD-Rom Bracket	1	86100-00027
9	Screw	2	0515-0372
10	Fan, 120 mm	1	3160-0917
11	Fan Bracket	1	86100-00026
12	Screw	4	0515-1349

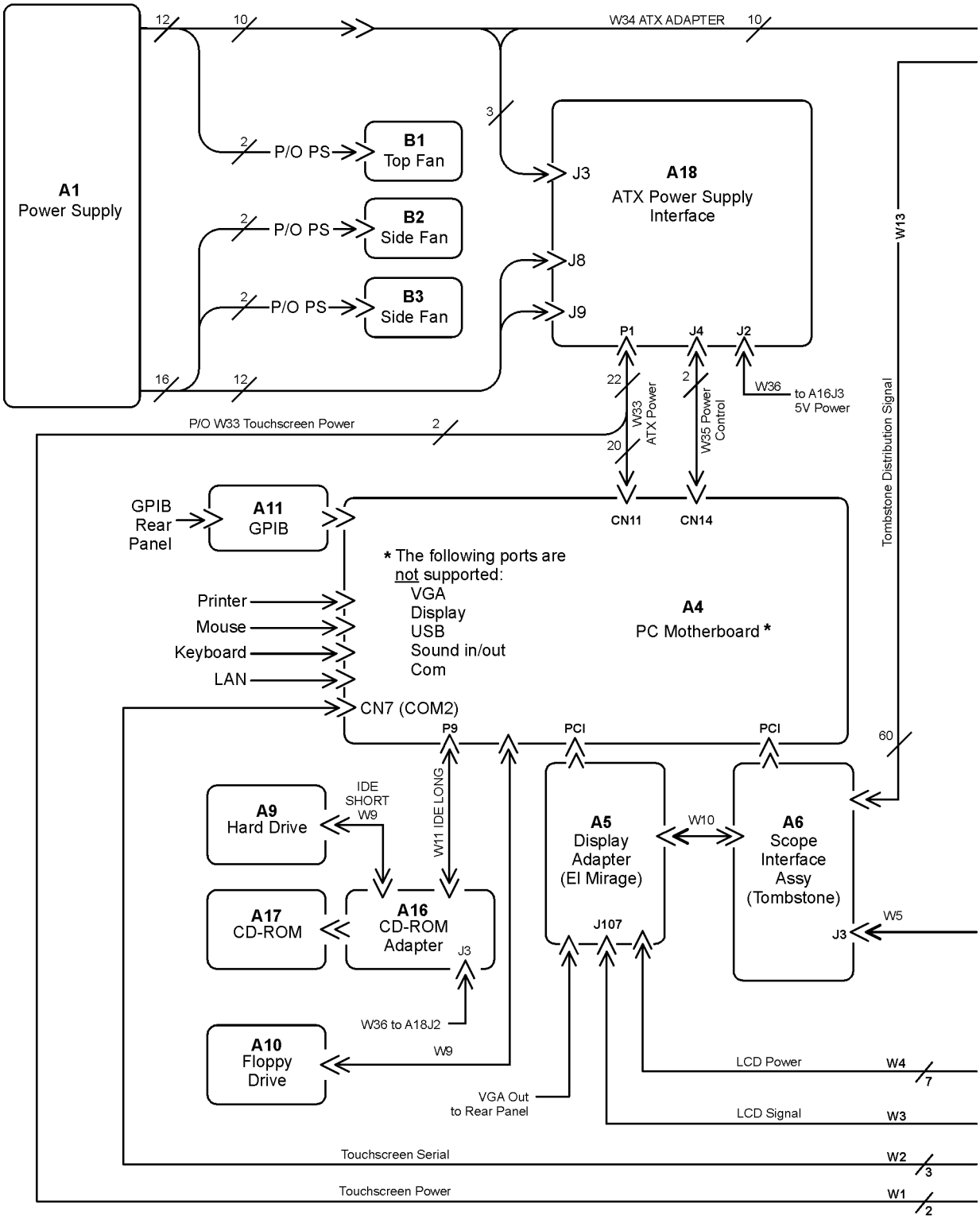

5
6
7
4
3
2
1
12
10
11
9
8

Rear Panel Identification

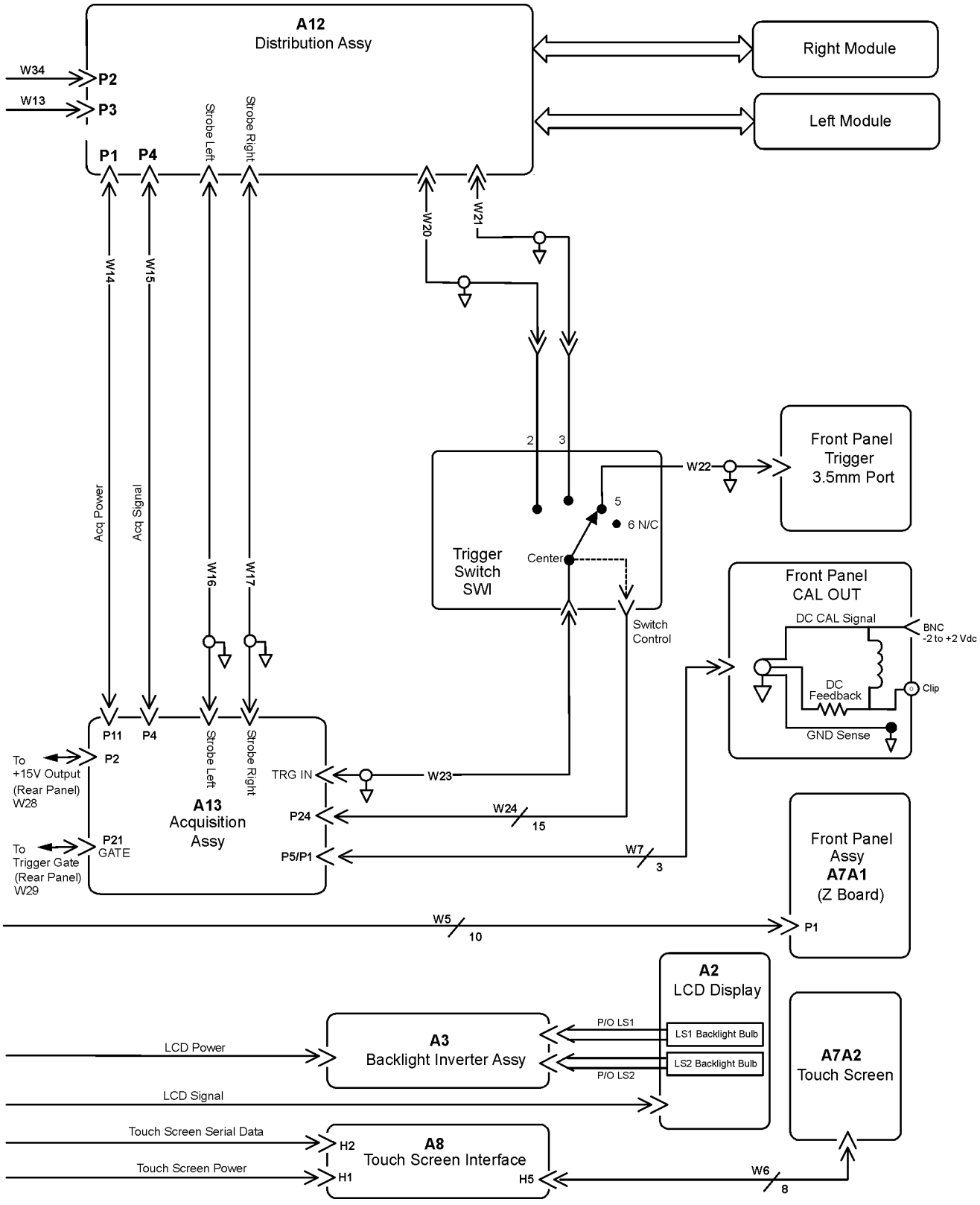


Block Diagrams

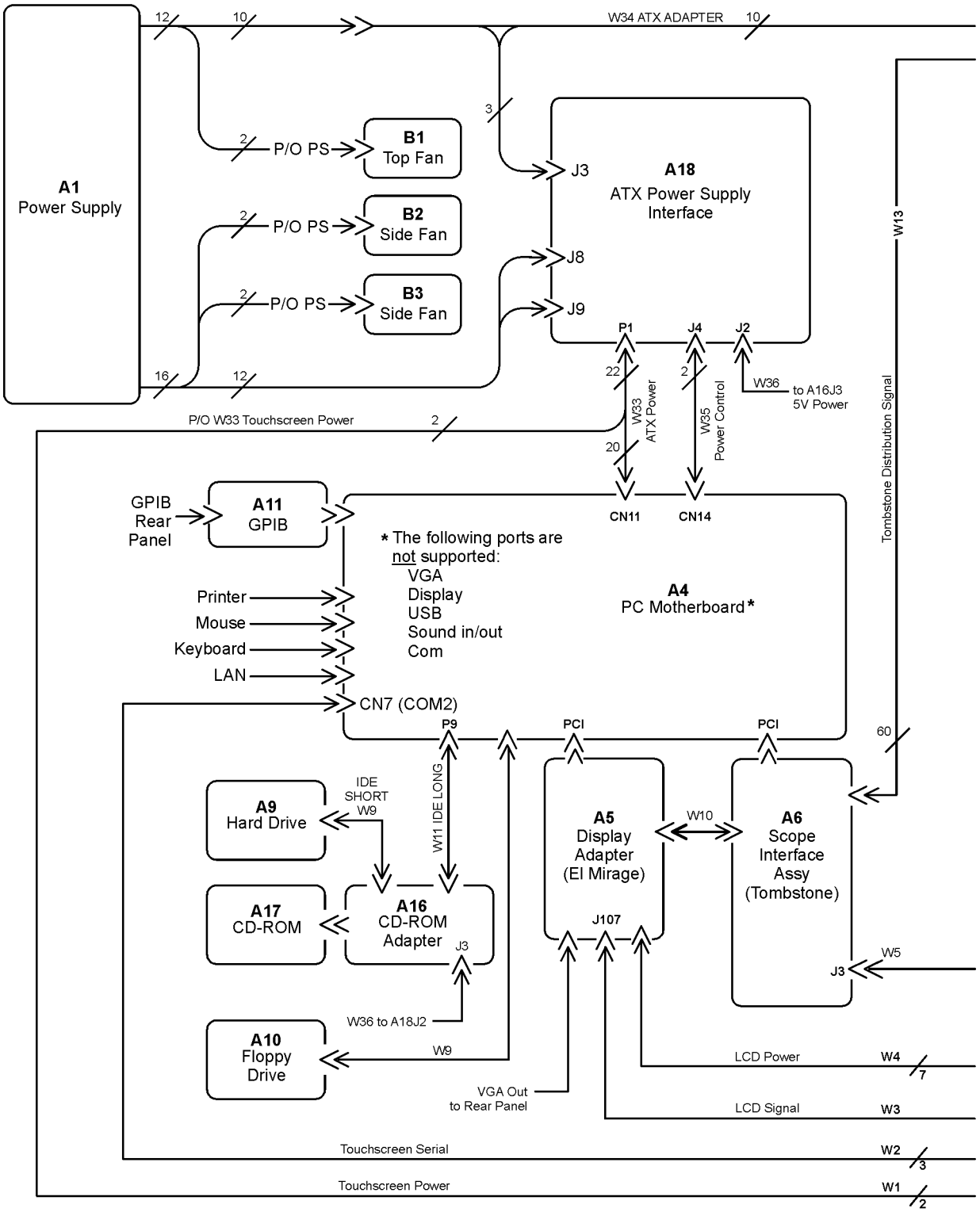
The following pages contain block diagrams of both the Standard and the Option 001 86100B Digital Communications Analyzer.



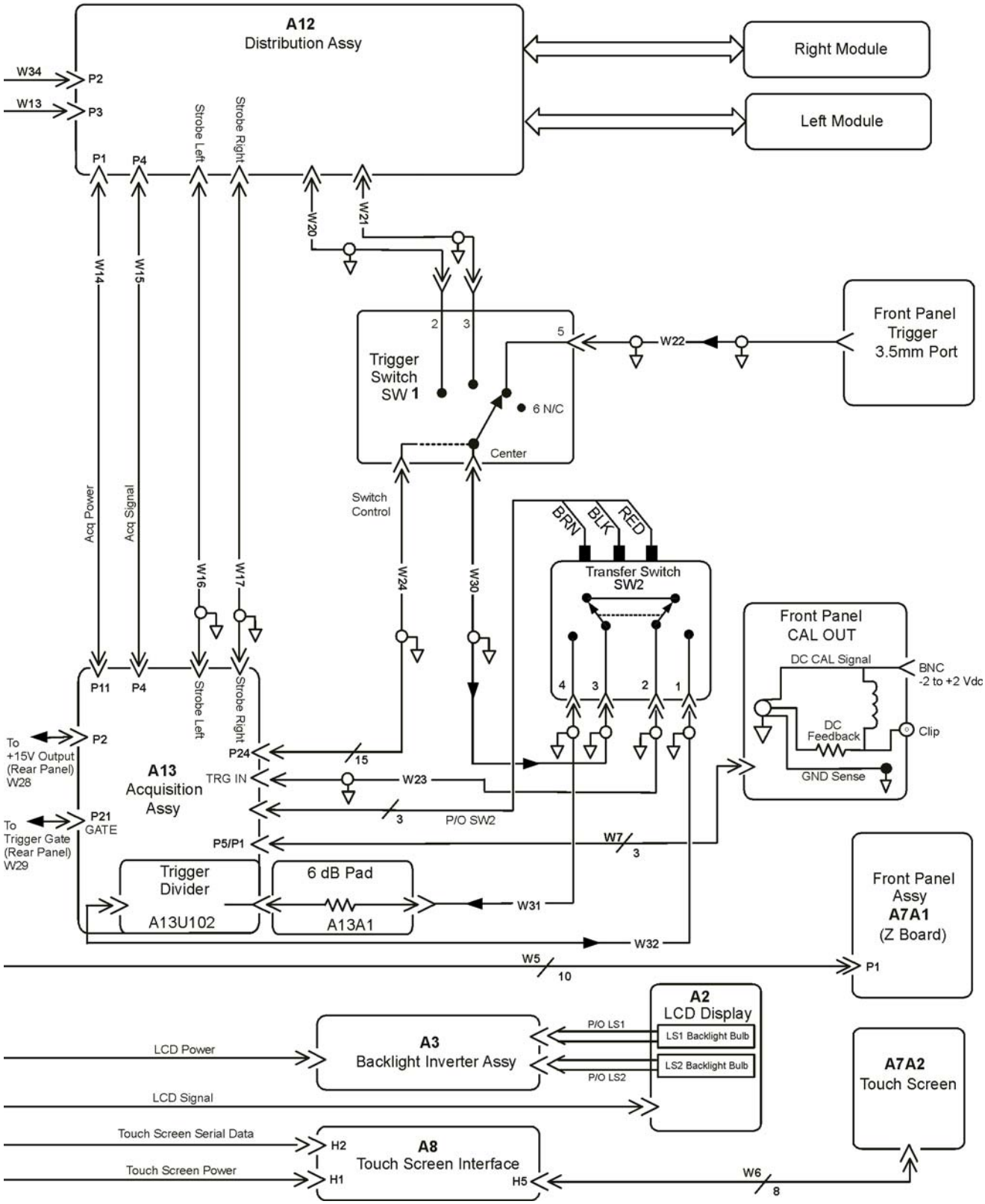
86100B Block Diagram (1 of 2)



86100B Block Diagram (2 of 2)



86100B Option 001 Block Diagram (1 of 2)



86100B Option 001 Block Diagram (2 of 2)

10

Replaceable Parts—86100C

Introduction

In this section, you'll find tables that identify each mechanical and electrical assembly in the Agilent 86100C mainframe. An Agilent part number is provided for each available part.

NOTE The 86100A is shown in some of the following identification diagrams. Although some of the components are not the same as the 86100C, part and assembly locations are very close.

Part Ordering Information
Only major assemblies can be replaced. To order an assembly, quote the Agilent part number, and indicate the quantity required.

Assemblies can be ordered from the nearest Agilent office. Customers within the USA can also use either the direct mail-order system or the direct phone-order system described below. The direct phone-order system has a toll-free phone number available.

Direct Mail-Order System
Within the USA, Agilent can supply parts through a direct mail-order system. Advantages of using the system are as follows:

- Direct ordering and shipment from Agilent
- No maximum or minimum on any mail order. (There is a minimum order amount for parts ordered through a local Agilent office when the orders require billing and invoicing.)
- Prepaid transportation. (There is a small handling charge for each order.)
- No invoices

To provide these advantages, a check or money order must accompany each order. Mail-order forms and specific ordering information are available through your local Agilent office.

Direct Phone-Order System
The toll-free phone number, (800) 227-8164, is available Monday through Friday, 6 am to 5 pm (Pacific time). Regular orders have a 4-day delivery time.

Major Assembly and Cable Location

Table 10-1. Major Assembly and Cable Identification (1 of 3)

Ref Des	Description	Agilent Part Number
A1	Power Supply	
	Serial prefix MY4652 and below	0950-3499
	Serial prefix MY4744 and above	0950-4996
A2	Flat Panel Display	
	Serial number MY45030706 and below or in the range MY45030712 through MY45030715. Ordering 2090-0396 is preferable to the 86100-60126 retrofit kit.	2090-0396 (or 86100-60126 retrofit kit)
	Serial number MY4503707 and above except within the range MY4503712 through MY4503715.	2097-0897
A2DS1/2	Backlight Bulb	2090-0365
A3	Backlight Inverter	0950-2888
A4	PC Motherboard	0960-2568
A4B1	Battery	1420-0356
A4A1,2	Motherboard Memory	1818-8783
A4F1	Microprocessor Fan Assembly with Heat Sink	3160-4122
A5	Display Adapter (El Mirage)	54810-66525
A5J103	Zip Cable Clip (part of J103 and W3)	1253-5093
A6	Scope Interface (Tombstone)	54810-66529
A6B1	Battery	1420-0390
A7	Front Panel Assembly	86100-60051
A7A1	Front Panel Keyboard (Z Board)	86100-63098
A7A2	Touch Screen Serial number MY45031195 and above except within the range MY45031201 through MY45031208. Serial number MY45031194 and below and within the range MY45031201 through MY45031208.	 0960-2632 1000-1013

Table 10-1. Major Assembly and Cable Identification (2 of 3)

Ref Des	Description	Agilent Part Number
A8	Touch Screen Interface (controller)	
	Serial number MY46520101 and above	0960-2590
	Serial number MY45031518 and below. The 1150-7826 is no longer available. Replace with touch screen replacement kit, part number 86100-60134.	86100-60134
A9	Hard Drive with	
	Software Revision A.07.00 *(serial number MY46520101 and above).* Part number includes touchscreen controller drivers for 0960-2590 controller.	86100-10065
	Software Revision A.06.00 *(serial number MY45031518 and below)* Part number includes touchscreen controller drivers for 1150-7826 controller.	86100-10059
A10	Not Used	N/A
A11	GP-IB	82350-66512
A12	Distribution	86100-66518
A13	Acquisition (Standard Option 701 and Option 001)	86100-68078
A13	Acquisition Rebuilt (Standard Option 701 and Option 001)	86100-69078
A14	Counter (Option 001)	86100-68079
A15	Limiter	N9355-66002
A16	USB Assembly	86130-60054
A17	Not Used	N/A
A18	ATX Power Supply Interface	
	Serial prefix MY4652 and below	86100-63097
	Serial prefix MY4744 and above	86100-63100
SW1	Trigger Select Switch (round)	87104-60001
SW2	Transfer Switch (flat) (option 001)	E2660-68707
W1	Cable, Touch Screen Power (P/O W33; from A18P1 to A8H1)	86100-60073
W2	Cable, Touch Screen Serial (from A8H2 to A4CN7 COM2)	86100-60033
W3	Cable, LCD Signal (from A5J103 to A2)	86100-60017
W4	Cable, LCD Power (from A5J1 to A3)	86100-60020
W5	Cable, A6J3 to A7A1P1	86100-60008
W6	Cable, A8H5 to A7A2	86100-60072
W7	Cable, A13P5/P1 to front panel CAL connector	86100-60002
W8	Cable, IDE, A4 IDE1 to A9 Hard Drive	86100-60069
W10	Cable, jumper, A5J118 to A6J1	54801-61624
W13	Cable, Tombstone, A6J2 to A12P3	86100-60032
W14	Cable, A12P1 to A13P11	86100-60003

Table 10-1. Major Assembly and Cable Identification (3 of 3)

Ref Des	Description	Agilent Part Number
W15	Cable, A12P4 to A13P4	86100-60004
W16	Cable, RF bulkhead to A13 Strobe left	86100-60080
W17	Cable, RF bulkhead to A13 Strobe right	86100-60080
W20	Cable, SW1 port 2 to upper A12	86100-60080
W21	Cable, SW1 port 3 to upper A12	86100-60080
W22	Cable, SW1 port 5 to front panel trigger	86100-20052
W23	Cable, A13 TRG IN to SW1 center (SW2 P2 on Option 001)	86100-60064
W24	Cable, SW1 to A13P24 SRC SEL	86100-60011
W29	Cable, A13P21 to rear panel trigger gate	86100-20013
W30	Cable, SW1 center to SW2 P3 (Option 001)	86100-60058
W31	Cable, SW2 P4 to A14J2 Input (Option 001)	86100-20053
W32	Cable, SW2 P1 to A14J3 Output (Option 001)	86100-20053
W33	ATX Power, A18P1 to A14 CN11	86100-60073
W34	ATX Adapter, PS harness to A12P2	86100-60041
W35	Power ON/OFF Control, A7A1J2 to A4CN14	86100-60070
W36	Counter Power, A18P4 to A14P2	86100-60071
W37	USB Cable, A16P1 to A4USB CH. 2	86100-60068

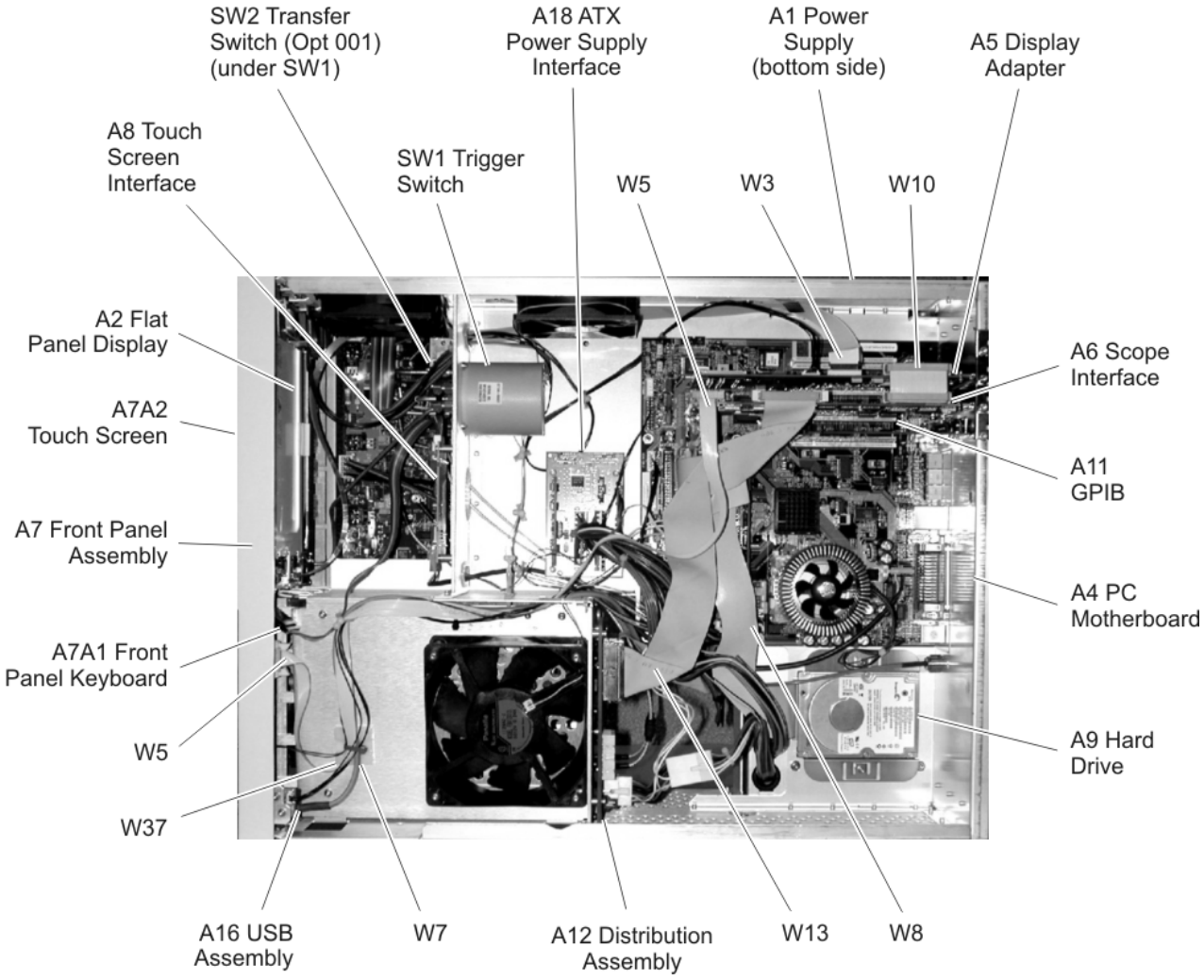
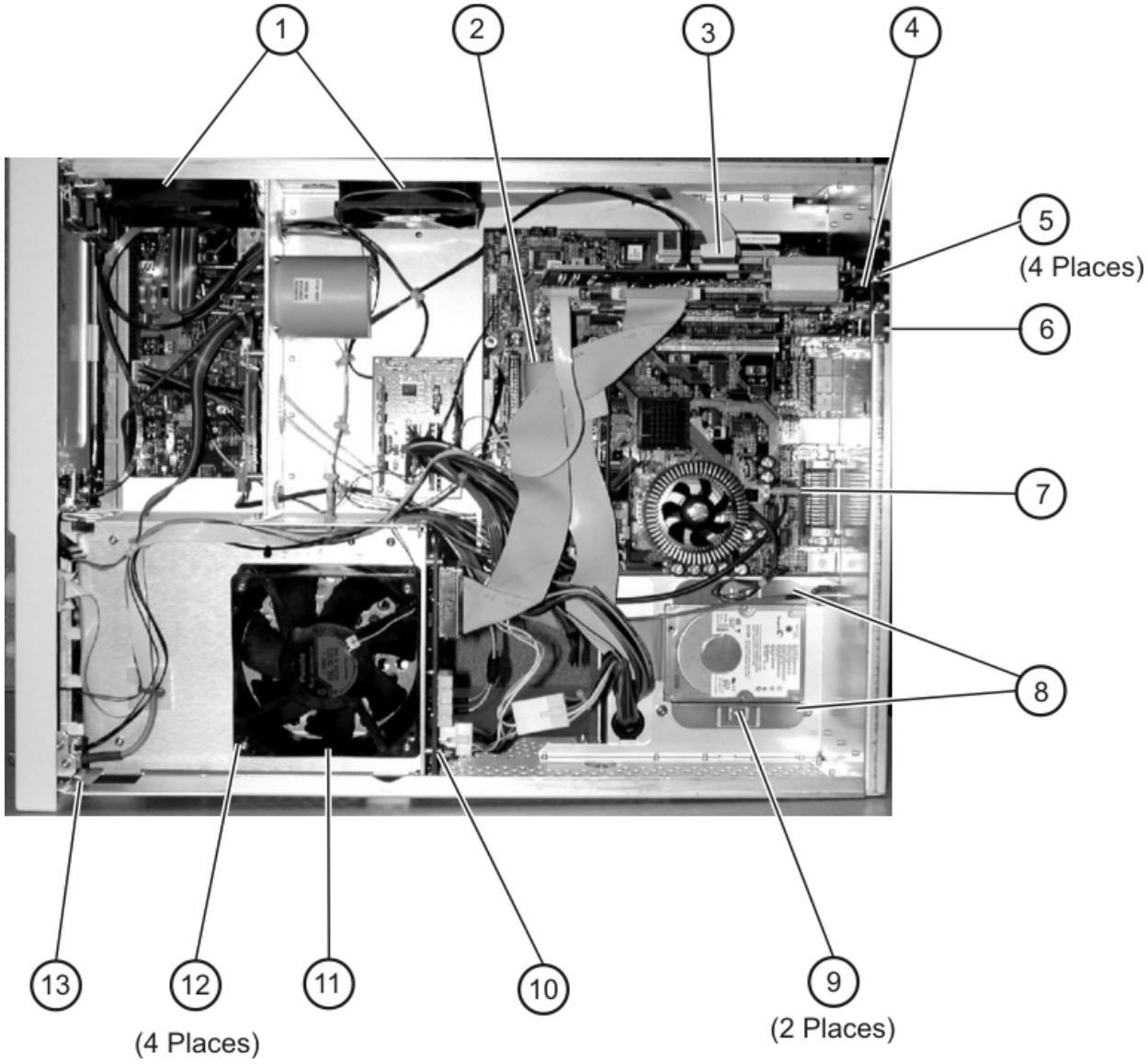


Figure 10-1. 86100C Major Assembly and Cable Location

Top View, Cover Removed, Identification

Table 10-2. Top View, Cover Removed, Identification

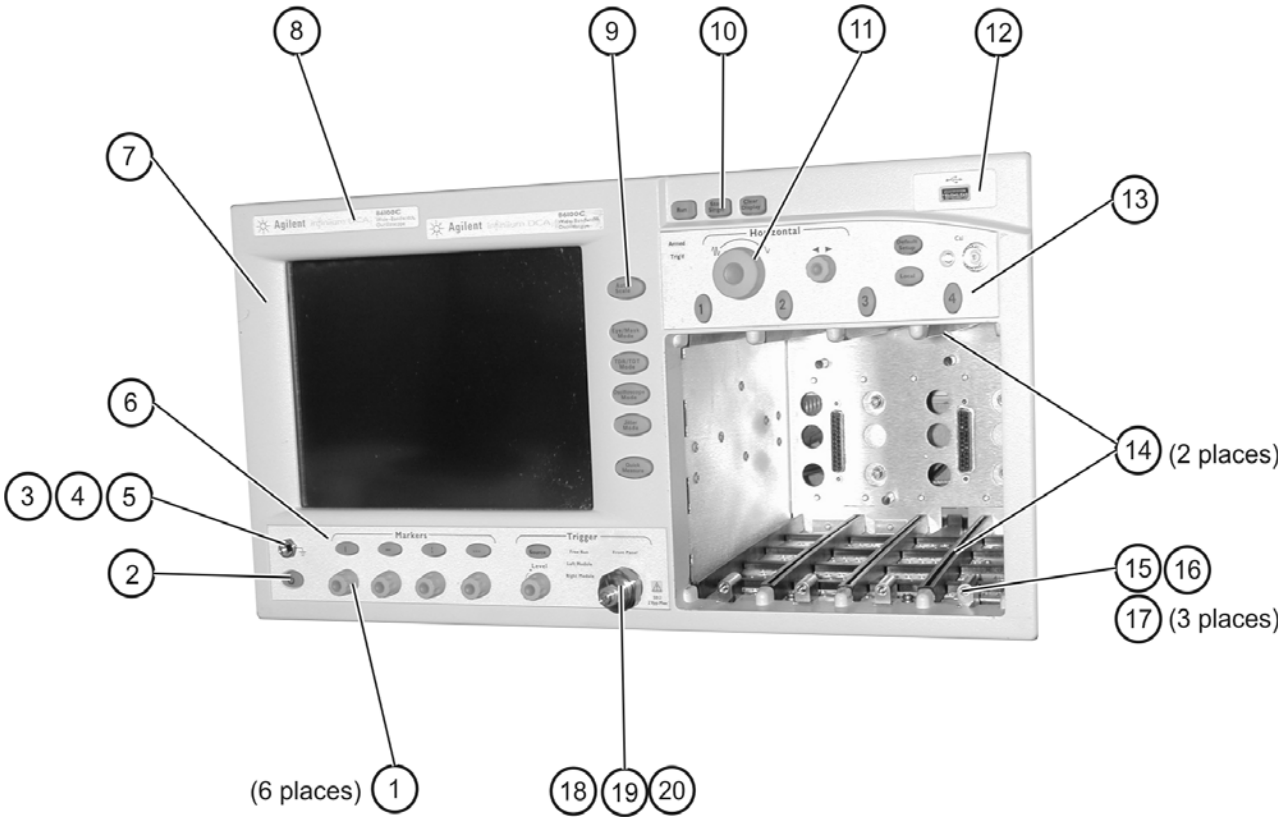
Item	Description	Quantity	Agilent Part Number
1	Fan, 90 mm	2	3160-4132
2	Cable Clip	1	1252-7017
3	Cable Clip	1	1253-5093
4	PCI Bracket (not shown)	1	86100-00043
5	PCI Sheet Metal Screws	4	0624-0847
6	ISA Filler Plate	2	1400-2120
7	Cable Clip	1	1252-7513
8	Hard Drive Bracket	2	86100-20051
9	HD Bracket Screws	2	0515-0372
10	Screws	6	0515-0372
11	Fan, 120 mm	1	3160-0917
12	Screws, Fan	4	0515-1352
13	USB Bracket	1	86100-00042

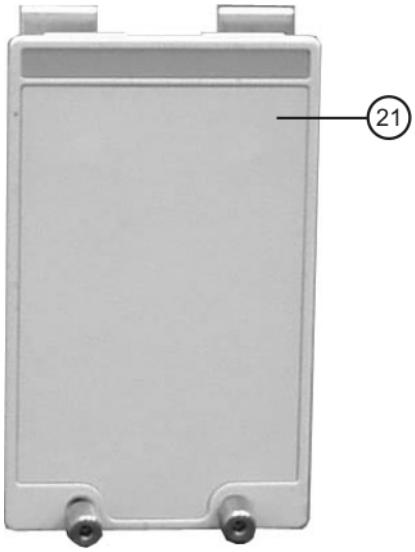

1
2
3
4
5
(4 Places)
6
7
8
9
(2 Places)
10
11
12
(4 Places)
13

Front View Identification

Table 10-3. Front View Identification

Item	Description	Quantity	Agilent Part Number
1	Knob, 12 mm	6	86100-47402
2	Lower cursor keypad	1	86100-40002
3	Ground lug	1	54542-26101
4	Washer	1	2190-0027
5	Nut	1	2950-0072
6	Lower front panel overlay	1	86100-60063
7	Front frame	1	86100-20042
8	Nameplate	1	86100-80019
9	Middle cursor keypad	1	86100-40006
10	Upper cursor keypad	1	86100-40001
11	Knob, 24 mm	1	86100-47401
12	USB overlay	1	86100-80021
13	Upper front panel overlay	1	86100-60014
14	Module rail	2	54710-43101
15	Copper spring	1	86100-20049
16	Module anchor	1	86100-20054
17	Screw	3	0515-0430
18	SM 3.5 mm connector	1	5062-1247
19	Washer, lock	1	2190-0104
20	Nut	1	2950-0132
21	Filler Panel	2	86101-60005


8
9
10
11
12
7
13
6
14 (2 places)
3 4 5
2
15 16
17 (3 places)
(6 places) 1
18 19 20

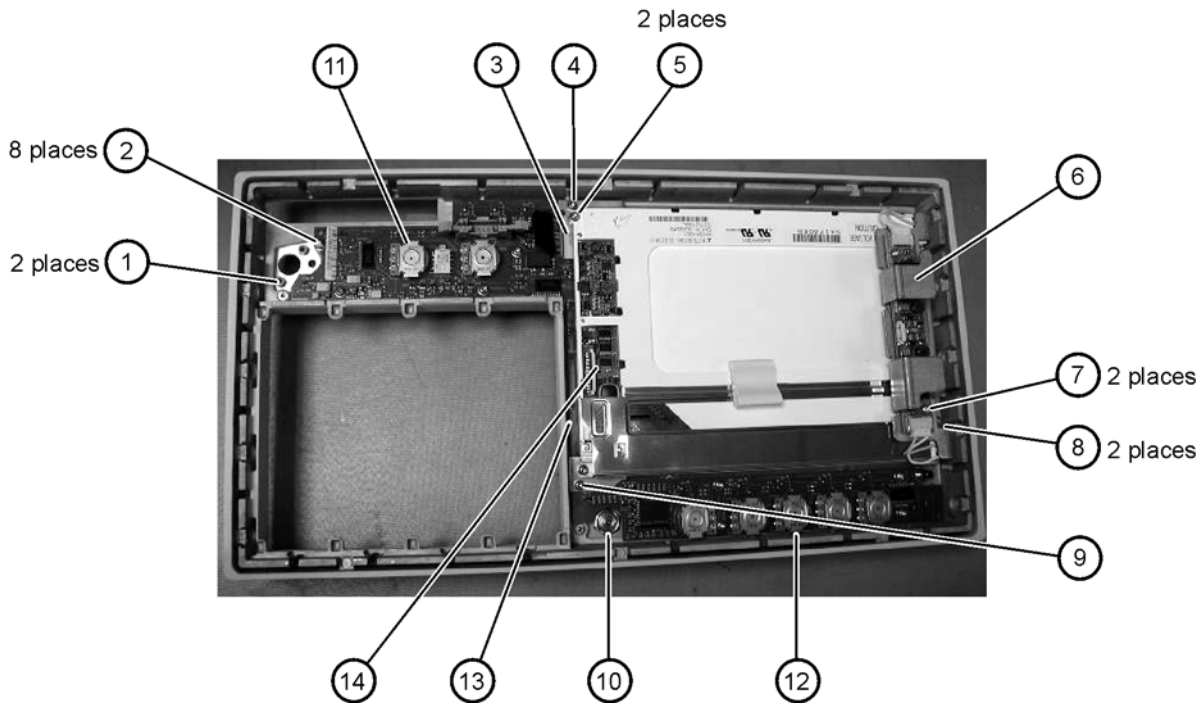

21

Front Inside Panel Identification

Table 10-4. Front Inside Panel Identification

Item	Description	Quantity	Agilent Part Number
1	Screw	2	0515-0372
2	Screw	8	0515-0372
3	Bracket, Touch Screen	1	86100-00007
4	Screw	1	0515-0372
5	Screw	2	0515-0430
6	Bracket, Inverter	1	86100-00016
7	Screw	2	0515-1246
8	Screw	2	0515-0664
9	Screw	1	0515-0664
10	RF Connector	1	5062-1247
11	Keypad Upper	1	86100-40001
12	Keypad Lower	1	86100-40002
13	Keypad Middle	1	86100-40006
14	Zip Cable Clip	1	1253-5093

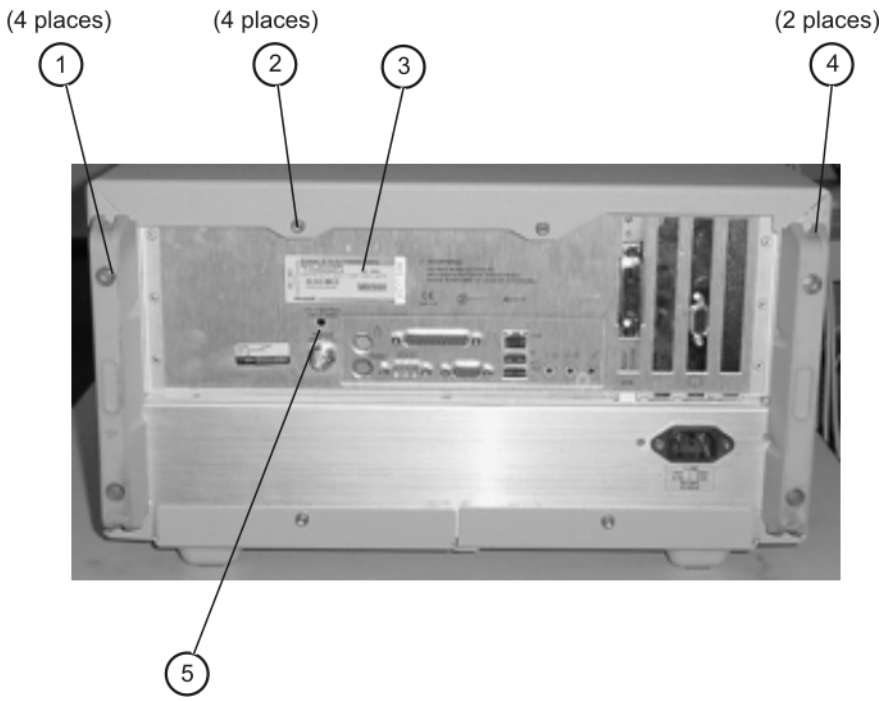
CAUTION The keypads are underneath the A7A1 keyboard.



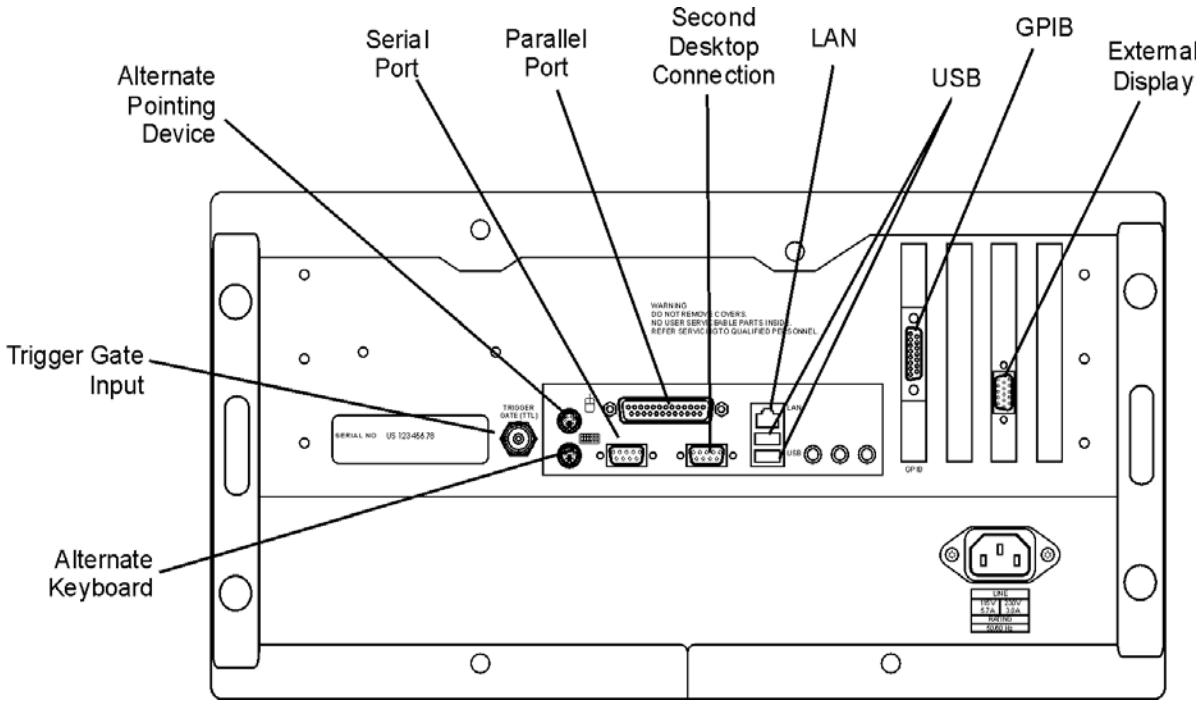
Rear View Identification

Table 10-5. Rear View Identification

Item	Description	Quantity	Agilent Part Number
1	Screw	4	0515-0456
2	Screw	4	0515-0433
3	Certificate of Authenticity	1	9010-0250
4	Foot	2	5042-1798
5	Hole Plug	1	6960-0059



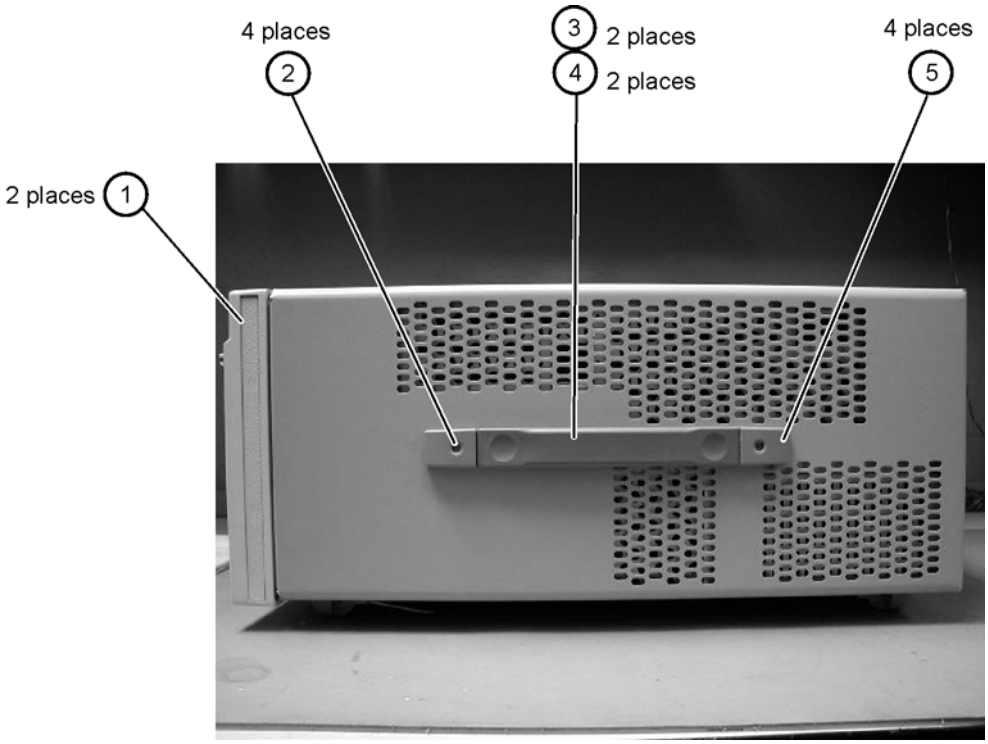
Rear Panel Identification



Left and Right Side Identification

Table 10-6. Left and Right Side Identification

Item	Description	Quantity	Agilent Part Number
1	Trim Strip	2	5041-9173
2	Screw	4	5021-4308
3	Molded Handle	2	54810-44901
4	Retainer Strip	2	54801-24702
5	Handle End Cap	4	54810-45001

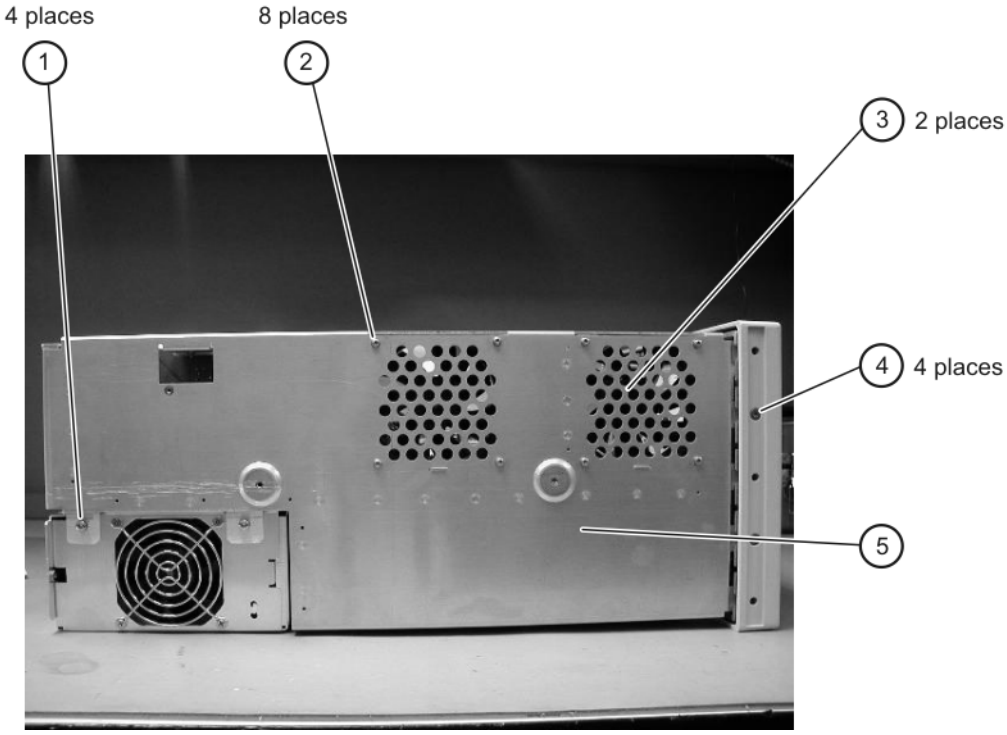


Left Side, Cover Removed, Identification

Table 10-7. Left Side, Cover Removed, Identification

Item	Description	Quantity	Agilent Part Number
1	Screw	4	0515-0380
2	Push fasteners	8	0361-1823
3	Fan, 90 mm	2	3160-4132
4	Screw	8 *	0515-2044
5	Chassis	1	86100-00040

*86100C uses 4 screws on the left side and 4 on the right side

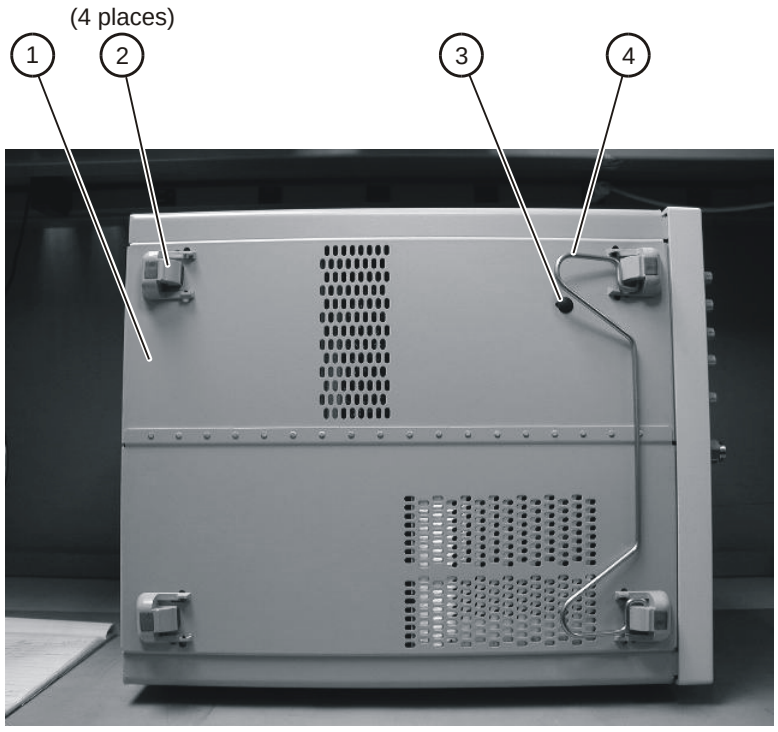


Bottom View Identification

Table 10-8. Bottom View Identification

Item	Description	Quantity	Agilent Part Number
1	Cover	1	86100-00032
2	Foot	4	54810-61001
3	Hole Plug	1	86100-60024
4	Tilt Stand **	1	86100-20030

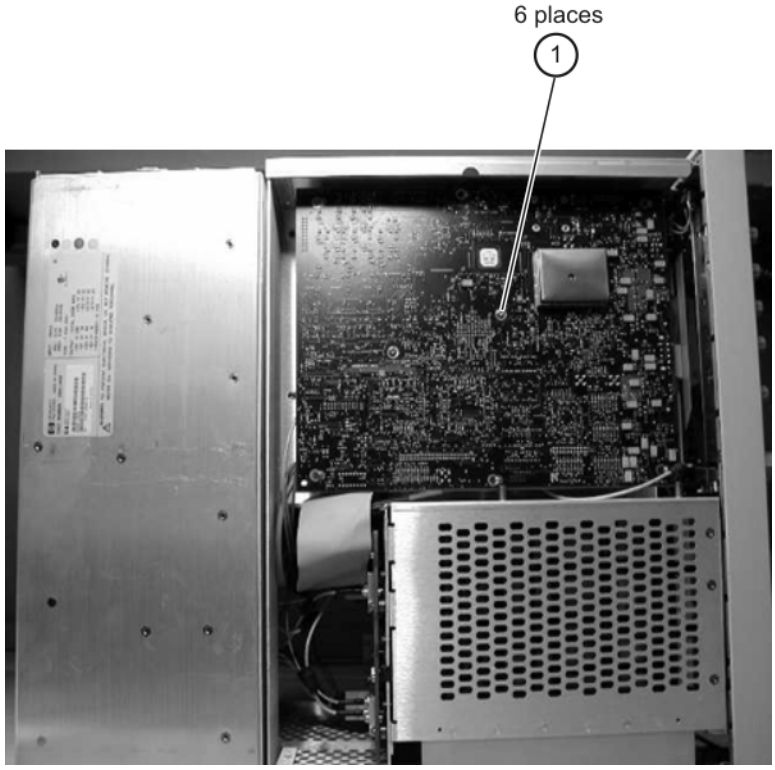
**Tilt stand does not ship with an 86100C



Bottom View, Cover Removed, Identification

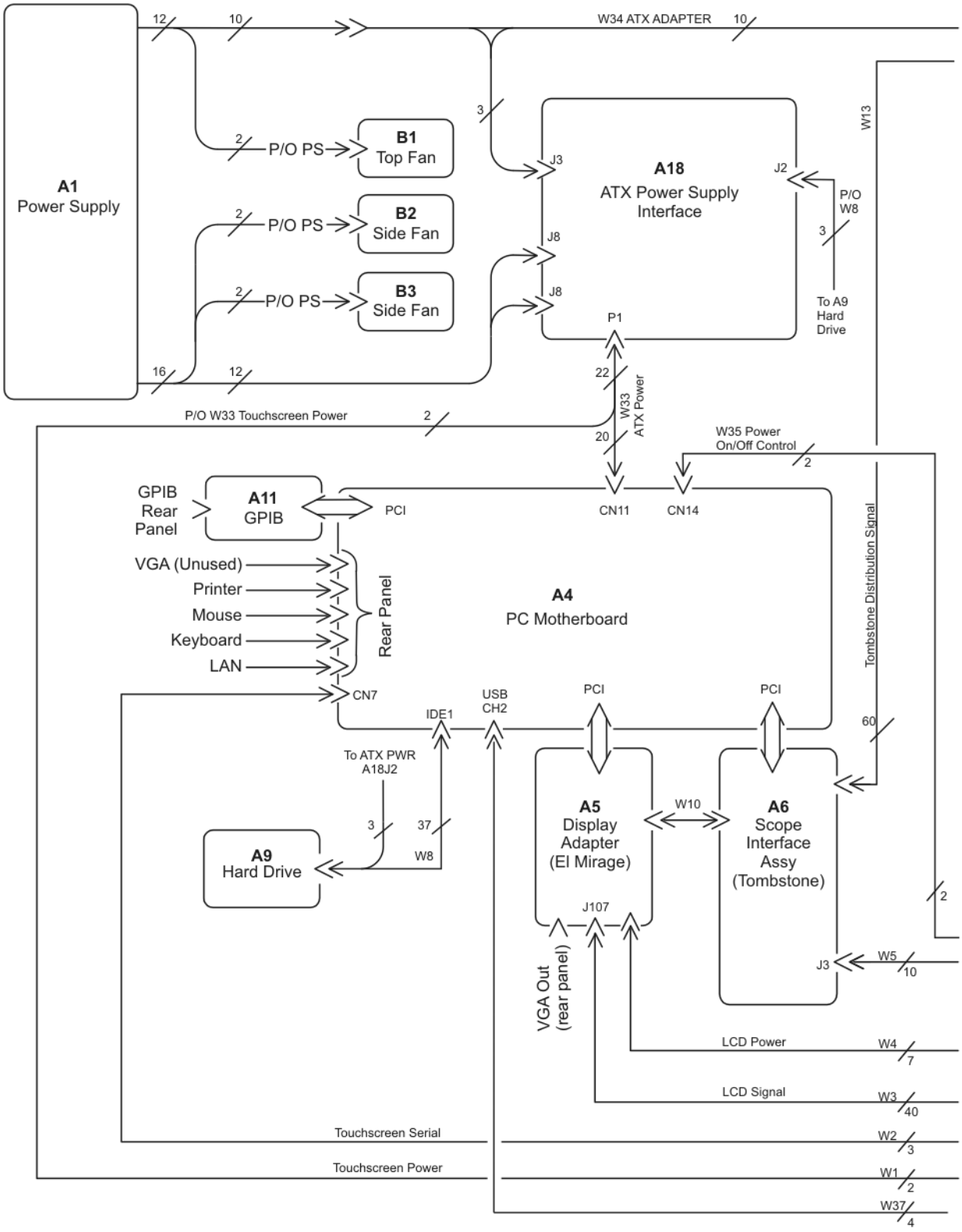
Table 10-9. Bottom View, Cover Removed, Identification

Item	Description	Quantity	Agilent Part Number
1	Screw	6	0515-0372

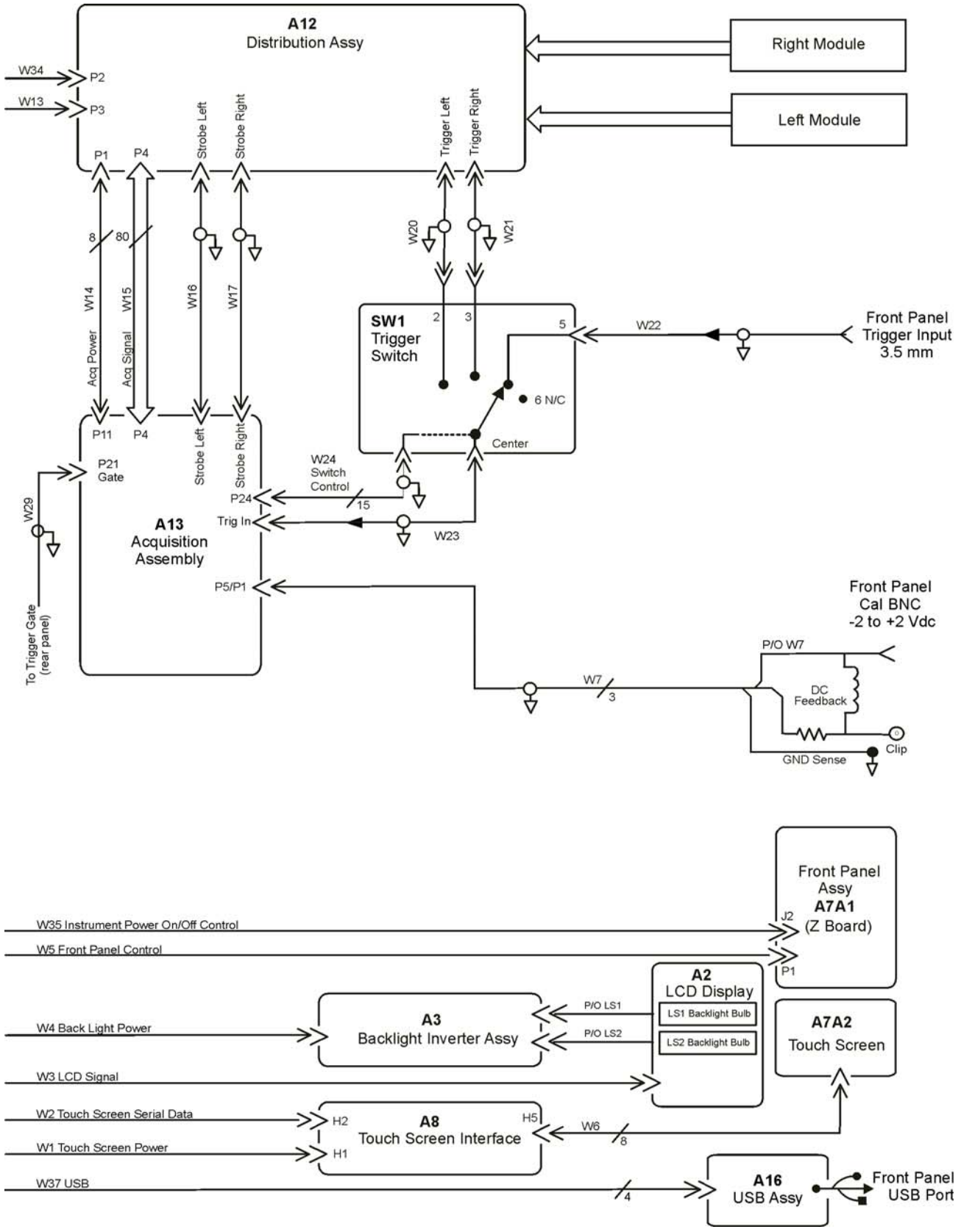


Block Diagrams

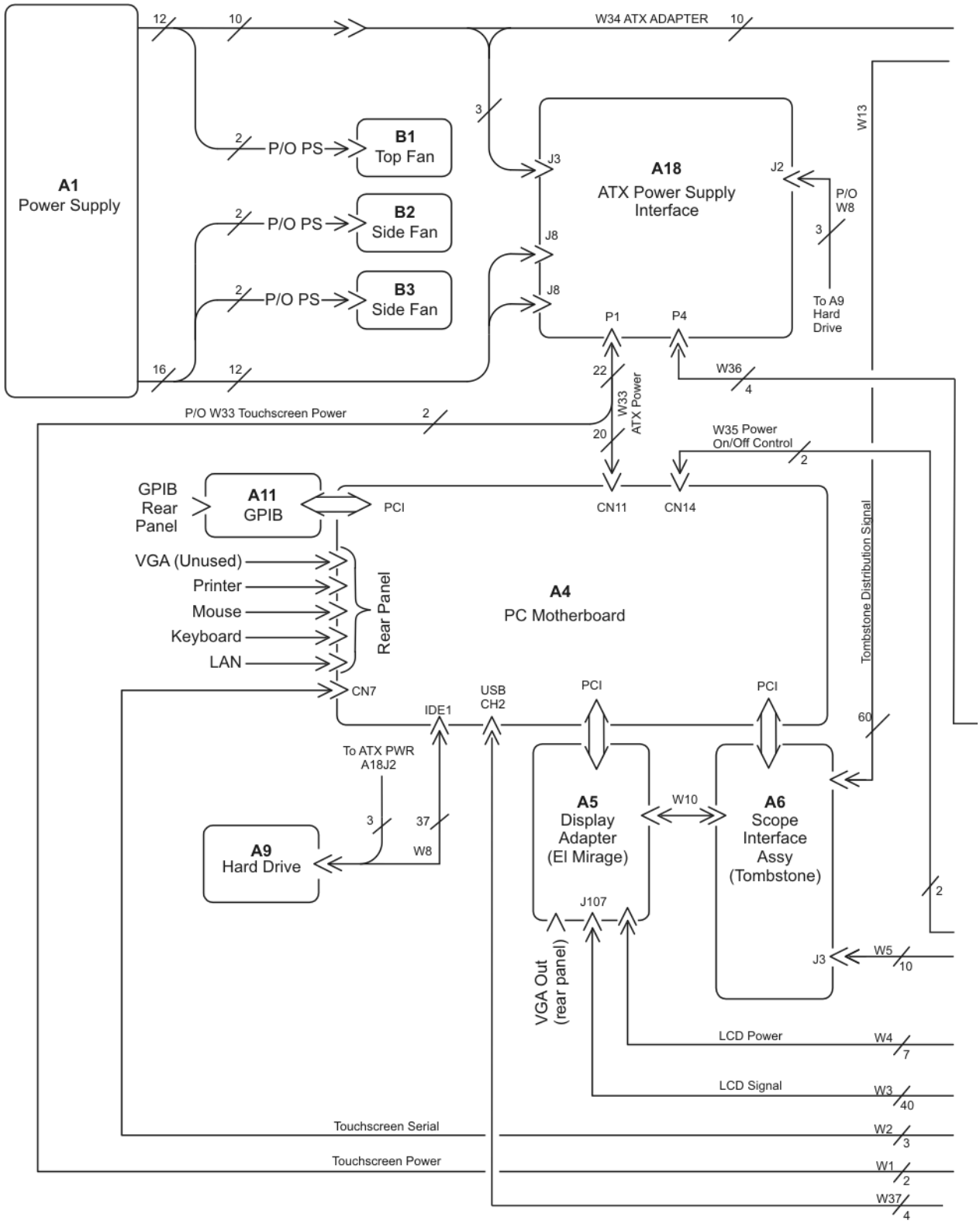
The following pages contain interconnect block diagrams of both the Standard and the Option 001 86100C Digital Communications Analyzer.



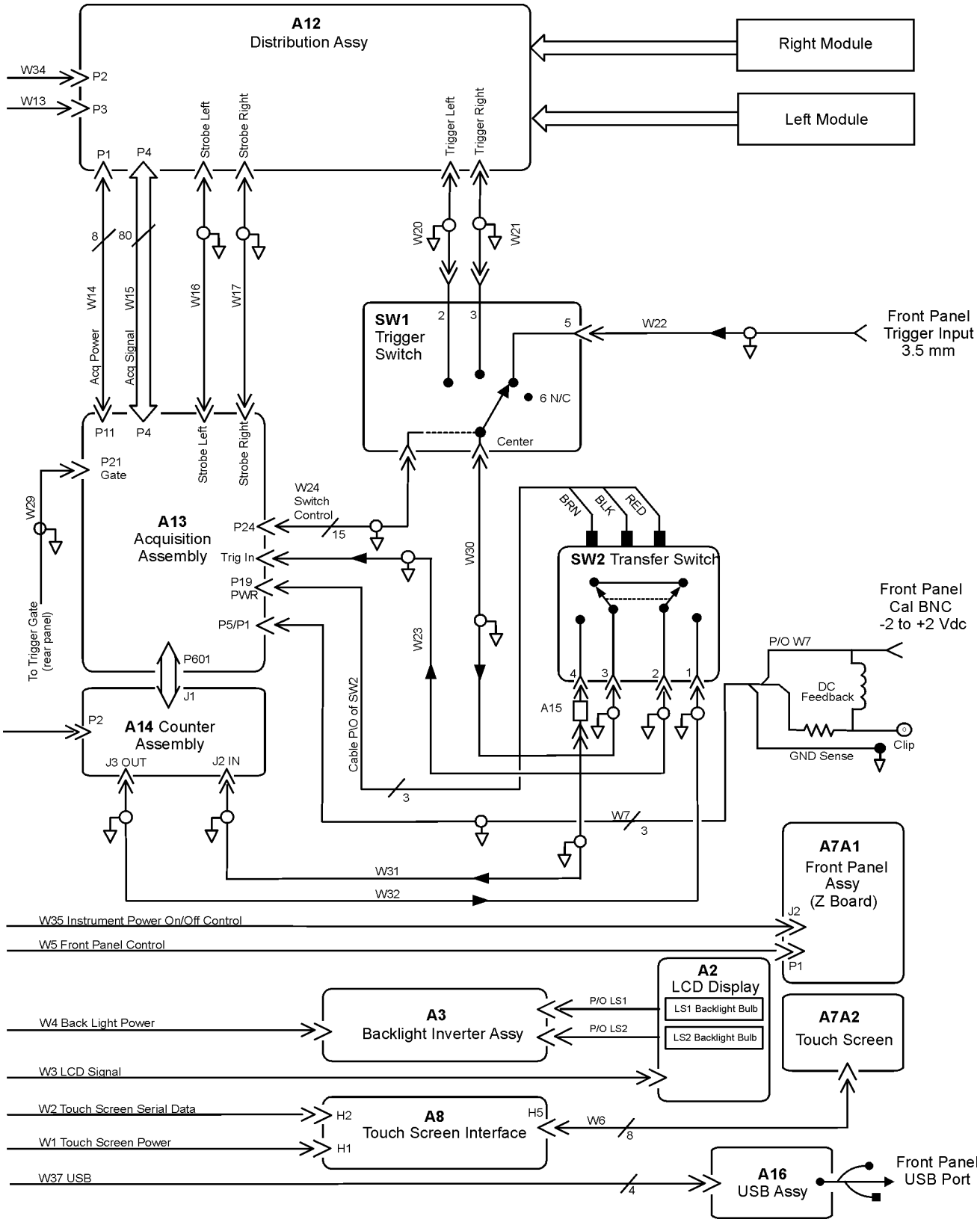
86100C Block Diagram (1 of 2)



86100C Block Diagram (2 of 2)



86100C Option 001 Block Diagram (1 of 2)



86100C Option 001 Block Diagram (2 of 2)

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