

# Notice

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## **Hewlett-Packard to Agilent Technologies Transition**

This documentation supports a product that previously shipped under the Hewlett-Packard company brand name. The brand name has now been changed to Agilent Technologies. The two products are functionally identical, only our name has changed. The document still includes references to Hewlett-Packard products, some of which have been transitioned to Agilent Technologies.



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Philippines	(632) 8426802 1-800-16510170 (PLDT Subscriber Only)	(632) 8426809 1-800-16510288 (PLDT Subscriber Only)
Thailand	(088) 226-008 (outside Bangkok) (662) 661-3999 (within Bangkok)	(66) 1-661-3714
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India	1-600-11-2929	000-800-650-1101

# **HP 8643A, HP 8644A/B, HP 8645A, HP 8664A, HP 8665A/B PERFORMANCE SIGNAL GENERATOR**

## **Assembly Level Repair**

### **SERIAL NUMBERS**

This manual applies directly to instruments with serial numbers prefixed:

HP 8643A: 3246A and below  
HP 8644A: 3203A and below  
HP 8644B: 3203A and below  
HP 8645A: 3203A and below  
HP 8664A: 3744A and below  
HP 8665A: 3744A and below  
HP 8665B: 3744A and below

For additional important information about serial numbers, refer to "INSTRUMENTS COVERED BY THIS MANUAL" in Section 1.

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## **CERTIFICATION**

*Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Bureau of Standards, to the extent allowed by the Bureau's calibration facility, and to the calibration facilities of other International Standards Organization members.*

## **WARRANTY**

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## SAFETY CONSIDERATIONS

### GENERAL

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

This product is a Safety Class I instrument (provided with a protective earth terminal).

### BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage and the correct fuse is installed.

### SAFETY EARTH GROUND

An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set.

### SAFETY SYMBOLS



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual (refer to Table of Contents.)



Indicates hazardous voltages.



Indicates earth (ground) terminal.

### WARNING

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

### CAUTION

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

### WARNING

*Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting the protective earth terminal will cause a potential shock hazard that could result in personal injury. (Grounding one conductor of a two conductor outlet is not sufficient protection).*

*Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.*

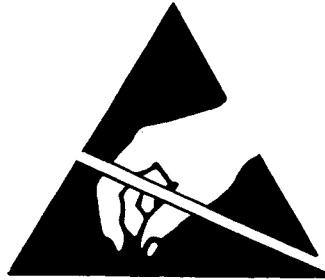
*If this instrument is to be energized via an autotransformer (for voltage reduction) make sure the common terminal is connected to the earth terminal of the power source.*

*Servicing instructions are for use by service trained personnel only. To avoid dangerous electric shock, do not perform any servicing unless qualified to do so.*

*Adjustments described in the manual are performed with power supplied to the instrument while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.*

*Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source of supply.*

*For continued protection against fire hazard, replace the line fuse(s) only with 250V fuse(s) of the same current rating and type (for example, normal blow, time delay, etc.) Do not use repaired fuses or short circuited fuseholders.*



**ATTENTION  
Static Sensitive  
Devices**

*This instrument was constructed in an ESD (electro-static discharge) protected environment. This is because most of the semi-conductor devices used in this instrument are susceptible to damage by static discharge.*

*Depending on the magnitude of the charge, device substrates can be punctured or destroyed by contact or mere proximity of a static charge. The results can cause degradation of device performance, early failure, or immediate destruction.*

*These charges are generated in numerous ways such as simple contact, separation of materials, and normal motions of persons working with static sensitive devices.*

*When handling or servicing equipment containing static sensitive devices, adequate precautions must be taken to prevent device damage or destruction.*

*Only those who are thoroughly familiar with industry accepted techniques for handling static sensitive devices should attempt to service circuitry with these devices.*

*In all instances, measures must be taken to prevent static charge build-up on work surfaces and persons handling the devices.*

# TABLE OF CONTENTS

## General Information

Introduction . . . . .	1-1
Safety Notes . . . . .	1-1
Using This Manual . . . . .	1-1
Error Messages . . . . .	1-1
Glossary . . . . .	1-2
ALR Manual Information . . . . .	1-4
Instruments Covered . . . . .	1-4
Documentation Updating . . . . .	1-4
On-Site Service Capability . . . . .	1-5
Service Kits . . . . .	1-5
HPIB Address Selection . . . . .	1-5
Power Requirements . . . . .	1-6
Power Cable Grounding Requirements . . . . .	1-6
Line Voltage . . . . .	1-6
Fuse Selection . . . . .	1-6

## Troubleshooting

Introduction . . . . .	2-1
Recommended Test Equipment . . . . .	2-2
Inoperative Instrument Troubleshooting . . . . .	2-3
Operation Requirements . . . . .	2-3
Symptoms . . . . .	2-3
DCU (Controller) Checks . . . . .	2-4
DCU Status Indicators Check . . . . .	2-4
DCU Voltage and Motherboard Check . . . . .	2-5
Front Panel Checks . . . . .	2-6
Front Panel Display and Keyboard Check . . . . .	2-6
Front Panel Display Check . . . . .	2-7
Front Panel LED Check . . . . .	2-8
RPG (KNOB) Check . . . . .	2-9
Front Panel-to-DCU I/O Signal Checks . . . . .	2-11
Conditions Not Covered by Diagnostics . . . . .	2-15
Introduction . . . . .	2-15
HP 8643/8644/8645 Known Output Power Failure: . . . . .	2-15
HP 8643/8644/8645 Known Pulse Failure: . . . . .	2-16
Non-specific Result Codes: . . . . .	2-16

**Running Diagnostics**

Introducing the Instrument Level Diagnostic . . . . . 2a-1

Assembly Replacement and Instrument Verification . . . . . 2a-2

    Setting Up the Instrument . . . . . 2a-3

    Activating the ILD and Reading the Result Code . . . . . 2a-4

    Interpreting the Result Code . . . . . 2a-5

    Locating the Correct Troubleshooting Information . . . . . 2a-6

    What Are the Diagnostics . . . . . 2a-7

        Conditions Not Covered by the Diagnostics . . . . . 2a-7

    How Do the Diagnostics Work? . . . . . 2a-7

Running the ILD . . . . . 2a-9

    Setting Up the Instrument . . . . . 2a-9

    Activating the ILD and Reading the Result Code . . . . . 2a-10

    Interpreting the Result Code . . . . . 2a-10

    Locating the Correct Troubleshooting Information . . . . . 2a-12

    Returning the Instrument to Operation . . . . . 2a-12

Special Functions Used with ILD . . . . . 2a-13

    Other Special Functions Used for Assembly Level Repair . . . . . 2a-16

**Result Codes**

Positive Result Codes Explanation . . . . . 2b-1

Negative Result Codes Explanation . . . . . 2b-2

    How to Use Result Codes and Diagnostic Test Procedures . . . . . 2b-2

Unsigned Result Codes Explanation . . . . . 2b-2

Result Codes List . . . . . 2b-4

**Result Code Tests**

Diagnostic Test Procedures . . . . . 2c-1

Assembly Locator Diagram . . . . . 2c-2

Test 1A - Input Cable to Voltmeter Test Set-up . . . . . 2c-3

Test 1B - HP 8664/8665 Input Cable to Voltmeter Test Set-up . . . . . 2c-5

Test 2A - Input Cable to Powermeter Test Set-up . . . . . 2c-7

Test 2B - HP 8664/8665 Input Cable to Powermeter Test Set-up . . . . . 2c-9

Test 3A - Output Port to Voltmeter Test Set-up . . . . . 2c-11

Test 3B - HP 8664/8665 Output Port to Voltmeter Test Set-up . . . . . 2c-13

Test 4A - Output Port to Powermeter Test Set-up . . . . . 2c-15

Test 4B - HP 8664/8665 Output Port to Powermeter Test Set-up . . . . . 2c-17

Test 5 - Output Port Test Set-up . . . . . 2c-19

Test 6 - Output Cable Test Set-up . . . . . 2c-21

Test 7A - Assembly Interface Ribbon Cable: Power Supply Check Test Set-up . . . . . 2c-23

    Ribbon Cable DC Voltage Level Limits . . . . . 2c-25

Test 7B - Serial and Parallel Interface Ribbon Cable: Control Signals Test Set-up . . . . . 2c-33

Test 8 - FRAC-N Reference Input Test Set-up . . . . . 2c-37

Test 9 - VCO/Fast Controller Ribbon Cable: Test Set-up . . . . . 2c-39

    Fast VCO Test Points . . . . . 2c-41

Test 10 - Phase Shift Ribbon Cable Test Set-up . . . . . 2c-43

    Phase Shift Test Points . . . . . 2c-44

**Result Code Tests - continued**

Test 11 - Reference Oscillator Cable Test Set-up . . . . .	2c-45
Reference Oscillator Test Points . . . . .	2c-46
Test 12A, B, C, & D - I/O Assembly . . . . .	2c-47
Initial Test Set-Up . . . . .	2c-47
General Test Procedures . . . . .	2c-49
Signal Tracing: Controller Board to I/O Assembly . . . . .	2c-50
Voltage Tracing: I/O Assembly to Controller Board . . . . .	2c-50
Motherboard Connector and Pin Locator Diagram . . . . .	2c-51
I/O Assembly → DCU Signal Connections Diagram . . . . .	2c-52
Test 13A & B - ALC Mod Control . . . . .	2c-53
Test 13A Set-Up . . . . .	2c-53
Test 13B Set-Up . . . . .	2c-53
General Instructions for 13A or 13B . . . . .	2c-54
Test 14A - Dividers/ALC Ribbon Cable: Test Set-up . . . . .	2c-55
Test 14 Logic Level Checks . . . . .	2c-56
Test 14 Supply Voltage and Logic Level Checks . . . . .	2c-56
Test 14B - Divider/ALC Ribbon Cable: Test Set-up . . . . .	2c-57
Voltage Limits for Test 14 Supply Voltages . . . . .	2c-58
Test 15 - Attenuator Driver Serial Interface . . . . .	2c-59
I/O Assembly → Attenuator Test Points . . . . .	2c-61
Attenuator → I/O Assembly Test Points . . . . .	2c-61
I/O Assembly → Attenuator Communication Data Lines . . . . .	2c-61
Test 16 - Power Supply Test . . . . .	2c-63
Power Supply Voltage Test Limits . . . . .	2c-63
Test 17 - HP 8664/8665 YTO Ribbon Cable: Test Set-up . . . . .	2c-65
Test 18 - Auxiliary FM Fault Detection . . . . .	2c-67

**Power Supply**

Power Supply Check . . . . .	2d-1
Power Supply Wiring Diagram for HP 8643 . . . . .	2d-3
Power Supply Wiring Diagram for HP 8644A/B and HP 8645A . . . . .	2d-5
Partial Power Supply Wiring Diagram for HP 8664A . . . . .	2d-7
Power Supply wiring Diagram for HP 8665 . . . . .	2d-9

**Adjustments**

HP 8643, 8644, 8645 Instrument Self-Calibration . . . . .	3-1
Option 010 RFI Adjustments . . . . .	3-1
HP 8664A, 65A/65B Assembly Self-Cal Adjustments . . . . .	3-1
MW Loop Self-Cal Adjustment . . . . .	3-2
MW LOOP Adjustment Locations . . . . .	3-3
HF DRVR Self-Cal Adjustment . . . . .	3-3
Attenuator/RPP ROM Replacement . . . . .	3-4
Cal Data Recovery for HP 8665A Only . . . . .	3-5

## Replaceable Parts

Introduction . . . . .	4-1
Reference Designations and Abbreviations Used . . . . .	4-2
Replaceable Parts List (Explanation) . . . . .	4-2
Ordering Information . . . . .	4-3
Assembly Exchange Program . . . . .	4-4
Parts List Updating . . . . .	4-4
Assembly Locations (HP 8643A, HP 8644A, HP 8644B) . . . . .	4-5
Assembly Locations (HP 8645A, HP 8664A, HP 8665A/B) . . . . .	4-6
Code List of Manufacturers . . . . .	4-7
Service Kit Part Numbers List . . . . .	4-8
Replaceable Parts List . . . . .	4-9
HP 8643A . . . . .	4-9
HP 8644A . . . . .	4-17
HP 8644B . . . . .	4-27
HP 8645A . . . . .	4-35
HP 8664A . . . . .	4-43
HP 8665A . . . . .	4-53
HP 8665B . . . . .	4-63
Common Cabinet Parts . . . . .	4-73

## Illustrated Parts Breakdown

Front Panel Illustrated Parts Breakdown . . . . .	4a-1
Digital Motherboard Illustrated Parts Breakdown . . . . .	4a-2
Power Supply and Rear Panel Illustrated Parts Breakdown (1 of 3) (except HP 8643) . . . . .	4a-3
Power Supply and Rear Panel Illustrated Parts Breakdown (2 of 3) (except HP 8643) . . . . .	4a-4
Power Supply and Rear Panel Illustrated Parts Breakdown (3 of 3) (except HP 8643) . . . . .	4a-5
Assembly Removal Illustrated Parts Breakdown . . . . .	4a-6
HP 8664/65 MW Assembly Illustrated Parts Breakdown . . . . .	4a-7

## Assembly Replacement

Screw Torque Settings . . . . .	4b-1
RF Assembly Removal and Verification . . . . .	4b-1
RF Assembly Removal and Replacement . . . . .	4b-2
Card-cage Assembly Removal and Replacement . . . . .	4b-4
HP 8643/44/45 Attenuator Assembly Removal and Replacement . . . . .	4b-6
HP 8664/65 Attenuator Assembly Removal and Replacement . . . . .	4b-8
HP 8664/65 ATTEN/RPP/ROM Replacement . . . . .	4b-10
HP 8664/65 YTO Assembly Removal and Replacement . . . . .	4b-11
HP 8664/65 GAAS DIV Assembly Removal and Replacement . . . . .	4b-13
I/O Assembly Removal and Replacement . . . . .	4b-16
HP 8643 Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-17
HP 8644 Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-17
HP 8645 Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-18
HP 8664 Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-18
HP 8665A Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-18
HP 8665B Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-19

**Assembly Replacement - continued**

Front Panel Assembly Removal and Replacement . . . . .	4b-20
Fan Removal and Replacement . . . . .	4b-22
Power Supply Assembly Removal and Replacement (except HP 8643A) . . . . .	4b-23
Fuseboard Removal and Replacement (except HP 8643A) . . . . .	4b-25
Power Transistor Board Removal and Replacement (except HP 8643A) . . . . .	4b-26
Rear Panel Removal and Replacement . . . . .	4b-27
Transformer Removal and Replacement . . . . .	4b-28
Line Power Assembly Removal and Replacement . . . . .	4b-30
Instrument Cover Removal and Replacement . . . . .	4b-32
2 Piece (Clamshell) Cover Removal and Replacement . . . . .	4b-35
1 Piece Cover Removal and Replacement . . . . .	4b-38
Verifying Instrument Operation . . . . .	4b-40
Verifying Assembly Operation . . . . .	4b-41
Returning the Instrument to Operation . . . . .	4b-42

**Cable Locator**

How Cables are Marked . . . . .	4c-1
RF Assemblies Diagram . . . . .	4c-2
HP 8643A Cables Table . . . . .	4c-3
HP 8644A Cables Table . . . . .	4c-4
HP 8644B Cables Table . . . . .	4c-5
HP 8645A Cables Table . . . . .	4c-6
HP 8664A Cables Table . . . . .	4c-7
HP 8665A Cables Table . . . . .	4c-8
HP 8665B Cables Table . . . . .	4c-9
HP 8644A Cable Location Illustrations . . . . .	4c-11
HP 8643A (Opt. 002) Cable Location Illustrations . . . . .	4c-13
HP 8644A (Opt. 004) Cable Location Illustrations . . . . .	4c-15
HP 8644A (STD) HP 8644A (Opt. 007) Cable Location Illustrations . . . . .	4c-17
HP 8644A (Opt. 004,007) HP 8644B (No Options) Cable Location Illustrations . . . . .	4c-19
HP 8644A (Opt. 002,004,007) HP 8644B (Opt. 002) Cable Location Illustrations . . . . .	4c-21
HP 8643A,8644A (Opt. 011), and HP 8644B Cable Location Illustrations . . . . .	4c-23
HP 8645A w/ serial prefix <2925A Cable Location Illustrations . . . . .	4c-25
HP 8644A (No Options) Cable Location Illustrations . . . . .	4c-27
HP 8644A (Opt. 004) Cable Location Illustrations . . . . .	4c-29
HP 8644A (Opt. 008) Cable Location Illustrations . . . . .	4c-31
HP 8645A (No Options) Cable Location Illustrations . . . . .	4c-33
HP 8645A (Opt. 004) Cable Location Illustrations . . . . .	4c-35
HP 8665A (Opt. 008) Cable Location Illustrations . . . . .	4c-37
HP 8665B (No Options) Cable Location Illustrations . . . . .	4c-39
HP 8645B (Opt. 004) Cable Location Illustrations . . . . .	4c-41
HP 8665B (Opt. 004) Cable Location Illustrations . . . . .	4c-43



**Retrofit Kit**

**List of Retrofit Kits** ..... 4d-1

# TABLE OF CONTENTS

## General Information

Introduction . . . . .	1-1
Safety Notes . . . . .	1-1
Using This Manual . . . . .	1-1
Error Messages . . . . .	1-1
Glossary . . . . .	1-2
ALR Manual Information . . . . .	1-4
Instruments Covered . . . . .	1-4
Documentation Updating . . . . .	1-4
On-Site Service Capability . . . . .	1-5
Service Kits . . . . .	1-5
HPIB Address Selection . . . . .	1-5
Power Requirements . . . . .	1-6
Power Cable Grounding Requirements . . . . .	1-6
Line Voltage . . . . .	1-6
Fuse Selection . . . . .	1-6



# 1

## General Information

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### **Introduction**

The *Performance Signal Generator (PSG) Service Diagnostics Manual* provides Assembly Level repair information for the HP 8644A/B, 8644B, 8645A, 8664A, 8665A and 8665B Synthesized Signal Generators. This manual will help you isolate a typical failure and perform a typical repair exchange.

### **Safety Notes**

Throughout this manual, safety information pertinent to the task at hand is provided. Before servicing this instrument, you should first read the Safety Considerations pages found before the Table of Contents and familiarize yourself with the safety information and symbols.

### **Using This Manual**

This manual is structured into five major parts: General Information, Troubleshooting, Adjustments, Replaceable Parts, and Block Diagrams.

The Troubleshooting part contains processes and result codes used to troubleshoot the signal generator to an assembly level.

The Adjustments part contains the necessary procedures to return the signal generator to service within the specifications.

The Replaceable Parts part of this manual contains the part numbers of all customer replaceable parts. The parts are listed in product numerical order.

The Block Diagram part contains a simplified block diagram for each signal generator covered in this manual. These block diagrams contain supplemental information to aid in troubleshooting a failed assembly.

### **Error Messages**

If the instrument detects a problem, error messages are queued into the message buffer as indicated by the Mssg annunciator lighting up. (To view the messages, press the **MSSG** key.)

These messages are general indicators of an instrument malfunction or an instrument calibration error (which may or may not be an indication of hardware problems). They do not give specific fault isolation or troubleshooting information. You must invoke the Instrument Level Diagnostic (ILD) and follow the diagnostic result codes to their conclusion before removing or replacing any assembly or cable. See *Running Diagnostics* for specific instructions on how to use the instrument diagnostics. If you want or need to review any message after it has been removed from the display screen, press the **SHIFT**, **MSSG** keys and the message or messages will return to the screen.

## Glossary

The terms included in this glossary are used throughout this manual. Understanding them will aid you in understanding the diagnosis and repair of these instruments.

**Assembly Level Repair** Assembly Level Repair means that instrument repair consists of isolating the problem to an assembly and then replacing the defective assembly with a new or restored assembly.

**Calibration** When an assembly has been removed, tampered with, or replaced the assembly and instrument must be calibrated in order to meet the instrument's specifications. To calibrate the entire instrument, the ReCal Routine is used (Special Function 171).

**Self-Cal Adjustments** When HP 8664A/B, 8665A/B MW LOOP, YTO, HF DRVR, or GAAS/DIV assemblies have been removed, tampered with, or replaced, those assemblies must be calibrated according to specific instructions found in the *Adjustments* section before the instrument can be calibrated (to meet the instrument's specifications).

**Diagnostics** Firmware diagnostic routines that test each assembly's internal hardware operation. Hardware diagnostics are distinguished from the calibration routine in that the hardware diagnostics test all aspects of the assembly's operation.

**HP-SL Diagnostic Commands** A limited set of controller Instrument and Assembly Diagnostic commands that can be implemented over the HP-IB bus by an external controller.

**ILD (Instrument Level Diagnostic)** This is the overall instrument diagnostic routine that tests all the assemblies, then displays the appropriate result code indicating the problem. The ILD is the most comprehensive test for this instrument.

**Key Sequence** A selection of front panel keys that are pressed in a specific order to execute a diagnostic or the ReCal routine.

**ALD (Assembly Level Diagnostic)** These are separate diagnostic routines that test individual assemblies, then displays the appropriate result code indicating the problem. They can be executed individually or as part of the ReCal routine. All of the ALD routines make up the ILD.

**Assembly Exchange** The complete assembly-level instrument repair process whereby an assembly is diagnosed as being bad, is removed, and then replaced (exchanged) with a known good assembly.

**Diagnostic Sense Points** Hardware multiplexer test points within the assemblies that test the operational status of the assembly(s) whenever the ILD or specific ALD routines are executed.

**ReCal (Special Function 171)** The Re-Calibration routine is used whenever an assembly is removed, tampered with, or replaced. ReCal can also be used to invoke specific assembly diagnostic routines when executed after an instrument calibration result code is displayed.

**Result Code** A displayed number on the front panel screen that indicates the status of the instrument (or assembly) after the internal diagnostic routine has tested the instrument.

Here are two examples of what an result code looks like when displayed on the front panel.

Result code = +4,151,213

msg

OR

Result code = -3,001,114

msg

When the instrument returns a negative result code, the instrument diagnostics have failed to isolate an assembly or cable on its own, and needs manual interaction by the service technician to further troubleshoot the instrument (using the Diagnostic Test Procedures to isolate the problem).

When the instrument returns a positive result code, the instrument diagnostics have isolated an assembly or cable.

When the instrument returns a positive zero result code, the instrument diagnostics have detected nothing wrong.

**Ribbon Cable Test Board** A special tool designed to help make ribbon cable testing easier and more reliable. This tool is part of the Service Kit.

**Service Kit** A group of cables, adapters, and special tools that are used when troubleshoot the instrument. A complete list of parts and part numbers for each service kit are included in *Replaceable Parts* section.

## **ALR Manual Information**

### **Instruments Covered by This Manual**

Additional copies of this manual may be ordered separately through your nearest Hewlett-Packard Sales Office. The Service Diagnostics Manual, (Assembly Level Repair) part number is shown on the manual title page.

### **Serial Numbers**

This instrument has a two-part serial number in the form 1234A00123 which is stamped on the serial number plate attached to the rear of the instrument (above and slightly to the right of the fan louvre). The first four digits and the letter (1234A) are the serial number prefix. This prefix is the same for all identical instruments; it changes only when a change is made to the instrument. The last five digits (00123) form the suffix that is unique to each instrument.

The contents of this manual apply directly to instruments having the same SERIAL NUMBERS as on the manual title page.

For information concerning a serial number prefix not listed on the title page or in the *Manual Update* supplement, contact your nearest Hewlett-Packard office.

### **Documentation Updating**

An instrument manufactured after the printing of this manual may have a serial number prefix that is not listed on the manual title page. Having a serial number prefix that is greater than that shown on the title page indicates that the instrument is slightly different from those documented in the manual. In this case, your manual is provided with updating information in the form of a Manual Update Packet to make your manual as current as possible. This updating information includes any hardware or software changes that have occurred, as well as corrections to the documentation.

### **A Description of the Manual Update Packet**

A *Manual Update* packet consists of shrink wrapped replacement and addition pages shipped with your instrument that have "rev dates" in the lower page corner opposite the page number. These *Manual Update* packet update pages (with the latest rev date) should be incorporated into your manual as soon as possible to bring it up to date.

**On-site Service  
Capability**

With the Modular design of the HP Performance Signal Generators, availability of assembly exchange, and assembly level fault diagnosis repairs can be made at the instrument site by the customer, or by Hewlett-Packard through an On-site Service Contract.

Hewlett-Packard offers an On-site Service Contract where trained service personnel will respond to your on-site instrument failure and do all fault diagnosis and repairs.

Option WO3 converts the standard 1 year Bench Warranty to 90 Day On-site Repair Service at no extra charge.

Additional On-site Repair Service contracts can be purchased that extend beyond the 90 days. Contact your nearest Hewlett-Packard Sales Office.

**Service Kits**

The HP 8644A/8645A Service Kit (part number 08645-61116) and HP 8664/8665 Service Kit (part number 08665-61116) contains extra cables, adapters, and tools necessary for completing diagnostic test procedures and troubleshooting the instrument to the assembly level.

**HP-IB Address  
Selection**

The Signal Generator's address is set to 19 at the factory both in RAM memory and on a switch located inside the instrument. The address stored in RAM remains valid through switching the power from Standby to On, and unplugging of the AC power cord (unless the internal battery power is lost which would cause RAM memory to be lost). If RAM memory is ever lost, the address on the internal switch is read and becomes the address at turn on. To set the address from the front panel, select: [Shift] [Local], enter the numeric digits for the address (from 00 to 30), then press [Enter].



**Power Requirements**

Each Performance Signal Generator requires a power source of ( $\pm 10\%$ ) 100, 120, 220, or 240 V ac from 48 to 440 Hz. Power consumption is 500 VA maximum.

**Power Cable Grounding Requirements**

This instrument is equipped with a three-wire power cable. When connected to an appropriate AC power receptacle, this cable grounds the instrument cabinet. The type of power cable plug shipped with each instrument depends on the country of destination. Refer to section 2, table 2-2, *Power Cable and Mains Plug Part Numbers* in the *Operation And Calibration Manual* for visual descriptions and part numbers of all power cable and mains plugs available.

**Line Voltage**

A rear-panel Line Power Assembly permits operation from 100, 120, 220, or 240 V ac. The number visible in the window (located on the assembly) indicates the nominal line voltage to which the instrument must be connected. Verify that the line voltage selection card and the fuse are matched to the power source. Refer to figure 1-1. *Line Voltage Selection*. (The HP 8643A does not use a line selector card.)

**Fuse Selection**

For 110/120 Vac line operation, the HP part number is:

HP 8643, 6A/250V .....	2110-0056
HP 8644, 4A/250V .....	2110-0055
HP 8645, 5A/250V .....	2110-0010
HP 8664/8665, 4A/250V .....	2110-0055

For 220/240 Vac line operation, the HP part number is:

HP 8644, 8645, and HP 8664/8665, 2.5A/250 V .....	2110-0083
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**Warning**

*For protection against fire hazard, the Line Power Assembly fuse should only be a 250 V normal-blow fuse with the correct current rating.*

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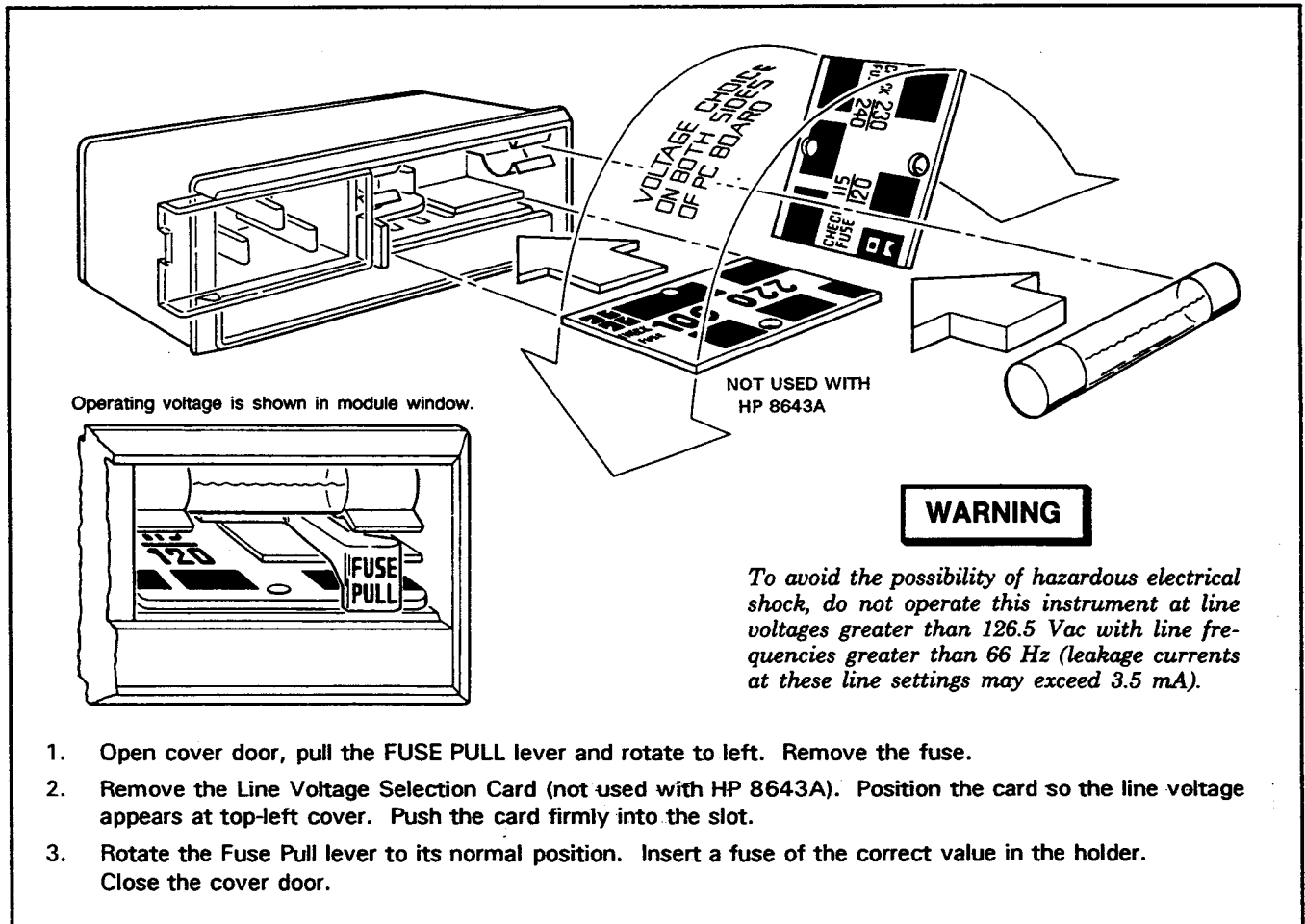


Figure 1-1. Line Voltage Selection



# TABLE OF CONTENTS

## Troubleshooting

Introduction . . . . .	2-1
Recommended Test Equipment . . . . .	2-2
Inoperative Instrument Troubleshooting . . . . .	2-3
Operation Requirements . . . . .	2-3
Symptoms . . . . .	2-3
DCU (Controller) Checks . . . . .	2-4
DCU Status Indicators Check . . . . .	2-4
DCU Voltage and Motherboard Check . . . . .	2-5
Front Panel Checks . . . . .	2-6
Front Panel Display and Keyboard Check . . . . .	2-6
Front Panel Display Check . . . . .	2-7
Front Panel LED Check . . . . .	2-8
RPG (KNOB) Check . . . . .	2-9
Front Panel-to-DCU I/O Signal Checks . . . . .	2-11
Conditions Not Covered by Diagnostics . . . . .	2-15
Introduction . . . . .	2-15
HP 8643/8644/8645 Known Output Power Failure: . . . . .	2-15
HP 8643/8644/8645 Known Pulse Failure: . . . . .	2-16
Non-specific Result Codes: . . . . .	2-16



# 2

## Troubleshooting

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### **Introduction**

This section provides Assembly Level repair troubleshooting information for problem conditions that prevent you from using the Instrument Diagnostics. These conditions consist of functional problems with front panel display (or no display at all), little or no instrument control, or lack of power to the instrument.

---

### **Caution**

*Before plugging this instrument into the mains (line) voltage, be sure the correct voltage and fuse have been selected.*

---

## Recommended Test Equipment

Table 2-1 *Recommended Test Equipment* lists the test equipment recommended for use in troubleshooting the HP 8643, HP 8644, HP 8645, HP 8664A, HP 8665A or HP 8665B. If any of the recommended equipment is unavailable, instruments with equivalent minimum specifications may be substituted.

Table 2-1. *Recommended Test Equipment*

Instrument Type	Critical Specifications	Suggested Model	Use*
Digital Multimeter	DC Range: 10mV to 600V DC Accuracy: 3 1/2 digit, $\pm 0.10\%$ of Reading Sensitivity: 10 $\mu$ V	HP 3455A	T
Frequency Counter	Range: 500 MHz to 1050 MHz Resolution: 9 digits Dynamic Range: 10 mV rms to 0.5 V rms	HP 5386A	T
Oscilloscope	Bandwidth: 50 MHz Sensitivity: 0.01mV per division minimum Input Impedance: 10 M $\Omega$ Triggering: Internal Time/Div: 0.1 mSec Input: Dual Channel	HP 1741A	T
Logic Probe		HP 545A	T
Service Kit		HP Part 08665-61116 or 08645-61116	T
Coaxial Detector	Range: .01 GHz to 18 GHz Input Power: 0.5 $\mu$ W to 200 mW	HP 8473B	T
* T = Troubleshooting			

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## ***Inoperative Instrument Troubleshooting***

### ***Operation Requirements***

Here are general inoperative instrument conditions and the actions to take for troubleshooting them:

The Front Panel display needs +38 V dc to operate correctly; the Front Panel Controller needs +5.2 V dc to operate.

The DCU (Digital Control Unit: the main controller assembly) needs +5.2 V dc to operate correctly.

### ***Symptoms***

- **No Front Panel display (blank):**

1. First check the +38 V dc and +5.2 V dc power supply LED indicators on the I/O Assembly. If those (or any other supply) LEDs are not lit then troubleshoot the power supplies. Refer to *Power Supply* section.
2. Next check the DCU (do the *DCU Status Indicator Check* and then check the voltage to the DCU).
3. Then test the Front Panel (do the *Front Panel Check*).

- **Front Panel displays only a dash:**

1. Check first the DCU (do the *DCU Status Indicator Check* and then check the voltage to the DCU).
2. Next test the Front Panel (do the *Front Panel Check*).
3. Then test the data transfer lines between the Front Panel and DCU (do the *Front Panel-To-DCU I/O Signal Checks*).

- **Erratic display, or lack of Front Panel control:**

1. First test the Front Panel (do the *Front Panel Check*).
2. Next test the data transfer lines between the Front Panel and DCU (do the *Front Panel-To-DCU I/O Signal Checks*).
3. Then check the DCU (do the *DCU Status Indicator Check* and then check the voltage to the DCU).

- **Missing characters in Front Panel display:**

1. Test the Front Panel (do the *Front Panel Check*).



## DCU (Controller) Checks

These checks will help you determine whether the DCU is defective when there is no front panel display. Instrument result code errors are processed through the DCU. If the DCU is defective, (especially RAM circuitry) then the Front Panel will not display a result code.

### DCU Status Indicators Check

There are four amber LEDs on the top of the DCU Assembly (in slot A16) labeled DS1 through DS4. These are the DCU status indicators that will give a quick indication of the operational status of the DCU Assembly.

To check the DCU Assembly:

1. Turn off instrument power.
2. Watch the DCU Status Indicator LEDs carefully while turning the power back on. (During power up the DCU tests will normally flash the LEDs very quickly.)
3. If after LED flickering has settled, the DCU Status Indicator LEDs flash one of the binary code patterns (listed in the table below) on and off three times in approximately one second and then stop, you have a defective DCU.

Replace the DCU Assembly.

If no binary code pattern (listed in the table below) is flashed, continue troubleshooting the DCU supply voltages to confirm that it is operating normally.

Note that the flashing pattern indicates a specific DCU diagnostic test has failed. If the DCU fails several of its tests, more than one of the binary code patterns may be displayed by the LEDs.

Test	DS1 LSB (TP2)	DS2 - (TP3)	DS3 - (TP4)	DS4 MSB (TP5)
CPU Test 1	On	Off	Off	Off
RAM Test	Off	On	Off	Off
CPU Test 2	On	On	Off	Off
ROM Test	Off	Off	On	Off
MFPC Test	On	Off	On	Off
VMETER Test	Off	On	On	Off
READBACK Test	On	On	On	Off

---

### DCU Voltage And Motherboard Check

This check is used to confirm the operational status of the DCU. Voltage supplies needed for the DCU Assembly are: +5.2 V dc for digital circuitry;  $\pm 15$  V dc for analog circuitry and internal Volt- and Powermeters; and +21 V dc for memory (battery) back up.

---

#### Note

*When the instrument is off and the Controller Board is removed from the motherboard connectors, the instrument calibration data located in the Controller Assembly RAM will be lost. At the next power-up, the instrument will sense a data lost condition and automatically activate the Recal routine. The instrument will be ready for normal operation after approximately 2-5 minutes.*

---

1. With the instrument off, remove the bottom panel.
2. Turn instrument on.
3. Using an external DVM at the bottom side of the Motherboard connectors, check the supply voltages for the DCU. (Pin outs and voltage supply limits are given in the *Power Supply DC Voltage Level Limits* table on the foldouts.)

If the voltages tested are within limits and the DCU Status Indicator LEDs check tests out normal, but you suspect that the DCU is not operating correctly, replace the Controller Assembly.

4. If the voltages do not test within limits, turn the instrument off, pull the Controller out of its Motherboard connectors (so there is no electrical connection) and measure the voltages again.

If the voltages tested are within limits, replace the Controller Assembly.

5. If the voltages do not test within limits, check the voltages at the Motherboard J10 connector pins.

If the voltages tested are within limits, replace the Motherboard.

6. If the voltages do not test within limits, continue troubleshooting the power supply voltages starting at Ribbon Cable W42 (between the Power Supply J1 and Motherboard J10).

## Front Panel Checks

This troubleshooting guide checks for (A): blank or erratic front panel display, no keyboard control or missing key characters, and (B): no RPG (knob) control.

The Front Panel Display, RPG, and Keyboard diagnostics need the correct voltages to the Front Panel Controller (+5.2 V dc) and Keyboard Assembly (+38 V dc) to operate correctly. (If a single dash is displayed on the screen, check to see if the DCU Assembly is properly seated in the DCU Motherboard connectors. If that does not correct the problem then perform the *DCU Status Indicators Check*.)

### Front Panel Display And Keyboard Check

1. Turn on instrument Power.
2. Press the **AUTO** key and the **SAVE** key simultaneously for approx 2 seconds (EXCEPT HP 8643A). For HP8643A, press the **.** key and the **SAVE** key simultaneously for approx 2 seconds.
3. When the D> character is displayed, press the **0** digit key.

If the D> is NOT displayed, check the DCU status indicators to see if the DCU is operating correctly according to instructions in *DCU Status Indicators Check*. If no problem is found there, then troubleshoot the +5.2, +38 V dc power supplies to the Front Panel using the Power Supply Wiring Diagram foldouts.

4. the correct display message of "Key Test Running, No Key Pressed" should appear.

If you get any error message before the correct message of "Key Test Running...", then check the DCU status indicator LEDs as described in *DCU (Controller) Checks* or troubleshoot the +5.2, +38 V dc power supplies to the Front Panel.

5. Check all of the front panel keys for the correct button keycode response by pressing each key on the front panel and comparing the displayed button keycode with the correct keycode found listed over the front panel key in figure 2-1. (Note that it is normal for front panel LEDs to light up when certain keys are pressed.)

If any pressed key does not produce the correct keycode response (for example, you might get a blank display), replace the Front Panel Keyboard Assembly. Assembly removal and replacement procedures are found in the *Assembly Replacement* section. The *Illustrated Parts Breakdown* section shows an exploded view of the Front Panel Keyboard and Front Panel Controller Assembly.

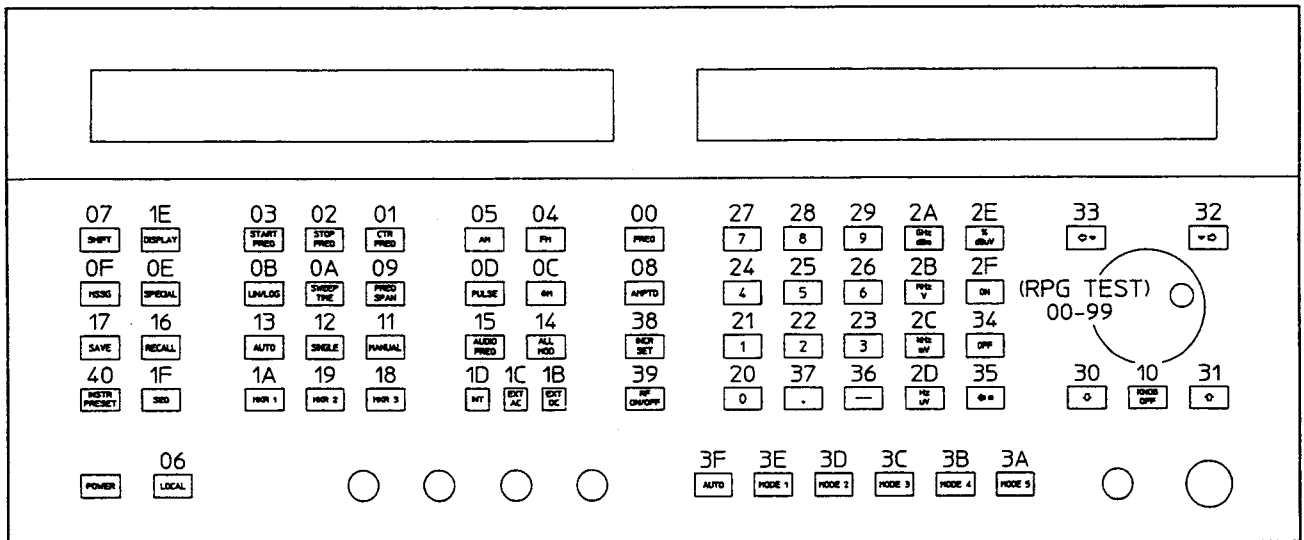


Figure 2-1. Front Panel Button Keycodes

- To return to normal instrument display without cycling instrument power, press the **AUTO** key and the **SAVE** keys simultaneously for approximately 2 seconds (or when the D> characters appear) (EXCEPT HP8643A). For HP8643A, press the **.** key and the **SAVE** key simultaneously for approximately 2 seconds.

Press the **9** digit key and then the green **INSTR PRESET** key.

### Front Panel Display Check

This check tests the display for shorted display grid lines. This test is similar to the display test run in the *Front Panel Display And Keyboard Check* but is easier to follow with the eye.

- Turn on instrument Power.
- Press the **AUTO** key and the **SAVE** key simultaneously for approx 2 seconds (EXCEPT HP 8643A). For HP8643A, press the **.** key and the **SAVE** key simultaneously for approx 2 seconds.

3. When the D> character is displayed, press the **[0]** digit key.

If the D> is NOT displayed, check the DCU status indicators to see if the DCU is operating correctly according to instructions in *DCU Status Indicators Check*. If no problem is found there, then troubleshoot the +5.2, +38 V dc power supplies to the Front Panel using the Power Supply Wiring Diagram foldouts.

4. When the D> character is displayed, press the **[8]** digit key. The screen should be filled with ASCII characters. Each character (display square) should be unique, that is, no repeated character pattern.
5. Press any key. A pattern of alternate pixels should light up in each display square. All the annunciators should light up also.

Press any key again. The compliment of display pixels should light up in each display square. (pressing any key a third time returns you to the ASCII character display.)

If an annunciator or display square is blanked or "missing" a pixel replace the Front Panel Controller Assembly. Assembly removal and replacement procedures are found in the elevenmli Assembly Replacement section. The elevenmli Illustrated Parts Breakdown section shows an exploded view of the Front Panel Keyboard and Front Panel Controller Assembly.

6. To return to normal instrument display without cycling instrument power press the **[AUTO]** key and the **[SAVE]** keys simultaneously for approximately 2 seconds (or when the D> characters appear) (EXCEPT HP8643A). For HP8643A, press the **[.]** key and the **[SAVE]** key simultaneously for approximately 2 seconds.

Press the **[9]** digit key and then the green **[INSTR PRESET]** key.

### **Front Panel LED Check**

This check tests all the Front Panel Keyboard LED indicators.

1. Turn on instrument Power.
2. Press the **[AUTO]** key and the **[SAVE]** key simultaneously for approx 2 seconds (EXCEPT HP 8643A). For HP8643A, press the **[.]** key and the **[SAVE]** key simultaneously for approx 2 seconds.

3. When the D> character is displayed, press the **[0]** digit key.

If the D> is NOT displayed, check the DCU status indicators to see if the DCU is operating correctly according to instructions in *DCU Status Indicators Check*. If no problem is found there, then troubleshoot the +5.2, +38 V dc power supplies to the Front Panel using the Power Supply Wiring Diagram foldouts.

4. When the D> character is displayed, press the **[7]** digit key. All the Front Panel Keyboard LED indicators should light up, and the LED test running message is displayed.
5. Press any key. The LEDs are continuously scanned at a slow rate and should turn on and off sequentially (to see if two LEDs are shorted together).

If any LED indicator does not light up replace the Front Panel Keyboard Assembly. Assembly removal and replacement procedures are found in the elevenmli Assembly Replacement section. The elevenmli Illustrated Parts Breakdown section shows an exploded view of the Front Panel Keyboard and Front Panel Controller Assembly.

6. To return to normal instrument display without cycling instrument power press the **[AUTO]** key and the **[SAVE]** keys simultaneously for approximately 2 seconds (or when the D> characters appear) (EXCEPT HP8643A). For HP8643A, press the **[.]** key and the **[SAVE]** key simultaneously for approximately 2 seconds.

Press the **[9]** digit key and then the green **[INSTR PRESET]** key.

### **RPG (KNOB) Check**

1. Turn on instrument Power.
2. Press the **[AUTO]** key and the **[SAVE]** key simultaneously for approx 2 seconds (EXCEPT HP 8643A). For HP8643A, press the **[.]** key and the **[SAVE]** key simultaneously for approx 2 seconds.
3. When the D> character is displayed, press the **[0]** digit key.

If the D> is NOT displayed, check the DCU status indicators to see if the DCU is operating correctly according to instructions in *DCU Status Indicators Check*. If no problem is found there, then troubleshoot the +5.2, +38 V dc power supplies to the Front Panel using the Power Supply Wiring Diagram foldouts.

4. Rotate the KNOB to activate the RPG test. You should see the displayed message "RPG test running nn", where the nn represents a number between 00 and 99. Rotating the knob to the left should cause the numbers to decrease in sequence (00, 99, 98, 97...). Rotating the knob to the the right should cause the numbers to increase in sequence (10, 11, 12, 13...).

If the RPG (KNOB) test sequence does not execute correctly or you don't have an RPG display, go on to step 3 and test the RPG voltage.

If the RPG (KNOB) sequences correctly when rotated, check to see if control signals from the DCU are being received by the Front Panel. Use the *Front Panel-To-DCU I/O Signal Checks* on the following pages.

(Pressing any key exits the RPG test and returns you to the Keyboard test mode). To exit this test go to step 5.

5. Test the RPG voltage for +5.2 V dc ( $\pm 0.05$ ) at front panel connector J3 pin 1. (J3 Pin 6 is GROUND.) The wiring diagrams in the elevenmli Power Supply section may be used for reference. Note: The HP 8643A uses a different power supply and therefore different voltage level limits.

If the RPG voltage measured at front panel J3 pin 1 IS NOT within limits, the Front Panel Controller Assembly is defective and should be replaced. Assembly removal and replacement procedures are found in the elevenmli Assembly Replacement section.

6. If the RPG voltage is within limits, then test the RPG Digital control by placing a logic probe at front panel J3 pin 3 and rotating the RPG (KNOB). The logic probe should blink each time the RPG (KNOB) is rotated. Repeat this test at front panel J3 pin 4.

If the RPG fails the Digital Control Test (no logic probe blinks at front panel J3 pin 3 or 4), then replace the RPG unit.

If the RPG passes the Digital control Test (Logic probe blinks at J3 pins 3, and 4) then replace the Front Panel Controller Assembly.

7. To Exit the RPG Test quickly, cycle the instrument power (instrument power up takes approximately 10 seconds.)

To return to normal instrument display without cycling instrument power press the **AUTO** key and the **SAVE** keys simultaneously for approximately 2 seconds (or when the D> characters appear) (EXCEPT HP8643A). For HP8643A, press the **.** key and the **SAVE** key simultaneously for approximately 2 seconds.

Press the **9** digit key and then the green **INSTR PRESET** key.

### **Front Panel-To-DCU I/O Signal Checks**

This troubleshooting guide checks for transfer of control signals between the Front Panel Controller and the DCU. In this test a logic probe is used to see if data is transferred when a key is pressed. A logic probe blink indicates that data transfer is happening.

If no data transfer occurs between the Front Panel Controller and the DCU, instrument result codes can't be received and displayed by the Front Panel (Controller). When a front panel key is pressed the front panel controller sends data to the DCU. When the DCU receives this data, it returns an "data received" acknowledgement signal back to the Front Panel Controller. It is possible for the DCU to pass its diagnostic tests and have a undetected interface problem.

1. Check to see if the DCU Assembly is properly seated in the DCU Motherboard connectors then perform the *DCU Status Indicators Check* before continuing this test.
2. Turn off the power switch and remove the bottom panel. Top and bottom cover removal instructions are found at the end of the *Assembly Replacement and Verification* subsection of *Replaceable Parts*.
3. Position the instrument so that you can reach the soldered pins on the underside of the motherboard with a logic probe.
4. Remove the front panel. Assembly removal and replacement procedures are found in the *Assembly Replacement and Verification* subsection in section 2.
5. Turn on the instrument power.
6. Starting with test 1 in table 2-2, place a logic probe on the pin indicated in the *Assembly, Connector, and Pin* column. Press any front panel key and look for a blink on the logic probe. Repeat this process for each test.



Table 2-2. Front Panel-To-DCU Data Transfer Logic Probe Test

Test No.	Assembly, Connector, and Pin	Results	
		Pass	Fail
1	Front Panel Controller J2-12	Do Test 2	Replace Front Panel Controller
2	Motherboard J1-12	Do test 3	Replace W41
3	Motherboard J6-3	Do test 4	Replace Motherboard
4	Motherboard J6-4	Do test 5	Replace Front Panel Controller
5	Motherboard J1-10	Do test 6	Replace Motherboard
6	Front Panel Controller J2-10	Replace Front Panel Controller	Replace W41
(If replacing the FP Controller doesn't fix the problem, then replace the DCU.)			

If the logic probe blinks, follow the instructions indicated in the Results Pass column of table 2-2. If the logic probe doesn't blink, follow the instructions indicated in the Results Fail column.

Use figure 2-2 as an aid in troubleshooting the front panel data lines. Use figure 2-3 as an aid in finding the correct pin locations for the test on the underside of the DCU Motherboard.

7. If data is present on all the lines and the problem remains, check the DCU status indicators (amber LEDs located on top front of the DCU Assembly in slot A16) to see if the DCU is operating correctly according to instructions in *DCU Status Indicators Check*. If no problem is found there, replace the Front Panel Controller. If that doesn't fix the problem, then troubleshoot the data lines to the Front Panel using figure 2-2.

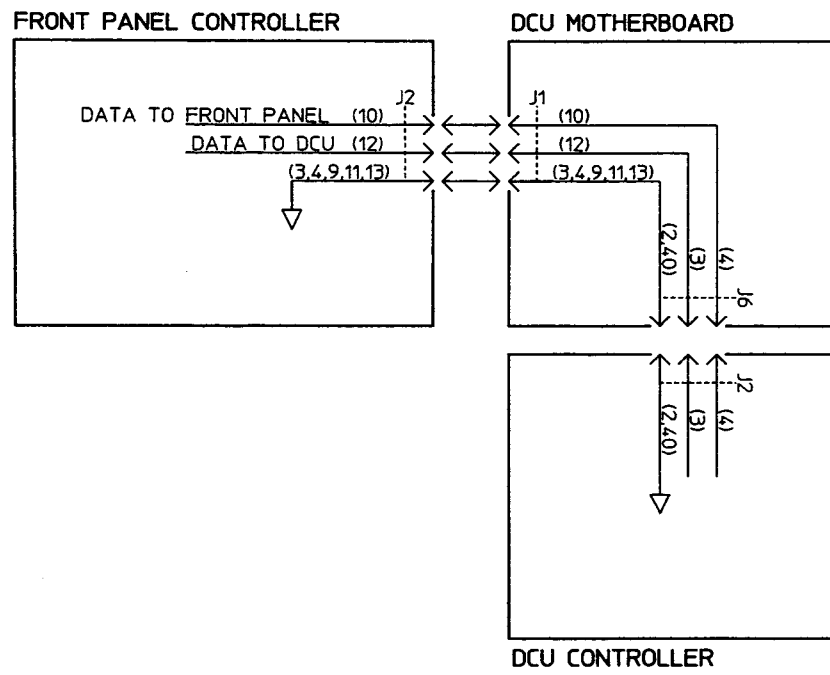


Figure 2-2. Front Panel Controller To DCU Data Lines Diagram

# MOTHERBOARD

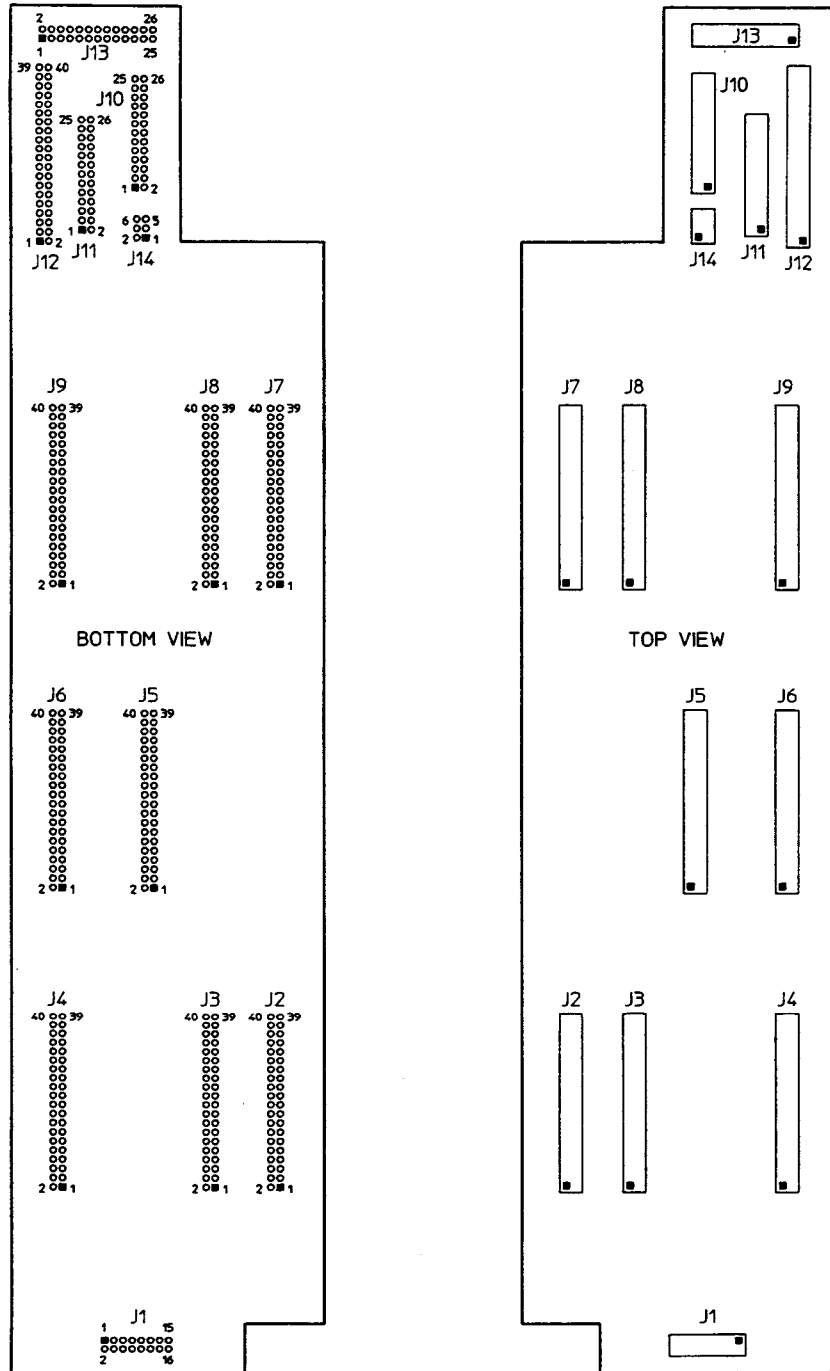


Figure 2-3. Motherboard Connector And Pin Identification

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## Conditions Not Covered By Diagnostics

### Introduction

This section contains instructions or suggestions for isolating failures which are not detected by diagnostics.

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### Note

*The material in this section places a higher reliance on the training and experience of the user. Certain suggestions and techniques presented in this section may seem vague to those without prior service training or experience with internal diagnostics.*

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### HP 8643/8644/8645 Known Output Power Failure:

The following conditions are valid only if:

1. the ILD (Special Function 320) has been activated,
2. a result code of +0 is displayed, and
3. you know or suspect that a problem exists.

The problem is solved only by swapping out and replacing the questionable assembly one at a time with a good assembly until the problem is fixed, or using known troubleshooting procedures to isolate the problem to an assembly and then replacing it.

- Symptom: At all power settings output power is good for frequencies from 1030.000 MHz to 2060.000 MHz, but output power is out of specification or completely dead at frequencies from 252 kHz to 1029.999 MHz.

Probable cause: Doubler Assembly is defective.

- Symptom: At all power settings output power is good for frequencies from 515.000 MHz to 1029.999 MHz, but output power is out of specification or completely dead starting at some point below 514.999 MHz.

Probable cause: semi-rigid coax cable W36 (from the ALC Assembly to the Attenuator Assembly) could be defective.

- Symptom: At all power settings output power is good for frequencies from 252 kHz to 1029.999 MHz, but output power is out of specification or completely dead at frequencies from 1030.000 MHz to 2060.000 MHz.

Probable cause: Doubler Assembly is defective.

- Symptom: Output power fails by some increment of 5 dB.

Probable cause: the Attenuator Assembly, I/O Assembly or DCU Motherboard (Assembly) is defective.

- Symptom: Output power fails max power specification at some frequency between 252.000 kHz and 1029.999 MHz.

Probable cause: ALC Assembly is defective.

- Symptom: Output power fails max power specification at some frequency between 1030.000 MHz and 2060.000 MHz:

Probable cause: Doubler Assembly is defective.

- Symptom: The RF output is CW when a TTL pulse waveform is applied to the Front-Panel Pulse (with the instrument PULSE MOD ON).

Probable cause: either the cable from the Front Panel to the ALC Pulse Input (W32) is defective, or the ALC Assembly is defective.

- a. Apply the TTL signal to the Ref ISC/Std ALC or Fast ALC Pulse Input at ALC connector J4 and check the RF Power again. If the RF is still CW, then the ALC Assembly is defective. If the RF is now pulsed, then the front-panel cable (W32) is defective.

**HP 8643/8644/8645  
Known Pulse Failure:**

**Non-specific  
Result Codes:**

The following entries are result codes that indicate a problem that is not isolated directly to a specific assembly. The problem is solved only by swapping out and replacing those questionable assemblies one at a time with a good assembly until the problem is fixed.

- Calibration error +2,403,3nn is a result code indicating that the PLL is out-of-lock.

Probable cause: The faulty assembly could be the FRAC-N or MWLOOP (HP 8664 or 8665). Replace the FRAC-N Assembly first, and if that does not correct the problem, replace the MWLOOP (HP 8664 or 8665).

- Result code +3,503,nnn is a calibration error indicating spurs are present that cannot be nulled or isolated by the instrument calibration firmware.

Probable cause: This result code (+3,503,nnn) listed in the *Result Codes* subsection indicates a defective FRAC-N that should be replaced. However, the defective assembly could be the VCO or REF OSC (in HP 8643/8644/8645 instruments), or the MWLOOP, GAAS-DIVIDER, REFERENCE, or YTO (in HP 8664 or 8665).

Replace the FRAC-N Assembly first, and if that does not correct the problem, replace the other assemblies in the order listed above.



## TABLE OF CONTENTS

### Troubleshooting - Running Diagnostics

Introducing the Instrument Level Diagnostic . . . . .	2a-1
Assembly Replacement and Instrument Verification . . . . .	2a-2
Setting Up the Instrument . . . . .	2a-3
Activating the ILD and Reading the Result Code . . . . .	2a-4
Interpreting the Result Code . . . . .	2a-5
Locating the Correct Troubleshooting Information . . . . .	2a-6
What Are the Diagnostics . . . . .	2a-7
Conditions Not Covered by the Diagnostics . . . . .	2a-7
How Do the Diagnostics Work? . . . . .	2a-7
Running the ILD . . . . .	2a-9
Setting Up the Instrument . . . . .	2a-9
Activating the ILD and Reading the Result Code . . . . .	2a-10
Interpreting the Result Code . . . . .	2a-10
Locating the Correct Troubleshooting Information . . . . .	2a-12
Returning the Instrument to Operation . . . . .	2a-12
Special Functions Used with ILD . . . . .	2a-13
Other Special Functions Used for Assembly Level Repair . . . . .	2a-16





# 2a

## Troubleshooting - Running Diagnostics

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### ***Introducing The Instrument Level Diagnostic***

The Instrument Level Diagnostic (ILD) tests the instrument and isolates problems to an assembly or cable. In most situations, the ILD will locate the malfunctioning assembly or cable by displaying a positive result code. However, displayed negative result codes indicate that further testing is needed to isolate the problem. To complete the ILD testing, Diagnostic Test Procedures are used.

These procedures direct you to make manual cable connections between assemblies, or between an assembly and the internal volt- or powermeter so that the ILD can finish testing and display a positive result code.

An unsigned result code (neither positive nor negative) indicates the instrument encountered a problem while calibrating itself. To see if the problem is caused by a hardware failure, you use the ILD.

## **Assembly Replacement and Instrument Verification**

After isolating and identifying the defective assembly, the next steps for completing instrument repair are assembly removal, replacement, and then repair verification.

Self-Cal Adjustments for the HP 8664/8665 HF DRVR, GAAS DIV, YTO, and MW LOOP Assemblies must be performed before assembly level repairs (for replacement) are completed.

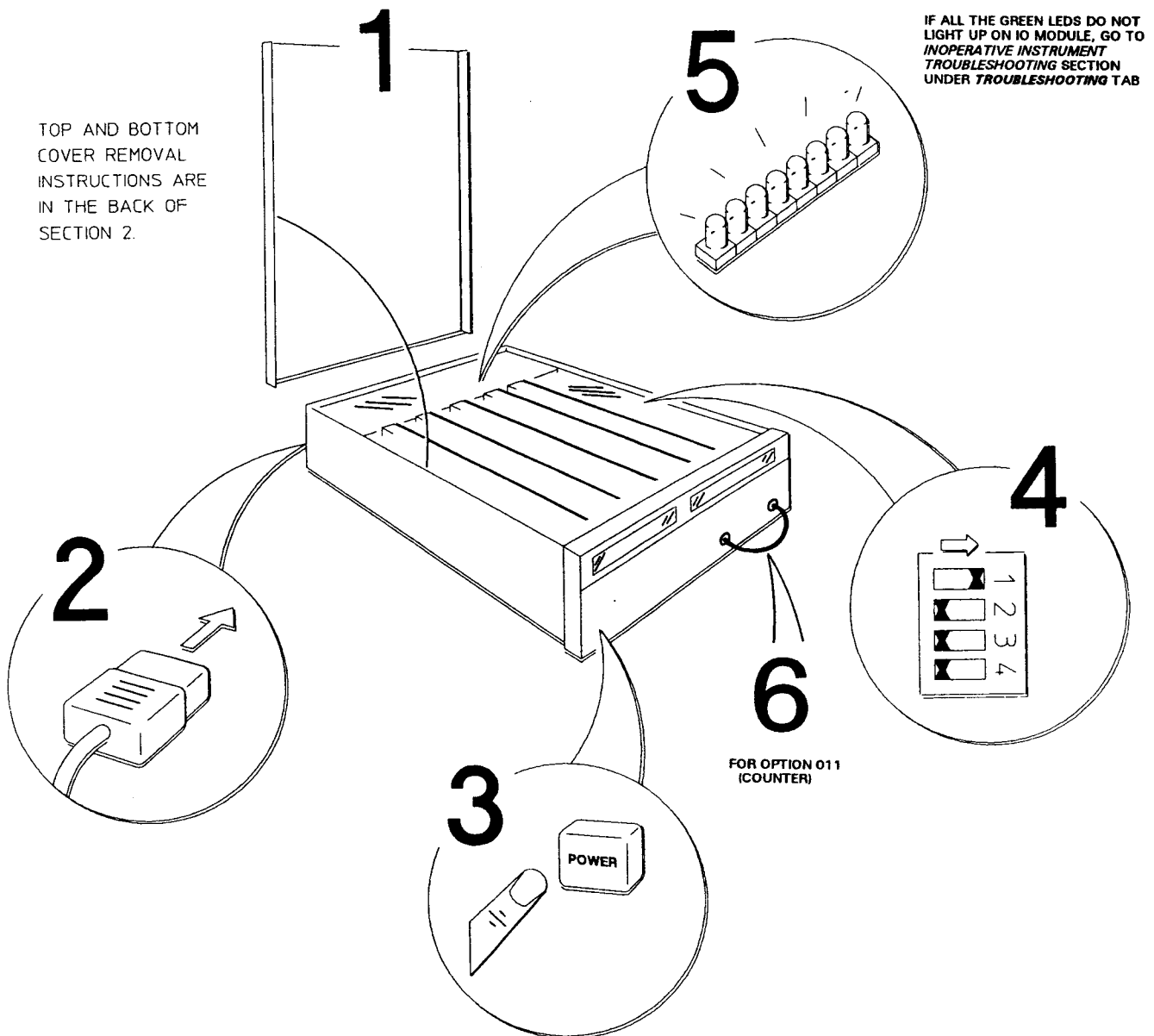
Here is a outline of the steps necessary to complete instrument repairs:

1. Turn to the *Replaceable Parts* section and order the necessary assembly or cable.
2. Turn off instrument and remove the Mains Power cord from the Line Power Assembly.
3. Remove the defective assembly or cable. Removal instructions are listed in this subsection.
4. Install the new assembly or cable. See the *Replaceable Parts* section; subsections *Illustrated Parts*, *Assembly Replacement*, and *Cable Locator*.
5. Perform the correct HP 8664/8665 Assembly Self-Cal Adjustment (if a HP 8664/8665 assembly requiring calibration is being replaced). The HP 8664/8665 Self-Cal Adjustments are found in the *Adjustments* section.
6. Verify that the instrument operates correctly using Special Function 320.
7. Replace all service switches, cables, and covers to their correct positions for normal operation.

## Setting Up The Instrument

1. Remove Top cover.
2. Plug in Line Power cable.
3. Turn on Instrument.
4. Set Service Special Function switch to "ON" (1).
5. Check Power Supply lights.
6. For Option 011 Counter, connect a 30 cm RF cable between the RF OUTPUT and MEAS INPUT connectors.

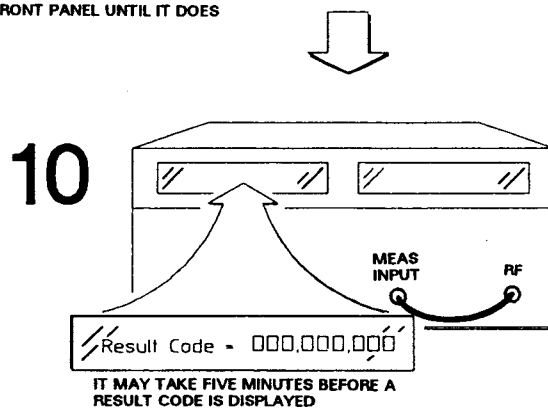
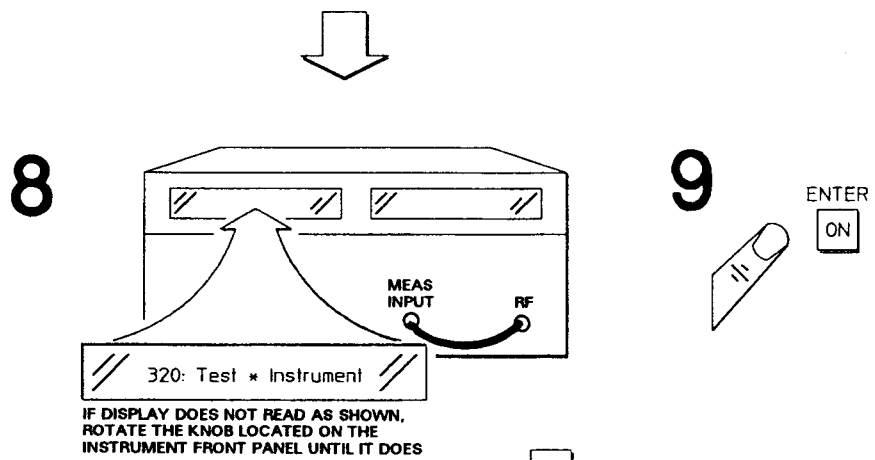
TOP AND BOTTOM COVER REMOVAL INSTRUCTIONS ARE IN THE BACK OF SECTION 2.



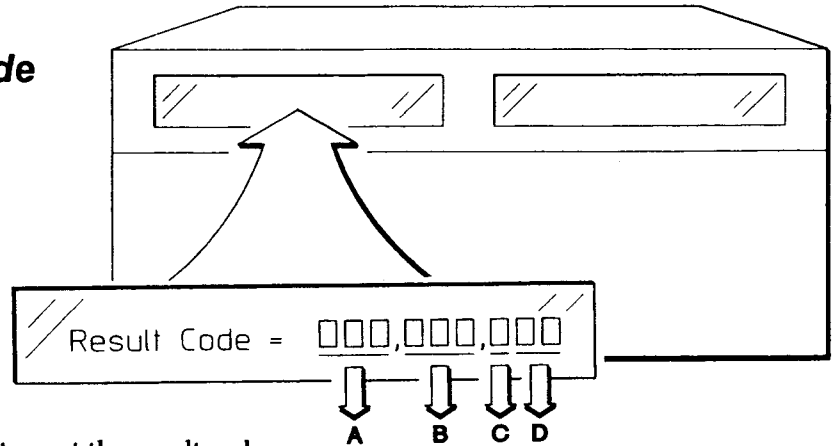
Continue with steps 7 through 12 on following pages.

### Activating The ILD And Reading The Result Code

7. Activate special function 320 by pressing; INSTR PRESET, SPECIAL,3,2,0,and ENTER (ON) keys.
8. Verify the display is reading "320 Test \* Instrument". If this is not displayed, rotate the RPG knob until this message is displayed.
9. Start the diagnostics by pressing the ENTER key.
10. When the diagonstics have finished (about 12 minutes), record the Result Code. (+0 indicates all tests pass).



## Interpreting The Result Code



11. Use the following information to interpret the result code.

### A Result Code Status

The polarity sign indicates the result code status:

A positive (number) means that the diagnostics have isolated the bad assembly.

A negative (number) means that further testing is needed to isolate the bad assembly.

+0 (zero) means that the diagnostics did not detect anything wrong.

The two digits after the polarity sign is the Assembly Function Identifier. This number helps you identify the correct assembly when using the Result Codes list. (Number range is 1-31. Leading zeros are not displayed.)

### B Circuitry Malfunction

These numbers, along with the Assembly Function Identifier, are used to direct you to specific test procedures in locating the problem in the Result Codes list.

### C Instrument Model Identifier

This number indicates the signal generator model:

1 = HP 8643, 8644

2 = HP 8645

3 = HP 8664, 8665

### D Configuration Code

This code indicates what options are installed in the instrument:

10 = STANDARD Model: No Options Installed.

11 = COMM DISCR Installed.

12 = DOUBLER Installed (HP 8643/8644/8645 Only).

12 = PULSE MOD Installed (HP 8664/8665 Only).

13 = COMM DISCR and DOUBLER Installed (HP 8643 8644/8645 Only).

13 = COMM DISCR and PULSE MOD Installed (HP 8664/8665 Only).

14 = AUDIO OSCILLATOR (NSM OSC) Installed (HP 8644A Only).

15 = COMM DISCR and NSM OSC Installed (HP 8644A Only).

16 = DOUBLER and NSM OSC Installed (HP 8643/8644 Only).

17 = COMM DISCR, DOUBLER and NSM OSC Installed (HP 8643/8644 Only).

18 = FREQUENCY COUNTER Installed.

19 = DOUBLER and FREQUENCY COUNTER Installed.

20 = COMM DISCR and FREQUENCY COUNTER Installed.

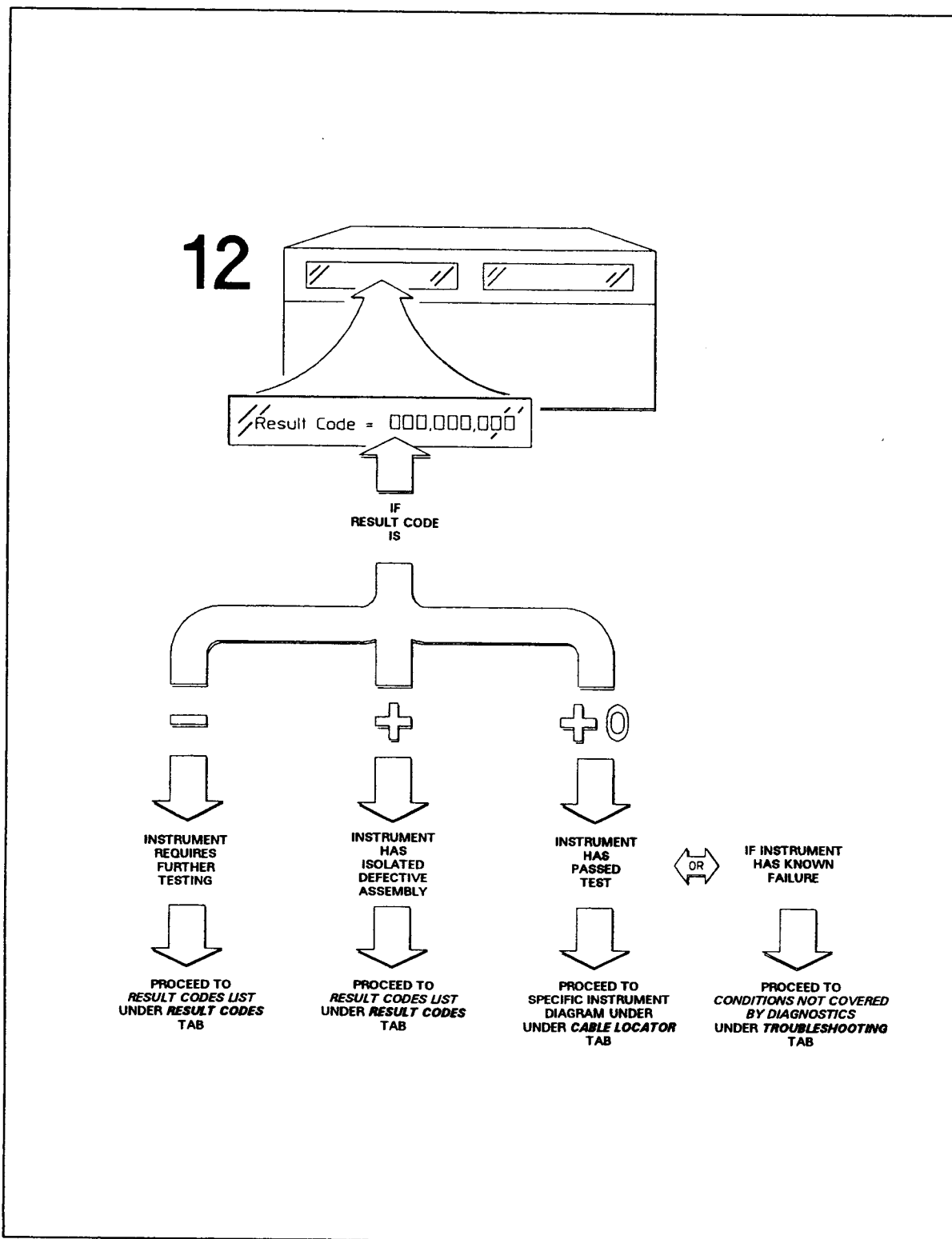
21 = NSM OSC and FREQUENCY COUNTER Installed.

22 = DOUBLER, COMM DISCR and FREQUENCY COUNTER Installed.

23 = DOUBLER, COMM DISCR, NSM OSC and FREQUENCY COUNTER Installed (HP 8643/8644 Only).

## Locating The Correct Troubleshooting Information

12. If you did not get a +0 (zero) Result Code, refer to the *Result Codes* subsection for further action.



### **What Are The Diagnostics?**

The diagnostics consist of firmware test routines that rely upon internal circuit hardware sense points that check for correct voltage outputs at critical locations throughout the instrument. From checking and comparing these voltage measurements against specifications stored in memory, these diagnostics are capable of isolating a faulty assembly or cable. The diagnostics consist of:

1. Instrument Level Diagnostic (ILD) that when activated tests all of the assemblies within the instrument for correct operation.
2. Module Level Diagnostic (MLD) that when activated tests only the assembly specified for correct operation.
3. Diagnostic Test Procedures are part of the diagnostic troubleshooting process that supplement the ILD when it cannot find a problem directly. These written procedures provide specific instructions to follow that help the firmware diagnostics complete the troubleshooting process. In most cases, these test procedures interact with the ILD through Service Special Functions. A summary of the service special functions and what they do is included in this section.

### **Conditions Not Covered By The Diagnostics**

The Instrument Level Diagnostic (ILD) may not diagnose the following problems:

- phase noise,
- spurious signals,
- fast switching,
- wideband modulation.

### **How Do The Diagnostics Work?**

Within the instrument's ROMs (firmware) are routines that monitor the instrument's operation. At power-up or during operation, whenever the instrument fails to perform according to specified parameters stored in ROM memory, error messages are queued into the message register (as indicated by the *MSSG* annunciator display). These error messages usually indicate an assembly failure and/or a calibration error. They do not give specific fault isolation or service troubleshooting information. You must invoke the ILD (Special Function 320 : Test × Instrument) and follow the diagnostic result codes to their conclusion before removing or replacing any assembly or cable.



Diagnostic Result Codes are generated in response to the Instrument Level Diagnostic (ILD) and Module Level Diagnostics (MLD). These result codes indicate specific problems as encrypted within the 7 digit number. The ILD tests the instrument's operation against the specifications, and stops at the first fault condition encountered. The result code returned by the ILD can have a negative (-) sign, a positive sign (+), or no sign in front of it. This sign indicates the status of the result code returned after the ILD has tested the instrument.

Negative result codes indicate that the ILD has tested the instrument to the extent of its capability but needs your help in completing the troubleshooting process to a positive result code. When a negative result code is returned by the ILD, written Diagnostic Test Procedures instruct you to move cables around and make specific voltage or power measurements to confirm signal presence at a specific assembly/cable connection. In these test situations, Special Function 321 (321:Continue Test) is used to continue the test after you have manually moved RF cables for a measurement. The ILD then displays a result code indicating the instrument's status after the test. (There are Diagnostic Test Procedures that instruct you to make voltage or logic probe tests that use other special functions also.)

Positive result codes mean that the ILD has successfully isolated a bad assembly or cable, and that you can then replace the assembly or cable. (The exception to this rule are the result codes in the +13,nnn,nnn; +14,nnn,nnn; +15,nnn,nnn; +16,nnn,nnn range. These result codes are listed in the Result Codes List in subsection *Result Codes* that direct you to a Diagnostic Test Procedure.)

Un-signed result codes mean an Error occurred during the Calibration part of diagnostics. For example a Result Code of 12030 indicates that the MW Extender ALC calibration data is corrupt and further action is required.

Instrument verification is the final step to perform once a bad assembly or cable has been replaced. This process involves running the ILD after an assembly or cable replacement to confirm the repairs made, to double check that no other problems/faults exist in the instrument, and to re-calibrate the instrument for correct operation.

**Running the ILD**

The following instructions more fully explain the steps required to perform ILDs as previously described in steps 1 through 12.

**Setting Up The Instrument: Steps 1 through 6.**

1. Remove the top cover.
2. Plug in the power cable. (Disconnect all other cables from the instrument.)
3. Turn on instrument power.
4. Locate SW1, the 4-bit Configuration Switch on the Controller board (assembly slot A16). Switch bit 1 or "A" to the right (away from the center of the instrument). This enables the Service Diagnostics which includes all the 300 level service special functions.
5. Visually confirm that all the power supply indicator LED's (located on the I/O Board at the right rear corner of the instrument) are lit. (The +21 V dc and +25 V dc LED indicators should turn on when the power cord is plugged into the instrument.)
6. For Option 011 equipped instruments, connect a 30 cm (12 in.) RF cable between the RF OUTPUT and MEAS INPUT connectors.

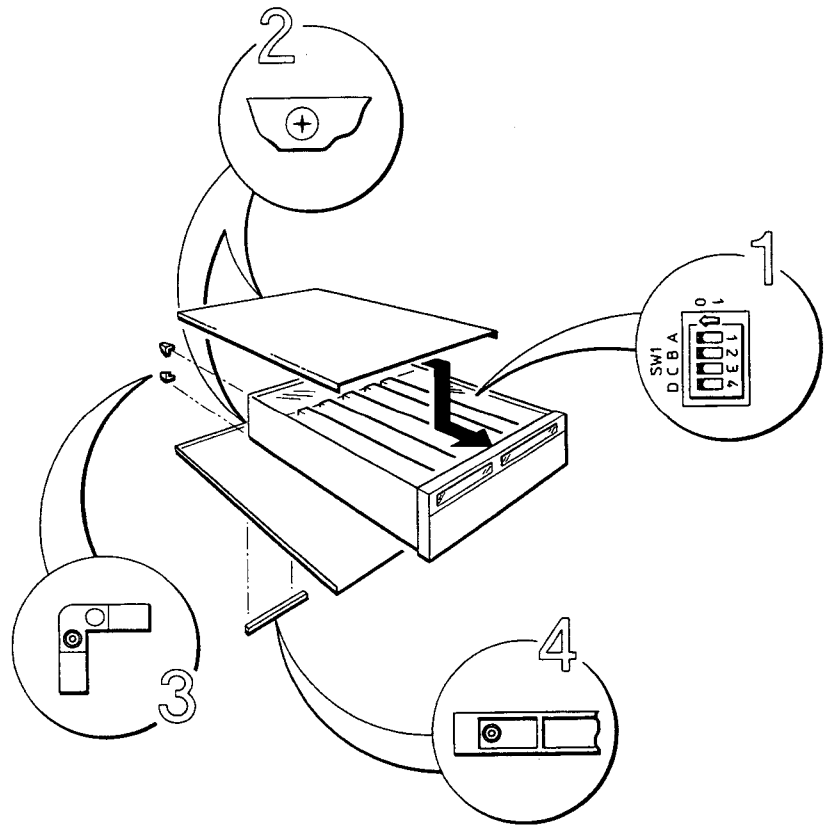


Figure 2a-1. Returning the Instrument to Operation

**Activating The ILD And Reading The Result Code: Steps 7 through 10.**

7. Press **INSTR PRESET**. Key in SPECIAL 320, press the **ON** key once. Confirm that **320: Test Instrument** is displayed, then press the **ON** key again.
8. If **320: Test Instrument** is not displayed, turn the KNOB until it is.
9. Press **ON**. The ILD test may take up to 12 minutes before displaying a result code.
10. When finished, the signal generator will display an ILD result code on the front panel in the following format (the number value and polarity sign will vary).

**Interpreting The Result Code**

11. This step outlines what the different digits in the result code represent. Understanding what the numbers mean is important in using this manual correctly. Refer to this result code example as you read through the following paragraphs that explain the specific number meanings.

**Example:**

Result code = -4,151,213

msg

- The Polarity Sign defined in box A is part of the Result Code Status that indicates whether the result code is either positive (plus), or negative (minus). Comparing with the example result code above, the status is negative indicating that further testing is needed to complete the troubleshooting process.

The digits as defined in the lower portion of box A represents the Assembly Function Identifier (number range is from 1 to 31, leading zeros are not displayed). This number in the result code identifies the assembly that either detected that an error condition exists, or is the actual cause of the problem.

In the result code example above, the Assembly Function Identifier portion of the code is represented by 4. This indicates that the ILD found the error originating with the Modulation Distribution assembly (MOD DIST in the HP 8645A) or Standard Modulation assembly (STD MOD in the HP 8644A). Note that with a negative result code this is not conclusive evidence that the MOD DIST or STD MOD assembly is the faulty assembly. The actual problem may exist in an "upstream" assembly.

- The digits as defined in box B represents the specific block of circuitry within the assembly indicating the error condition.

In the result code example the Circuit Function Identifier portion of the code is represented by the number 151 which indicates the specific block of circuitry within the assembly indicating the error condition. This information is especially useful in troubleshooting the assembly down to the component level. It is beyond the purpose of this manual to list what circuit blocks these SSS codes refer to, or to explain component level repair.

- The digits as defined in box C represent the Instrument Model Identifier.

In the result code example the number 2 identifies the specific HP 8645A Agile Signal Generator model.

- The digits as defined in box D represent the Configuration Code of the instrument. This information defines which assembly options are installed in the instrument. It may seem confusing that two "12" and "13" configuration codes exist. Keep in mind that when these numbers are combined with the Instrument Model Identifier, the correct combination of options will be understood. For example, if the last three digits of the displayed result code are 212, when looked up in "Block E", you will see that the instrument is a HP 8645A and the Option installed is the (Frequency) Doubler Assembly.

In the result code example, the number 10 indicates the standard configuration. That is, no optional assemblies are installed in this instrument.

### **Locating The Correct Troubleshooting Information**

- This step shows you where to turn next to complete troubleshooting based upon the result code status (+0, positive, or negative).

#### **Note**

*If the instrument does not respond to front panel key inputs, or appears "dead" (that is, no apparent power), or if you are unable to complete the instrument test routine, turn to Inoperative Instrument Troubleshooting located in the Troubleshooting section.*

- A displayed negative (–) result code indicates that further testing is required to isolate the failure. Using the 7-digit result code, turn to the *Result Codes* section to look up the result code and locate which diagnostic test procedure needed for assembly testing.
- A displayed positive result code indicates that the diagnostics have isolated the defective assembly or cable. Using the 7-digit result code refer to the *Result Codes* section to identify the indicated assembly for replacement and (repair) verification.
- A displayed result code of +0 indicates that the ILD test passed; no assembly failures were detected. If a displayed result code of +0 is returned after the ILD was run to verify repairs, this indicates that the repairs corrected the failure.
- Un-signed Result Codes mean an Error occurred during the Calibration part of diagnostics. For example a Result Code of 12030 indicates that the MW Extender ALC calibration data is corrupt and further action is required.

If the ILD test is unable to detect a failure that you know exists in the instrument, (a zero result code is returned) proceed to the *Troubleshooting* section (*Conditions Not Covered By Diagnostics*) for further troubleshooting helps.

### **Returning The Instrument To Operation**

Reset the Service Diagnostics Enable Switch, replace the covers, and other hardware before returning the instrument to operational status.

## Special Functions Used with ILD

Special Functions are the 300 level special functions used in troubleshooting and servicing the instrument. This list of special functions are those special functions that are used for assembly level repair. It is not an exhaustive list of all the 300 level special functions.

- Special Function 300: [300: Service (off) or (on)] indicates whether the service mode is activated or not. For example, if Special Function 300 is entered when the Service Diagnostics Enable Switch is off (dip switch A of SW1 is in the •0 position), the instrument displays "300: Service off".

---

### Note

*When the Service Diagnostics Enable Switch is off (dip switch A of SW1 is in the •0 position), any entry of a 300 level special function will result in the instrument displaying "No such special".*

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- Special Function 301: [301: Diag. Module (nn)] Sets the voltmeter to monitor assembly functions. The assembly number (nn) needed is the same number that identifies assembly result codes. For example, 1 is Coax DISCR, 2 is VCO, 3 is FRAC-N, etc.  
This special function acts like a "prefix" that points the instrument to monitor specific functions within an assembly that are further defined by the lower level special functions such as 302, 303, and 304.
- Special Function 304: [304: Diag. Mux (nn)] Selects the specific diagnostic Mux line (multiplexed sense point) to be monitored and displayed by the voltmeter (when Special Function 306 is selected). The Mux number (nn) is the decimal equivalent of the binary number required to select the desired signal line (of the diagnostic mux) to be measured.
- Special Function 305: [305: Voltmeter Mode (DC or AC)] Sets the internal voltmeter mode to AC or DC. Selection is made by rotating the front panel KNOB left for AC, right for DC.
- Special Function 306: [306: Voltmeter +nnn.n mV] Turns on the voltmeter and displays the voltage of the function selected (by other special functions such as SPCL 301 and 304).

- Special Function 315: [315: RPG | | | | | | | |] activates the RPG (Front Panel KNOB) "domino effect test". This special function is not the conclusive test for RPG (KNOB) functionality. (To thoroughly test the RPG KNOB, perform the RPG (KNOB) test in *Front Panel Checks* located in section 1.
- Special Function 320: [320: Test Instrument] activates the instrument level diagnostic mode for testing all of the instrument. Activating Special Function 320 and rotating the Front Panel KNOB (the RPG control) allows you to select individual assembly (320: Test Assembly Name).
- Special Function 321: [321: Continue Test (ON)] continues the previously activated diagnostic test using Special Function 320. This special function is primarily used for diagnostic test procedures where coax cables are connected to the internal volt and power meters to check for output signal.
- Special Function 325: [325: LastResult (number)] displays the last result code generated by the diagnostics or any firmware controlled code or message.

If using Special Function 325 to recall the last displayed result code, you must not change the status of the instrument (i.e., turn it on or off, or enter another special function) before using Special Function 325 to recall the last displayed result code.

- Special Function 326: [326: RepTst (Assembly Name)] causes the activated diagnostic routine to repeat itself until the instrument power is turned off (hard instrument reset). To activate this function, key in SPCL 326 and press "ON". Turn the KNOB on the Front Panel until the desired assembly name is displayed. Then press "ON" again.

This special function is used to determine intermittent failures that a "once through" single test would not detect. When a diagnostic test is running, voltage, power, and/or digital control signal measurements are made by the diagnostic routines. Repeating the test continuously allows you to monitor the circuitry until a decisive fault is observed.

When used to troubleshoot digital control problems, the technique is to use a logic probe to trace the presence or absence of digital signals through a specific control line.

- Special Function 327: [327: Cable Test ?] tests for shorted or open assembly (control) ribbon cable conditions when used in conjunction with the Ribbon Cable Test Board (08645-60143). To identify which assembly control ribbon cable to test, the specific Assembly Function Identifier (ID) Number must be entered.  
to use this special function correctly, these instructions must be followed:
  - a. Always turn power off when dis-connecting or connecting assembly control ribbon cables.
  - b. On the Ribbon Cable Test Board, either the SERIAL I/O Jumper or the PARALLEL I/O Jumper (depending on which type of control interface cable you are testing) but not both, needs to be in the TEST position (J6 or J5 respectively). Only one cable can be tested at a time.
  - c. Key in Special 327 and press  ON. At the [327: Cable Test ?] prompt, key in the specific Assembly Function Identifier (ID) Number to identify which assembly control ribbon cable to test. (This assembly ID number can be found in the Assembly function ID Number table in Diagnostic Test 7B, or is derived from the first one or two digits of the positive result code.)
  - d. If the result code returned is +27,000,nnn this indicates that the test passes, the cable is good.
  - e. If the result code returned is +27,999,nnn this indicates that either an incorrect Assembly ID Number was entered, a mistake was made in the entry procedure, or that the ribbon cable test board was incorrectly set-up.
  - f. If the result code returned is +27,XXX,nnn (where XXX represents a non-zero number) the test does not pass, the cable is defective.
- Special Function 335: [335: Set Ser # ] allows you to enter the instrument's serial number into memory. These HP 8664/8665 Self-Cal Adjustments calibrate the MW LOOP Assembly after replacement or component level repair. These procedures involve firmware routines and manual voltage adjustments necessary for optimum assembly operation.
- Special Function 340: [340: MWL Cal 1 (Press ON)] This HP 8664/8665 MW LOOP calibration routine "learns" the correct pretune DAC values for various frequencies, then saves that data in EEPROM for use during normal instrument operation.



- Special Function 341: [341: MWL Cal 2 (Press ON)] This HP 8664/8665 MW LOOP calibration routine generates the FM coil calibration factor (manual adjustment is required). This routine must be performed after Special Function 340.
- Special Function 342: [342: MWL Cal 3 (Press ON)] This HP 8664/8665 MW LOOP calibration routine generates the FM gain calibration factor (manual adjustment is required). This routine must be performed after Special Function 341.

#### **Other Special Functions Used For Assembly Level Repair**

- Special Function 171: [171: Recal (Press On)] allows you to recalibrate the whole instrument. A recalibration takes about three minutes.

When the recalibration routine is finished, an unsigned Result Code (that is, no plus or minus sign in front of the result code leading digit), is returned. This unsigned result code indicates that a specific problem exists, but cannot provide you with the isolation troubleshooting process to find the fault. You must use Special Function 320.

- Special Function 180: [180: DC Voltmeter + 0.00V] allows you to use the instrument as a DC voltmeter. DC voltages are monitored from the rear panel VM IN (BNC) connector, or through the SMC connector on top of the Controller Assembly. (The green wire is wire from the rear panel VM IN connector.) the instrument's serial number into memory.
- Special Function 181: [181: AC Voltmeter + 0.00V] allows you to allows you to use the instrument as an AC voltmeter. AC voltages are monitored from the rear panel VM IN (BNC) connector, or through the voltmeter SMC connector on top of the Controller Assembly. (The green wire is wire from the rear panel VM IN connector.) the instrument's serial number into memory.
- Special Function 182: [182: Power Meter dBm] allows you to allows you to use the instrument as a Power meter. AC voltages are monitored from the SMC connector on top of the Controller Assembly (next to the voltmeter connector).

# TABLE OF CONTENTS

## Troubleshooting - Result Codes

Positive Result Codes Explanation . . . . .	2b-1
Negative Result Codes Explanation . . . . .	2b-2
How to Use Result Codes and Diagnostic Test Procedures . . . . .	2b-2
Unsigned Result Codes Explanation . . . . .	2b-2
Result Codes List . . . . .	2b-4



# 2b

## Troubleshooting - Result Codes

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### **Positive Result Codes Explanation**

Positive result codes indicate that the ILD has successfully isolated a faulty assembly (with the exception of result codes +14,nnn,nnn or +15,nnn,nnn).

### **Result Codes List**

The Result Codes list in this section displays all the result codes. Look up the displayed result code in the list. Each result code identifies the faulty assembly (according to the result code's Assembly Function Identifier digit) in the next column. At this point, you replace the assembly using the *Assembly Replacement* procedure to complete repairs and return the instrument to operation.

For positive result codes +14,nnn,nnn through +15,nnn,nnn, and all negative result codes, the information in the next column indicates an assembly name, a specific connector, and a Diagnostic Test Procedure (to perform). For these result codes, turn to the diagnostic test procedure and follow the instructions at the assembly and connector indicated.

## Negative Result Codes Explanation

### How To Use Result Codes and Diagnostic Test Procedures

Negative result codes indicate that the instrument diagnostics have not completely isolated the problem, and that you need to manually interact with the instrument. The Result Codes list in this section displays negative result codes that will direct you to a specific Diagnostic Test Procedure and the assembly and assembly connector at which to perform the test. Here are the steps for using the information in the Result Codes list.

#### Note

*To view the last displayed result code, enter Special 325 **[ON]**. This will display the last result code generated by the ILD. However, Function 325 will also display any other firmware controlled code or message. Therefore, you must not change the status of the instrument (i.e., turn it on or off, or enter another special function) before using Special Function 325 to recall the last displayed result code.*

1. Look up the displayed result code in the Result Codes list. n's in the result code number indicate a "don't care" condition. That is, at this point only the polarity sign, Assembly Function Identifier and Instrument Identifier (if supplied) are necessary to direct you to the suspected assembly.
2. Read right to the center column to find the indicated assembly and the specific assembly connector at which the test is made.
3. The last column in Result Codes list shows the Diagnostic Test Procedure that you will use to help diagnose the problem.

Turn to the indicated Diagnostic Test Procedure and follow the instructions. Each test includes all the information necessary to test the instrument for the condition indicated by the negative result code. In some cases the test procedure will not result in a displayed result code, but will have you make voltage or digital logic probe measurements to arrive at a fault diagnosis.

4. Once a positive result code is displayed, turn to the Result Codes list to identify the assembly for replacement, i.e., positive codes without test conditions.

## Unsigned Result Codes Explanation

Result codes displayed without a negative or positive sign are calibration error codes. These indicate additional action is required to return the instrument to working condition.

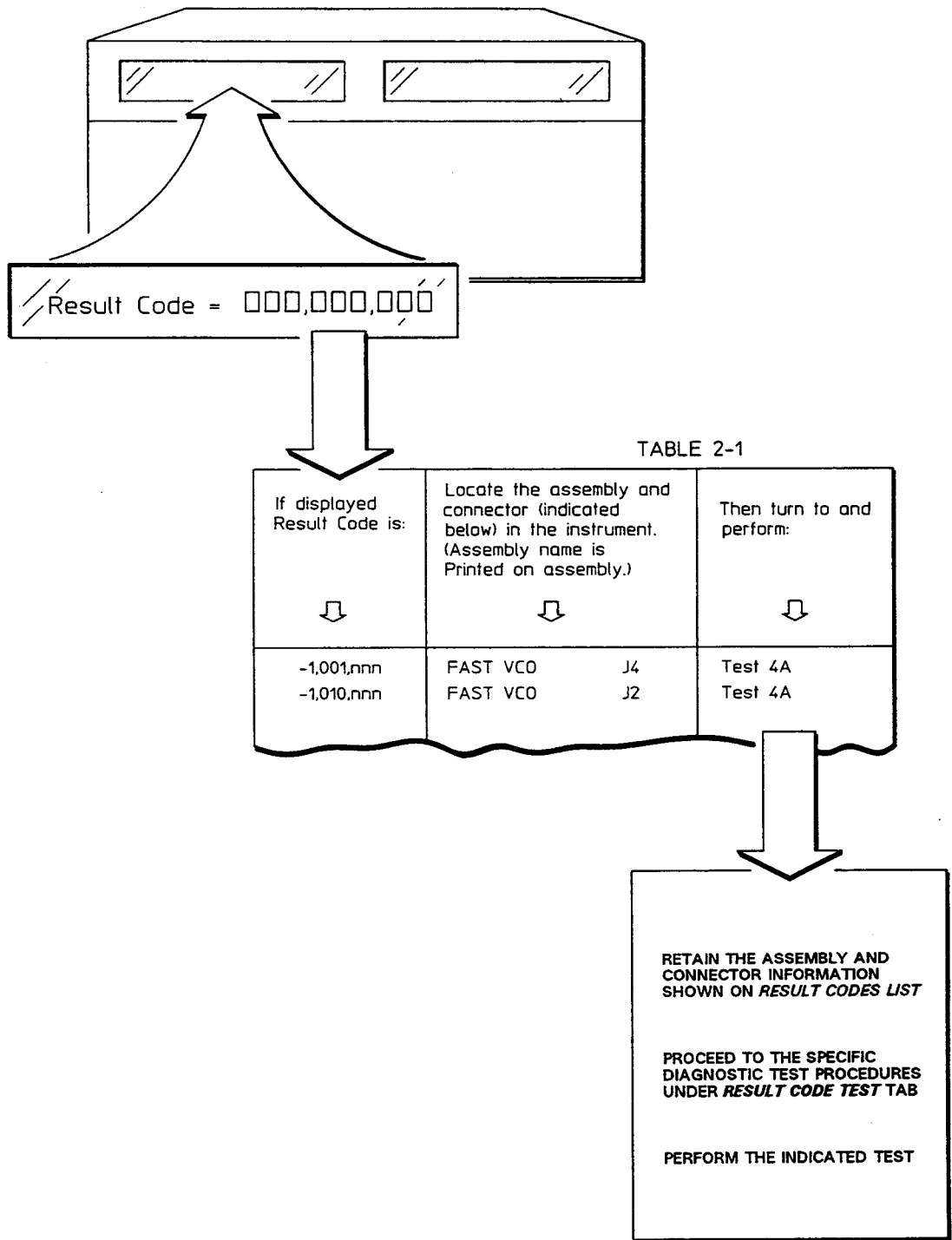


Figure 2b-1. Using The Result Code Test Data

## *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
-1,001,nnn	COAX DSC - J5	Test 7A
-1,010,nnn to -1,025,nnn	COAX DSC - J5	Test 7A
+1,010,nnn to +1,025,nnn +1,029,nnn	COAX DSC COAX DSC	
-1,030,nnn to -1,037,nnn +1,030,nnn to +1,037,nnn	COAX DSC - J5 COAX DSC	Test 7A
-1,040,nnn +1,041,nnn -1,042,nnn +1,042,nnn -1,043,nnn	COAX DSC - J1 COAX DSC COAX DSC - J5 COAX DSC COAX DSC - J5	Test 2A Test 7A Test 7A
+1,043,nnn -1,044,nnn -1,045,nnn +1,045,nnn -1,046,nnn	COAX DSC COAX DSC - J1 COAX DSC - J5 COAX DSC COAX DSC - J5	Test 2A Test 7A Test 7A
+1,046,nnn -1,050,nnn -1,051,nnn -1,052,nnn -1,053,nnn	COAX DSC COAX DSC - J4 COAX DSC - J4 COAX DSC - J4 COAX DSC - J4	Test 2A Test 2A Test 2A Test 2A
+1,054,nnn +1,055,nnn +1,056,nnn -1,057,nnn +1,057,nnn	COAX DSC COAX DSC COAX DSC COAX DSC - J5 COAX DSC	Test 7A
-1,058,nnn +1,058,nnn -1,060,nnn to -1,063,nnn	COAX DSC - J5 COAX DSC COAX DSC - J5	Test 7A Test 7A
+1,060,nnn +1,061,nnn +1,062,nnn +1,063,nnn	COAX DSC COAX DSC COAX DSC COAX DSC	

## *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
-1,065,nnn to -1,068,nnn +1,065,nnn to +1,069,nnn	COAX DSC - J5  COAX DSC	Test 7A
+1,077,nnn +1,078,nnn +1,079,nnn -1,080,nnn +1,081,nnn	COAX DSC COAX DSC COAX DSC COAX DSC - J6 COAX DSC	Test 5
-1,082,nnn +1,083,nnn -1,084,nnn +1,085,nnn -1,086,nnn	COAX DSC - J6 COAX DSC COAX DSC - J6 COAX DSC COAX DSC - J6	Test 5  Test 5  Test 5
+1,087,nnn -1,090,nnn +1,091,nnn -1,092,nnn +1,093,nnn	COAX DSC COAX DSC - J10 COAX DSC COAX DSC - J10 COAX DSC	Test 1A  Test 1A
-1,094,2nn +1,095,nnn -1,096,2nn +1,097,nnn -1,098,nnn	COAX DSC - J10 COAX DSC COAX DSC - J10 COAX DSC COAX DSC - J5	Test 1A  Test 1A  Test 7A
+1,098,nnn -1,099,nnn +1,099,nnn -1,100,nnn +1,101,nnn	COAX DSC COAX DSC - J5 COAX DSC COAX DSC - J10 COAX DSC	Test 7A  Test 1A
-1,102,nnn +1,102,nnn -1,103,nnn +1,103,nnn -1,104,nnn	COAX DSC - J5 COAX DSC COAX DSC - J5 COAX DSC COAX DSC - J10	Test 7A  Test 7A  Test 1A
+1,105,nnn -1,106,nnn +1,106,nnn -1,107,nnn +1,107,nnn	COAX DSC COAX DSC - J5 COAX DSC COAX DSC - J5 COAX DSC	Test 7A  Test 7A
-1,110,nnn +1,111,nnn -1,112,nnn to -1,115,nnn +1,112,nnn	COAX DSC - J8 COAX DSC  COAX DSC - J5 COAX DSC	Test 1A   Test 7A



### *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+1,113,nnn	COAX DSC	
+1,114,nnn	COAX DSC	
+1,115,nnn	COAX DSC	
-1,120,nnn to -1,124,nnn	COAX DSC - J5	Test 7A
+1,120,nnn	COAX DSC	
+1,121,nnn	COAX DSC	
+1,122,nnn	COAX DSC	
+1,123,nnn	COAX DSC	
+1,124,nnn	COAX DSC	
+1,127,nnn	COAX DSC	
+1,128,nnn	COAX DSC	
+1,129,nnn	COAX DSC	
-1,131,nnn +1,131,nnn	COAX DSC - J8 COAX DSC	Test 1A
-1,150,nnn +1,151,nnn	COAX DSC - J8 COAX DSC	Test 1A
-1,152,nnn +1,153,nnn	COAX DSC - J8 COAX DSC	Test 1A
-1,154,nnn	COAX DSC - J8	Test 1A
+1,155,nnn -1,156,nnn	COAX DSC COAX DSC - J8	Test 1A
+1,157,nnn -1,158,nnn	COAX DSC COAX DSC - J8	Test 1A
+1,159,nnn	COAX DSC	
-1,160,nnn +1,161,nnn	COAX DSC - J8 COAX DSC	Test 1A
+1,200,nnn to +1,213,nnn	COAX DSC	
+1,250,nnn	COAX DSC	
+1,998,nnn	COAX DSC	
-1,999,nnn	COAX DSC - J5	Test 7A
-2,001,1nn	STD VCO - J4	Test 7A
-2,001,2nn	FAST VCO - J3	Test 9
-2,002,1nn	STD VCO - J4	Test 7A
-2,002,2nn	FAST VCO - J3	Test 9
-2,007,2nn	FAST VCO - J3	Test 9
+2,008,1nn	STD VCO	
+2,008,2nn	FAST VCO	
-2,008,2nn	(Replace Fast Controller Board)	
+2,009,1nn	STD VCO	
+2,009,2nn	FAST VCO	
-2,009,2nn	(Replace Fast Controller Board)	

### *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
-2,010,2nn to -2,013,2nn -2,020,2nn -2,021,2nn	FAST VCO - J3 FAST VCO - J3 FAST VCO - J3	Test 9 Test 9 Test 9
-2,026,2nn to -2,030,2nn -2,032,2nn	FAST VCO - J3 FAST VCO - J13	Test 9 Test 1A
-2,033,2nn to -2,039,2nn +2,033,2nn +2,033,3nn +2,045,1nn	FAST VCO - J3 FAST VCO MW LOOP (Must do MW Loop Adj.) STD VCO	Test 9
+2,045,2nn -2,045,2nn to -2,049,2nn +2,046,1nn	FAST VCO  FAST VCO - J3 STD VCO	Test 9
+2,046,2nn +2,047,1nn +2,047,2nn +2,048,1nn +2,048,2nn	FAST VCO STD VCO FAST VCO STD VCO FAST VCO	
+2,049,1nn +2,049,2nn -2,050,1nn -2,050,2nn +2,051,1nn	STD VCO FAST VCO STD VCO - J8 FAST VCO - J6 STD VCO	Test 1A Test 1A
+2,051,2nn +2,051,3nn -2,052,2nn -2,053,2nn to -2,067,2nn	FAST VCO MW LOOP (Must do MW Loop Adj.) FAST VCO - J6  FAST VCO - J3	Test 1A Test 9
+2,053,2nn +2,053,3nn +2,070,1nn -2,070,2nn to -2,086,2nn	FAST VCO MW LOOP (Must do MW Loop Adj.) STD VCO  FAST VCO - J3	Test 9
+2,071,1nn to +2,082,1nn +2,085,1nn +2,086,1nn	STD VCO STD VCO STD VCO	

## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
-2,090,1nn to -2,099,1nn +2,090,1nn	STD VCO - J1 STD VCO	Test 4A
-2,090,2nn to -2,099,2nn	FAST VCO - J5	Test 4A
+2,091,1nn to +2,100,1nn -2,100,2nn +2,100,2nn	STD VCO FAST VCO - J3 FAST VCO	Test 9
-2,103,2nn to -2,106,2nn +2,104,1nn +2,104,2nn +2,105,1nn	FAST VCO - J3 STD VCO FAST VCO STD VCO	Test 9
+2,105,2nn -2,110,2nn to -2,119,2nn -2,120,2nn +2,120,2nn	FAST VCO FAST VCO - J2 FAST VCO - J3 FAST VCO	Test 4A Test 9
+2,127,1nn -2,127,2nn to -2,150,2nn +2,128,1nn +2,128,2nn	STD VCO FAST VCO - J3 STD VCO FAST VCO	Test 9
+2,129,3nn +2,131,3nn to +2,150,3nn +2,157,1nn +2,157,2nn	MW LOOP (Must do MW Loop Adj.) MW LOOP (Must do MW Loop Adj.) STD VCO (Possible I/O Assembly Failure) FAST VCO (Possible I/O Assembly Failure)	
-2,157,2nn +2,158,1nn -2,158,2nn +2,159,1nn -2,159,2nn	FAST VCO - J3 STD VCO FAST VCO - J3 STD VCO FAST VCO - J3	Test 9 Test 9 Test 9
+2,168,1nn +2,168,2nn -2,168,2nn +2,169,1nn +2,169,2nn	STD VCO FAST VCO FAST VCO - J3 STD VCO FAST VCO	Test 9

### *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
-2,169,2nn	FAST VCO - J3	Test 9
-2,170,1nn	STD VCO - J5	Test 1A
-2,170,2nn	FAST VCO - J10	Test 2A
-2,171,1nn	STD VCO - J5	Test 1A
-2,171,2nn	FAST VCO - J10	Test 2A
-2,172,1nn	STD VCO - J5	Test 1A
-2,172,2nn	FAST VCO - J10	Test 2A
-2,173,1nn	STD VCO - J5	Test 1A
-2,173,2nn	FAST VCO - J10	Test 2A
-2,174,2nn to		
-2,178,2nn	FAST VCO - J3	Test 9
+2,174,2nn	PH SHIFT (Slot A5)	
+2,175,2nn	PH SHIFT (Slot A5)	
+2,176,2nn	DELAY LINE (Slot A2/A3)	
+2,177,1nn	STD VCO	
+2,177,2nn	FAST VCO	
+2,178,2nn	FAST VCO	
-2,179,2nn	PH SHIFT - J3	Test 10
+2,180,1nn	STD VCO	
-2,180,2nn	FAST VCO - J10	Test 2A
+2,180,2nn	FAST VCO	
+2,181,1nn	STD VCO	
-2,181,2nn	FAST VCO - J10	Test 2A
+2,199,nnn	FAST VCO	
-2,199,2nn to		
-2,212,2nn	FAST VCO - J3	Test 9
+2,207,1nn	STD VCO	
-2,220,1nn	STD VCO - J6	Test 1A
+2,221,1nn	STD VCO	
+2,222,1nn	STD VCO	
+2,223,1nn	STD VCO	
-2,225,1nn	STD VCO - J6	Test 1A
+2,226,1nn	STD VCO	
+2,227,1nn	STD VCO	
-2,228,1nn	STD VCO - J6	Test 1A
+2,229,1nn to	STD VCO	
+2,246,1nn	STD VCO	
-2,250,1nn	STD VCO - J6	Test 1A
+2,251,1nn	STD VCO	
+2,251,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,254,1nn	STD VCO	
-2,255,1nn	STD VCO - J8	Test 1A
+2,256,1nn	STD VCO	
-2,257,1nn	STD VCO - J8	Test 1A

## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+2,258,1nn	STD VCO	
-2,260,1nn	STD VCO - J3	Test 4A
to		
-2,269,1nn	STD VCO - J3	Test 4A
+2,270,1nn	STD VCO	
to		
+2,278,1nn	STD VCO	
+2,280,1nn	STD VCO	
+2,281,1nn	STD VCO	
+2,282,1nn	STD VCO	
+2,290,1nn	STD VCO	
+2,291,1nn	STD VCO	
+2,294,1nn	STD VCO	
+2,295,1nn	STD VCO	
+2,296,1nn	STD VCO	
+2,297,1nn	STD VCO	
+2,301,1nn	STD VCO	
+2,302,1nn	STD VCO	
+2,303,1nn	STD VCO	
+2,303,2nn	FAST VCO	
+2,304,2nn	FAST VCO	
+2,305,2nn	FAST VCO	
+2,306,1nn	STD VCO	
+2,306,2nn	FAST VCO	
+2,307,1nn	STD VCO	
+2,307,2nn	FAST VCO	
+2,308,1nn	STD VCO	
+2,308,2nn	FAST VCO	
+2,309,1nn	STD VCO	
+2,309,2nn	FAST VCO	
+2,310,1nn	STD VCO	
+2,311,1nn	STD VCO	
+2,400,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,401,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,402,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,403,3nn	Turn to <i>Non-Specific Result Codes</i> under <i>Conditions Not Covered By Diagnostics</i> in <i>Troubleshooting</i> section	
+2,404,3nn	MW LOOP (Must do MW Loop Adj.)	
-2,410,3nn	MW LOOP/PLL YIG - J3	Test 1B
+2,411,3nn	MW LOOP (Must do MW Loop Adj.)	
-2,412,3nn	MW LOOP/PLL YIG - J1	Test 17
+2,413,3nn		
to		
+2,422,3nn	MW LOOP (Must do MW Loop Adj.)	

## ***Result Codes List***

<b><u>Result Code</u></b>	<b><u>Assembly/Connector</u></b>	<b><u>Test</u></b>
-2,425,3nn	MW LOOP/PLL YIG - J2	Test 1B
+2,426,3nn	MW LOOP (Must do MW Loop Adj.)	
-2,427,3nn	MW LOOP/PLL YIG - J4	Test 1A
+2,428,3nn		
to		
+2,437,3nn	MW LOOP (Must do MW Loop Adj.)	
-2,438,3nn	MW LOOP/PLL YIG - J1	Test 17
+2,440,3nn		
to		
+2,453,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,455,3nn	MW LOOP (Must do MW Loop Adj.)	
-2,456,3nn	MW LOOP/DIVIDER - J2	Test 4A
-2,457,3nn	MW LOOP/DIVIDER - J1	Test 4A
-2,458,3nn	MW LOOP/DIVIDER - J2	Test 4A
-2,459,3nn	MW LOOP/DIVIDER - J1	Test 4A
-2,460,3nn	MW LOOP/DIVIDER - J2	Test 4A
-2,461,3nn	MW LOOP/DIVIDER - J1	Test 4A
-2,462,3nn	MW LOOP/DIVIDER - J2	Test 4A
-2,463,3nn	MW LOOP/DIVIDER - J1	Test 4A
-2,464,3nn	MW LOOP/DIVIDER - J2	Test 4A
-2,465,3nn	MW LOOP/DIVIDER - J1	Test 4A
-2,466,3nn	MW LOOP/DIVIDER - J2	Test 4A
-2,467,3nn	MW LOOP/DIVIDER - J1	Test 4A
-2,468,3nn	MW LOOP/DIVIDER - J2	Test 4A
-2,469,3nn	MW LOOP/DIVIDER - J1	Test 4A
-2,470,3nn	MW LOOP/DIVIDER - J2	Test 4A
-2,485,3nn	MW LOOP/PLL YIG - J3	Test 1B
+2,486,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,487,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,488,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,491,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,492,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,493,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,494,3nn	MW LOOP (Must do MW Loop Adj.)	
+2,500,3nn	YIG TUNED OSCILLATOR (Must do MW Loop Adj.)	
+2,501,3nn	YIG TUNED OSCILLATOR (Must do MW Loop Adj.)	
+2,502,3nn	YIG TUNED OSCILLATOR (Must do MW Loop Adj.)	
+2,600,3nn	GAAS DIVIDERS (slot A14)	
+2,601,3nn	GAAS DIVIDERS (slot A14)	
+2,602,3nn	GAAS DIVIDERS (slot A14)	
+2,603,3nn	GAAS DIVIDERS (slot A14)	
+2,998,1nn	STD VCO	
+2,998,2nn	FAST VCO	
-2,999,1nn	STD VCO - J4	Test 7A
-2,999,2nn	FAST VCO - J3	Test 9
-2,999,3nn	MW LOOP/PLL YIG - J5	Test 7A

### *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
-3,001,nnn	FRAC-N - J3	Test 7A
-3,010,nnn	FRAC-N - J1	Test 2A
+3,011,nnn	FRAC-N	
-3,012,nnn	FRAC-N - J3	Test 7A
+3,012,nnn	FRAC-N	
+3,020,nnn	FRAC-N	
-3,021,1nn	REF OSC/STD ALC - J2	Test 8
-3,021,2nn	REF OSC/FAST ALC - J2	Test 8
-3,022,1nn	REF OSC/STD ALC - J2	Test 8
-3,022,2nn	REF OSC/FAST ALC - J2	Test 8
-3,030,nnn	FRAC-N - J3	Test 7A
+3,030,nnn	FRAC-N	
-3,031,nnn	FRAC-N - J3	Test 7A
+3,031,nnn	FRAC-N	
-3,040,nnn	FRAC-N - J3	Test 7A
+3,040,nnn	FRAC-N	
-3,041,nnn	FRAC-N - J3	Test 7A
+3,041,nnn	FRAC-N	
-3,050,nnn	FRAC-N - J3	Test 7A
+3,050,nnn to		
+3,070,nnn	FRAC-N	
-3,071,nnn	FRAC-N - J3	Test 7A
+3,071,nnn	FRAC-N	
-3,080,nnn to		
-3,084,nnn	FRAC-N - J3	Test 7A
+3,080,nnn to		
+3,084,nnn	FRAC-N	
-3,090,nnn to		
-3,100,nnn	FRAC-N - J3	Test 7A
+3,090,nnn to	FRAC-N	
+3,109,nnn	FRAC-N	
-3,110,nnn	FRAC-N - J3	Test 7A
+3,110,nnn	FRAC-N	
-3,111,nnn	FRAC-N - J3	Test 7A
+3,111,nnn	FRAC-N	
-3,112,nnn	FRAC-N - J3	Test 7A
+3,112,nnn	FRAC-N	
-3,113,nnn	FRAC-N - J2	Test 1A
+3,114,nnn	FRAC-N	

### ***Result Codes List***

<b><u>Result Code</u></b>	<b><u>Assembly/Connector</u></b>	<b><u>Test</u></b>
-3,115,nnn	FRAC-N - J3	Test 7A
+3,115,nnn	FRAC-N	
-3,120,nnn		
to		
-3,129,nnn	FRAC-N - J3	Test 7A
+3,120,nnn	FRAC-N	
to		
+3,129,nnn	FRAC-N	
-3,140,nnn	FRAC-N - J2	Test 1A
+3,141,nnn	FRAC-N	
-3,142,nnn	FRAC-N - J2	Test 1A
+3,143,nnn	FRAC-N	
-3,144,nnn	FRAC-N - J2	Test 1A
+3,145,nnn	FRAC-N	
-3,146,nnn	FRAC-N - J2	Test 1A
+3,147,nnn	FRAC-N	
-3,148,nnn	FRAC-N - J2	Test 1A
+3,149,nnn	FRAC-N	
-3,150,nnn	FRAC-N - J2	Test 1A
+3,151,nnn	FRAC-N	
+3,200,nnn		
to		
+3,211,nnn	FRAC-N	
+3,500,nnn	FRAC-N	
+3,501,nnn	FRAC-N	
+3,502,nnn	FRAC-N	
+3,503,nnn	Turn to <i>Conditions Not Covered By Diagnostics</i> in <i>Troubleshooting</i> section	
+3,504,nnn	FRAC-N	
+3,505,nnn	FRAC-N	
+3,506,nnn	FRAC-N	
+3,507,nnn	FRAC-N	
+3,600,nnn		
to		
+3,751,nnn	FRAC-N	
-3,999,nnn	FRAC-N - J3	Test 7A
+3,999,nnn	FRAC-N	
-4,001,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J1	Test 3A
+4,001,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+4,002,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,003,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J1	Test 3A
+4,003,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+4,004,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+4,005,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+4,006,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,007,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J9	Test 5
+4,008,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	



## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
-4,009,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J9	Test 5
+4,010,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,011,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 5
+4,012,1nn	STANDARD MODULATION OR STD MOD/NSM OSC	
+4,012,2nn	MOD DIST/NSM OSC	
+4,012,3nn	MOD DIST/NSM OSC	
-4,013,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 5
+4,014,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,015,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J2	Test 5
+4,016,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,016,2nn	MOD DIST/NSM OSC	
+4,016,3nn	MOD DIST/NSM OSC	
-4,017,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J2	Test 5
+4,018,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,018,2nn	MOD DIST/NSM OSC	
+4,018,3nn	MOD DIST/NSM OSC	
-4,025,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J7	Test 1A
+4,026,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,027,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J7	Test 1A
+4,028,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,029,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J8	Test 5
+4,030,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,031,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J8	Test 5
+4,032,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,033,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 5
+4,034,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,035,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 5
+4,036,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,037,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J2	Test 5
+4,038,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,038,2nn	MOD DIST/NSM OSC	
+4,038,3nn	MOD DIST/NSM OSC	
-4,039,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J2	Test 5
+4,040,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,041,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J9	Test 5
+4,042,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,043,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J9	Test 5
+4,044,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,055,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J7	Test 1A
+4,056,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,057,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J8	Test 5
+4,058,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,059,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J9	Test 5
+4,060,nnn		
to		
+4,066,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	

## *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+ 4,070,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+ 4,071,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
- 4,072,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 5
+ 4,073,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+ 4,076,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+ 4,076,2nn	MOD DIST/NSM OSC	
+ 4,076,3nn	MOD DIST/NSM OSC	
+ 4,077,nnn		
to		
+ 4,095,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
- 4,096,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J2	Test 5
+ 4,097,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+ 4,098,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+ 4,099,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+ 4,100,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+ 4,101,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+ 4,101,2nn	MOD DIST/NSM OSC	
+ 4,101,3nn	MOD DIST/NSM OSC	
+ 4,102,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+ 4,103,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+ 4,105,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+ 4,105,2nn	MOD DIST/NSM OSC	
+ 4,105,3nn	MOD DIST/NSM OSC	
+ 4,106,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+ 4,106,2nn	MOD DIST/NSM OSC	
+ 4,106,3nn	MOD DIST/NSM OSC	
+ 4,107,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+ 4,107,2nn	MOD DIST/NSM OSC	
+ 4,107,3nn	MOD DIST/NSM OSC	
+ 4,110,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+ 4,110,2nn	MOD DIST/NSM OSC	
+ 4,110,3nn	MOD DIST/NSM OSC	
+ 4,111,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+ 4,111,2nn	MOD DIST/NSM OSC	
+ 4,111,3nn	MOD DIST/NSM OSC	
+ 4,112,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+ 4,112,2nn	MOD DIST/NSM OSC	
+ 4,112,3nn	MOD DIST/NSM OSC	
+ 4,113,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+ 4,113,2nn	MOD DIST/NSM OSC	
+ 4,113,3nn	MOD DIST/NSM OSC	
+ 4,114,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+ 4,114,2nn	MOD DIST/NSM OSC	
+ 4,114,3nn	MOD DIST/NSM OSC	
+ 4,115,1nn	STANDARD MODULATION or STD MOD/NSM OSC	

## *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+4,115,2nn	MOD DIST/NSM OSC	
+4,115,3nn	MOD DIST/NSM OSC	
+4,116,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,116,2nn	MOD DIST/NSM OSC	
+4,116,3nn	MOD DIST/NSM OSC	
+4,117,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,117,2nn	MOD DIST/NSM OSC	
+4,117,3nn	MOD DIST/NSM OSC	
+4,201,nnn to +4,208,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-4,301,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J6 Test 7A	
+4,310,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,311,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,313,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,314,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,315,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,320,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J9 Test 5	
+4,320,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,321,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,322,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J9 Test 5	
+4,323,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,324,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J9 Test 5	
+4,325,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,326,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J9 Test 5	
+4,327,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,330,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J9 Test 5	
+4,330,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,331,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J9 Test 5	
+4,331,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,332,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J9 Test 5	
+4,332,1nn to +4,336,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,340,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J3 Test 5	
+4,341,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,342,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J3 Test 5	
+4,343,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,344,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,345,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,346,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J3 Test 5	
+4,347,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,348,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,349,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J3 Test 5	
+4,350,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,360,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,361,1nn	STANDARD MODULATION or STD MOD/NSM OSC	

## ***Result Codes List***

<b><u>Result Code</u></b>	<b><u>Assembly/Connector</u></b>	<b><u>Test</u></b>
-4,362,1nn +4,363,1nn to +4,366,1nn +4,370,1nn to +4,375,1nn	STANDARD MODULATION or STD MOD/NSM OSC	J3 Test 5
	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
-4,380,1nn -4,381,1nn -4,382,1nn +4,383,1nn to +4,388,1nn	STANDARD MODULATION or STD MOD/NSM OSC	J2 Test 5
	STANDARD MODULATION or STD MOD/NSM OSC	J2 Test 5
	STANDARD MODULATION or STD MOD/NSM OSC	J2 Test 5
	STANDARD MODULATION or STD MOD/NSM OSC	
+4,390,1nn to +4,402,1nn +4,410,1nn to +4,422,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
-4,430,1nn -4,430,2nn -4,430,3nn -4,431,1nn -4,431,2nn	STANDARD MODULATION or STD MOD/NSM OSC	J1 Test 18
	MOD DIST/NSM OSC - J1	Test 18
	MOD DIST/NSM OSC - J1	Test 18
	STANDARD MODULATION or STD MOD/NSM OSC	J1 Test 18
	MOD DIST/NSM OSC - J1	Test 18
-4,431,3nn -4,432,1nn -4,432,2nn -4,432,3nn +4,433,1nn	MOD DIST/NSM OSC - J1	Test 18
	STANDARD MODULATION or STD MOD/NSM OSC	J1 Test 18
	MOD DIST/NSM OSC - J1	Test 18
	MOD DIST/NSM OSC - J1	Test 18
	STANDARD MODULATION or STD MOD/NSM OSC	
+4,434,1nn +4,435,1nn +4,440,1nn +4,441,1nn +4,442,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
+4,443,1nn +4,450,1nn to +4,455,1nn -4,456,1nn +4,457,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	J2 Test 5
	STANDARD MODULATION or STD MOD/NSM OSC	
+4,458,1nn +4,459,1nn +4,460,1nn -4,461,1nn +4,462,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	
	STANDARD MODULATION or STD MOD/NSM OSC	J2 Test 5
	STANDARD MODULATION or STD MOD/NSM OSC	

## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+4,463,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,470,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J7 Test 1A	
-4,471,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J7 Test 1A	
+4,471,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,472,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,473,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,474,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J7 Test 1A	
+4,475,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,476,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,477,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,478,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J7 Test 1A	
+4,479,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,480,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,481,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,490,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,491,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,492,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,493,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
+4,500,1nn		
to		
+4,504,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,999,1nn	STANDARD MODULATION or STD MOD/NSM OSC - J6 Test 7A	
+4,999,1nn	STANDARD MODULATION or STD MOD/NSM OSC	
-4,999,2nn	MOD DIST/NSM OSC - J6	Test 7A
+5,010,1nn	REF OSC/STD ALC	
+5,010,2nn	REF OSC/FAST ALC	
+5,011,1nn	REF OSC/STD ALC	
+5,011,2nn	REF OSC/FAST ALC	
+5,012,1nn	REF OSC/STD ALC	
+5,012,2nn	REF OSC/FAST ALC	
+5,013,1nn	REF OSC/STD ALC	
+5,013,2nn	REF OSC/FAST ALC	
+5,014,1nn	REF OSC/STD ALC	
+5,014,2nn	REF OSC/FAST ALC	
+5,016,1nn	REF OSC/STD ALC	
+5,016,2nn	REF OSC/FAST ALC	
+5,017,1nn	REF OSC/STD ALC	
+5,017,2nn	REF OSC/FAST ALC	
+5,018,1nn	REF OSC/STD ALC	
+5,018,2nn	REF OSC/FAST ALC	
+5,019,1nn	REF OSC/STD ALC	
+5,019,2nn	REF OSC/FAST ALC	
5,030,nnn	Perform CAL_DATA Recovery Program (See <i>Adjustments</i> section)	
+5,030,1nn	REF OSC/STD ALC	

## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+ 5,030,2nn	REF OSC/FAST ALC	
+ 5,031,1nn	REF OSC/STD ALC	
+ 5,031,2nn	REF OSC/FAST ALC	
+ 5,032,1nn	REF OSC/STD ALC	
+ 5,032,2nn	REF OSC/FAST ALC	
+ 5,038,1nn	REF OSC/STD ALC	
+ 5,038,2nn	REF OSC/FAST ALC	
+ 5,039,1nn	REF OSC/STD ALC	
+ 5,039,2nn	REF OSC/FAST ALC	
+ 5,040,1nn	REF OSC/STD ALC	
+ 5,040,2nn	REF OSC/FAST ALC	
+ 5,041,1nn	REF OSC/STD ALC	
+ 5,041,2nn	REF OSC/FAST ALC	
+ 5,050,1nn	REF OSC/STD ALC	
+ 5,050,2nn	REF OSC/FAST ALC	
+ 5,051,1nn	REF OSC/STD ALC	
+ 5,051,2nn	REF OSC/FAST ALC	
+ 5,052,1nn	REF OSC/STD ALC	
+ 5,052,2nn	REF OSC/FAST ALC	
+ 5,053,1nn	REF OSC/STD ALC	
+ 5,053,2nn	REF OSC/FAST ALC	
+ 5,060,1nn	REF OSC/STD ALC	
+ 5,060,2nn	REF OSC/FAST ALC	
- 5,070,1nn	REF OSC/STD ALC - J6	Test 7A
- 5,070,2nn	REF OSC/FAST ALC - J6	Test 7A
- 5,070,3nn	OUTPUT/OUT AMP - J1	Test 7A
- 5,071,1nn	REF OSC/STD ALC - J6	Test 7A
- 5,071,2nn	REF OSC/FAST ALC - J6	Test 7A
- 5,072,1nn	REF OSC/STD ALC - J6	Test 7A
- 5,072,2nn	REF OSC/FAST ALC - J6	Test 7A
- 5,072,3nn	OUTPUT/OUT AMP - J1	Test 7A
- 5,073,3nn	OUTPUT/OUT AMP - J1	Test 7A
- 5,074,3nn	OUTPUT/OUT AMP - J1	Test 7A
- 5,075,1nn	REF OSC/STD ALC - J1	Test 1A
- 5,075,2nn	REF OSC/FAST ALC - J1	Test 1A
- 5,075,3nn	OUTPUT/OUT AMP - J4	Test 1A
- 5,076,1nn	REF OSC/STD ALC - J1	Test 1A
- 5,076,2nn	REF OSC/FAST ALC - J1	Test 1A
- 5,076,3nn	OUTPUT/OUT AMP - J4	Test 1A
+ 5,080,1nn	REF OSC/STD ALC	
+ 5,080,2nn	REF OSC/FAST ALC	
+ 5,080,3nn	OUTPUT/ALC	
+ 5,081,1nn	REF OSC/STD ALC	
+ 5,081,2nn	REF OSC/FAST ALC	
+ 5,081,3nn	OUTPUT/ALC	

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**Result Codes List**

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+5,082,1nn	REF OSC/STD ALC	
+5,082,2nn	REF OSC/FAST ALC	
+5,082,3nn	OUTPUT/ALC	
+5,083,1nn	REF OSC/STD ALC	
+5,083,2nn	REF OSC/FAST ALC	
+5,083,3nn	OUTPUT/ALC	
+5,084,1nn	REF OSC/STD ALC	
+5,084,2nn	REF OSC/FAST ALC	
+5,084,3nn	OUTPUT/ALC	
+5,085,1nn	REF OSC/STD ALC	
+5,085,2nn	REF OSC/FAST ALC	
+5,085,3nn	OUTPUT/ALC	
+5,086,1nn	REF OSC/STD ALC	
+5,086,2nn	REF OSC/FAST ALC	
+5,086,3nn	OUTPUT/ALC	
+5,087,1nn	REF OSC/STD ALC	
+5,087,2nn	REF OSC/FAST ALC	
+5,087,3nn	OUTPUT/ALC	
+5,088,1nn	REF OSC/STD ALC	
+5,088,2nn	REF OSC/FAST ALC	
+5,088,3nn	OUTPUT/ALC	
+5,089,1nn	REF OSC/STD ALC	
+5,089,2nn	REF OSC/FAST ALC	
+5,089,3nn	OUTPUT/ALC	
+5,090,1nn	REF OSC/STD ALC	
+5,090,2nn	REF OSC/FAST ALC	
+5,090,3nn	OUTPUT/ALC	
+5,091,1nn	REF OSC/STD ALC	
+5,091,2nn	REF OSC/FAST ALC	
+5,091,3nn	OUTPUT/ALC	
+5,092,1nn	REF OSC/STD ALC	
+5,092,2nn	REF OSC/FAST ALC	
+5,093,3nn	OUTPUT/ALC	
-5,094,3nn	OUTPUT/OUT AMP - J4	Test 1A
-5,095,1nn	REF OSC/STD ALC - J1	Test 1A
-5,095,2nn	REF OSC/FAST ALC - J1	Test 1A
+5,095,3nn	OUTPUT/ALC	
+5,096,1nn	REF OSC/STD ALC	
+5,096,2nn	REF OSC/FAST ALC	
+5,096,3nn	OUTPUT/ALC	
+5,097,1nn	REF OSC/STD ALC	
+5,097,2nn	REF OSC/FAST ALC	
+5,097,3nn	OUTPUT/ALC	
+5,098,3nn	OUTPUT/ALC	
+5,109,3nn	OUTPUT/ALC	

## *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+5,110,1nn	REF OSC/STD ALC	
+5,110,2nn	REF OSC/FAST ALC	
+5,111,1nn	REF OSC/STD ALC	
+5,111,2nn	REF OSC/FAST ALC	
+5,112,1nn	REF OSC/STD ALC	
+5,112,2nn	REF OSC/FAST ALC	
-5,113,1nn	REF OSC/STD ALC - J8	Test 13A
-5,113,2nn	REF OSC/FAST ALC - J8	Test 13A
+5,113,3nn	OUTPUT/ALC	
-5,114,1nn	REF OSC/STD ALC - J8	Test 5
-5,114,2nn	REF OSC/FAST ALC - J8	Test 5
+5,114,1nn	REF OSC/STD ALC	
+5,114,2nn	REF OSC/FAST ALC	
+5,114,3nn	OUTPUT/ALC	
+5,130,1nn	REF OSC/STD ALC	
+5,130,2nn	REF OSC/FAST ALC	
+5,130,3nn	OUTPUT/ALC	
+5,131,1nn	REF OSC/STD ALC	
+5,131,2nn	REF OSC/FAST ALC	
+5,131,3nn	OUTPUT/ALC	
+5,132,1nn	REF OSC/STD ALC	
+5,132,2nn	REF OSC/FAST ALC	
+5,132,3nn	OUTPUT/ALC	
+5,135,1nn	REF OSC/STD ALC	
+5,135,2nn	REF OSC/FAST ALC	
+5,136,1nn	REF OSC/STD ALC	
+5,135,2nn	REF OSC/FAST ALC	
+5,137,1nn	REF OSC/STD ALC	
+5,137,2nn	REF OSC/FAST ALC	
+5,138,1nn	REF OSC/STD ALC	
+5,138,2nn	REF OSC/FAST ALC	
+5,139,1nn	REF OSC/STD ALC	
+5,139,2nn	REF OSC/FAST ALC	
+5,140,1nn	REF OSC/STD ALC	
+5,140,2nn	REF OSC/FAST ALC	
+5,145,1nn	REF OSC/STD ALC	
+5,145,2nn	REF OSC/FAST ALC	
+5,150,3nn to		
+5,158,3nn	OUTPUT/ALC	
+5,160,1nn	REF OSC/STD ALC	
+5,160,2nn	REF OSC/FAST ALC	
+5,160,3nn	OUTPUT/ALC	
+5,161,1nn	REF OSC/STD ALC	
+5,161,2nn	REF OSC/FAST ALC	



## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+5,161,3nn	OUTPUT/ALC	
+5,162,3nn	OUTPUT/ALC	
+5,163,1nn	REF OSC/STD ALC	
+5,163,2nn	REF OSC/FAST ALC	
+5,163,3nn	OUTPUT/ALC	
+5,164,1nn	REF OSC/STD ALC	
+5,164,2nn	REF OSC/FAST ALC	
+5,164,3nn	OUTPUT/ALC	
+5,165,1nn	REF OSC/STD ALC	
+5,165,2nn	REF OSC/FAST ALC	
+5,165,3nn	OUTPUT/ALC	
+5,166,1nn	REF OSC/STD ALC	
+5,166,2nn	REF OSC/FAST ALC	
+5,166,3nn	OUTPUT/ALC	
+5,167,3nn	OUTPUT/ALC	
+5,168,3nn	OUTPUT/ALC	
-5,185,1nn	REF OSC/STD ALC - J5	Test 2A
-5,185,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,185,3nn	OUTPUT/OUT AMP - J5	Test 2A
-5,186,1nn to		
-5,189,1nn	REF OSC/STD ALC - J5	Test 2A
-5,186,2nn to		
-5,189,2nn	REF OSC/FAST ALC - J5	Test 2A
+5,186,3nn	OUTPUT/ALC	
-5,190,1nn	REF OSC/STD ALC - J5	Test 2A
-5,190,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,190,3nn	OUTPUT/OUT AMP - J5	Test 2A
-5,191,1nn to		
-5,194,1nn	REF OSC/STD ALC - J5	Test 2A
-5,191,2nn to		
-5,194,2nn	REF OSC/FAST ALC - J5	
+5,191,3nn	OUTPUT/ALC	
-5,195,1nn	REF OSC/STD ALC - J5	Test 2A
-5,195,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,195,3nn	OUTPUT/OUT AMP - J5	Test 2A
-5,196,3nn	OUTPUT/OUT AMP - J5	Test 2A
+5,196,3nn	OUTPUT/ALC	
+5,200,1nn	REF OSC/STD ALC	
+5,200,2nn	REF OSC/FAST ALC	
-5,200,3nn	OUTPUT/OUT AMP - J5	Test 2A
+5,201,1nn	REF OSC/STD ALC	
+5,201,2nn	REF OSC/FAST ALC	
+5,202,1nn	REF OSC/STD ALC	
+5,202,2nn	REF OSC/FAST ALC	

**Result Codes List**

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+5,203,1nn	REF OSC/STD ALC	
+5,203,2nn	REF OSC/FAST ALC	
+5,204,1nn	REF OSC/STD ALC	
+5,204,2nn	REF OSC/FAST ALC	
+5,205,1nn	REF OSC/STD ALC	
+5,205,2nn	REF OSC/FAST ALC	
-5,205,3nn	OUTPUT/OUT AMP - J5	Test 2A
+5,206,1nn	REF OSC/STD ALC	
+5,206,2nn	REF OSC/FAST ALC	
+5,207,1nn	REF OSC/STD ALC	
+5,207,2nn	REF OSC/FAST ALC	
+5,208,1nn	REF OSC/STD ALC	
+5,208,2nn	REF OSC/FAST ALC	
+5,209,1nn	REF OSC/STD ALC	
+5,209,2nn	REF OSC/FAST ALC	
+5,210,1nn	REF OSC/STD ALC	
+5,210,2nn	REF OSC/FAST ALC	
-5,210,3nn	OUTPUT/OUT AMP - J5	Test 2A
+5,211,1nn	REF OSC/STD ALC	
+5,211,2nn	REF OSC/FAST ALC	
+5,215,1nn	REF OSC/STD ALC	
+5,215,2nn	REF OSC/FAST ALC	
-5,215,3nn	OUTPUT/OUT AMP - J5	Test 2A
+5,216,1nn	REF OSC/STD ALC	
+5,215,2nn	REF OSC/FAST ALC	
+5,217,1nn	REF OSC/STD ALC	
+5,217,2nn	REF OSC/FAST ALC	
+5,218,1nn	REF OSC/STD ALC	
+5,218,2nn	REF OSC/FAST ALC	
+5,219,1nn	REF OSC/STD ALC	
+5,219,2nn	REF OSC/FAST ALC	
+5,220,1nn	REF OSC/STD ALC	
+5,220,2nn	REF OSC/FAST ALC	
-5,220,3nn	OUTPUT/OUT AMP - J3	Test 1A
+5,221,1nn	REF OSC/STD ALC	
+5,221,2nn	REF OSC/FAST ALC	
+5,222,1nn	REF OSC/STD ALC	
+5,222,2nn	REF OSC/FAST ALC	
+5,223,1nn	REF OSC/STD ALC	
+5,223,2nn	REF OSC/FAST ALC	
+5,224,1nn	REF OSC/STD ALC	
+5,224,2nn	REF OSC/FAST ALC	
+5,225,1nn	REF OSC/STD ALC	
+5,225,2nn	REF OSC/FAST ALC	
-5,225,3nn	OUTPUT/OUT AMP - J3	Test 1A

### Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+5,226,1nn	REF OSC/STD ALC	
+5,226,2nn	REF OSC/FAST ALC	
+5,230,1nn	REF OSC/STD ALC	
+5,230,2nn	REF OSC/FAST ALC	
-5,230,3nn	OUTPUT/OUT AMP - J3	Test 1A
+5,231,1nn	REF OSC/STD ALC	
+5,231,2nn	REF OSC/FAST ALC	
+5,232,1nn	REF OSC/STD ALC	
+5,232,2nn	REF OSC/FAST ALC	
+5,233,1nn	REF OSC/STD ALC	
+5,233,2nn	REF OSC/FAST ALC	
+5,234,1nn	REF OSC/STD ALC	
+5,234,2nn	REF OSC/FAST ALC	
+5,235,1nn	REF OSC/STD ALC	
+5,235,2nn	REF OSC/FAST ALC	
-5,235,3nn	OUTPUT/OUT AMP - J3	Test 1A
+5,236,1nn	REF OSC/STD ALC	
+5,236,2nn	REF OSC/FAST ALC	
+5,237,1nn	REF OSC/STD ALC	
+5,237,2nn	REF OSC/FAST ALC	
+5,238,1nn	REF OSC/STD ALC	
+5,238,2nn	REF OSC/FAST ALC	
+5,239,1nn	REF OSC/STD ALC	
+5,239,2nn	REF OSC/FAST ALC	
+5,240,1nn	REF OSC/STD ALC	
+5,240,2nn	REF OSC/FAST ALC	
-5,240,3nn	OUTPUT/OUT AMP - J3	Test 1A
+5,241,1nn	REF OSC/STD ALC	
+5,241,2nn	REF OSC/FAST ALC	
+5,245,1nn	REF OSC/STD ALC	
+5,245,2nn	REF OSC/FAST ALC	
-5,245,3nn	OUTPUT/OUT AMP - J3	Test 2B
+5,246,1nn	REF OSC/STD ALC	
+5,246,2nn	REF OSC/FAST ALC	
+5,247,1nn	REF OSC/STD ALC	
+5,247,2nn	REF OSC/FAST ALC	
+5,248,1nn	REF OSC/STD ALC	
+5,248,2nn	REF OSC/FAST ALC	
+5,249,1nn	REF OSC/STD ALC	
+5,249,2nn	REF OSC/FAST ALC	
+5,250,1nn	REF OSC/STD ALC	
+5,250,2nn	REF OSC/FAST ALC	
-5,250,3nn	OUTPUT/OUT AMP - J3	Test 2B
+5,251,1nn	REF OSC/STD ALC	
+5,251,2nn	REF OSC/FAST ALC	

## ***Result Codes List***

<b><u>Result Code</u></b>	<b><u>Assembly/Connector</u></b>	<b><u>Test</u></b>
+5,252,1nn	REF OSC/STD ALC	
+5,252,2nn	REF OSC/FAST ALC	
+5,253,1nn	REF OSC/STD ALC	
+5,253,2nn	REF OSC/FAST ALC	
+5,254,1nn	REF OSC/STD ALC	
+5,254,2nn	REF OSC/FAST ALC	
+5,255,1nn	REF OSC/STD ALC	
+5,255,2nn	REF OSC/FAST ALC	
+5,256,1nn	REF OSC/STD ALC	
+5,256,2nn	REF OSC/FAST ALC	
+5,260,1nn	REF OSC/STD ALC	
+5,260,2nn	REF OSC/FAST ALC	
+5,261,1nn	REF OSC/STD ALC	
+5,261,2nn	REF OSC/FAST ALC	
+5,262,1nn	REF OSC/STD ALC	
+5,262,2nn	REF OSC/FAST ALC	
+5,263,1nn	REF OSC/STD ALC	
+5,263,2nn	REF OSC/FAST ALC	
+5,265,1nn	REF OSC/STD ALC	
+5,265,2nn	REF OSC/FAST ALC	
+5,266,1nn	REF OSC/STD ALC	
+5,266,2nn	REF OSC/FAST ALC	
+5,267,1nn	REF OSC/STD ALC	
+5,267,2nn	REF OSC/FAST ALC	
+5,268,1nn	REF OSC/STD ALC	
+5,268,2nn	REF OSC/FAST ALC	
+5,269,1nn	REF OSC/STD ALC	
+5,269,2nn	REF OSC/FAST ALC	
+5,270,1nn	REF OSC/STD ALC	
+5,270,2nn	REF OSC/FAST ALC	
+5,271,1nn	REF OSC/STD ALC	
+5,271,2nn	REF OSC/FAST ALC	
+5,272,1nn	REF OSC/STD ALC	
+5,272,2nn	REF OSC/FAST ALC	
+5,273,1nn	REF OSC/STD ALC	
+5,273,2nn	REF OSC/FAST ALC	
+5,274,1nn	REF OSC/STD ALC	
+5,274,2nn	REF OSC/FAST ALC	
+5,275,1nn	REF OSC/STD ALC	
+5,275,2nn	REF OSC/FAST ALC	
+5,276,1nn	REF OSC/STD ALC	
+5,276,2nn	REF OSC/FAST ALC	
+5,280,1nn	REF OSC/STD ALC	
+5,280,2nn	REF OSC/FAST ALC	
+5,281,1nn	REF OSC/STD ALC	

## *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+5,281,2nn	REF OSC/FAST ALC	
+5,282,1nn	REF OSC/STD ALC	
+5,282,2nn	REF OSC/FAST ALC	
+5,283,1nn	REF OSC/STD ALC	
+5,283,2nn	REF OSC/FAST ALC	
+5,284,1nn	REF OSC/STD ALC	
+5,284,2nn	REF OSC/FAST ALC	
+5,285,1nn	REF OSC/STD ALC	
+5,285,2nn	REF OSC/FAST ALC	
+5,286,1nn	REF OSC/STD ALC	
+5,286,2nn	REF OSC/FAST ALC	
+5,287,1nn	REF OSC/STD ALC	
+5,287,2nn	REF OSC/FAST ALC	
+5,288,1nn	REF OSC/STD ALC	
+5,288,2nn	REF OSC/FAST ALC	
+5,289,1nn	REF OSC/STD ALC	
+5,289,2nn	REF OSC/FAST ALC	
+5,290,1nn	REF OSC/STD ALC	
+5,290,2nn	REF OSC/FAST ALC	
+5,291,1nn	REF OSC/STD ALC	
+5,291,2nn	REF OSC/FAST ALC	
+5,292,1nn	REF OSC/STD ALC	
+5,292,2nn	REF OSC/FAST ALC	
+5,293,1nn	REF OSC/STD ALC	
+5,293,2nn	REF OSC/FAST ALC	
+5,294,1nn	REF OSC/STD ALC	
+5,294,2nn	REF OSC/FAST ALC	
+5,295,1nn	REF OSC/STD ALC	
+5,295,2nn	REF OSC/FAST ALC	
+5,296,1nn	REF OSC/STD ALC	
+5,296,2nn	REF OSC/FAST ALC	
+5,297,1nn	REF OSC/STD ALC	
+5,297,2nn	REF OSC/FAST ALC	
+5,298,1nn	REF OSC/STD ALC	
+5,298,2nn	REF OSC/FAST ALC	
+5,299,1nn	REF OSC/STD ALC	
+5,299,2nn	REF OSC/FAST ALC	
+5,300,1nn	REF OSC/STD ALC	
+5,300,2nn	REF OSC/FAST ALC	
+5,301,1nn	REF OSC/STD ALC	
+5,301,2nn	REF OSC/FAST ALC	
+5,302,1nn	REF OSC/STD ALC	
+5,302,2nn	REF OSC/FAST ALC	
+5,303,1nn	REF OSC/STD ALC	
+5,303,2nn	REF OSC/FAST ALC	

### ***Result Codes List***

<b><u>Result Code</u></b>	<b><u>Assembly/Connector</u></b>	<b><u>Test</u></b>
+5,304,1nn	REF OSC/STD ALC	
+5,304,2nn	REF OSC/FAST ALC	
+5,305,1nn	REF OSC/STD ALC	
+5,305,2nn	REF OSC/FAST ALC	
+5,306,1nn	REF OSC/STD ALC	
+5,306,2nn	REF OSC/FAST ALC	
+5,307,1nn	REF OSC/STD ALC	
+5,307,2nn	REF OSC/FAST ALC	
+5,308,1nn	REF OSC/STD ALC	
+5,308,2nn	REF OSC/FAST ALC	
+5,309,1nn	REF OSC/STD ALC	
+5,309,2nn	REF OSC/FAST ALC	
+5,310,1nn	REF OSC/STD ALC	
+5,310,2nn	REF OSC/FAST ALC	
+5,311,1nn	REF OSC/STD ALC	
+5,311,2nn	REF OSC/FAST ALC	
+5,312,1nn	REF OSC/STD ALC	
+5,312,2nn	REF OSC/FAST ALC	
+5,313,1nn	REF OSC/STD ALC	
+5,313,2nn	REF OSC/FAST ALC	
+5,314,1nn	REF OSC/STD ALC	
+5,314,2nn	REF OSC/FAST ALC	
+5,315,1nn	REF OSC/STD ALC	
+5,315,2nn	REF OSC/FAST ALC	
+5,316,1nn	REF OSC/STD ALC	
+5,316,2nn	REF OSC/FAST ALC	
+5,317,1nn	REF OSC/STD ALC	
+5,317,2nn	REF OSC/FAST ALC	
+5,317,2nn	REF OSC/FAST ALC	
-5,350,3nn	OUTPUT/OUT AMP - J1	Test 7A
-5,351,3nn	OUTPUT/OUT AMP - J1	Test 7A
+5,352,1nn	REF OSC/STD ALC	
+5,352,2nn	REF OSC/FAST ALC	
-5,500,1nn to		
-5,502,1nn	REF OSC/STD ALC - J5	Test 2A
-5,500,2nn to		
-5,502,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,510,1nn to		
-5,516,1nn	REF OSC/STD ALC - J5	Test 2A
-5,510,2nn to		
-5,516,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,520,1nn	REF OSC/STD ALC - J5	Test 2A
-5,520,2nn	REF OSC/FAST ALC - J5	Test 2A
+5,521,1nn	REF OSC/STD ALC	

## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+5,521,2nn	REF OSC/FAST ALC	
+5,522,1nn	REF OSC/STD ALC	
+5,522,2nn	REF OSC/FAST ALC	
+5,523,1nn	REF OSC/STD ALC	
+5,523,2nn	REF OSC/FAST ALC	
+5,524,1nn	REF OSC/STD ALC	
+5,524,2nn	REF OSC/FAST ALC	
+5,525,1nn	REF OSC/STD ALC	
+5,525,2nn	REF OSC/FAST ALC	
+5,526,1nn	REF OSC/STD ALC	
+5,526,2nn	REF OSC/FAST ALC	
-5,530,1nn	REF OSC/STD ALC - J5	Test 2A
-5,530,2nn	REF OSC/FAST ALC - J5	Test 2A
+5,531,1nn	REF OSC/STD ALC	
+5,531,2nn	REF OSC/FAST ALC	
+5,532,1nn	REF OSC/STD ALC	
+5,532,2nn	REF OSC/FAST ALC	
+5,533,1nn	REF OSC/STD ALC	
+5,533,2nn	REF OSC/FAST ALC	
-5,541,1nn	REF OSC/STD ALC - J5	Test 2A
-5,541,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,543,1nn	REF OSC/STD ALC - J5	Test 2A
-5,543,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,545,1nn	REF OSC/STD ALC - J5	Test 2A
-5,545,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,547,1nn	REF OSC/STD ALC - J5	Test 2A
-5,547,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,549,1nn	REF OSC/STD ALC - J5	Test 2A
-5,549,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,551,1nn	REF OSC/STD ALC - J5	Test 2A
-5,551,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,553,1nn	REF OSC/STD ALC - J5	Test 2A
-5,553,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,555,1nn	REF OSC/STD ALC - J5	Test 2A
-5,555,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,557,1nn	REF OSC/STD ALC - J5	Test 2A
-5,557,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,559,1nn	REF OSC/STD ALC - J5	Test 2A
-5,559,2nn	REF OSC/FAST ALC - J5	Test 2A
+5,601,nnn	DIVIDER	
+5,602,nnn	DIVIDER	
+5,603,nnn	DIVIDER	
+5,604,nnn	DIVIDER	
-5,605,nnn	DIVIDER - J1	Test 14A
-5,606,nnn	DIVIDER - J1	Test 14A

## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
-5,607,nnn	DIVIDER - J1	Test 14A
-5,650,nnn	DIVIDER - J1	Test 14A
-5,651,nnn	DIVIDER - J1	Test 14A
-5,652,nnn	Replace Divider Assembly	
-5,653,nnn	Replace Divider Assembly	
-5,655,nnn	DIVIDER - J1	Test 14A
-5,656,nnn	DIVIDER - J1	Test 14A
-5,660,nnn	DIVIDER - J1	Test 14A
-5,662,nnn	DIVIDER - J4	Test 13B
-5,664,nnn	DIVIDER - J1	Test 14A
-5,666,nnn	DIVIDER - J1	Test 14A
-5,668,nnn	DIVIDER - J1	Test 14A
-5,670,nnn	DIVIDER - J1	Test 14A
-5,672,nnn	DIVIDER - J1	Test 14A
-5,674,nnn	DIVIDER - J1	Test 14A
-5,676,nnn	DIVIDER - J1	Test 14A
-5,678,nnn	DIVIDER - J1	Test 14A
-5,680,nnn	DIVIDER - J1	Test 14A
-5,682,nnn	DIVIDER - J1	Test 14A
-5,684,nnn	DIVIDER - J1	Test 14A
-5,722,nnn	DIVIDER - J1	Test 14A
-5,724,nnn	DIVIDER - J1	Test 14A
-5,726,nnn	DIVIDER - J1	Test 14A
-5,728,nnn	DIVIDER - J1	Test 14A
-5,730,nnn	DIVIDER - J1	Test 14A
-5,732,nnn	DIVIDER - J1	Test 14A
-5,734,nnn	DIVIDER - J1	Test 14A
-5,736,nnn	DIVIDER - J1	Test 14A
-5,738,nnn	DIVIDER - J1	Test 14A
-5,740,nnn	DIVIDER - J1	Test 14A
-5,742,nnn	DIVIDER - J1	Test 14A
-5,744,nnn	DIVIDER - J1	Test 14A
-5,751,1nn to		
-5,822,1nn	REF OSC/STD ALC - J5	Test 2A
-5,751,2nn to		
-5,822,2nn	REF OSC/FAST ALC - J5	Test 2A
-5,999,1nn	REF OSC/STD ALC - J6	Test 7A
-5,999,2nn	REF OSC/FAST ALC - J6	Test 7A
+6,010,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,011,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,013,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,016,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,017,nnn	ATTENUATOR or 2 GHz ATTENUATOR	



## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+6,018,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,019,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,030,nnn		
to		
+6,037,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,040,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,041,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,042,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,070,nnn		
to		
+6,074,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,076,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
+6,100,1nn	2 GHz ATTENUATOR (Slot A15 in card cage)	
+6,100,2nn	ATTENUATOR (Slot A15 in card cage)	
+6,100,3nn	MW ASSEMBLY/ATTENUATOR	
+6,101,1nn	2 GHz ATTENUATOR (Slot A15 in card cage)	
+6,102,1nn	2 GHz ATTENUATOR (Slot A15 in card cage)	
+6,999,nnn	ATTENUATOR or 2 GHz ATTENUATOR	
-6,999,1nn	2 GHz ATTENUATOR - N/A	Test 15
-6,999,2nn	ATTENUATOR - N/A	Test 15
-6,999,3nn	MW ASSEMBLY/GAAS DIVIDERS - J4	Test 7B
-7,010,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 7A
+7,010,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-7,020,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 7A
+7,020,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-7,030,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J4	Test 2A
+7,030,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+7,031,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-7,040,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 7A
+7,040,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-7,050,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 7A
+7,050,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-7,051,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 7A
+7,051,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-7,052,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 7A
+7,052,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
+7,161,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-7,162,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 7A
+7,162,nnn		
to		
+7,166,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	
-7,999,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J3	Test 7A
+7,999,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC	

## *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+8,000,1nn	REF OSC/STD ALC	
+8,000,2nn	REF OSC/FAST ALC	
+8,000,3nn	REFERENCE	
-8,005,3nn	REFERENCE - J3	Test 7A
+8,010,1nn	REF OSC/STD ALC - J3	Test 11
+8,010,2nn	REF OSC/FAST ALC - J3	Test 11
-8,010,3nn	REFERENCE - J3	Test 7A
+8,011,1nn	REF OSC/STD ALC - J3	Test 11
+8,011,2nn	REF OSC/FAST ALC - J3	Test 11
-8,011,3nn	REFERENCE - J3	Test 7A
+8,020,1nn	REF OSC/STD ALC - J3	Test 11
+8,020,2nn	REF OSC/FAST ALC - J3	Test 11
+8,020,3nn	REFERENCE	
+8,030,1nn	REF OSC/STD ALC - J3	Test 11
+8,030,2nn	REF OSC/FAST ALC - J3	Test 11
+8,030,3nn	REFERENCE	
+8,040,3nn	REFERENCE	
+8,041,3nn	REFERENCE	
+8,042,3nn	REFERENCE	
-8,043,3nn	REFERENCE - J3	Test 7A
+8,044,3nn	REFERENCE	
-8,045,3nn	REFERENCE - J3	Test 7A
+8,046,3nn	REFERENCE	
+8,047,3nn	REFERENCE	
+8,048,3nn	REFERENCE	
+8,049,3nn	REFERENCE	
+8,100,1nn	REF OSC/STD ALC	
+8,100,2nn	REF OSC/FAST ALC	
+8,100,3nn	REFERENCE	
+8,101,1nn	REF OSC/STD ALC	
+8,101,2nn	REF OSC/FAST ALC	
+8,101,3nn	REFERENCE	
+8,102,1nn	REF OSC/STD ALC	
+8,102,2nn	REF OSC/FAST ALC	
+8,102,3nn	REFERENCE	
+8,103,1nn	REF OSC/STD ALC	
-8,999,1nn	REF OSC/STD ALC - J3	Test 11
-8,999,2nn	REF OSC/FAST ALC - J3	Test 11
-8,999,3nn	REFERENCE - J3	Test 7A
+9,010,nnn	STD DOUBLER/DOUBLER	
+9,011,nnn	STD DOUBLER/DOUBLER	
+9,020,nnn		
to		
+9,023,nnn	STD DOUBLER/DOUBLER	

## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+9,031,nnn to +9,038,nnn	STD DOUBLER/DOUBLER	
+9,040,nnn to +9,044,nnn	STD DOUBLER/DOUBLER	
+9,046,nnn to +9,051,nnn	STD DOUBLER/DOUBLER	
-9,070,2nn	DOUBLER - J1	Test 7A
+9,071,nnn	STD DOUBLER/DOUBLER	
+9,072,nnn	STD DOUBLER/DOUBLER	
+9,080,nnn to +9,083,nnn	STD DOUBLER/DOUBLER	
+9,090,nnn	STD DOUBLER/DOUBLER	
+9,091,nnn	STD DOUBLER/DOUBLER	
-9,092,2nn	MOD DIST/NSM OSC - J9	Test 3A
-9,093,2nn	MOD DIST/NSM OSC - J9	Test 3A
+9,100,nnn to +9,110,nnn	STD DOUBLER/DOUBLER	
-9,120,2nn	DOUBLER - J3	Test 1A
+9,121,nnn	STD DOUBLER/DOUBLER	
+9,122,nnn	STD DOUBLER/DOUBLER	
+9,130,nnn	STD DOUBLER/DOUBLER	
+9,131,nnn	STD DOUBLER/DOUBLER	
+9,132,nnn		
+9,143,nnn	STD DOUBLER/DOUBLER	
+9,160,nnn	STD DOUBLER/DOUBLER	
+9,161,nnn	STD DOUBLER/DOUBLER	
+9,164,nnn	STD DOUBLER/DOUBLER	
+9,185,nnn		
-9,186,2nn	ATTENUATOR - INPUT	Test 2A
-9,196,2nn	ATTENUATOR - INPUT	Test 2A
-9,206,2nn	ATTENUATOR - INPUT	Test 2A
+9,211,nnn	STD DOUBLER/DOUBLER	
+9,250,nnn	STD DOUBLER/DOUBLER	
+9,251,nnn	STD DOUBLER/DOUBLER	
+9,260,nnn		
+9,265,nnn	STD DOUBLER/DOUBLER	
+9,300,nnn	STD DOUBLER/DOUBLER	
+9,301,nnn	STD DOUBLER/DOUBLER	
-9,999,nnn	STD DOUBLER/DOUBLER - J1	Test 7A
+9,999,nnn	STD DOUBLER/DOUBLER	

## *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
- 10,100,3nn	HF DRVR - J4	Test 7A
- 10,101,3nn	HF DRVR - J4	Test 7A
- 10,102,3nn	HF DRVR - J4	Test 7A
- 10,110,3nn	HF DRVR - J6	Test 1A
- 10,111,3nn	HF DRVR - J6	Test 1A
+ 10,121,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,123,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,124,3nn	HF DRVR - J6	Test 2A
- 10,124,3nn	HF DRVR - J6	Test 2A
+ 10,125,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,127,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,129,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,130,3nn	HF DRVR - J6	Test 2A
- 10,130,3nn	HF DRVR - J6	Test 2A
+ 10,131,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,133,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,135,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,136,3nn	HF DRVR - J6	Test 2A
- 10,136,3nn	HF DRVR - J6	Test 2A
+ 10,137,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,138,3nn	LF DRVR - J4	Test 2A
- 10,138,3nn	LF DRVR - J4	Test 2A
+ 10,139,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,141,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,143,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,144,3nn	LF DRVR - J4	Test 2A
- 10,144,3nn	LF DRVR - J4	Test 2A
+ 10,145,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,147,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,149,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,150,3nn	LF DRVR - J4	Test 2A
+ 10,151,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,153,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,155,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,156,3nn	LF DRVR - J4	Test 2A
+ 10,157,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,159,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,161,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,163,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,164,3nn	HF DRVR - J2	Test 2A
+ 10,165,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,167,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,169,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,170,3nn	HF DRVR - J2	Test 2A
+ 10,171,3nn	HF DRVR (Must do MW Loop Adj.)	

## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+ 10,173,3nn	HF DRVR (Must do MW Loop Adj.)	Test 2A
+ 10,175,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,176,3nn	HF DRVR - J2	
+ 10,177,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,179,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,181,3nn	HF DRVR (Must do MW Loop Adj.)	Test 2A
- 10,182,3nn	HF DRVR - J2	
+ 10,183,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,185,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,187,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,188,3nn	HF DRVR - J1	Test 2B
+ 10,189,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,191,3nn	HF DRVR (Must do MW Loop Adj.)	Test 2B
+ 10,193,3nn	HF DRVR (Must do MW Loop Adj.)	
- 10,194,3nn	HF DRVR - J1	
+ 10,195,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,197,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,199,3nn	HF DRVR (Must do MW Loop Adj.)	Test 2B
- 10,200,3nn	HF DRVR - J1	
+ 10,201,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,203,3nn	HF DRVR (Must do MW Loop Adj.)	Test 7A
- 10,250,3nn	HF DRVR - J4	
- 10,251,3nn	HF DRVR - J4	
+ 10,252,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,300,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,301,3nn	HF DRVR (Must do MW Loop Adj.)	Test 7A
+ 10,302,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,304,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,305,3nn	HF DRVR (Must do MW Loop Adj.)	
+ 10,310,3nn to		
+ 10,316,3nn	HF DRVR (Must do MW Loop Adj.)	Test 7A
- 10,999,3nn	HF DRVR - J4	
- 11,099,3nn	LF DRVR - J2	Test 7A
- 11,100,3nn	LF DRVR/IF DIVIDER - J3	Test 1A
- 11,101,3nn	LF DRVR/IF DIVIDER - J3	Test 1A
- 11,105,3nn	LF DRVR - J4	Test 2A
- 11,110,3nn	LF DRVR/IF DIVIDER - J4	Test 2A
- 11,111,3nn	OUTPUT/ALC - J5	Test 2A
+ 11,111,3nn	LF DRVR	Test 2A
- 11,112,3nn	OUTPUT/ALC - J5	
+ 11,112,3nn	LF DRVR	
+ 11,113,3nn	LF DRVR	

## ***Result Codes List***

<b><u>Result Code</u></b>	<b><u>Assembly/Connector</u></b>	<b><u>Test</u></b>
- 11,115,3nn	LF DRVR/IF DIVIDER - J4	Test 2A
- 11,116,3nn	OUTPUT/ALC - J5	Test 2A
+ 11,116,3nn	LF DRVR	
- 11,117,3nn	OUTPUT/ALC - J5	Test 2A
+ 11,117,3nn	LF DRVR	
- 11,120,3nn	LF DRVR/IF DIVIDER - J4	Test 2A
- 11,121,3nn	OUTPUT/ALC - J5	Test 2A
+ 11,121,3nn	LF DRVR	
- 11,122,3nn	OUTPUT/ALC - J5	Test 2A
+ 11,122,3nn	LF DRVR	
- 11,125,3nn	LF DRVR/DIVIDER - J4	Test 2A
- 11,126,3nn	OUTPUT/ALC - J5	Test 2A
+ 11,126,3nn	LF DRVR	
- 11,127,3nn	OUTPUT/ALC - J5	Test 2A
+ 11,127,3nn	LF DRVR	
+ 11,128,3nn	LF DRVR	
- 11,130,3nn	LF DRVR/IF DIVIDER - J3	Test 2A
+ 11,131,3nn	LF DRVR	
- 11,140,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
- 11,141,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,141,3nn	LF DRVR	
- 11,142,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,142,3nn	LF DRVR	
- 11,143,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,143,3nn	LF DRVR	
- 11,144,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,144,3nn	LF DRVR	
- 11,145,3nn	LF DRVR - J5	Test 2A
+ 11,145,3nn	LF DRVR	
- 11,146,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,146,3nn	LF DRVR	
- 11,147,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,147,3nn	LF DRVR	
- 11,148,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,148,3nn	LF DRVR	
- 11,149,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,149,3nn	LF DRVR	
- 11,150,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,150,3nn	LF DRVR	
- 11,151,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,151,3nn	LF DRVR	
- 11,152,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,152,3nn	LF DRVR	
- 11,153,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+ 11,153,3nn	LF DRVR	

### Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
-11,154,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+11,154,3nn	LF DRVR	
-11,155,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+11,155,3nn	LF DRVR	
-11,156,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+11,156,3nn	LF DRVR	
-11,157,3nn	LF DRVR/IF DIVIDER - J5	Test 2A
+11,157,3nn	LF DRVR	
+11,200,3nn	LF DRVR	
to		
+11,210,3nn	LF DRVR	
-11,999,3nn	LF DRVR/IF DIVIDER - J2	Test 7A
12,030,3nn	Perform Cal_Data Recover Program (See <i>Adjustments</i> section)	
-12,070,3nn	MW EXT/3 - 6 MW CONV - J1	Test 7A
-12,070,3nn	MW EXT - J1	Test 7A
-12,073,3nn	MW EXT/MW ALC - J1	Test 7A
-12,073,3nn	MW EXT - J1	Test 7A
-12,074,3nn	MW EXT - J1	Test 7A
-12,074,3nn	MW EXT/MW ALC - J1	Test 7A
-12,113,3nn	MW EXT - J2	Test 2A
-12,113,3nn	MW EXT/MW ALC - J2	Test 2A
+12,114,3nn	MW EXT	
+12,115,3nn	MW EXT	
+12,137,3nn	MW EXT	
+12,138,3nn	MW EXT	
+12,139,3nn	MW EXT	
-12,185,3nn	ATTEN/RPP - S1J1	Test 2B
+12,186,3nn	MW EXT	
+12,187,3nn	MW EXT	
+12,188,3nn	MW EXT	
+12,189,3nn	MW EXT	
-12,190,3nn	ATTEN/RPP - S1J1	Test 2B
+12,191,3nn		
to		
+12,194,3nn	MW EXT	
-12,195,3nn	ATTEN/RPP - S1J1	Test 2B
-12,295,3nn	MW EXT - J1	Test 7A
+12,196,3nn		
to		
+12,199,3nn	MW EXT	
+12,260,3nn	MW EXT	
+12,261,3nn	MW EXT	
+12,265,3nn		
to		
+12,268,3nn	MW EXT	
+12,270,3nn	MW EXT	
+12,294,3nn	MW EXT	
-12,295,3nn	MW EXT/MW ALC - J1	Test 7A

## ***Result Codes List***

<b><u>Result Code</u></b>	<b><u>Assembly/Connector</u></b>	<b><u>Test</u></b>
+ 12,296,3nn	MW EXT	
- 12,297,3nn	MW EXT - J1	Test 7A
- 12,297,3nn	MW EXT/MW ALC - J1	Test 7A
+ 12,298,3nn	MW EXT	
+ 12,299,3nn	MW EXT	
- 12,999,3nn	MW EXT/MW ALC - J1	Test 7A
- 12,999,3nn	MW EXT - J1	Test 7A
+ 13,nnn,nnn	Front Panel Controller	
+ 14,080,nnn	I/O ASSEMBLY	
+ 14,081,nnn	I/O ASSEMBLY	
+ 14,nnn,nnn	I/O ASSEMBLY - J3	Test 16
+ 15,010,nnn	I/O ASSEMBLY - J7	Test 12A
+ 15,011,nnn		
to		
+ 15,018,nnn	I/O ASSEMBLY - J1	Test 12B
+ 15,021,nnn	I/O ASSEMBLY - J1	Test 12C
+ 15,022,nnn	I/O ASSEMBLY - J1	Test 12C
+ 15,023,nnn	I/O ASSEMBLY - J1	Test 12C
+ 15,031,nnn	I/O ASSEMBLY - J1	Test 12C
+ 15,032,nnn	I/O ASSEMBLY - J2	Test 12D
+ 15,033,nnn	I/O ASSEMBLY - J2	Test 12D
+ 15,034,nnn	I/O ASSEMBLY - J1	Test 12B
+ 15,035,nnn	I/O ASSEMBLY - J1	TEst 12B
+ 15,110,3nn	I/O ASSEMBLY	
+ 15,120,3nn	I/O ASSEMBLY <sup>1</sup>	
+ 15,121,3nn	I/O ASSEMBLY <sup>1</sup>	
+ 15,122,3nn		
to		
+ 15,127,3nn	I/O ASSEMBLY <sup>2</sup>	
+ 15,130,3nn	I/O ASSEMBLY	
+ 15,140,3nn	I/O ASSEMBLY	
+ 15,141,3nn	I/O ASSEMBLY	
+ 15,150,3nn	I/O ASSEMBLY	
+ 15,151,3nn	I/O ASSEMBLY	
+ 15,152,3nn	I/O ASSEMBLY	
+ 15,160,3nn	I/O ASSEMBLY	
+ 15,161,3nn	I/O ASSEMBLY	
+ 15,062,3nn	I/O ASSEMBLY	
+ 16,nnn,nnn	DCU (Digital Control HP 8664A, 8665A/B)	
+ 17,nnn,3nn	PULSE MOD (HP 8665A OPTION 008)	

<sup>1</sup>Inspect ribbon cable W44 (between Motherboard J12 and I/O Assembly J1) for improper connection or damage. If W44 checks out good, replace the I/O Assembly.



## *Result Codes List*

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+ 18,nnn,1nn	COUNTER (2 GHz Freq Counter opt 011)	
- 18,001,1nn	COUNTER - J1	Test 7A
- 18,002,1nn	COUNTER - J1	Test 7A
- 18,003,1nn	COUNTER - J3	Test 2A
- 18,010,1nn to		
- 18,029,1nn	COUNTER - J4	Test 2A
- 18,030,1nn to		
- 18,049,1nn	COUNTER - J3	Test 2A
+ 18,050,1nn	COUNTER (2 GHz Freq Counter opt 011)	
+ 18,051,1nn	COUNTER (2 GHz Freq Counter opt 011)	
+ 18,060,1nn to		
+ 18,064,1nn	COUNTER (2 GHz Freq Counter opt 011)	
+ 18,070,1nn to		
+ 18,121,1nn	COUNTER (2 GHz Freq Counter opt 011)	
+ 18,130,1nn to		
+ 18,133,1nn	COUNTER (2 GHz Freq Counter opt 011)	
+ 18,201,1nn	COUNTER (2 GHz Freq Counter opt 011)	
+ 18,202,1nn	COUNTER (2 GHz Freq Counter opt 011)	
+ 18,203,1nn	COUNTER (2 GHz Freq Counter opt 011)	
- 30,265,3nn	MW EXT/MW CONV - J1	Test 2B
- 30,320,3nn	FRAC-N - J4	Test 3B
- 30,326,3nn	COAX DSC - J10	Test 3B
- 30,460,3nn	HF DRVR - J7	Test 4B
- 30,463,3nn	MW EXT/MW CONV - J2	Test 4B
- 30,465,3nn	MW ASSEMBLY/GAAS DIVIDERS - U17J1	Test 4B
- 30,468,3nn	MW ASSEMBLY/GAAS DIVIDERS - U17J3	Test 4B
- 30,470,3nn	YIG TUNED OSCILLATOR - J2	Test 4B
+ 31,001,1nn	W9 (STD MOD - J2 to STD VCO - J6)	
+ 31,001,2nn	W9 (MOD DIST - J2 to FAST VCO - J13)	
+ 31,001,3nn	W9 (MOD DIST - J2 to PLL-YIG - J4)	
+ 31,002,1nn	W405 (STD MOD - J2 to COAX DSC - J8)	
+ 31,002,2nn	W405 (MOD DIST - J2 to COAX DSC - J8)	
+ 31,002,3nn	W405 (MOD DIST - J2 to COAX DSC - J8)	
+ 31,003,1nn	W10 (STD MOD - J3 to FRAC-N - J2)	
+ 31,003,2nn	W10 (MOD DIST - J3 to FRAC-N - J2)	
+ 31,003,3nn	W10 (MOD DIST - J3 to FRAC-N - J2)	
+ 31,004,1nn	W16 (STD MOD - J9 to STD ALC - J1)	
+ 31,004,2nn	W16 (MOD DIST - J9 to FAST ALC - J1)	
+ 31,004,3nn	W16 (MOD DIST - J9 to OUT AMP - J4)	
+ 31,005,1nn	W201 (STD MOD - J9 to DOUBLER - J3)	
+ 31,005,2nn	W201 (MOD DIST - J9 to DOUBLER - J3)	
+ 31,006,1nn	W15 (STD MOD - J8 to AUDIO OUT [Front Panel])	

## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
+31,006,2nn	W15 (MOD DIST - J8 to AUDIO OUT [Front Panel])	
+31,006,3nn	W15 (MOD DIST - J8 to AUDIO OUT [Front Panel])	
+31,010,110	W26 (DIVIDER - J3 to STD VCO - J1)	
+31,010,111	W403 (DIVIDER - J3 to COAX DSC - J2)	
+31,010,112	W26 (DIVIDER - J3 to STD VCO - J1)	
+31,010,113	W403 (DIVIDER - J3 to COAX DSC - J2)	
+31,010,114	W26 (DIVIDER - J3 to STD VCO - J1)	
+31,010,115	W403 (DIVIDER - J3 to COAX DSC - J2)	
+31,010,116	W26 (DIVIDER - J3 to STD VCO - J1)	
+31,010,117	W403 (DIVIDER - J3 to COAX DSC - J2)	
+31,010,210	W26 (DIVIDER - J3 to FAST VCO - J5)	
+31,010,211	W403 (DIVIDER - J3 to COAX DSC - J2)	
+31,010,212	W26 (DIVIDER - J3 to FAST VCO - J5)	
+31,010,213	W403 (DIVIDER - J3 to COAX DSC - J2)	
+31,011,1nn	W402 (STD VCO - J1 to COAX DSC - J1)	
+31,011,2nn	W402 (FAST VCO - J5 to COAX DSC - J1)	
+31,011,3nn	W402 (COAX DSC - J1 to DIVIDER - J2)	
+31,012,1nn	W20 (STD VCO - J3 to FRAC-N - J1)	
+31,012,2nn	W20 (FAST VCO - J1 to FRAC-N - J1)	
+31,012,3nn	W20 (MW LOOP DIVIDER - J1 to FRAC-N - J1)	
+31,013,2nn	W5 (FAST VCO - J4 to PH SHIFT - J4)	
+31,014,2nn	W4 (FAST VCO - J2 to PH SHIFT - J1)	
+31,015,2nn	W3 (FAST VCO - J10 to PH SHIFT - J5)	
+31,016,2nn	W2 (DELAY LINE - J2 to PH SHIFT - J2)	
+31,017,1nn	W1 (DELAY LINE - J1 to STD VCO - J5)	
+31,017,2nn	W1 (DELAY LINE - J1 to FAST VCO - J9)	
+31,018,1nn	W4 (DELAY LINE - J2 to STD VCO - J2)	
+31,020,1nn	W22 (FRAC-N - J4 to STD VCO - J8)	
+31,020,2nn	W22 (FRAC-N - J4 to FAST VCO - J6)	
+31,020,3nn	W27 (FRAC-N - J4 to MW LOOP/PLL YIG - J3)	
+31,021,1nn	W407 (FRAC-N - J4 to COAX DSC - J10)	
+31,021,2nn	W407 (FRAC-N - J4 to COAX DSC - J10)	
+31,021,3nn	W407 (FRAC-N - J4 to COAX DSC - J10)	
+31,025,1nn	W404 (STD VCO - J7 to COAX DSC - J6)	
-31,152,nnn	DIVIDER - J4	Test 13B
-31,210,nnn	DIVIDER - J3	Test 2A
-31,211,1nn	COAX DSC - J1	Test 2A
-31,211,2nn	COAX DSC - J1	Test 2A
-31,211,3nn	COAX DSC - J1	Test 2A
-31,212,1nn	FRAC-N - J1	Test 2A
-31,212,3nn	FRAC-N - J1	Test 2A
-31,213,2nn	PH SHIFT - J4	Test 2A
-31,214,2nn	PH SHIFT - J1	Test 2A
-31,216,2nn	DELAY LINE - J2	Test 2A
-31,217,2nn	FAST VCO - J9	Test 2A

## Result Codes List

<u>Result Code</u>	<u>Assembly/Connector</u>	<u>Test</u>
-31,218,1nn	DELAY LINE - J2	Test 2A
-31,228,nnn	DELAY LINE - J3	Test 2A
-31,250,nnn	2 GHz ATTENUATOR - INPUT	Test 2A
-31,251,nnn	STD DOUBLER/DOUBLER - J6	Test 2A
-31,256,3nn	OUTPUT/DN CONV - J3	Test 2A
-31,257,3nn	OUTPUT/DN CONV - J2	Test 2A
-31,260,3nn	OUTPUT/OUT AMP - J3	Test 2A
-31,266,3nn	DIVIDER - J3	Test 2A
-31,301,1nn	STD MOD/NSM OSC - J2	Test 3A
-31,301,2nn	MOD DIST/NSM OSC - J2	Test 3A
-31,301,3nn	MOD DIST/NSM OSC - J2	Test 3A
-31,302,2nn	MOD DIST/NSM OSC - J2	Test 3A
-31,303,1nn	STD MOD - J3	Test 3A
-31,303,2nn	MOD DIST/NSM OSC - J3	Test 3A
-31,303,3nn	MOD DIST/NSM OSC - J3	Test 3A
-31,304,1nn	STD MOD - J9	Test 3A
-31,304,2nn	MOD DIST/NSM OSC - J9	Test 3A
-31,304,3nn	MOD DIST/NSM OSC - J9	Test 3A
-31,305,1nn	STD MOD - J9	Test 3A
-31,305,2nn	MOD DIST/NSM OSC - J9	Test 3A
-31,305,3nn	MOD DIST/NSM OSC - J9	Test 3A
-31,306,1nn	STD MOD - J8	Test 3A
-31,306,2nn	MOD DIST/NSM OSC - J8	Test 3A
-31,306,3nn	MOD DIST/NSM OSC - J8	Test 3A
-31,320,nnn	FRAC-N - J4	Test 3A
-31,321,nnn	FRAC-N - J4	Test 3A
-31,326,nnn	COAX DSC - J11	Test 3A
-31,327,1nn	COAX DSC - J9	Test 3A
-31,327,2nn	COAX DSC - J9	Test 3A
-31,327,3nn	COAX DSC - J10	Test 3A
-31,331,nnn	STD DOUBLER/DOUBLER - J2	Test 3A
-31,335,nnn	STD MOD/NSM OSC or MOD DIST/NSM OSC - J1	Test 3A
-31,351,3nn	OUTPUT/OUT AMP - J6	Test 3A
-31,352,1nn	REF OSC/STD ALC - J8	Test 13A
-31,352,2nn	REF OSC/FAST ALC - J8	Test 13A
-31,359,3nn	OUTPUT/OUT AMP - J7	Test 3A
-31,361,3nn	OUTPUT/OUT AMP - J6	Test 3A
-31,362,3nn	OUTPUT/OUT AMP - J8	Test 3A
-31,411,1nn	STD VCO - J1	Test 4A
-31,411,2nn	FAST VCO - J5	Test 4A
-31,412,1nn	STD VCO - J3	Test 4A
-31,412,2nn	FAST VCO - J1	Test 4A
-31,413,2nn	FAST VCO - J4	Test 4A
-31,414,2nn	FAST VCO - J2	Test 4A
-31,415,2nn	PH SHIFT - J5	Test 4A

## ***Result Codes List***

<b><u>Result Code</u></b>	<b><u>Assembly/Connector</u></b>	<b><u>Test</u></b>
-31,416,2nn	PH SHIFT - J2	Test 4A
-31,417,nnn	DELAY LINE - J1	Test 4A
-31,418,nnn	DELAY LINE - J1	Test 4A
-31,428,2nn	COAX DSC - J3	Test 4A
-31,429,nnn	DELAY LINE - J4	Test 4A
-31,441,nnn	REF OSC - J4	Test 4A
-31,442,1nn	REF OSC - J1	Test 4A
-31,445,nnn	DIVIDER - J2	Test 4A
-31,450,1nn	REF OSC/STD ALC - J7	Test 4A
-31,450,2nn	REF OSC/FAST ALC - J7	Test 4A
-31,451,1nn	REF OSC/STD ALC - J7	Test 4A
-31,451,2nn	REF OSC/FAST ALC - J7	Test 4A
-31,453,3nn	HF DRVR - J3	Test 4A
-31,454,3nn	LF DRVR/IF DIVIDER - J1	Test 4A
-31,455,3nn	OUTPUT/DN CONV - J1	Test 4A
-31,456,3nn	HF DRVR - J5	Test 4A
-31,457,3nn	LF DRVR/IF DIVIDER - J2	Test 4A
-31,458,3nn	REFERENCE - J1	Test 4A
-31,460,3nn	HF DRVR - J7	Test 4A
-31,466,3nn	MW ASSEMBLY/GAAS DIVIDER - J3	Test 4A
-31,467,3nn	MW ASSEMBLY/GAAS DIVIDERS - U17- J4	Test 4A
-31,475,1nn	RF OUTPUT	Test 4A
-31,527,1nn	COAX DSC - J9	Test 5
-31,527,2nn	MOD DIST/NSM OSC - J2	Test 5
-31,531,nnn	STD DOUBLER/DOUBLER - J2	Test 5
-31,601,1nn	STD VCO - J6	Test 6
-31,601,2nn	FAST VCO - J13	Test 6
-31,602,1nn	COAX DSC - J8	Test 6
-31,602,2nn	COAX DSC - J6	Test 6
-31,603,nnn	FRAC-N - J2	Test 6
-31,604,nnn	ALC - J1	Test 6
-31,605,nnn	STD DOUBLER/DOUBLER - J3	Test 6
-31,625,1nn	STD VCO - J7	Test 6
-31,625,2nn	FAST VCO - J12	Test 6
-31,627,1nn	STD VCO - J6	Test 6
-31,627,2nn	COAX DSC - J8	Test 6
-31,631,1nn	REF OSC/STD ALC - J1	Test 6
-31,631,2nn	REF OSC/FAST ALC - J1	Test 6
-31,704,2nn	MOD DIST/NSM OSC - J6	Test 7A
-31,769,3nn	MW LOOP/PLL YIG - J1	Test 17
-31,840,nnn		P/O Test 8, Step 5a



## TABLE OF CONTENTS

### Troubleshooting - Result Code Tests

Diagnostic Test Procedures . . . . .	2c-1
Assembly Locator Diagram . . . . .	2c-2
Test 1A - Input Cable to Voltmeter Test Set-up . . . . .	2c-3
Test 1B - HP 8664/8665 Input Cable to Voltmeter Test Set-up . . . . .	2c-5
Test 2A - Input Cable to Powermeter Test Set-up . . . . .	2c-7
Test 2B - HP 8664/8665 Input Cable to Powermeter Test Set-up . . . . .	2c-9
Test 3A - Output Port to Voltmeter Test Set-up . . . . .	2c-11
Test 3B - HP 8664/8665 Output Port to Voltmeter Test Set-up . . . . .	2c-13
Test 4A - Output Port to Powermeter Test Set-up . . . . .	2c-15
Test 4B - HP 8664/8665 Output Port to Powermeter Test Set-up . . . . .	2c-17
Test 5 - Output Port Test Set-up . . . . .	2c-19
Test 6 - Output Cable Test Set-up . . . . .	2c-21
Test 7A - Assembly Interface Ribbon Cable: Power Supply Check Test Set-up . . . . .	2c-23
Ribbon Cable DC Voltage Level Limits . . . . .	2c-25
Test 7B - Serial and Parallel Interface Ribbon Cable: Control Signals Test Set-up . . . . .	2c-33
Test 8 - FRAC-N Reference Input Test Set-up . . . . .	2c-37
Test 9 - VCO/Fast Controller Ribbon Cable: Test Set-up . . . . .	2c-39
Fast VCO Test Points . . . . .	2c-41
Test 10 - Phase Shift Ribbon Cable Test Set-up . . . . .	2c-43
Phase Shift Test Points . . . . .	2c-44
Test 11 - Reference Oscillator Cable Test Set-up . . . . .	2c-45
Reference Oscillator Test Points . . . . .	2c-46
Test 12A, B, C, & D - I/O Assembly . . . . .	2c-47
Initial Test Set-Up . . . . .	2c-47
General Test Procedures . . . . .	2c-49
Signal Tracing: Controller Board to I/O Assembly . . . . .	2c-50
Voltage Tracing: I/O Assembly to Controller Board . . . . .	2c-50
Motherboard Connector and Pin Locator Diagram . . . . .	2c-51
I/O Assembly → DCU Signal Connections Diagram . . . . .	2c-52
Test 13A & B - ALC Mod Control . . . . .	2c-53
Test 13A Set-Up . . . . .	2c-53
Test 13B Set-Up . . . . .	2c-53
General Instructions for 13A or 13B . . . . .	2c-54
Test 14A - Dividers/ALC Ribbon Cable: Test Set-up . . . . .	2c-55
Test 14 Logic Level Checks . . . . .	2c-56
Test 14 Supply Voltage and Logic Level Checks . . . . .	2c-56
Test 14B - Divider/ALC Ribbon Cable: Test Set-up . . . . .	2c-57
Voltage Limits for Test 14 Supply Voltages . . . . .	2c-58
Test 15 - Attenuator Driver Serial Interface . . . . .	2c-59
I/O Assembly → Attenuator Test Points . . . . .	2c-61
Attenuator → I/O Assembly Test Points . . . . .	2c-61
I/O Assembly → Attenuator Communication Data Lines . . . . .	2c-61
Test 16 - Power Supply Test . . . . .	2c-63
Power Supply Voltage Test Limits . . . . .	2c-63
Test 17 - HP 8664/8665 YTO Ribbon Cable: Test Set-up . . . . .	2c-65
Test 18 - Auxiliary FM Fault Detection . . . . .	2c-67



# 2c

## Troubleshooting - Result Code Tests

---

### ***Diagnostic Test Procedures***

The Diagnostic Test Procedures are specific instructions used to help (the ILD) isolate a defective assembly or cable. They provide cable inter-connections and test measurement data necessary to complete fault diagnosis. These test procedures are accessed in the *Result Codes* subsection.



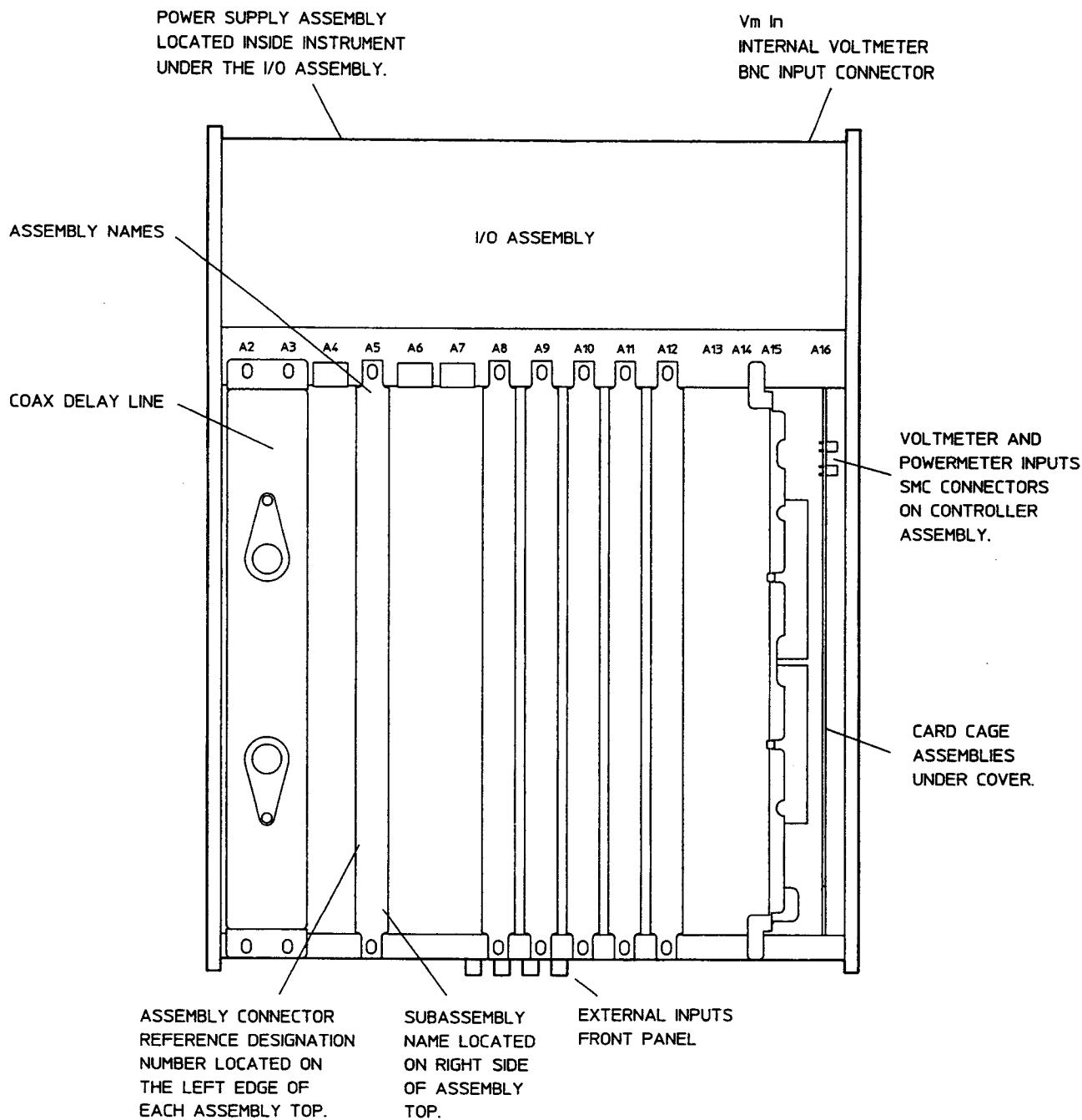
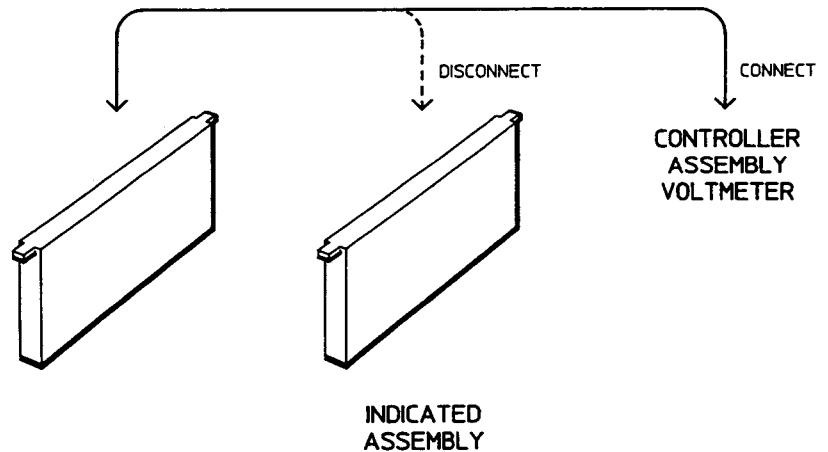


Figure 2c-1. Assembly Locator Diagram

**TEST 1A****Input Cable  
to Voltmeter  
Test Set-Up**

1. Disconnect the cable from the Connector indicated in *Result Codes* subsection.

**Caution**

*When RF coax cables are disconnected from the assembly, do not allow the loose ends to contact any exposed circuitry or connectors. This is to prevent possible short circuiting.*

2. Connect the same cable (disconnected in step 1) to the rear panel Voltmeter input (VM IN), or to the Voltmeter SMC connection on the Controller assembly (you must first disconnect the VM IN voltmeter cable).

**Running the Test****Determining  
the next action**

3. Key in **[SPECIAL]** 321, then press the **[ON]** key twice.
4. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.

Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

---

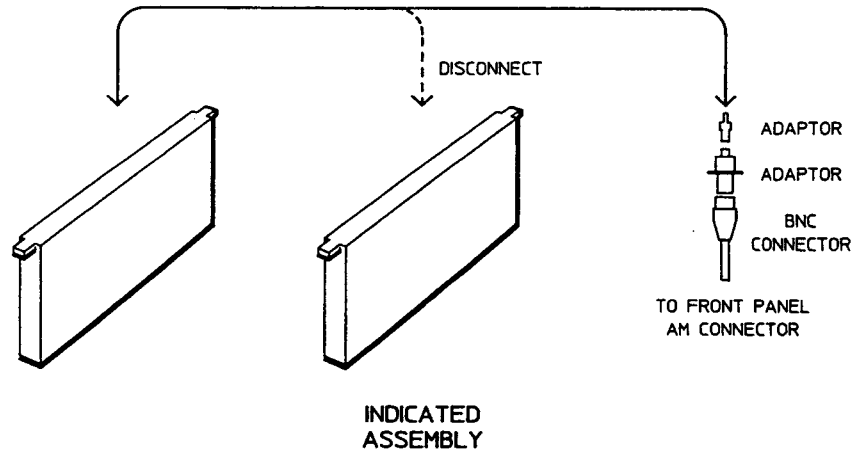
**Caution**

*When replacing coax cables, tighten connectors to 5.5 in.-lb for SMC, and 8.5 in.-lb for SMA to prevent potential RFI leakage and connector damage.*

---

## TEST 1B

### (HP 8664/8665) Input Cable to Voltmeter Test Set-Up



1. Disconnect the cable from the Connector indicated in *Result Codes* subsection.

#### Caution

*When RF coax cables are disconnected from the assembly, do not allow the loose ends to contact any exposed circuitry or connectors. This is to prevent possible short circuiting.*

2. Connect the same cable (disconnected in step 1) to the front panel AM input connector using these adapters and a BNC cable from the HP 8664/8665 Service Kit: SMC M-to-M adaptor (p/n 1250-0827), SMC F-to-BNC F adaptor (p/n 1250-0832). See the test set-up diagram.

#### Running the Test

#### Determining the next action

3. Key in **SPECIAL** 321, then press the **ON** key twice.
4. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.

Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

---

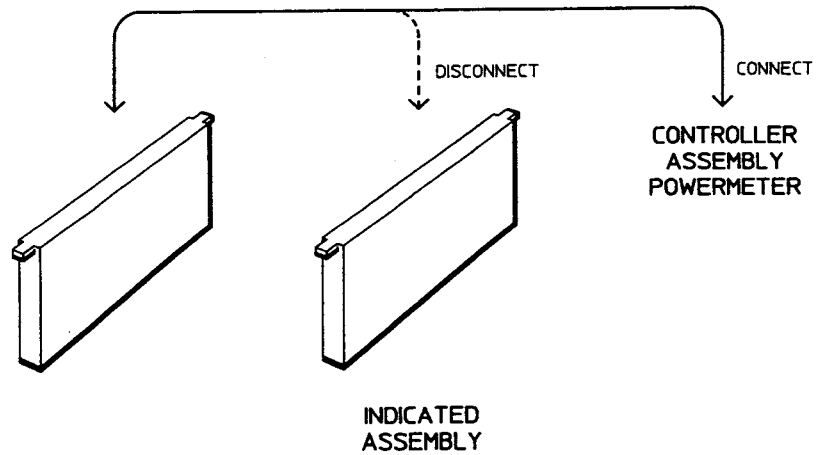
**Caution**

*When replacing coax cables, tighten connectors to 5.5 in.-lb for SMC, and 8.5 in.-lb for SMA to prevent potential RFI leakage and connector damage.*

---

**TEST 2A**

**Input Cable to  
Powermeter  
Test Set-Up**



1. Disconnect the cable from the Connector indicated in subsection *Result Codes*.

If making connections to the Delay Line Assembly, see the Delay Line Connector Location diagram for locating the correct Delay Line connector reference designators.

**Caution**

*When RF coax cables are disconnected from the assembly, do not allow the loose ends to contact any exposed circuitry or connectors to prevent possible short circuiting.*

**Running the Test**

**Determining  
the next action**

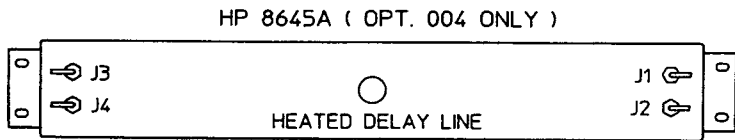
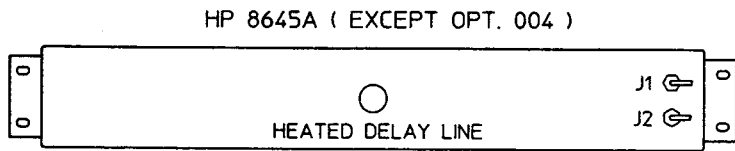
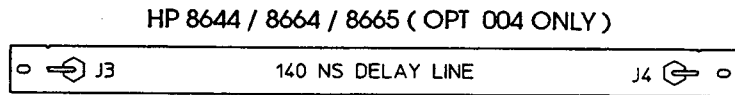
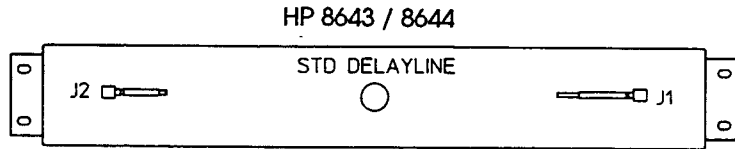
2. Connect the same cable (disconnected in step 1) to the Powermeter input next to the Voltmeter connector on the Controller Assembly.
3. Key in **SPECIAL** 321, then press the **ON** key twice.
4. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.

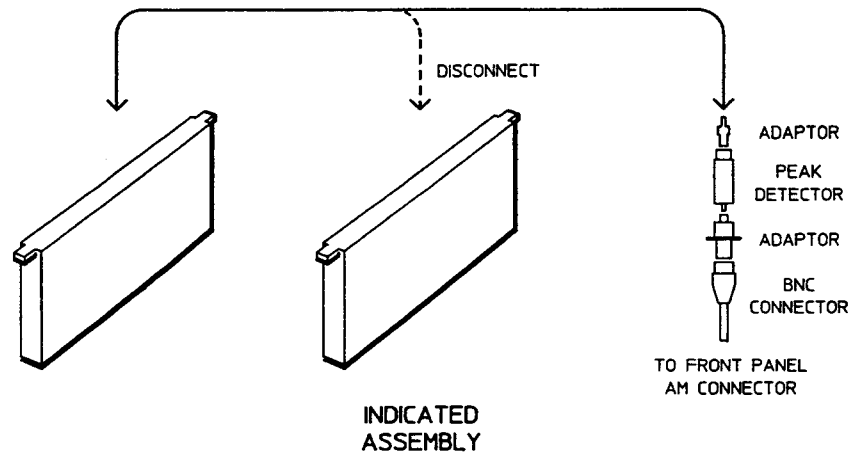
Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

**Caution**

*When replacing coax cables, tighten connectors to 5.5 in.-lb for SMC, and 8.5 in.-lb for SMA to prevent potential RFI leakage and connector damage.*



*Delay Line Connectors Location Diagram*

**TEST 2B****(HP 8664/8665)  
Input Cable to  
Powermeter  
Test Set-Up**

1. Disconnect the cable from the Connector indicated in *Result Codes* subsection.

If making connections to the Delay Line Assembly, see the Delay Line Connector Location diagram for locating the correct Delay Line connector reference designators.

**Caution**

*When RF coax cables are disconnected from the assembly, do not allow the loose ends to contact any exposed circuitry or connectors to prevent possible short circuiting.*

2. Connect the HP 33310B Peak Detector between the cable disconnected in step 1 and the front panel AM input connector using these necessary adaptors and coax cables from the HP 8664/8665 Service Kit:

Use the SMC (female) to SMA (female) adapter (p/n 1250-0675) between the disconnected coax cable and the input (SMA connector) of the HP 33310B Peak Detector. Use the SMC (female) to BNC (female) adapter (p/n 1250-0832) between the output (SMC connector) of the HP 33310B and the BNC cable that connects to the front panel AM input connector. See the test set-up diagram.



**Running the Test**

**Determining  
the next action**

3. Key in **SPECIAL** 321, then press the **ON** key twice.
4. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.

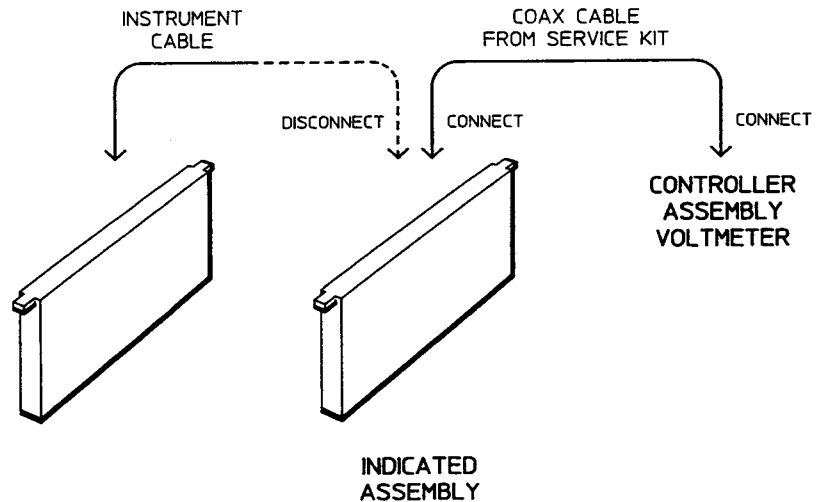
Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

---

**Caution**

*When replacing coax cables, tighten connectors to 5.5 in.-lb for SMC, and 8.5 in.-lb for SMA to prevent potential RFI leakage and connector damage.*

---

**TEST 3A****Output Port  
to Voltmeter  
Test Set-Up**

1. Disconnect the cable from the Connector indicated in *Result Codes* subsection.
2. Connect a good cable from the Service Kit between the assembly Connector as indicated in *Result Codes* subsection and the rear panel Voltmeter input (VM IN). Or, you can connect to the Voltmeter SMC connection on the Controller (you must first disconnect the VM IN voltmeter cable).
3. Key in **SPECIAL** 321, then press the **ON** key twice.
4. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

**Running the Test****Determining  
the next action**

If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.

Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

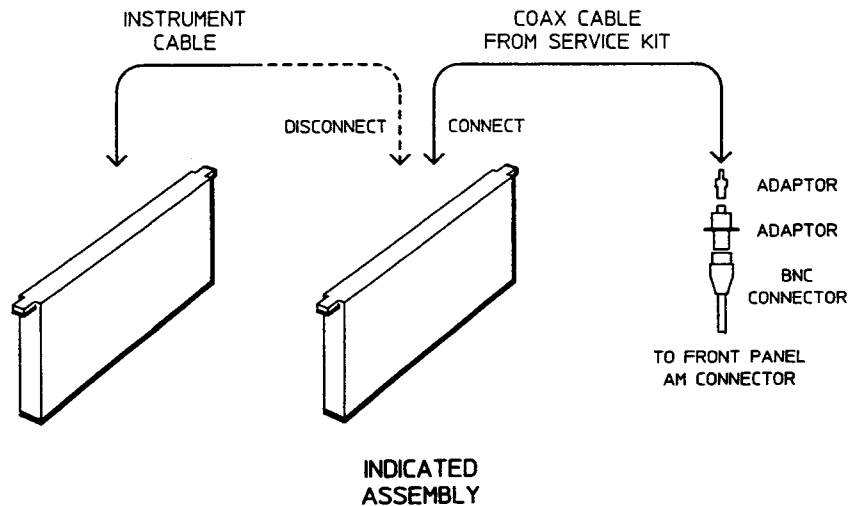
**Caution**

When replacing coax cables, tighten connectors to 5.5 in-lb for SMC, and 8.5 in-lb for SMA to prevent potential RFI leakage and connector damage.



**TEST 3B**

**(HP 8664/8665)  
Output Port  
to Voltmeter  
Test Set-Up**



1. Disconnect the cable from the Connector indicated in *Result Codes* subsection.
2. Connect a good coax cable between the assembly Connector as indicated in subsection *Result Codes* and the front panel AM input connector using these adapters and a BNC cable from the HP 8664/8665 Service Kit: a SMC M-to-M adaptor (p/n 1250-0827), SMC F-to-BNC F adaptor (p/n 1250-0832). See the test set-up diagram.
3. Key in **SPECIAL** 321, then press the **ON** key twice.
4. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

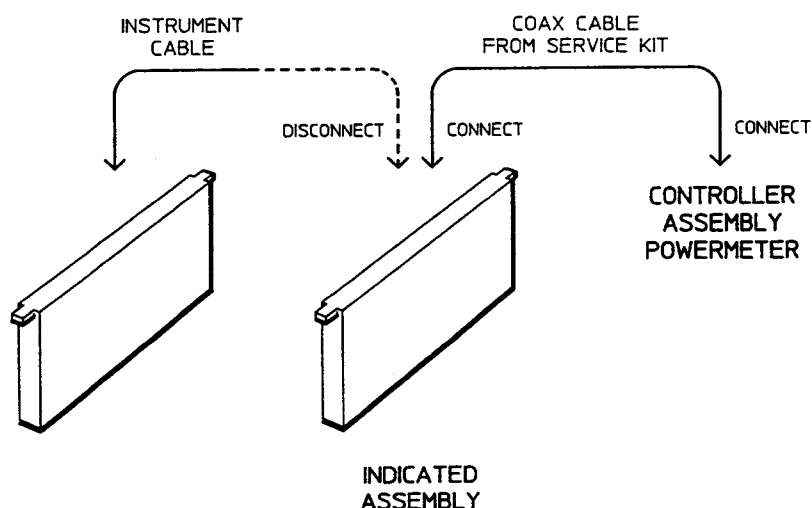
If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.

Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

**Caution**

*When replacing coax cables, tighten connectors to 5.5 in-lb for SMC, and 8.5 in-lb for SMA to prevent potential RFI leakage and connector damage.*



**TEST 4A****Output Port to  
Powermeter  
Test Set-Up**

1. Disconnect the cable from the Connector indicated in subsection *Result Codes*.

If making connections to the Delay Line Assembly, see the Delay Line Connector Location diagram for locating the correct Delay Line connector reference designators.

2. Connect a good cable from the Service Kit between the assembly Connector as indicated in subsection *Result Codes* and the Powermeter input next to the Voltmeter connector on the Controller Assembly.

**Running the Test****Determining  
the next action**

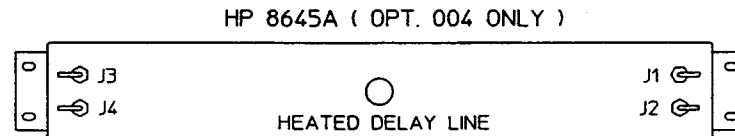
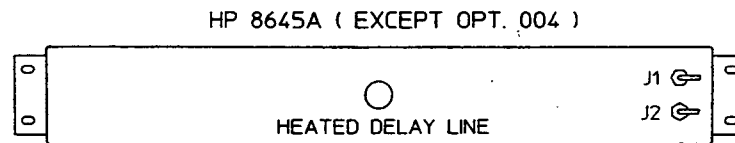
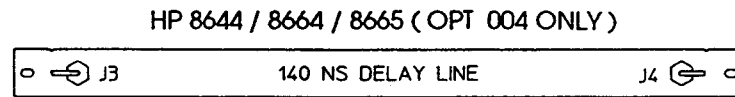
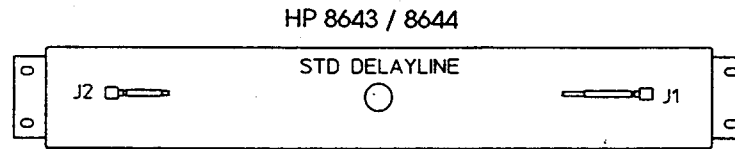
3. Key in **[SPECIAL] 321**, then press the **[ON]** key twice.
4. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.

Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

**Caution**

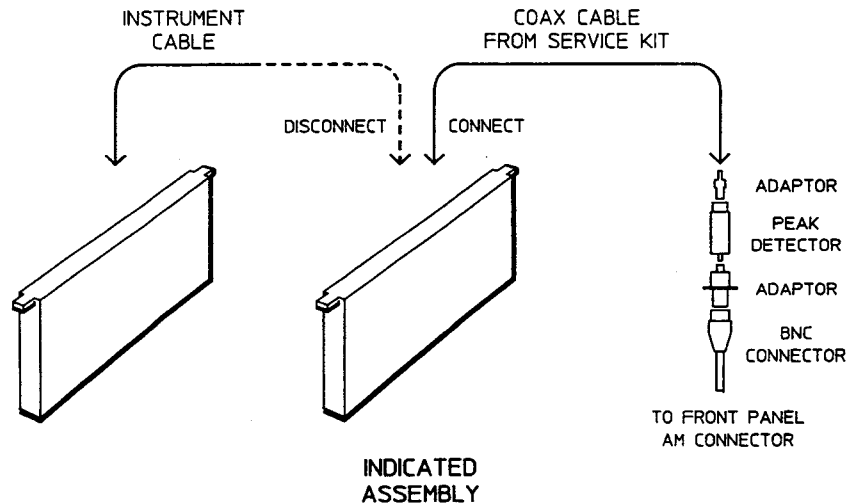
When replacing coax cables, tighten connectors to 5.5 in-lb for SMC, and 8.5 in-lb for SMA to prevent potential RFI leakage and connector damage.



*Delay Line Connector Locations Diagram*

## TEST 4B

### (HP 8664/8665) Output Port to Powermeter Test Set-Up



1. Disconnect the cable from the Connector indicated in subsection *Result Codes*.

If making connections to the Delay Line Assembly, see the Delay Line Connector Location diagram for locating the correct Delay Line connector reference designators.

2. Using the necessary adaptors and coax cables from the HP 8664/8665 Service Kit, connect a good coax cable between the assembly Connector (as indicated in subsection *Result Codes* and the input (SMA connector) of the HP 33310B Peak Detector using a SMC (female) to SMA (female) adapter (p/n 1250-0675). Connect a good cable from the output (SMC connector) of the HP 33310B to the front panel AM input connector using a SMC (female) to BNC (female) adapter (p/n 1250-0832). See the test set-up diagram.

### Running the Test

#### Determining the next action

3. Key in **SPECIAL** 321, then press the **ON** key twice.
4. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.



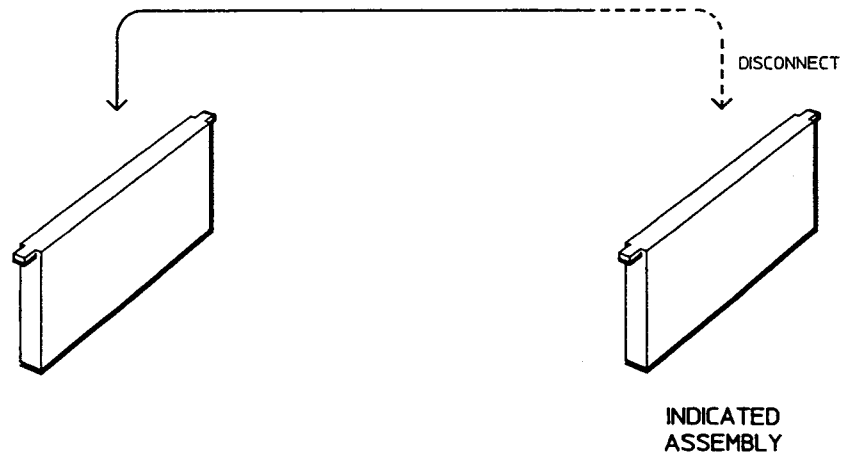
Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

---

**Caution**

*When replacing coax cables, tighten connectors to 5.5 in-lb for SMC, and 8.5 in-lb for SMA to prevent potential RFI leakage and connector damage.*

---

**TEST 5****Output Port  
Test Set-Up**

1. Disconnect the cable from the Connector indicated in subsection *Result Codes*.

**Caution**

*When RF coax cables are disconnected from the assembly, do not allow the loose ends to contact any exposed circuitry or connectors to prevent possible short circuiting.*

**Running the Test****Determining  
the next action**

2. Key in **SPECIAL** 321, then press the **ON** key twice.
3. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

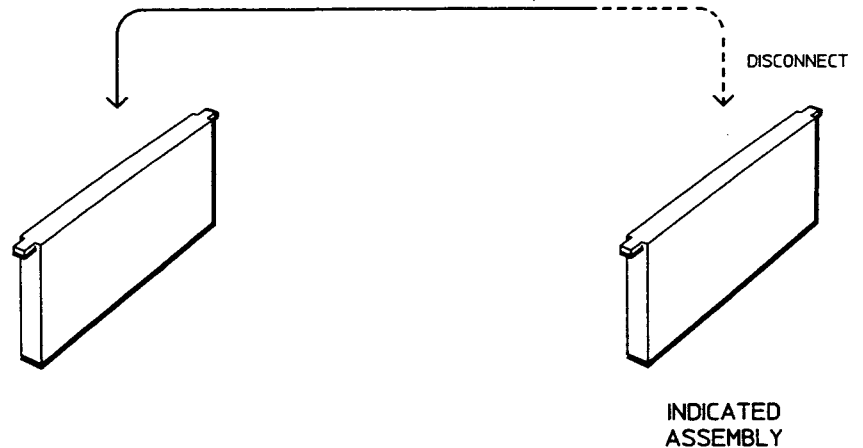
If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.

Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

**Caution**

*When replacing coax cables, tighten connectors to 5.5 in-lb for SMC, and 8.5 in-lb for SMA to prevent potential RFI leakage and connector damage.*



**TEST 6****Output Cable  
Test Set-Up**

1. Reconnect any cables removed from previous tests to the correct assembly connector.
2. Disconnect the cable from the Connector indicated in subsection *Result Codes*.

**Caution**

*When RF coax cables are disconnected from the assembly, do not allow the loose ends to contact any exposed circuitry or connectors to prevent possible short circuiting.*

**Running the Test****Determining  
the next action**

3. Key in **SPECIAL** 321, then press the **ON** key twice.
4. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.

Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

---

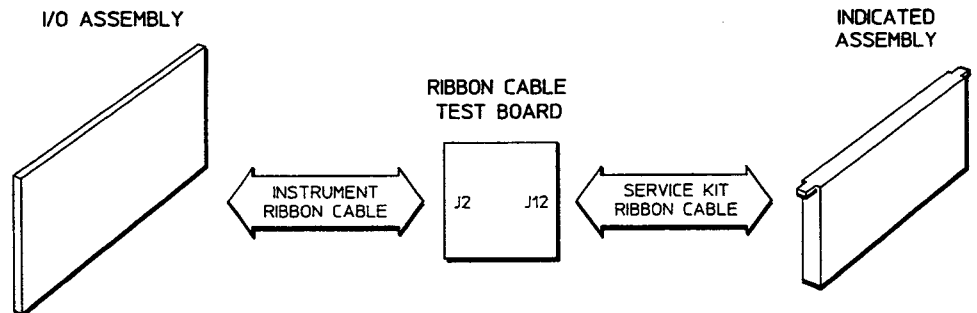
**Caution**

*When replacing coax cables, tighten connectors to 5.5 in-lb for SMC, and 8.5 in-lb for SMA to prevent potential RFI leakage and connector damage.*

---

**TEST 7A**

**Assembly  
Interface  
Ribbon Cable:  
Power Supply  
Check Test  
Set-Up**



1. Switch the instrument to stand-by (power off).
2. Disconnect the ribbon cable from the Connector indicated in subsection *Result Codes* and connect it to the J2 connector on the Ribbon Cable Test Board (from the Service Kit). See the test connections diagram.

**Note**

*If you are testing parallel interface ribbon cables (such as the FRAC-N assembly ribbon cable), use connectors J1 and J11 on the Ribbon Cable Test Board.*

**Running the Test**

3. Connect a good (matching connector) ribbon cable from the Service Kit to the Ribbon Cable Test Board J12 connector, and then to the Assembly connector.
4. Connect a BNC cable to BNC-to-alligator test clips (from the Service Kit), then connect the BNC cable to the rear panel Vm In connector.
5. Turn the instrument power back on.
6. Key in **SPECIAL** 180 then press the **ON** key once to turn on the internal DC Voltmeter. Pressing the **ON** key again will turn off the DC Voltmeter. (If available, use an external DVM.)
7. Find the Voltage Limits table (tables 2-1 through 2-14) for the assembly ribbon cable you are testing. Measure the voltage level (referenced to chassis ground) at the same pin on the Ribbon Cable Test Board as indicated in the Voltage Limits table. Compare the results.

8. If all voltages test good (each voltage level should be within the limit shown in the correct table), proceed to the next test, *RIBBON CABLE: TEST 7B CONTROL SIGNALS* to check the ribbon cable control signal lines.

If any voltage is not within limits, continue with testing the assembly ribbon cable as follows:

**Ribbon Cable  
Recheck**

1. Switch the instrument to stand-by (power off).
2. Replace the normal ribbon cable (between the Ribbon Cable Test Board and the I/O Assembly) with another good ribbon cable from the Service Kit.
3. Turn on the instrument power.
4. Key in **SPECIAL** 180, then press the **ON** key once to turn on the DC Voltmeter.
5. Recheck the voltage levels at each pin on the Ribbon Cable Test Board as previously explained in step 8 under **Running the Test**.
6. If all voltages are within listed tolerances, the normally used ribbon cable is defective and should be replaced with a good ribbon cable.
7. If any voltage is not within tolerance, check the Power Supply using the wiring diagram found at the end of the *Troubleshooting* section in subsection *Power Supply*. If the power supplies are good, the I/O Assembly is defective and should be replaced.

**Determining  
The Next Action**

If the Power Supply Assembly or another part of the power supply is found to be defective, it should be replaced.

Reconnect all removed or disconnected cables after the completion of this test.

**Ribbon Cable DC  
Voltage Level Limits**

*Table 2c-1. Voltage Limits for FAST VCO Assembly*

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
5	+38 V dc	+38.876	+37.124	+38.48	+37.52
6	-15 V dc	-14.389	-15.611	-14.75	-15.25
7	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
13	+10 V dc	+10.554	+9.446	+10.2	+9.8
14	+15 V dc	+15.611	+14.389	+15.25	+14.75
15	+5.2 V dc	+5.699	+4.701	+5.352	+5.048

*Table 2c-2. Voltage Limits for ALC Assembly*

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
2	-15 V dc	-14.389	-15.611	-14.75	-15.25
3	+15 V dc	+15.611	+14.389	+15.25	+14.75
4	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
8	Gnd	+0.150	-0.150	+0.150	-0.150
9	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
11	+15 V dc	+15.611	+14.389	+15.25	+14.75
12	+5.2 V dc	+5.699	+4.701	+5.352	+5.048

\* If you are troubleshooting an HP 8643A, you will need to observe the upper and lower voltage limits unique to its power supply. Refer to the HP 8643A Power Supply Wiring Diagram located at the end of the *Troubleshooting* section in subsection *Power Supply*.



Table 2c-3. Voltage Limits for FRAC-N Assembly

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	Gnd	+0.150	-0.150	+0.150	-0.150
2	-15 V dc	-14.389	-15.611	-14.75	-15.25
3	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
4,5	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
12,13	Gnd	+0.150 V dc	-0.150	+0.150	-0.150
14	+15 V dc	+15.611	+14.389	+15.25	+14.75
15,16	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
17,18	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
18	-5.2 V dc	-4.553	-5.847	-4.9	-5.5

Table 2c-4. Voltage Limits for NSM OSC,  
STD VCO, and STD MOD Assemblies

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
2	-15 V dc	-14.389	-15.611	-14.75	-15.25
3	+15 V dc	+15.611	+14.389	+15.25	+14.75
4	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
8	Gnd	+0.150	-0.150	+0.150	-0.150

\* If you are troubleshooting an HP 8643A, you will need to observe the upper and lower voltage limits unique to its power supply. Refer to the HP 8643A Power Supply Wiring Diagram located at the end of the *Troubleshooting* section in subsection *Power Supply*.

Table 2c-5. Voltage Limits for MOD DIST Assembly

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
2	-15 V dc	-14.389	-15.611	-14.75	-15.25
3	+15 V dc	+15.611	+14.389	+15.25	+14.75
4	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
8	Gnd	+0.150	-0.150	+0.150	-0.150
10	Gnd	+0.150	-0.150	+0.150	-0.150
11	Gnd	+0.150	-0.150	+0.150	-0.150
12	+10 V dc	+10.554	+9.446	+10.2	+9.8

Table 2c-6. Voltage Limits for DOUBLER Assembly

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
2	-15 V dc	-14.389	-15.611	-14.75	-15.25
3	+15 V dc	+15.611	+14.389	+15.25	+14.75
4	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
8	Gnd	+0.150 V dc	-0.150 V dc	+0.150V dc	-0.150 V dc
9	+10 V dc	+10.554	+9.446	+10.2	+9.8
10	+38 V dc	+38.876	+37.124	+38.48	+37.52
11	+15 V dc	+15.611	+14.389	+15.25	+14.75
12	+5.2 V dc	+5.699	+4.701	+5.352	+5.048

\* If you are troubleshooting a HP 8643A, you will need to observe the upper and lower voltage limits unique to its power supply. Refer to the HP 8643A Power Supply Wiring Diagram located at the end of the *Troubleshooting* section in subsection *Power Supply*.

Table 2c-7. Voltage Limits for COAX DISCR Assembly

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
2	-15 V dc	-14.389	-15.611	-14.75	-15.25
3	+15 V dc	+15.611	+14.389	+15.25	+14.75
4	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
8	Gnd	+0.150 V dc	-0.150	+0.150	-0.150
9	+10 V dc	+10.554	+9.446	+10.2	+9.8
10	+38 V dc	+38.876	+37.124	+38.48	+37.52
11	+15 V dc	+15.611	+14.389	+15.25	+14.75
12	+5.2 V dc	+5.699	+4.701	+5.352	+5.048

Table 2c-8. Voltage Limits for LF DRVR Assembly

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
2	+15 V dc	+15.611	+14.389	+15.25	+14.75
3	+10 V dc	+15.611	+14.389	+15.25	+14.75
7,8	Gnd	+0.150	-0.150	+0.150	-0.150
10	-15 V dc	-14.389	-15.611	-14.75	-15.25
15	Gnd	+0.150	-0.150	+0.150	-0.150

\* If you are troubleshooting a HP 8643A, you will need to observe the upper and lower voltage limits unique to its power supply. Refer to the HP 8643A Power Supply Wiring Diagram located at the end of the *Troubleshooting* section in subsection *Power Supply*.

Table 2c-9. Voltage Limits for MW LOOP Assembly

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	Gnd	+0.150	-0.150	+0.150	-0.150
2	-15 V dc	-14.389	-15.611	-14.75	-15.25
3	+15 V dc	+15.611	+14.389	+15.25	+14.75
4	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
5	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
12,13	Gnd	+0.150	-0.150	+0.150	-0.150
14	+10 V dc	+15.611	+14.389	+15.25	+14.75
15	+15 V dc	+15.611	+14.389	+15.25	+14.75
18	Gnd	+0.150	-0.150	+0.150	-0.150
25	+21 V dc	+15.611	+14.389	+15.25	+14.75

Table 2c-10. Voltage Limits for HF DRVR Assembly

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
2	+15 V dc	+15.611	+14.389	+15.25	+14.75
3	+10 V dc	+15.611	+14.389	+15.25	+14.75
7,8	Gnd	+0.150	-0.150	+0.150	-0.150
9	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
10	-15 V dc	-14.389	-15.611	-14.75	-15.25

\* If you are troubleshooting a HP 8643A, you will need to observe the upper and lower voltage limits unique to its power supply. Refer to the HP 8643A Power Supply Wiring Diagram located at the end of the *Troubleshooting* section in subsection *Power Supply*.

Table 2c-11. Voltage Limits for PM DRVR (PULSE MOD) Assembly

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
2	-15 V dc	-14.389	-15.611	-14.75	-15.25
3	+15 V dc	+15.611	+14.389	+15.25	+14.75
4	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
8	Gnd	+0.150	-0.150	+0.150	-0.150
9	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
10	Gnd	+0.150	-0.150	+0.150	-0.150
11	+15 V dc	+15.611	+14.389	+15.25	+14.75
12	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
13	Gnd	+0.150	-0.150	+0.150	-0.150

Table 2c-12. Voltage Limits for OUTPUT Assembly

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
2	+15 V dc	+15.611	+14.389	+15.25	+14.75
3	+10 V dc	+15.611	+14.389	+15.25	+14.75
8	Gnd	+0.150	-0.150	+0.150	-0.150
9	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
10	-15 V dc	-14.389	-15.611	-14.75	-15.25

\* If you are troubleshooting a HP 8643A, you will need to observe the upper and lower voltage limits unique to its power supply. Refer to the HP 8643A Power Supply Wiring Diagram located at the end of the Troubleshooting section in subsection Power Supply.

Table 2c-13. Voltage Limits for MW EXT Assembly

Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
2	+15 V dc	+15.611	+14.389	+15.25	+14.75
3	+10 V dc	+15.611	+14.389	+15.25	+14.75
7,8	Gnd	+0.150	-0.150	+0.150	-0.150
9	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
10	-15 V dc	-14.389	-15.611	-14.75	-15.25
11	+21 V dc	+15.611	+14.389	+15.25	+14.75
15	+10 V dc	+15.611	+14.389	+15.25	+14.75

Table 2c-14. Voltage Limits for REFERENCE Assembly

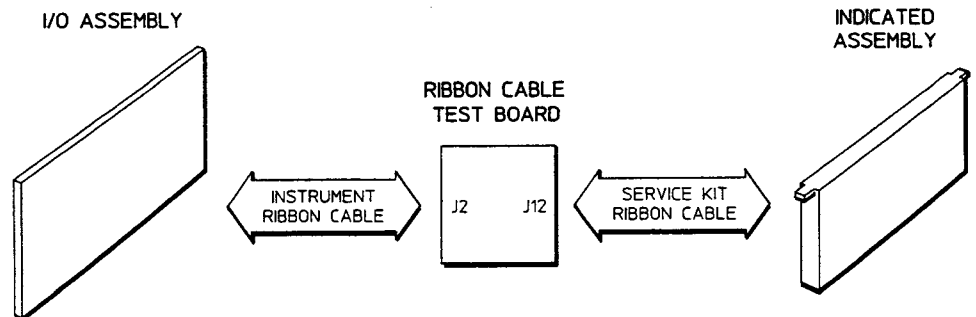
Test Voltage At Pin:		Internal DVM		External DVM	
		Upper Limit* V dc	Lower Limit* V dc	Upper Limit* V dc	Lower Limit* V dc
1	+5.2 V dc	+5.699	+4.701	+5.352	+5.048
2	+15 V dc	+15.611	+14.389	+15.25	+14.75
3	+10 V dc	+15.611	+14.389	+15.25	+14.75
8	Gnd	+0.150	-0.150	+0.150	-0.150
9	-5.2 V dc	-4.553	-5.847	-4.9	-5.5
10	-15 V dc	-14.389	-15.611	-14.75	-15.25
11	+21 V dc	+15.611	+14.389	+15.25	+14.75

\* If you are troubleshooting a HP 8643A, you will need to observe the upper and lower voltage limits unique to its power supply. Refer to the HP 8643A Power Supply Wiring Diagram located at the end of the *Troubleshooting* section in subsection *Power Supply*.



## TEST 7B

### Serial and Parallel Interface Ribbon Cable: Control Signals Test Set-Up



1. Switch the instrument to stand-by (power off).
2. Reconnect the normally used instrument Ribbon cable between the I/O Assembly and the Ribbon Cable Test Board at Connector J2.
3. Disconnect the ribbon cable from the Connector indicated in subsection *Result Codes* and connect it to the J2 connector on the Ribbon Cable Test Board. See the test connections diagram above.

#### Note

*For parallel interface ribbon cable tests (for example, the FRAC-N assembly ribbon cable), use connectors J1 and J11 on the Ribbon Cable Test Board in the same order as for serial interface connections described. Move the Cable Test Board PARALLEL I/O "Jumper" to the TEST (J5) position.*

*If you are testing the HP 8664/8665 GAAS/DIV Assembly ribbon cable, use connectors J3 and J13. Move the Cable Test Board MICROWAVE ASSEMBLY "Jumper" to the TEST (J9) position.*

4. Connect a good ribbon cable from the Service Kit to the Ribbon Cable Test Board J12 connector, and then to the Assembly.
5. Move the Cable Test Board SERIAL I/O "Jumper" to the TEST1 (J7) position for HP 8644A and 8645A instruments. See figure 2-2, *Ribbon Cable Test Board Jumper Positions*.

For HP 8664/8665 serial interface ribbon cables (other than testing the GAAS/DIV Assembly), move the Cable Test Board SERIAL I/O "Jumper" to the TEST2 (J6) position.



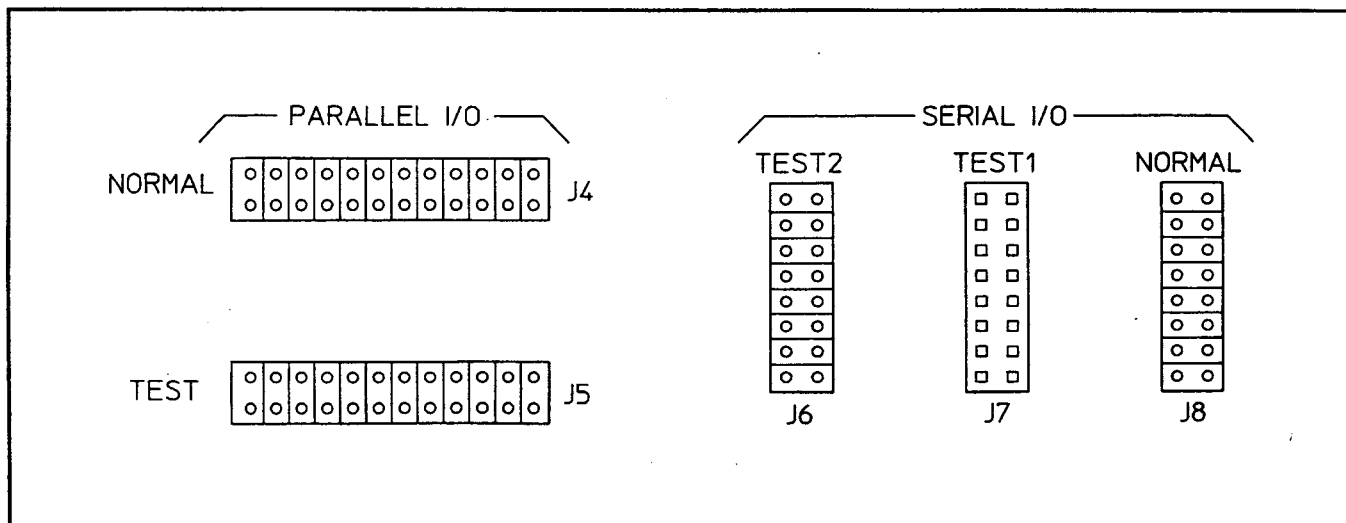


Figure 2c-8. Ribbon Cable Test Board Jumper Positions

6. Switch instrument power back on.

**Running the Test**

7. Key in **SPECIAL** 327 and press the **ON** key once. At the (327:Cable Test (?)) prompt, enter in the Assembly Function Identifier (ID) number from the following table (this identifies which assembly control ribbon cable to test), then press the **ON** key once.

(For more information see Special Function 327 in Special Functions Used with ILD in *Troubleshooting*, subsection *Running Diagnostics*.)

Assembly Function ID Number	Assembly Name	Assembly Function ID Number	Assembly Name
1	COAX DISCR	8	REF OSC
2	STD VCO (HP 8643/8644)	8	REFERENCE (HP 8664/65)
2	FAST VCO (HP 8645A)	9	DOUBLER
2	MW LOOP (HP 8665A)	10	HF DRVR (HP 8664/65)
3	FRAC-N	11	LF DRVR (HP 8664/65)
4	STD MOD (HP 8643/8644)	12	MW EXT (HP 8665A/B)
4	MOD DIST	13	FRONT PANEL
5	ALC	14	POWER SUPPLY
5	OUTPUT (HP 8664/65)	15	I/O ASSEMBLY
6	ATTENUATOR	16	DCU (CONTROLLER)
6	GAAS/DIV (HP 8664/65)	17	PULSE MOD (HP 8664/65)
7	NSM OSC		

**Determining  
the next action**

8. A displayed result code of +27,000,nnn means that the test passes and that the assembly (and not the ribbon cable) is defective. Replace the assembly. Assembly replacement and verification procedures are found at the rear of this section.

A displayed result code of +27,999,nnn indicates that either an incorrect Assembly ID Number was entered, a mistake was made in the entry procedure, or that the ribbon cable test board was incorrectly set-up. Try again.

If the displayed result code is +27,XXX,nnn (where XXX represents a non-zero number), continue with testing the assembly ribbon cable as follows:

**Check Ribbon Cable**

1. Turn the instrument to stand-by (power off).
2. Replace the ribbon cable between the Cable Test Board and the I/O Assembly with a good cable from the Service Kit.
3. Turn the instrument back on.
4. Re-do Test 7B: *Ribbon Cable Control Signals Test* as previously described.
5. If the displayed result code is +27,000,nnn (test passes), replace the normal instrument assembly ribbon cable (it is defective). Cable descriptions and part numbers are in *Replaceable Parts* section.

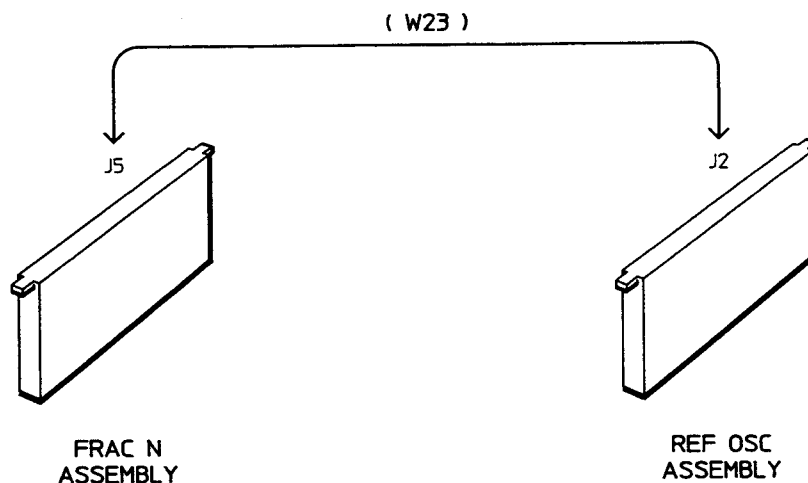
A displayed result code of +27,999,nnn indicates that either an incorrect Assembly ID Number was entered, a mistake was made in the entry procedure, or that the ribbon cable test board was incorrectly set-up. Try again.

6. If the displayed result code is +27,XXX,nnn (where XXX represents a non-zero number), the test does not pass, replace the I/O Assembly. Removal, replacement, and verification instructions are in *Replaceable Parts*, subsection *Assembly Replacement*.
7. Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.
8. On the Ribbon Cable Test Board, return the respective SERIAL I/O, PARALLEL I/O, or MICROWAVE ASSEMBLY test "Jumper" back to the NORMAL position (J8, J4, or J10 respectively).



**TEST 8****FRAC-N  
Reference Input  
Test Set-Up**

This test procedure checks the FRAC-N 200 kHz (pulsed) Reference Oscillator signal by substituting in the TONE-GEN 200 kHz (square wave) Reference Oscillator signal.



1. Disconnect the cable from the Connector indicated in *Result Codes* subsection.
2. Disconnect Cable W23 from the REF-OSC Assembly at Connector J4, then re-connect it (W23) to the REF-OSC Connector J2.
3. Key in **SPECIAL** 321, then press the **ON** key twice.
4. If the displayed result code is positive, turn to *Result Codes* subsection and find and replace the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

**Running the Test****Determining  
the next action**

If the displayed result code is negative, turn to *Result Codes* subsection and locate the displayed result code. Continue testing with the indicated test procedure.

- a. If the displayed result code is -31,840,nnn remove Cable W23 from the FRAC-N assembly at J5 and from the REF-OSC assembly at J4. Replace W23 with a good coax cable from the Service Kit.

5. Key in **SPECIAL** 321, then press the **ON** key twice. If the displayed result code is positive turn to *Result Codes* and find the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

If the displayed result code is negative return to subsection *Result Codes*, and locate the displayed result code. Continue testing with the indicated test procedure.

Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

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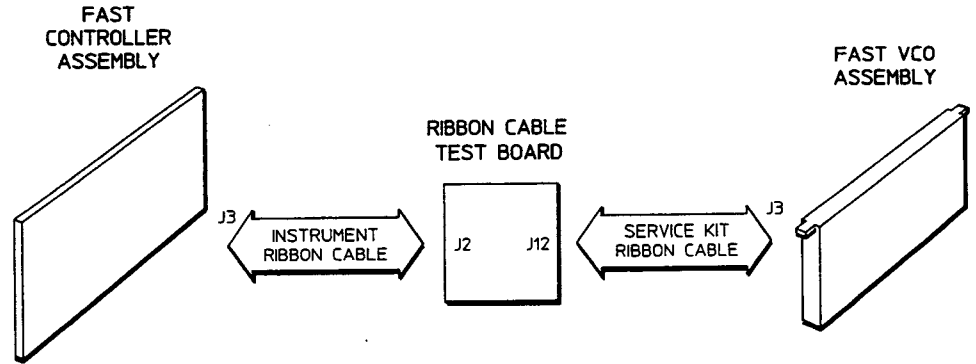
**Caution**

*When replacing coax cables, tighten connectors to 5.5 in.-lb for SMC, and 8.5 in.-lb for SMA to prevent potential RFI leakage and connector damage.*

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**TEST 9**

**VCO/Fast  
Controller  
Ribbon Cable:  
Test Set-Up**



1. Disconnect the instrument ribbon cable at connector J3 on the FAST VCO Assembly and connect it to connector J2 on the Ribbon Cable Test Board.
2. Take a good ribbon cable from the HP 8645A Service Kit and connect it to the Ribbon Cable Test Board at connector J12. Connect the other end of the Service Kit ribbon cable to connector J3 on the FAST VCO. Table 2c-15 provides a guide for connecting up the other ribbon cables (in this test) to the test board.

Table 2c-15. Test Board Connections For Diagnostic Test 9

Ribbon Cable Test Board Connections						
From Connector:	# Of Pins In Connector	Connect To	Test Board		Connect To	FAST VCO Connector
			In	Out		
Fast Controller J3	15	→	J2	J12	→	J3
Fast Controller J3	15	→	J2	J12	→	J7
Fast Controller J4	25	→	J1	J11	→	J8
Fast Controller J4	15	→	J2	J12	→	J11

### Running the Test

3. Key in **SPECIAL** 326, **ON** and rotate the KNOB until you see (326: RepTst Fast Control). Press **ON** again. Note that this special function continuously repeats the diagnostic routine. The only way to exit this special function is by cycling the instrument power.
4. With a logic probe, check those pins listed in table 2c-16, *Fast VCO Test Points* indicating DIGITAL CHANGE. The logic probe should blink at least once through each iteration of the test.
5. For the lines in table 2c-16 indicating a voltage level, measure the line voltages with an external DVM. (Note that you could use the internal voltmeter, but to access it you would have to turn off the instrument which would disrupt this test.)
6. Repeat steps 1 through 5 for each ribbon cable connected to J7, J11, and J8 on the FAST VCO assembly. (For the ribbon cable at connector J8 on the FAST VCO, use the Ribbon Cable Test Board connectors J1 and J11.)

### Determining the next action

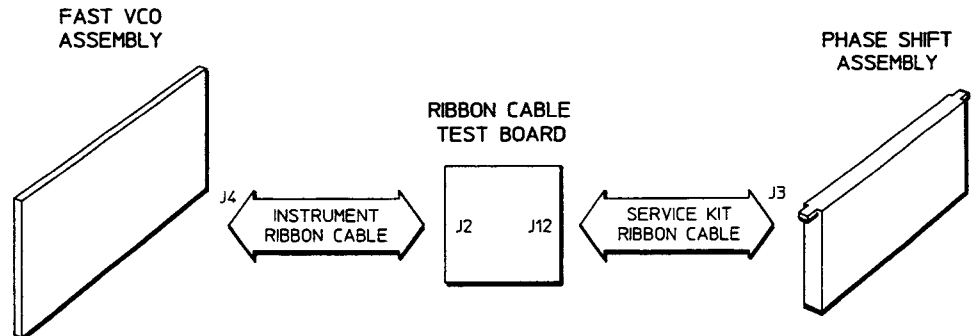
1. If at a specific connector pin in table 2c-16 you do not get a logic blink (where Digital Change is listed in the "Test For" column) or the correct voltage disconnect the cable-under-test from the FAST VCO assembly and repeat steps 1 through 5. (You are testing the cable again without the assembly connected to test if the assembly is causing a "loading" condition.)
  - a. If from the repeated test you get blinks (logic probe check) or the correct voltage, then the FAST VCO assembly is defective and should be replaced.
2. If from the repeated test (from step 1 of **Determining The Next Action**) you do not get blinks (logic probe check) or the correct voltage, substitute in a good cable (from the Service Kit) for the one between the FAST CONTROLLER and the Ribbon Cable Test Board. Repeat steps 1 through 5 a third time.
  - a. If after the third test (from **Determining The Next Action: Step 2**) all the measurements are good (logic probe blinks or voltage is within limits), then the ribbon cable between the FAST CONTROLLER and the FAST VCO is defective and should be replaced.
  - b. If any measurement made in the third test (from **Determining The Next Action: Step 2**) is not good (no logic probe blinks or voltage is not within limits), then the FAST CONTROLLER is defective and should be replaced.
3. Turn to *Replaceable Parts*, subsection *Assembly Replacement* for removal, replacement, and verification procedures for the defective assembly or cable.

Table 2c-16. Fast VCO Test Points

FAST VCO		
Connector	Pin Number	Test For
J3	2-7, 9-15	Digital Change
	1, 8	Nothing
J7	1-4	Digital Change
	5	+38 V dc ( $\pm$ .48)
	6	-15 V dc ( $\pm$ .25)
	7	-5.2 V dc ( $\pm$ .3)
	8-12	Digital Change
	13	+10 V dc ( $\pm$ .2)
	14	+15 V dc ( $\pm$ .25)
	15	+5.2 V dc ( $\pm$ .352)
J8	1-11, 14-24	Digital Change
	12, 13, 25	Nothing
J11	1-15	Digital Change





**TEST 10****Phase Shift  
Ribbon Cable  
Test Set-Up**

1. Disconnect the ribbon cable at connector J3 on the PH SHIFT (PHase Shift) Assembly and connect it to connector J2 on the Ribbon Cable Test Board.
2. Take a good ribbon cable from the Service Kit and connect it to connector J12 on the Ribbon Cable Test Board. Connect the other end of the Service Kit ribbon cable and connect it to PHase SHIFT Connector J3.

**Running the Test**

3. Key in **SPECIAL** 326, **ON** and rotate the KNOB until you see **326: RepTst Fast Control**. Press **ON** again. Note that this special function continuously repeats the diagnostic routine. The only way to exit this special function is by cycling the instrument power.
4. With a logic probe, check those pins listed in table 2c-17, *Phase Shift Test Points* indicating DIGITAL CHANGE. The logic probe should blink at least once through each iteration of the test.
5. For the lines in table 2c-17 indicating a voltage level, measure the line voltages with an external DVM. (Note that you could use the internal voltmeter, but to access it you would have to turn off the instrument which would disrupt this test.)

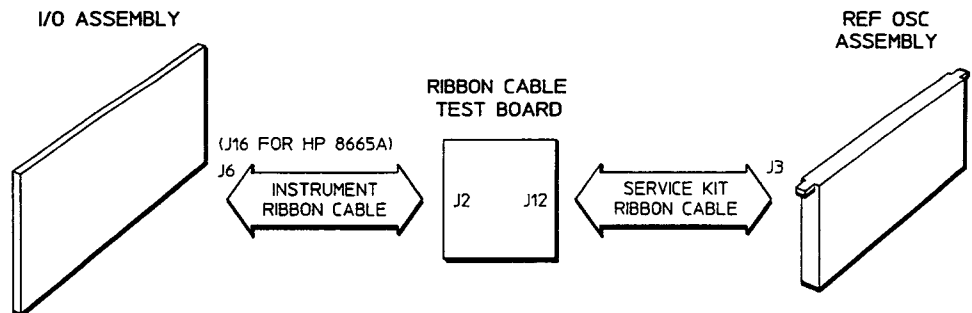
**Determining  
the next action**

1. If at a specific connector pin in table 2c-17 you do not get a logic probe blink (where Digital Change is listed in the "Test For" column) or the correct voltage, disconnect the cable-under-test from the PHase SHIFT assembly connector J3 and repeat steps 1 through 5. (You are testing the cable again without the assembly connected to see if the assembly is causing a "loading" condition.)

- a. If from the repeated test (from step 1 of Determining the Next Action) you get blinks (logic probe check) or the correct voltage, then the PHase SHIFT Assembly is defective and should be replaced.
2. If from the repeated test (from step 1 of Determining the Next Action) you do not get blinks (logic probe check) or the correct voltage, substitute in a good cable (from the Service Kit) for the one between the FAST CONTROLLER and the Ribbon Cable Test Board. Repeat steps 1 through 5 a third time.
    - a. If after the third test (from Determining the Next Action: Step 2) all the measurements are good (logic probe blinks or voltage is within limits), then the ribbon cable between the FAST CONTROLLER and the PHase SHIFT is defective and should be replaced.
    - b. If any measurement made in the third test (from Determining the Next Action: Step 2) is not good (no logic probe blinks or voltage is not within limits), then the FAST CONTROLLER is defective and should be replaced.
  3. Turn to *Replaceable Parts*, subsection *Assembly Replacement* for removal, replacement, and verification procedures for the defective assembly or cable.

Table 2c-17. Phase Shift Test Points

PHASE SHIFT		
Connector	Pin Number	Test For
J3	4, 5, 7, 14, 15	Digital Change
	6	-15 V dc ( $\pm .25$ )
	13	+5.2 V dc ( $\pm .3$ )
	8, 12	Ground
	1-3, 9-11	Nothing

**TEST 11****Reference  
Oscillator  
Ribbon Cable  
Test Set-Up**

1. Disconnect the ribbon cable at connector J3 on the REF OSC Assembly and connect it to connector J2 on the Ribbon Cable Test Board. (Make sure that the other end of the cable is still connected to the I/O Assembly at connector J6.)
  2. Take a good ribbon cable from the Service Kit and connect it to the Ribbon Cable Test Board at connector J12. Connect the other end of the Service Kit ribbon cable to the REF OSC at connector J3.
- Running the Test**
3. Key in **[SPECIAL] 326, [ON]** and rotate the KNOB until you see **(326: RepTst Reference)**. Press **[ON]** again. Note that this special function continuously repeats the diagnostic routine. The only way to exit this special function is by cycling the instrument power.
  4. With a logic probe, check those pins listed in table 2c-18, *Reference Oscillator Test Points* indicating DIGITAL CHANGE. The logic probe should blink at least once through each iteration of the test.
  5. For the lines in table 2c-18 indicating a voltage level, measure the line voltages with an external DVM. (Note that you could use the internal voltmeter, but to access it you would have to turn off the instrument which would disrupt this test.)

**Determining  
the next action**

1. If at a specific connector pin in table 2c-18 you do not get a logic probe blink (where Digital Change is listed in the "Test For" column) or the correct voltage, disconnect the cable-under-test at the REF OSC assembly connector J3 and repeat steps 1 through 5. (You are testing the cable again without the assembly connected to see if the assembly is causing a "loading" condition.)

- a. If from the repeated test you get blinks (logic probe check) or the correct voltage, then the REF OSC assembly is defective and should be replaced.
2. If any of the repeated test measurements are bad, then substitute in a good cable from the Service Kit for the one between the I/O Assembly and the Ribbon Cable Test Board. Repeat this REFERENCE OSCILLATOR RIBBON CABLE test a third time.
3. If from the repeated test (from step 1 of Determining the Next Action) you do not get blinks (logic probe check) or the correct voltage, substitute in a good cable (from the Service Kit) for the one between the I/O Assembly and the Ribbon Cable Test Board. Repeat steps 1 through 5 a third time.
  - a. If after the third test (from Determining the Next Action: Step 2) all the measurements are good (logic probe blinks or voltage is within limits), then the ribbon cable between the I/O Assembly and the REF OSC is defective and should be replaced.
  - b. If any measurement made in the third test (from Determining the Next Action: Step 2) is not good (no logic probe blinks or voltage is not within limits), then the I/O Assembly is defective and should be replaced.
4. Turn to *Replaceable Parts*, subsection *Assembly Replacement* for removal, replacement, and verification procedures for the defective assembly.

Table 2c-18. Reference Oscillator Test Points

REFERENCE OSCILLATOR		
Connector	Pin Number	Test For
J3	1	+15 V dc ( $\pm .25$ )
	2	+15 V dc ( $\pm .25$ )
	3, 5, 7, 10-15	Digital Change
	8	Ground
	9	-15 V dc ( $\pm .25$ )
	4, 6	Nothing

---

## TEST 12A, B, C, & D

---

### I/O ASSEMBLY

Before doing any of these tests, first:

Check all the power supply voltages at the main power supply cable (on the I/O Assembly at connector J3) using an external DVM. Compare with the voltages given in the *Power Supply DC Voltage Level Limits* table found on the Power Supply Wiring Diagram found at the end of *Troubleshooting* section in subsection *Power Supply*. If any power supply voltage is out of tolerance, troubleshoot using subsection *Power Supply* found in *Troubleshooting* section.

#### Initial Test Set-Up

1. Disconnect the cable from the connector indicated in subsection *Result Codes*.

#### Test #12A:

1. Remove the (FRAC-N) parallel bus ribbon cable at J7 on I/O Assembly.
2. Key in   320,  and rotate the KNOB until you see (320: Test I/O Assembly). Press  again.
3. IF result code = +0; then:
  - a. Reconnect the (FRAC-N) parallel bus ribbon cable to the I/O Assembly at J7 and disconnect it at J3 on the FRAC-N assembly.
  - b. Re-run (320: Test I/O Assembly) as explained in step 2 above.
  - c. If the result code = -15,010,nnn, then go to table 2c-19 and trace the R/W line following the instructions in this test's **General Test Procedures**. See the Motherboard Connector and Pin Locator Diagram for actual pin locations called out in tables 2-19 and 2-20. Figure 2c-3, *I/O to DCU Signal Connections* is an aid for tracing signals between the I/O and Controller (DCU) Assemblies.

#### Test #12B:

1. Check the +5V supply with an external DVM (if you have not checked it prior to this I/O Assembly test). Compare with the voltages given in the *Power Supply DC Voltage Level Limits* table found on the Power Supply Wiring Diagram located in *Replaceable Parts*, subsection *Assembly Replacement* \*\* (figure 1-5 found in section 1). ?figure 1-5 in old manual is a foldout in section 1...where does it go here?

- a. If the +5V supply voltage is out of tolerance, troubleshoot it using section *Replaceable Parts*, subsection *Assembly Replacement*. If the +5V Power Supply checks out within limits, continue on with step 2.
2. Following the instructions under this test's **General Test Procedures** trace bad bit(s) to the "source" of the problem using the information in table 2c-20. Test each signal line at all test points.

**(Result Code = -15,034,nnn):**

3. If the displayed result code is -15,034,nnn follow the instructions under this test's **General Test Procedures** to trace the CNT\_CLK signal row (from the I/O Assembly to the Controller) on table 2c-19.

**Test #12C:**

1. Remove the main ribbon cable to the I/O Assembly at J1 and check the -10 V dc (I/O mux reference voltage) at Pin 22 using an external DVM. If out of tolerance ( $> -9.929$  or  $< -10.071$ ), replace the I/O Assembly. If the voltage is within tolerance, trace the line back to the controller assembly (through the ribbon cable and motherboard) using table 2c-20.
2. Following the instructions under this test's **General Test Procedures** trace the "ANALOG\_OUT" signal (-10 V dc I/O mux reference voltage) on table 2c-21 at the places indicated using an external DVM.

**Test #12D:**

1. Remove the I/O-to-Rear Panel cable at I/O Assembly J2 (the black Molex connector hidden under the large ribbon cable).
2. Key in   320,  and rotate the KNOB until you see (320: Test I/O Assembly). Press  again.
  - a. If the result code = +0, then the I/O Assembly-to-Rear Panel cable is defective and should be replaced.
  - b. If result code = -15,032,nnn or -15,033,nnn, then the I/O Assembly is defective and should be replaced.

---

### General Test Procedures

1. Place the Logic Probe at the first pin indicated in the I/O Assembly column of table 2c-19 (as indicated by the specific test).
2. Key in   320,  and rotate the KNOB until you see (320: Test I/O Assembly). Press  again.
3. Look for the logic probe to blink.
4. If the logic probe blinks, move down to the next pin indicated (same column) and continue with the test.
5. If the logic probe does not blink, stay in the same row and move to the pin in the next column (to the right) until the logic probe blinks.
6. When a logic probe blink is observed in a column (to the right of the I/O Assembly column itself), the problem exists in the assembly or cable that was previously probed (in the column to the left of the current probe test).

For example, if you are testing the DIOB[4] line in table 2c-19 and you don't get a blink at U9 pin 18 (I/O Assembly column), but you move to the right and get a blink at Pin 11 (Ribbon Cable at I/O J1 column), the problem is the I/O Assembly which should be replaced.

As another example, if you are testing the DIOB[0] line in table 2c-19 and you don't get a logic blink at U9 pin 14 or ribbon cable Pin 3, but you do get a logic blink at Motherboard J12 pin 3, then the ribbon cable is faulty and should be replaced.

7. Table 2c-20 data is tested in the same way (as described) with the exception that you are using an external DVM to check for -10 V dc.

---

#### Note

*Before making measurements in the Motherboard column remove the cable to prevent "loading" of signal by a possible faulty Motherboard-to-I/O Assembly ribbon cable.*

---



Table 2c-19. Signal Tracing: Controller Board to I/O Assembly

Error Codes	Signal Name	I/O Assembly	Ribbon Cable at I/O J1 <sup>(1)</sup>	Motherboard <sup>(2)</sup>		Controller <sup>(3)</sup>
-15,011,nnn through -15,018,nnn	DIOB[0]	U9 pin 14	Pin 3	J12 pin 3	J9 pin 10	J1 pin 10
	DIOB[1]	U9 pin 7	Pin 5	J12 pin 5	J9 pin 12	J1 pin 12
	DIOB[2]	U9 pin 8	Pin 7	J12 pin 7	J9 pin 14	J1 pin 14
	DIOB[3]	U9 pin 13	Pin 9	J12 pin 9	J9 pin 16	J1 pin 16
	DIOB[4]	U9 pin 18	Pin 11	J12 pin 11	J9 pin 18	J1 pin 18
	DIOB[5]	U9 pin 3	Pin 13	J12 pin 13	J9 pin 20	J1 pin 20
	DIOB[6]	U9 pin 17	Pin 15	J12 pin 15	J9 pin 22	J1 pin 22
	DIOB[7]	U9 pin 4	Pin 17	J12 pin 17	J9 pin 24	J1 pin 24
	C1	U4 pin 7	Pin 4	J12 pin 4	J9 pin 28	J1 pin 28
	C2	U4 pin 8	Pin 6	J12 pin 6	J9 pin 30	J1 pin 30
	C3	U4 pin 9	Pin 8	J12 pin 8	J9 pin 32	J1 pin 32
	C4	U1 pin 2	Pin 10	J12 pin 10	J9 pin 34	J1 pin 34
	C5	U1 pin 3	Pin 12	J12 pin 12	J9 pin 35	J1 pin 35
	C6	U1 pin 6	Pin 14	J12 pin 14	J9 pin 36	J1 pin 36
C7	U1 pin 4	Pin 16	J12 pin 16	J9 pin 37	J1 pin 37	
-15,010,nnn	R/W (CIOB[8])	U9 pin 1	Pin 26	J12 pin 26	J9 pin 38	J1 pin 38
-15,011,nnn through -15,018,nnn and -15,034,nnn	I/O_BOARD (CIOB[0]) CNT_CLK	U46 pin 5 U94 pin 13	Pin 19 Pin 20	J12 pin 19 J12 pin 20	J9 pin 26 J6 pin 31	J1 pin 26 J2 pin 31

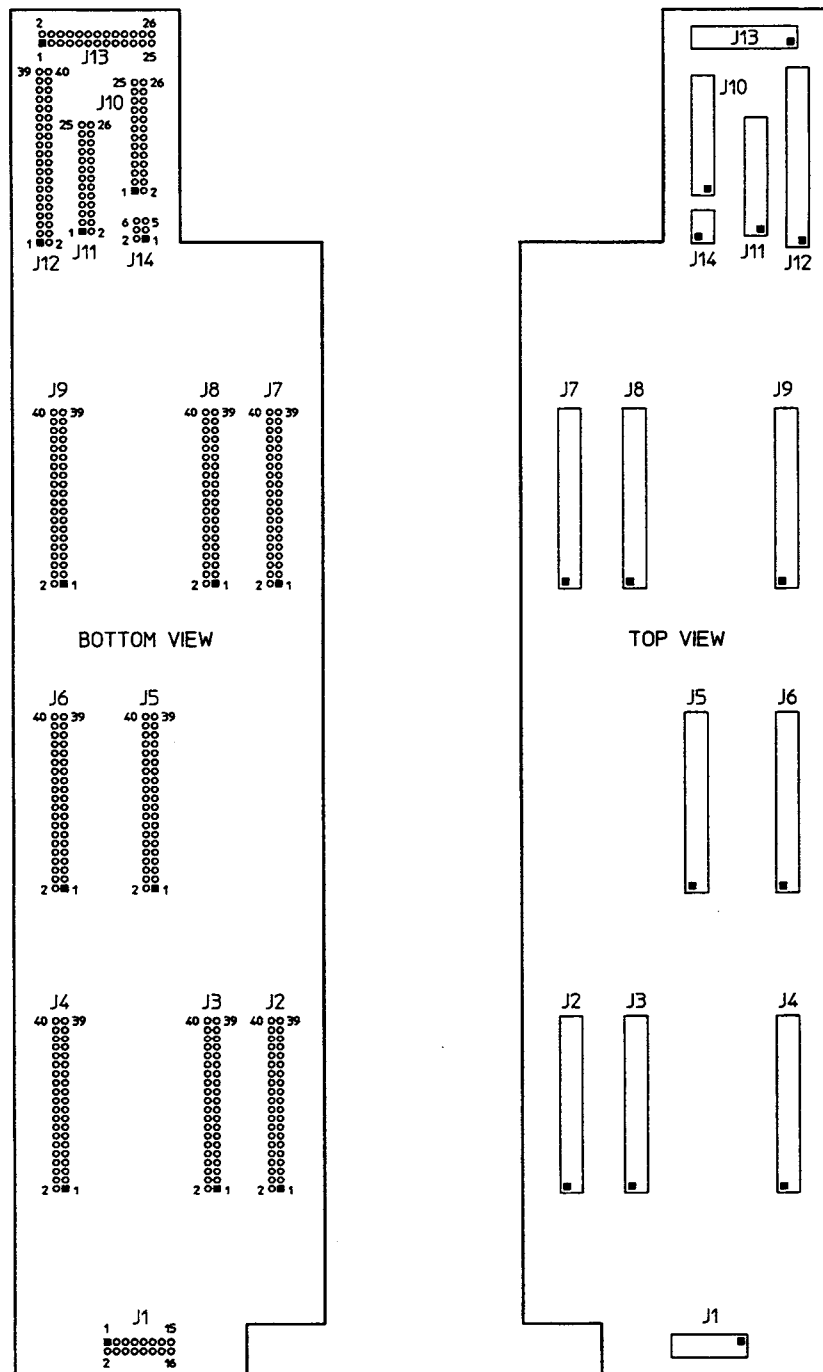
(1) Unplug ribbon cable from I/O J1 and measure the signal at the connector on the cable.  
 (2) Turn the instrument on its left side, remove bottom cover, and measure the signal on the Motherboard.  
 (3) Make measurements on the Controller with the Controller on an extender board (HP Part 08645-60125).

Table 2c-20. Voltage Tracing: I/O Assembly to Controller Board

Error Codes	Signal Name	I/O Assembly	Ribbon Cable to Motherboard J12 <sup>(1)</sup>	Motherboard <sup>(2)</sup>	Controller <sup>(3)</sup>
-15,021,nnn and -15,023,nnn	ANALOG_OUT (IOBDMUX)	U37 pin 8	Pin 22	J6 pin 32	J2 pin 32

(1) Unplug ribbon cable from Motherboard J12 and measure the signal at the connector on the cable.  
 (2) Turn the instrument on its left side, remove bottom cover, and measure the signal on the Motherboard.  
 (3) Make measurements on the Controller with the Controller on an extender board (HP Part 08645-60125).

# MOTHERBOARD



*Motherboard Connector and Pin Locator Diagram*

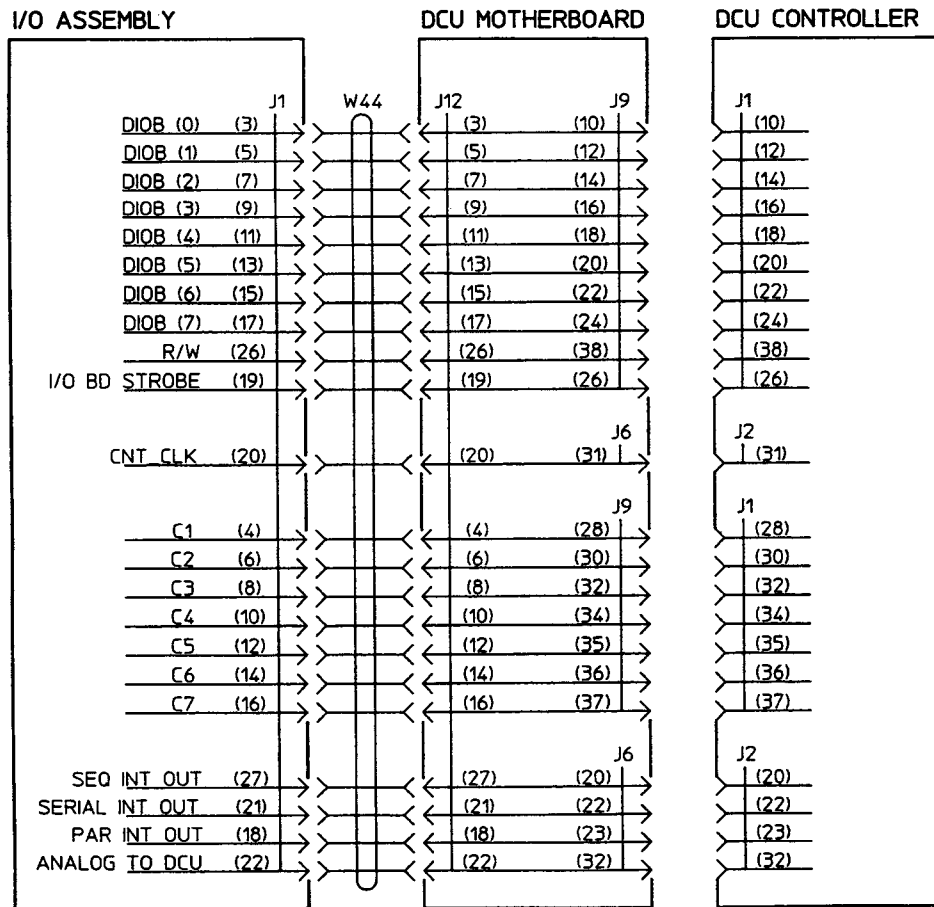
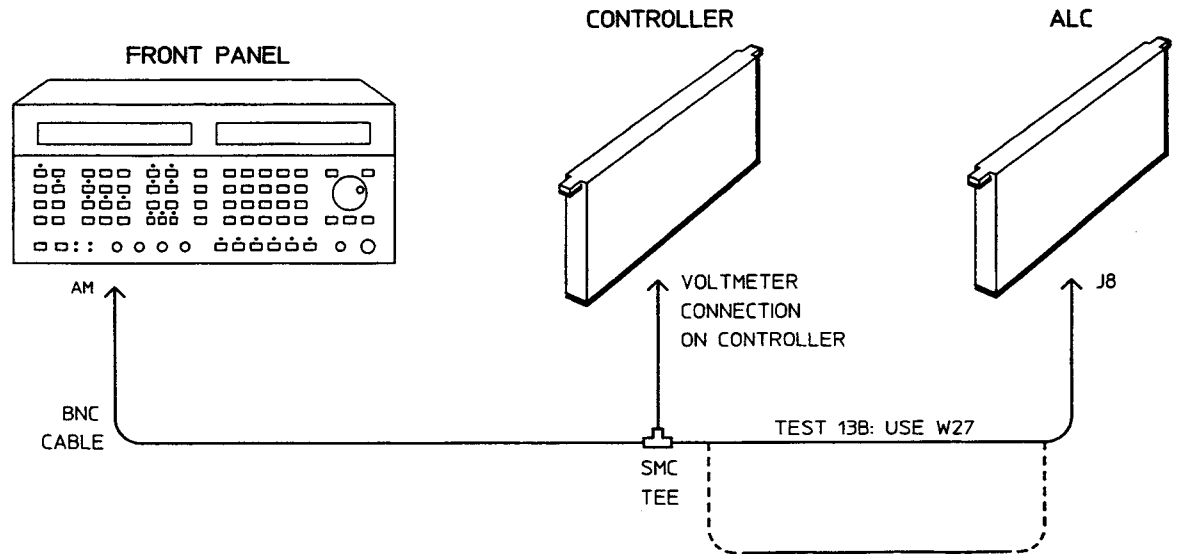


Figure 2c-3. I/O Assembly → DCU Signal Connections Diagram (P/O Test 12)

# TEST 13A and 13B

## ALC Mod Control Set-Up Diagram For Tests 13A, 13B



### Test 13A Set-Up

1. Disconnect coax cable W27 from the Dividers Assembly at connector J4 and from the ALC Assembly at connector J8.
2. Using adaptors and cables from the Service Kit, connect the SMC TEE (p/n 1250-0838) to the Voltmeter (at SMC connector on DCU), connect a good coax cable between the ALC J8 connector and the SMC TEE, and connect a BNC cable between the SMC TEE and front panel AM input (using the BNC-to-SMC Adapter p/n 1250-0832). See the test setup diagram.

### Test 13B Set-Up

1. Disconnect coax cable W27 from the Dividers Assembly at connector J4. Assembly name and Connector locations are called out on the assembly.
2. Using adaptors and cables from the Service Kit, connect the SMC TEE to the Voltmeter, then connect the loose end of coax cable W27 to the SMC TEE. Connect a BNC cable between the SMC TEE and front panel AM input as shown in the test setup diagram.

**General Test  
Instructions  
For 13A Or 13B**

3. Key in **SPECIAL** 321, then press the **ON** key twice.
4. If the displayed result code is positive turn to *Result Codes* section and find the assembly indicated. Assembly, cable replacement and verification procedures are found in *Replaceable Parts*, subsection *Assembly Replacement*.

If the displayed result code is negative return to *Result Codes* section, and locate the displayed result code. Continue testing with the indicated test procedures.

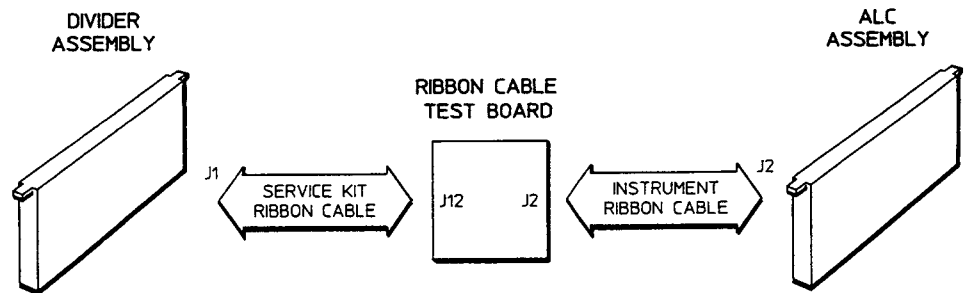
Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

**Caution**

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*When replacing coax cables, tighten connectors to 5.5 in.-lb for SMC, and 8.5 in.-lb for SMA to prevent potential RFI leakage and connector damage.*

---

**TEST 14A****Dividers/ALC  
Ribbon Cable:  
Test Set-Up**

TEST SETUP 1

1. Turn off the instrument.
2. Re-connect any coax or ribbon cables previously disconnected.
3. Disconnect W24 (the instrument ribbon cable between the Divider and ALC assemblies) at Divider J1, and connect it to the Ribbon Cable Test Board connector J2 as shown in the test set-up diagram. Connect a ribbon cable (from the Service Kit) between Divider connector J1 and Ribbon Cable Test Board connector J12.

**Running The Test**

4. Turn on the instrument. Run the Divider/ALC Assembly Diagnostic Test (by keying in **INSTR PRESET** **SPECIAL** **320** **ON**, then turning the KNOB until **320: Test ALC** is displayed. Press the **ON** key.)
5. Find the displayed result code in either table 2c-21 or table 2c-22, then check the indicated ribbon cable pins for the correct logic level or supply voltage listed. Make the voltage measurements using either an external DVM or the internal dc voltmeter. Key in Special 180 then press the **ON** key once to activate the internal dc voltmeter. Pressing the **ON** key again turns it off.

The supply voltages should be within the voltage limits listed in table 2c-23, *Voltage Limits For Test 14 Supply Voltages* (at the end of Test 14B).

**Determining  
The Next Action**

6. If any voltage level measured is incorrect, go on to Test 14B.

If all the voltage levels are within limits, then the Divider Assembly is defective and should be replaced.

Table 2c-21. Test 14 Logic Level Checks

TEST 14 CODES	TEST CABLE AT PIN:					TEST 14 CODES	TEST CABLE AT PIN:					TEST 14 CODES	TEST CABLE AT PIN:				
	15	14	13	12	11		15	14	13	12	11		15	14	13	12	11
-5,655,nnn	L	L	L	L	L												
-5,656,nnn	L	L	L	H	H												
-5,660,nnn	H	H	H	L	L												
-5,662, -5,722	L	L	L	H	H	-5,751, -5,771	H	L	L	H	H	-5,791, -5,811	L	L	L	H	H
-5,664, -5,724	L	H	H	L	H	-5,752, -5,772	H	H	H	L	H	-5,792, -5,812	L	H	H	L	H
-5,666, -5,726	L	L	H	L	H	-5,753, -5,773	H	L	H	L	H	-5,793, -5,813	L	L	H	L	H
-5,668, -5,728	L	H	L	L	H	-5,754, -5,774	H	H	L	L	H	-5,794, -5,814	L	H	L	L	H
-5,670, -5,730	L	L	L	L	H	-5,755, -5,775	H	L	L	L	H	-5,795, -5,815	L	L	L	L	H
-5,672, -5,732	L	H	H	H	L	-5,756, -5,776	H	H	H	H	L	-5,796, -5,816	L	H	H	H	L
-5,674, -5,734	L	L	H	H	L	-5,757, -5,777	H	L	H	H	L	-5,797, -5,817	L	L	H	H	L
-5,676, -5,736	L	H	L	H	L	-5,758, -5,778	H	H	L	H	L	-5,798, -5,818	L	H	L	H	L
-5,678, -5,738	L	L	L	H	L	-5,759, -5,779	H	L	L	H	L	-5,799, -5,819	L	L	L	H	L
-5,680, -5,740	L	L	H	L	L	-5,760, -5,780	H	L	H	L	L	-5,800, -5,820	L	L	H	L	L
-5,682, -5,742	L	H	L	L	L	-5,761, -5,781	H	H	L	L	L	-5,801, -5,821	L	H	L	L	L
-5,684, -5,744	L	L	L	L	L	-5,762, -5,782	H	L	L	L	L	-5,802, -5,822	L	L	L	L	L

H (Level) = +1.9 to +5.5 V dc; L (Level) = -0.5 to +0.9 V dc

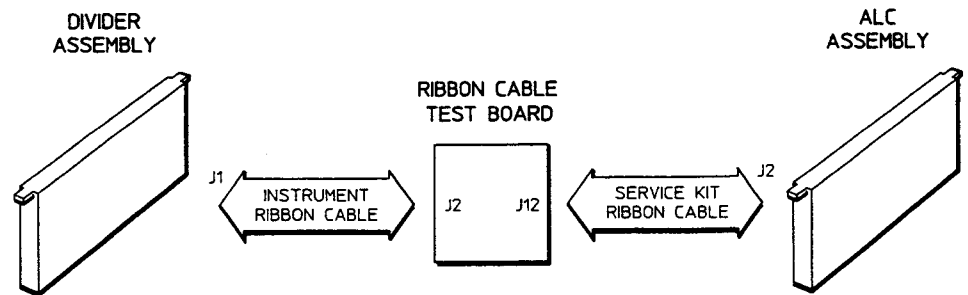
Table 2c-22. Test 14 Supply Voltage And Logic Level Checks

TEST 14 CODES	TEST CABLE AT PIN:							
	1	2	3	4	5	6	9	7,10
-5,607,nnn	H	L	L	N/A	-N/A-			
-5,650,nnn	L	H	H	4.5-5.5	-15	+15	+5.2	-5.2
-5,651,nnn	L	L	L	6.0-12.0	-15	+15	+5.2	-5.2

H (Level) = +1.9 to +5.5 V dc; L (Level) = -0.5 to +0.9 V dc. All supply voltages are dc.

## TEST 14B

### Divider/ALC Ribbon Cable: Test Set-Up



TEST SETUP 2

1. Turn off the instrument.
2. Re-connect any coax or ribbon cables previously disconnected.
3. Disconnect W24 (the instrument ribbon cable between the Divider and ALC assemblies) at ALC Assembly J2, and connect to the Ribbon Cable Test Board connector J2 as shown in the test set-up diagram. Connect a ribbon cable (from the Service Kit) between ALC Assembly connector J1 and Ribbon Cable Test Board connector J12.
4. Turn on the instrument. Run the Divider/ALC Assembly Diagnostic Test by keying in **INSTR PRESET** **SPECIAL** 320 **ON**, then turning the KNOB until 320: Test ALC is displayed. Press the **ON** key.
5. Find the displayed error code in either table 2c-21 or 2c-22, then check the indicated ribbon cable pins for the correct logic level or supply voltage listed. Make the voltage measurements using either an external DVM or the internal dc voltmeter. Key in Special 180 then press the **ON** key once to activate the internal dc voltmeter. Pressing the **ON** key again turns it off.

The supply voltages should be within the voltage limits listed in table 2c-23, *Voltage Limits For Test 14 Supply Voltages*.

6. If any measured voltage level is not within limits, then the ALC Assembly is defective and should be replaced.

If all the voltage levels are within limits, then W24 (the instrument ribbon cable between the Divider and ALC Assemblies) is defective and should be replaced.

### Running The Test

### Determining The Next Action



Table 2c-23. Voltage Limits For Test 14 Supply Voltages

Test Voltage At Pin:	Internal DVM		External DVM	
	Upper Limit V dc	Lower Limit V dc	Upper Limit V dc	Lower Limit V dc
-5.2 V dc	-4.553	-5.847	-4.9	-5.5
+5.2 V dc	+5.699	+4.701	+5.352	+5.048
-15 V dc	-14.389	-15.611	-14.75	-15.25
+15 V dc	+15.611	+14.389	+15.25	+14.75

---

**TEST 15**

---

**Attenuator Driver  
Serial Interface**

1. Turn off the instrument and remove the bottom cover. (Top and Bottom cover removal and replacement instructions are found at the end of this section.)
2. Turn on the instrument.
3. Place the Logic Probe at the first pin indicated in the DCU Motherboard J5 column of table 2c-24. See the *Motherboard Connector and Pin Locator diagram* (at the end of test 12A, B, C, & D) for actual pin locations.
4. Press **INSTR PRESET**. If the logic probe blinks, the signal line is good. Move the logic probe to the next pin down in the same column and continue with the test. If all pins in the DCU Motherboard J5 column test good, go on to step 10 of this test.
  - a. If at any pin (in the DCU Motherboard J5 column) the logic probe does not blink, there is a failure. Proceed with steps 5 through 8 to isolate the faulty assembly.
5. Turn off the instrument. Disconnect W36 and W37 (the RF IN and RF OUT semi-rigid cables) from the Attenuator Assembly. Read first the attenuator removal instructions in the *Assembly Replacement* subsection under *Replaceable Parts*, and refer to figures in the *Cable Locator* subsection under *Replaceable Parts* for location and identification of these cables on your instrument.

Remove the Attenuator Assembly securing screws. Pull the Attenuator Assembly out of the motherboard connectors so that there is no electrical connection. Turn on the instrument.
6. Place the logic probe at the pin in the DCU Motherboard J5 column that failed to produce a logic blink in step 4a. Press **INSTR PRESET**. If the logic probe now blinks, the Attenuator Assembly is defective and should be replaced.
  - a. If the logic probe does not blink, move the logic probe to the test pin indicated in the next column to the right (but same row) in table 2c-24. Continue on with step 7.
7. Press **INSTR PRESET**. If the logic probe blinks, the motherboard is defective and should be replaced.
  - a. If the logic probe does not blink, move the logic probe to the test pin indicated in the next column to the right (but same row) in table 2c-24.\* Continue on with step 8.

8. Disconnect Cable W44 (large gray ribbon cable) at the Motherboard J12 connector. Place the logic probe as directed by Step 7a on the indicated cable connector pin of Ribbon Cable W44. Press **INSTR PRESET**. If logic probe blinks, the motherboard is defective and should be replaced.
  - a. If the logic probe does not blink, move the logic probe to the test pin indicated in the next column to the right (but same row) in table 2c-24. Continue on with step 9.
9. Reconnect Ribbon Cable W44 to the Motherboard at J12. Disconnect Cable W44 at the I/O Assembly J1 connector. Place the logic probe as directed by Step 8a on the indicated I/O Assembly J1 connector pin. Press **INSTR PRESET**. If the logic probe blinks, Ribbon Cable W44 is defective and should be replaced.
  - a. If there is no logic probe blink, the I/O Assembly is defective and should be replaced.
10. Place the logic probe at the pin indicated in the Motherboard J5 column of table 2c-25. Press **INSTR PRESET**. If the logic probe does not blink, the Attenuator Assembly is defective and should be replaced.
  - a. If logic probe does blink, the signal is good at this point. Proceed with steps 11 and 12 to isolate the faulty assembly.
11. Place the logic probe at the pin indicated in the Motherboard J12 column of table 2c-25. Press **INSTR PRESET**. If the logic probe does not blink, the Motherboard is defective and should be replaced.
  - a. If logic probe does blink, the signal is good at this point. Continue with step 12 to isolate the faulty assembly.
12. Place the logic probe on the pin indicated in the I/O Assembly column of table 2c-25. Press **INSTR PRESET**. If the logic probe does not blink, the I/O Assembly or the Ribbon Cable W44 is defective. Replace ribbon cable W44 first. If this does not solve the problem, replace the I/O Assembly.
  - a. If the logic probe does blink, the signal is good at this point. Therefore, the I/O or the Attenuator Assembly is defective. Replace the Attenuator Assembly first and then verify instrument operation. (Attenuator removal, replacement, and repair verification procedures are found in the *Assembly Replacement* subsection under *Replaceable Parts*.)
  - b. If the result code returned from the repair verification is -6,999,nnn, replace the I/O Assembly and retest again to verify that the instrument is now completely repaired.

If any result code other than +0 is displayed, return to *Result Codes* subsection and continue the troubleshooting process indicated for the displayed result code.

Table 2c-24. I/O Assembly → Attenuator Test Points

Signal Name	DCU Motherboard		Ribbon Cable W44 Pin:	I/O Assembly J1 Pin:
	J5 Pin:	J12 Pin:		
DATA IN	36	32	32	32
LATCH	37	33	33	33
CLOCK	38	29	29	29

Table 2c-25. Attenuator → I/O Assembly Test Points

Signal Name	DCU Motherboard		I/O Assembly
	J5 Pin:	J12 Pin:	
DATA OUT	35	28	U12-5

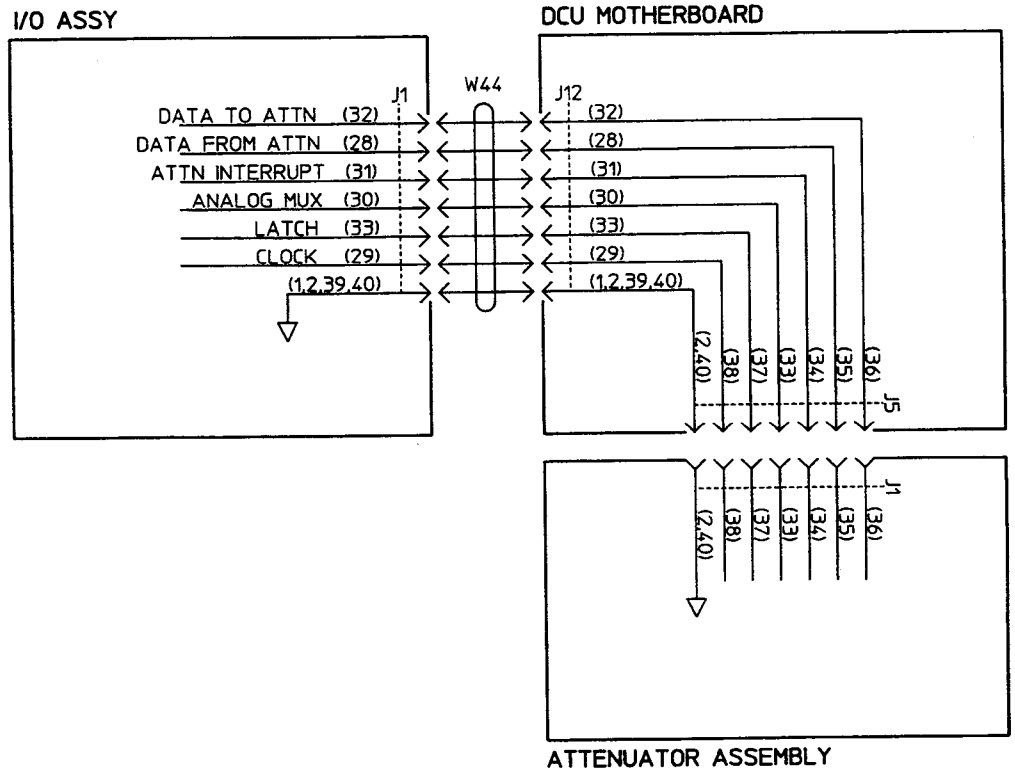


Figure 2c-4. I/O Assembly → Attenuator Communication Data Lines (P/O Test 15)



**TEST 16**

**Power  
Supply Test**

**Note**

*The Power Supplies are monitored on the I/O Assembly only at initial power up, and not during instrument operation.*

1. Using an external DVM, check all the power supply voltages at the I/O Assembly J3 connector (the connector leads are the test points). Compare with the voltage limits given in table 2c-26.
2. If any power supply voltage measured is out of tolerance, go to subsection *Power Supply* and continue troubleshooting to find out which part of the power supply is at fault. That is, whether it is the Power Supply Assembly, a Power Transistor Board, or possibly the Transformer or Line Power Assembly.
3. If all measured voltages are correct, or if the result code displayed is +14,080,nnn or +14,081,nnn, replace the I/O Assembly.

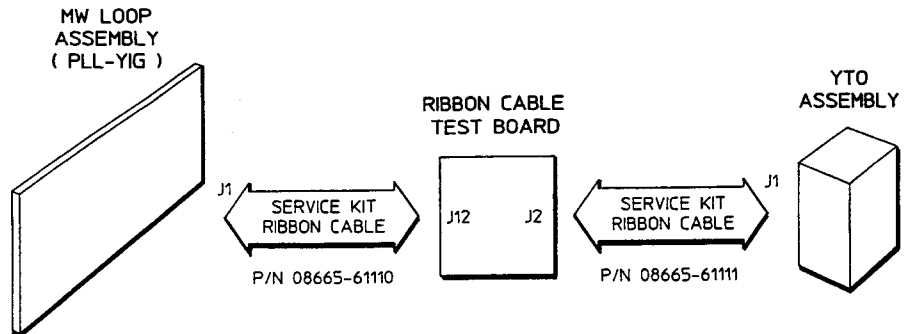
Table 2c-26. Power Supply Voltage Test Limits

Result Code	Power Supply V dc	Internal Voltmeter		External DVM	
		Upper Limit V dc	Lower Limit V dc	Upper Limit V dc	Lower Limit V dc
+14,01n,nnn	GND	+0.150	-0.150	+0.150	-0.150
+14,02n,nnn	+5.2	+5.699	+4.701	+5.352	+5.048
+14,03n,nnn	-5.2	-4.553	-5.847	-4.9	-5.5
+14,04n,nnn	+15	+15.611	+14.389	+15.25	+14.75
+14,05n,nnn	-15	-14.389	-15.611	-14.75	-15.25
+14,06n,nnn	+38	+38.876	+37.124	+38.48	+37.52
+14,07n,nnn	+10	+10.554	+9.446	+10.2	+9.8
+14,09n,nnn	+21	23.0	19.0	22.0	20.0
+14,10n,nnn	+25	40.0	20.0	40.0	20.0



# TEST 17

## (HP 8664/8665) YTO Ribbon Cable: Test Set-Up



1. Turn off the instrument.
2. Disconnect and remove the normal instrument YTO ribbon cable (W59) from the MWLOOP (PLL-YIG) and YTO J1 connectors. (Access W59 by removing the top panel that covers the card cage assemblies in slots A14, A15, and A16.)
3. Connect the 15 pin "D" (F) to 9 pin "D" (F) ribbon cable (p/n 08665-61111 from the HP 8664/8665 Service Kit) between the Ribbon Cable Test Board connector J2 and YTO connector J1.

Connect the 15 pin "D" (M) to 16 pin "3M" (F) ribbon cable (p/n 08665-61110 from the HP 8664/8665 Service kit) between the test board connector J12 and MW LOOP (PLL-YIG) connector J1. See the test set-up diagram.

### Running The Test

#### Note

**DO NOT press INSTR PRESET before keying in Special Function 320 for this test.**

4. Turn on the instrument. Enter **[SPECIAL] 320** and press the **[ON]** key once. Rotate the KNOB until **320: Test VCO** is displayed, then press the **[ON]** key once.
5. If the same result code that got you to this test is displayed, then the YTO ribbon cable is not the problem. Continue on to step 6.

#### Determining The Next Action

If the result code displayed is different than the result code that got you to this test, then the YTO ribbon cable (W59) is defective and should be replaced.

Once you have replaced W59, return to subsection *Result Codes* and look up the displayed result code. Follow the action described.



6. If the initial result code that brought you to this test procedure was -2,412,3nn, then jumper pins 8 and 15 on the Ribbon Cable Test Board together. Enter Special Function 321 and press the **ON** key twice.

If the initial result code that brought you to this test procedure was -2,438,3nn, then jumper pins 6 and 13 on the Ribbon Cable Test Board together. Enter Special Function 321 and press the **ON** key twice.

7. If the displayed result code is negative return to subsection *Result Codes* and locate the displayed result code. Continue testing with the indicated test procedure.

If the displayed result code is positive turn to *Replacement Parts*, subsection *Assembly Replacement* and find the assembly indicated. Assembly, cable replacement and verification procedures are found at the rear of this section.

Re-connect all removed or disconnected cables after the completion of this test procedure, and before another test procedure is performed.

---

**Caution**

*When replacing coax cables, tighten connectors to 5.5 in.-lb for SMC, and 8.5in.-lb for SMA to prevent potential RFI leakage and connector damage.*

---

---

**TEST 18****Auxiliary FM  
Fault Detection**

The Auxiliary FM output (Connector J1 on the STD MOD or MOD DIST Assembly) is not currently used and should not be connected in this configuration.

You may have mistakenly connected a cable to this connection, or the internal Auxiliary FM output sense point detected a malfunction.

1. If a cable is connected to J1 on either the STD MOD or MOD DIST Assembly, disconnect that cable from Connector J1.
2. Re-check the correct cable connections as called out by figures in *Cable Locator* section for your instrument, or the diagnostic test procedure instructions if you are troubleshooting a problem.
3. Retest by keying in **INSTR PRESET**, **SPECIAL** 320, and then the **ON** key twice.

If -4,430,nnn; -4,431,nnn; or -4,432,nnn is displayed, then the STD MOD or MOD DIST Assembly (whichever is installed in your instrument) is defective and should be replaced.

If the displayed result code is different than those above, then return to *Result Codes* subsection, locate the displayed result code and continue with the indicated test procedure.

4. If the displayed result code is positive, turn to *Replaceable Parts*, subsection *Assembly Replacement* and find the assembly indicated. Assembly, cable replacement and verification procedures are found at the rear of this section.

**Determining  
the next action**

**Caution**

---

*When replacing coax cables, tighten connectors to 5.5 in.-lb for SMC, and 8.5 in.-lb for SMA to prevent potential RFI leakage and connector damage.*

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# TABLE OF CONTENTS

## Troubleshooting - Power Supply

Power Supply Check . . . . .	2d-1
Power Supply Wiring Diagram for HP 8643 . . . . .	2d-3
Power Supply Wiring Diagram for HP 8644A/B and HP 8645A . . . . .	2d-5
Partial Power Supply Wiring Diagram for HP 8664A . . . . .	2d-7
Power Supply wiring Diagram for HP 8665 . . . . .	2d-9



# 2d

## Troubleshooting - Power Supply

---

### **Power Supply Check**

These guidelines direct you to troubleshoot power supply voltages from the Line Power Assembly to the individual RF assemblies through the power supply, I/O, and controller motherboard assemblies.

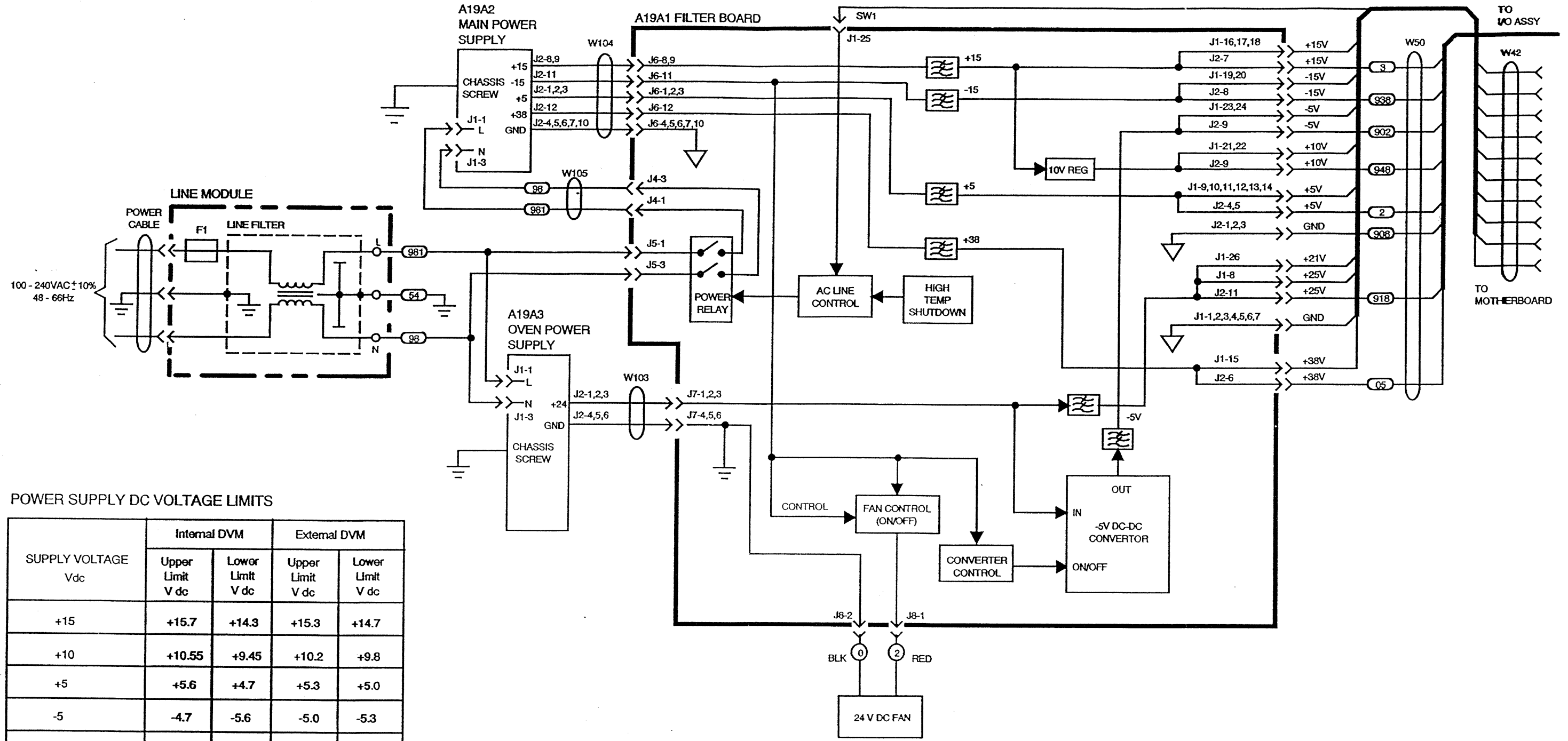
In most cases the problem can be traced to incorrect voltage levels due to a bad connection or defective power supply. Figures 2d-1 through 2d-4 are foldouts at the end of this section that provide wiring connections, pin locations, and voltage values to aid in troubleshooting voltage lines back to the power supplies. Tables on the foldout provide you with measurement points and values useful in troubleshooting bad or marginal voltages.

1. Remove the top cover of the instrument. (Removal procedures are found in Assembly Replacement subsection of the *Replaceable Parts* section.)
2. Turn on instrument power.
3. Measure power supply voltages at I/O Assembly connector J3 and compare the voltages with those values listed in the Power Supply DC Voltage Level Limits table on the Power Supply Wiring Diagrams at the end of this section. *If you are troubleshooting a HP 8643, be sure to refer to the supply voltage limitations listed on the HP 8643 Power Supply Wiring Diagram as the Power Supply is unique to this model.*
4. If a power supply voltage is out of limits, turn off the instrument, remove the Mains Power cord (from the Line Power Assembly) then remove the bottom panel.
5. Plug in the Mains Power cord and turn on the instrument.
6. Using the Power Supply Wiring Diagram foldouts and the information in the tables on the foldout, continue troubleshooting voltage lines back towards the Line Power Assembly until you isolate the problem to the defective assembly. Replace the defective assembly.

Assembly replacement instructions are found in the Assembly Replacement subsection of the *Replaceable Parts* section.

Note that the Power Supply Assembly, Power Transistor Boards, Transformer, and Line Power Assembly are each replaced as separate assemblies.





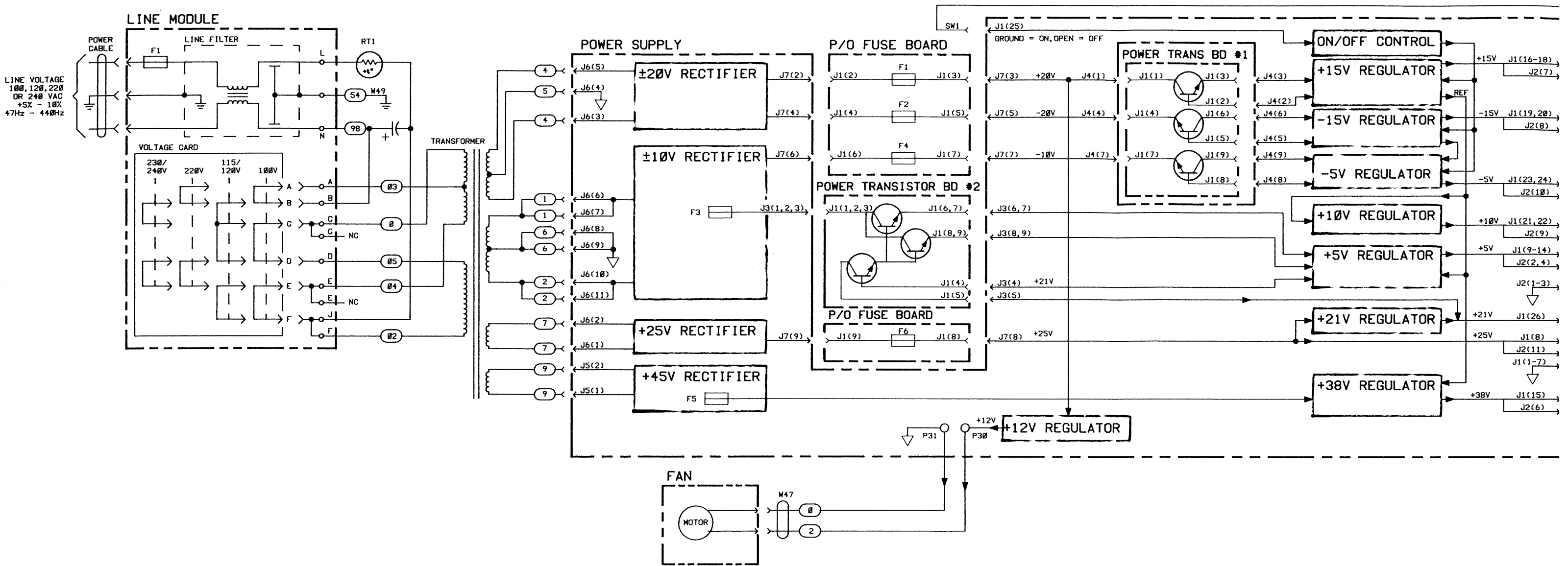
POWER SUPPLY DC VOLTAGE LIMITS

SUPPLY VOLTAGE Vdc	Internal DVM		External DVM	
	Upper Limit V dc	Lower Limit V dc	Upper Limit V dc	Lower Limit V dc
+15	+15.7	+14.3	+15.3	+14.7
+10	+10.55	+9.45	+10.2	+9.8
+5	+5.6	+4.7	+5.3	+5.0
-5	-4.7	-5.6	-5.0	-5.3
-15	-14.3	-15.7	-14.7	-15.3
+21,+24,+25*	+25.7	+22.3	+25.2	+22.8
+38	+40.5	+35.5	+39.9	+36.1

\* Note: Voltages Throughout the Instrument that are Labeled +21 or +25 are Actually the +24 Volt Supply.

Figure 2d-1. Power Supply Wiring Diagram for HP 8643





Power Supply DC Voltage Level Limits\*\*

Supply Voltage V dc	Upper Limit V dc	Lower Limit V dc
-15	-14.75	-15.25
-5.2	-4.9	-5.5
Gnd	+0.150	-0.150
+5.2	+5.352	+5.048
+10	+10.2	+9.8
+15	+15.25	+14.75
+21	+22.0	+20.0
+25 (Unreg)	+40.0	+20.0
+38	+38.48	+37.55

\*\*These limits do not apply when using the internal voltmeter.

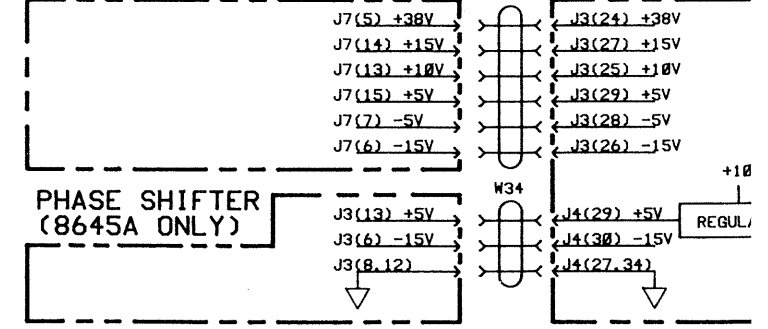
Input Voltage To Power Transistor Boards

Power Supply	Unregulated Voltage	
	Measure at Connector-Pin	Should Be (V dc)
+15V	J4-1	>16.8
+5V	J3-1,2,3	>6.8
	J3-5	>18.0*
-15V	J4-4	>-16.8
-5V	J4-7	>-6.8
* If this voltage is bad, troubleshoot the ±21V supply.		

Input Voltage To Power Supply (From Transformer)

Power Supply	AC Input Voltage	
	Measure at Connector-Pin	Should Be (V ac)
+15V	J6-4,5	>15.0
+5V	J6-6,8	>5.0
	J6-7,9	>5.0
-15V	J6-3,4	>15.0
-5V	J6-8,10	>5.0
	J6-9,11	>5.0
+21V	J6-1,2	>21.0
+38V	J5-1,2	>38.0

FAST VCO(8645A ONLY) FAST CONTROL



KEY

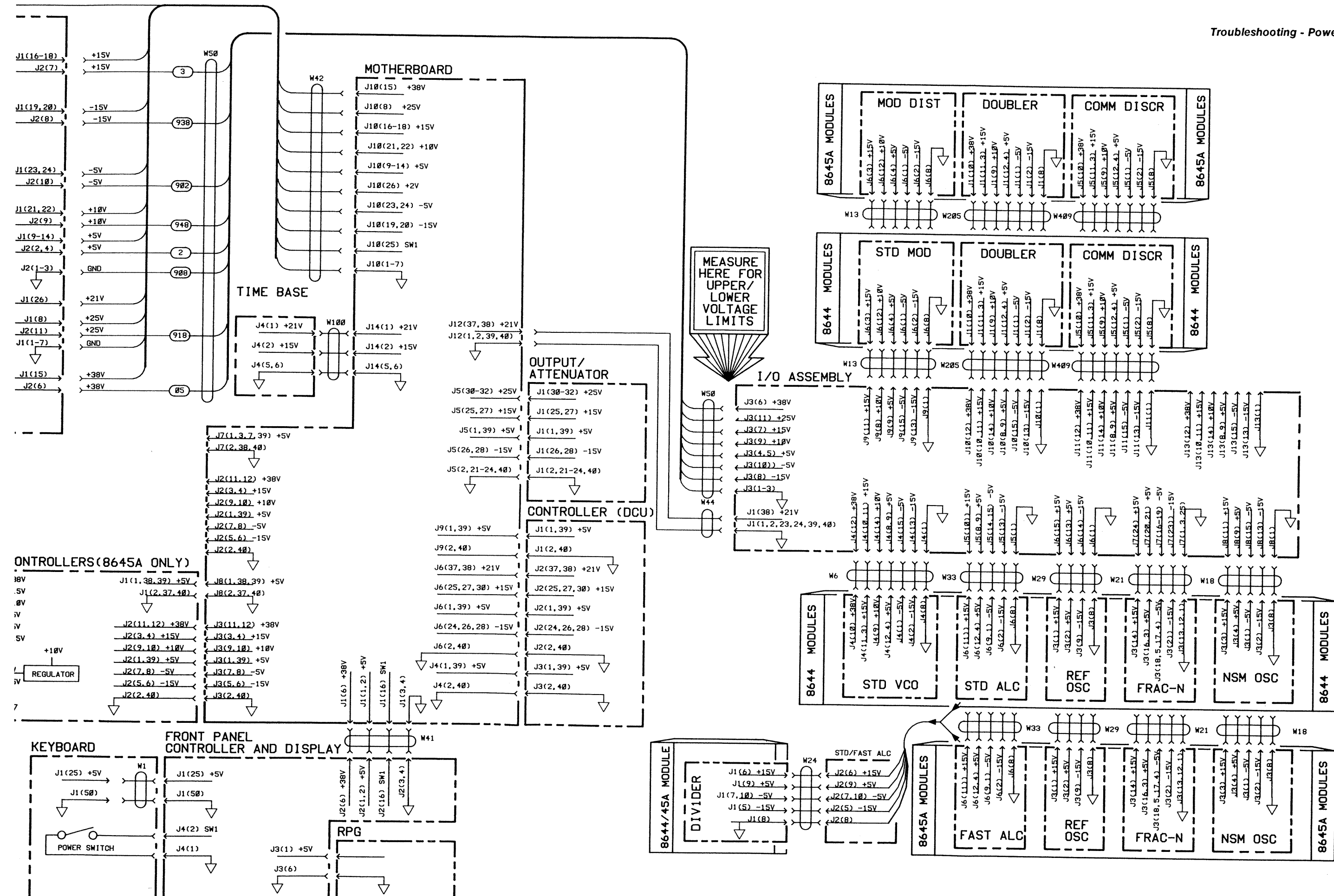


Figure 2d-2. Power Supply Wiring Diagram for HP 8644A/B and HP 8645A

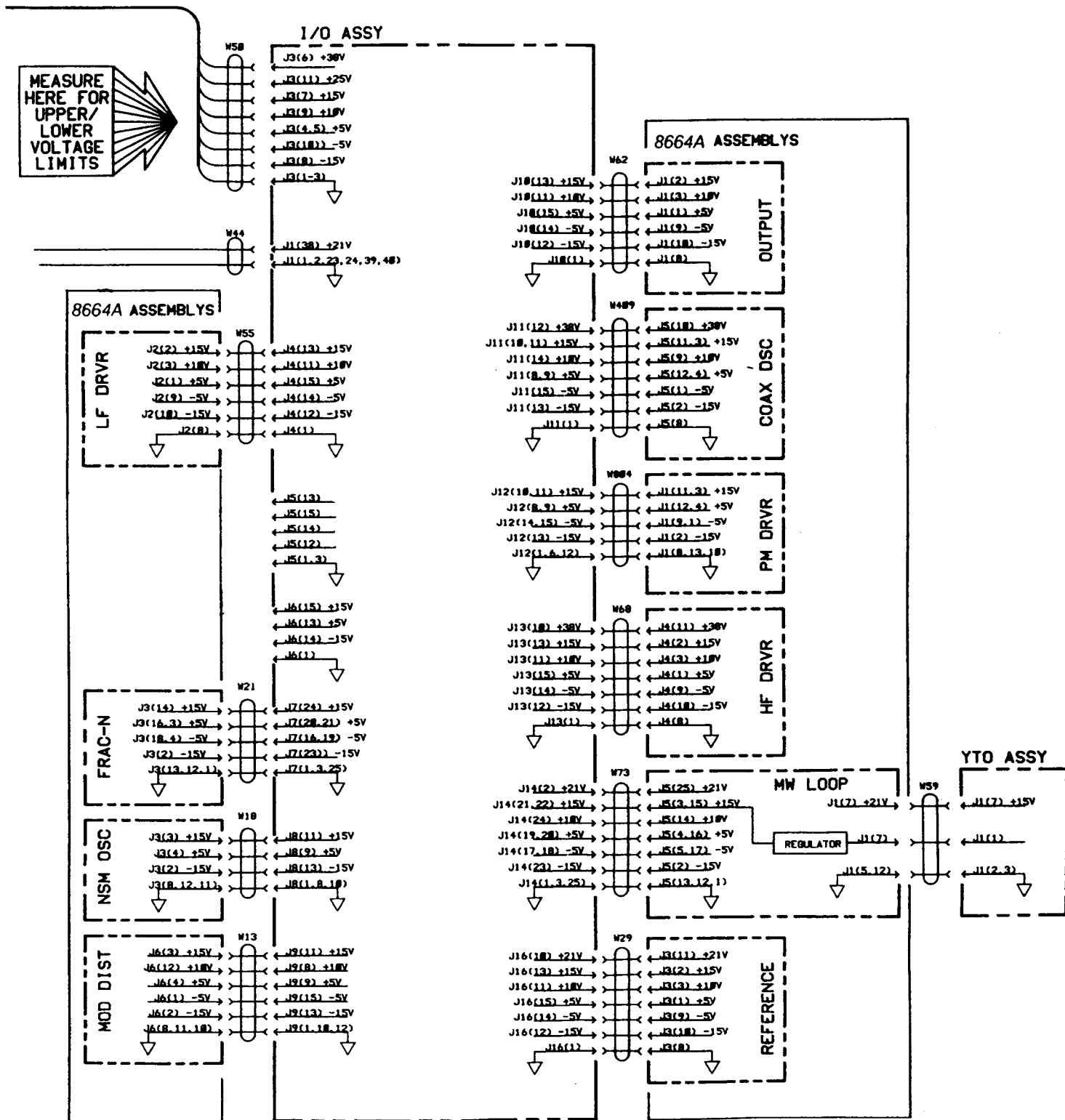
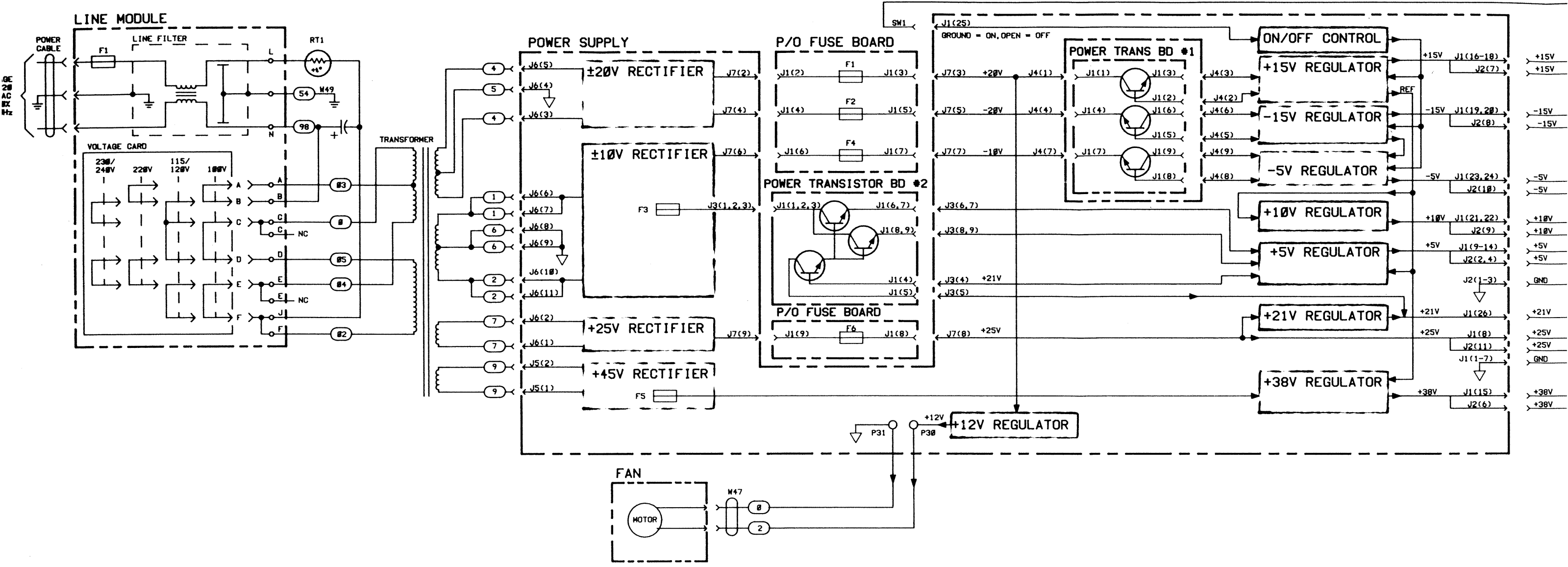


Figure 2d-3. Partial Power Supply Wiring Diagram for HP 8664A - To be used with the HP 8664A/B Wiring Diagram





Power Supply DC Voltage Level Limits\*\*

Supply Voltage V dc	Upper Limit V dc	Lower Limit V dc
-15	-14.75	-15.25
-5.2	-4.9	-5.5
Gnd	+0.150	-0.150
+5.2	+5.352	+5.048
+10	+10.2	+9.8
+15	+15.25	+14.75
+21	+22.0	+20.0
+25 (Unreg)	+40.0	+20.0
+38	+38.48	+37.55

\*\*These limits do not apply when using the internal voltmeter.

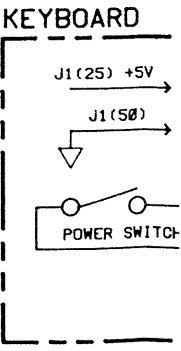
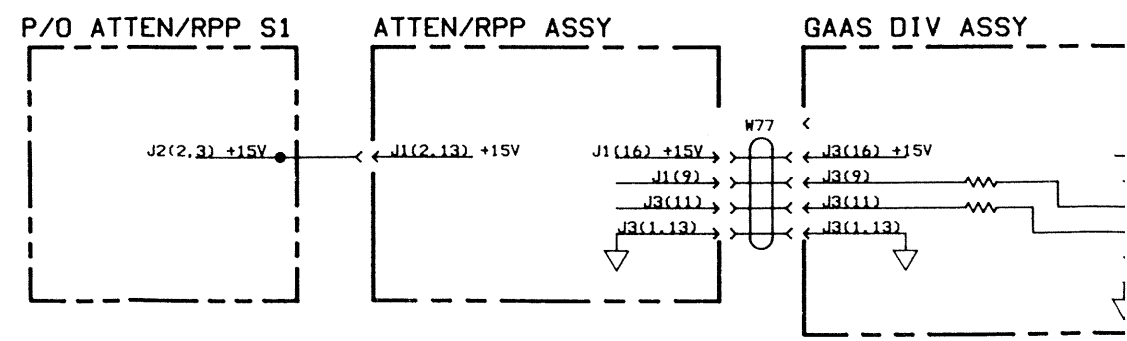
Input Voltage To Power Transistor Boards

Power Supply	Unregulated Voltage	
	Measure at Connector-Pin	Should Be (V dc)
+15V	J4-1	>16.8
+5V	J3-1,2,3	>6.8
	J3-5	>18.0*
-15V	J4-4	>-16.8
-5V	J4-7	>-6.8

\* If this voltage is bad, troubleshoot the ±21V supply.

Input Voltage To Power Supply (From Transformer)

Power Supply	AC Input Voltage	
	Measure at Connector-Pin	Should Be (V ac)
+15V	J6-4,5	>15.0
+5V	J6-6,8	>5.0
	J6-7,9	>5.0
-15V	J6-3,4	>15.0
-5V	J6-8,10	>5.0
	J6-9,11	>5.0
+21V	J6-1,2	>21.0
+38V	J5-1,2	>38.0



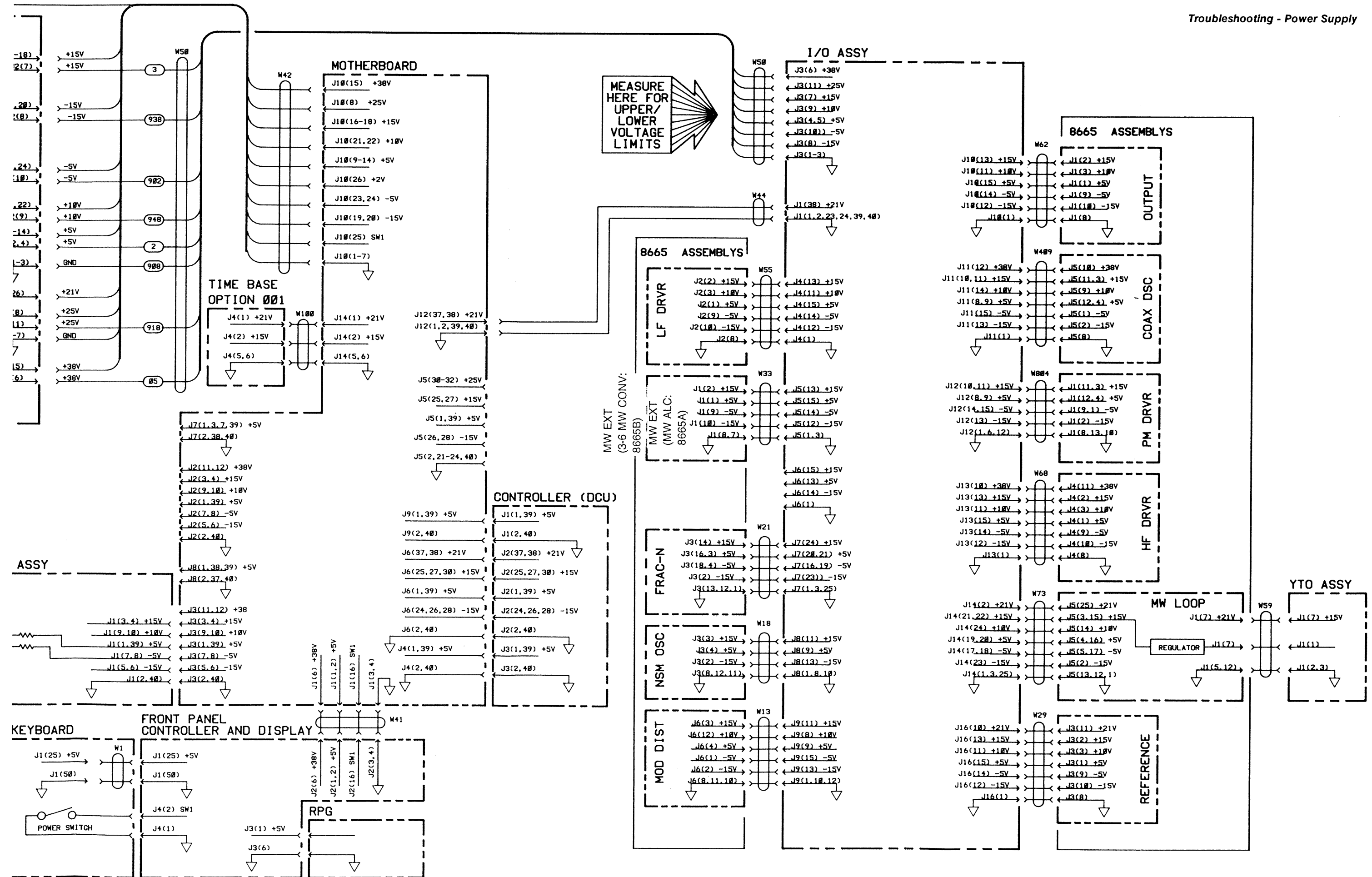


Figure 2d-4. Power Supply Wiring Diagram for HP 8665

# TABLE OF CONTENTS

## Assembly Replacement Self-Cal Adjustments

- HP 8643, 8644, 8645 Instrument Self-Calibration . . . . . 3-1
- Option 010 RFI Adjustments . . . . . 3-1
- HP 8664A,65A/65B Assembly Self-Cal Adjustments . . . . . 3-1
  - MW Loop Self-Cal Adjustment . . . . . 3-2
    - MW LOOP Adjustment Locations . . . . . 3-3
  - HF DRVR Self-Cal Adjustment . . . . . 3-3
  - Attenuator/RPP ROM Replacement . . . . . 3-4
  - Cal Data Recovery for HP 8665A Only . . . . . 3-5





# 3

## Assembly Replacement Self-Cal Adjustments

---

This section provides assembly replacement or component level repair calibration and adjustment procedures (when necessary) to return your Performance Signal Generator to its specified operation.

### **HP 8643, 8644, 8645 Instrument Self Calibration**

After an assembly replacement the HP 8643, 8644 or 8645 Signal Generator will activate the ReCal routine and calibrate itself when instrument operation is verified (by entering Special Function 320), and with no errors detected. However, if an error is detected and a result code other than zero is returned, the ReCal routine is aborted.

If at any time you wish to re-calibrate the HP 8643, 8644 or 8645 Signal Generator enter **SPECIAL** 171 (ReCal), and press the **ON** key twice. A displayed **Result code = 0** indicates that the instrument is calibrated. An unsigned result code indicates that problems exist and that the instrument is not calibrated. Retest the instrument using the ILD diagnostics as explained in the *Running Diagnostics* subsection under *Troubleshooting*.

### **Option 010 RFI Adjustments**

For instructions needed to verify the reduced RFI specification in signal generators installed with Option 010, *Reduced Leakage Configuration* refer to section 3, *Performance Tests* in the *Operation and Calibration Manual* for your instrument.

### **HP 8664A, 65A/65B Assembly Self-Cal Adjustments**

The HP 8664A, 65A/65B Self-Cal Adjustments (MW LOOP Adjustment for the MW LOOP and YTO Assemblies, HF DRVR Adjustment for the HF DRVR and GAAS/DIV Assemblies) calibrate the assemblies after replacement or component level repair. These procedures involve firmware routines and manual voltage adjustments necessary for optimum assembly operation.

### MW LOOP Self-Cal Adjustment

Perform this adjustment when the MW LOOP or YTO Assembly is replaced.

This procedure sets and stores correct pretune DAC values and cal factors for the MW LOOP (PLL-YIG) circuitry using firmware calibration routines and manual voltage adjustments.

The MW LOOP Assembly must be laid horizontally on its side to access R18 on the assembly side. (R56, R154 are on the assembly top edge.)

#### Note

*These steps must be followed in the order listed for correct adjustment results. All voltages should be adjusted within  $\pm 7$  mV.*

1. Establish the YTO pretune DAC values by entering **SPECIAL** 340 and pressing **ON** twice. (After pressing the **ON** key once, the display should look like:  
340: MWL Cal 1 (Press ON).
2. Establish the FM coil cal factor by entering **SPECIAL** 341 and pressing **ON** once. The display should show:  
341: MWL Cal 2 [voltage reading].
  - a. Locate and adjust R56 (next to J2 on the PLL-YIG) until the displayed voltage reading equals  $+1000 \pm 25$ .
  - b. Press the **ON** key when finished. (This executes a Hardware Reset, but does not affect the adjustment.)
3. Establish the FM gain cal factor by entering **SPECIAL** 342 and pressing **ON** once. The display should look like:  
342: MWL Cal 3 [voltage reading].
  - a. Locate and adjust R18 (See figure 5-1) until the displayed reading equals the R18 value on the MWLOOP ASSY ADJ calibration sticker. (The MWLOOP ASSY ADJ calibration sticker is located atop the YTO Assembly.)
  - b. Press the **ON** key when finished. (This executes a Hardware Reset, but does not affect this adjustment.)

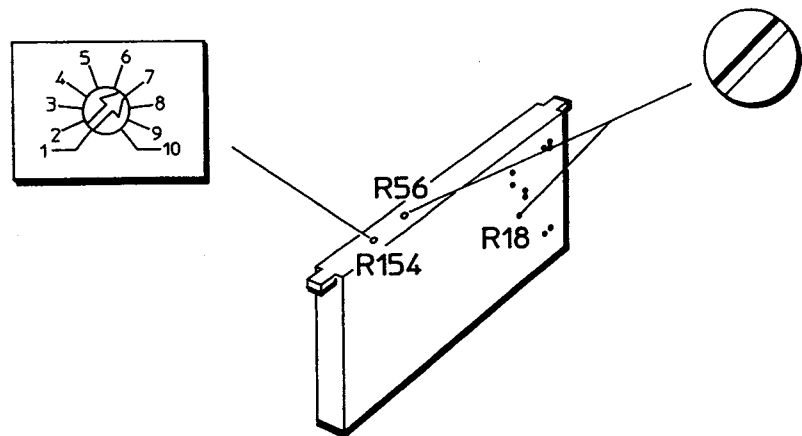


Figure 3-1. MW LOOP Adjustment Locations

4. Locate and adjust R154 until the displayed reading equals the R154 value on the MWLOOP ASSY ADJ sticker. (The MWLOOP ASSY ADJ calibration sticker is located atop the YTO Assembly.)
5. After 30 minutes re-execute **SPECIAL** 340 (for a final pretune calibration).
6. Re-calibrate the instrument by entering **SPECIAL** 171 (ReCal) and pressing the **ON** key twice. A displayed `Result code = 0` indicates that the instrument is calibrated.
7. Return the instrument to operation.

#### HF DRVR Self-Cal Adjustment

Perform this adjustment when the HF DRVR or GAAS/DIV Assembly is replaced. This procedure adjusts for correct HET DRIVE Output level using R170 (HET Level), the high accuracy internal voltmeter, and the front display.

When the HF DRVR Assembly is replaced, the voltmeter is set to monitor the voltage at the HFOS DC\_POWER sense point in the HF DRVR Assembly. The HET LEVEL (R170) is adjusted so that the displayed voltage reading on the instrument screen equals the cal value on the ADJUST TO [cal value] calibration sticker. (R170 and the calibration sticker are located on the HF DRVR Assembly next to J6.)

#### Note

*These steps must be followed in the order listed for correct adjustment results. All voltages should be adjusted within  $\pm 7$  mV.*

8. Set the instrument to a carrier frequency of 100 MHz, and amplitude of -10 dBm.
9. Set the voltmeter to monitor the HF DRVR (assembly number 10) by entering **[SPECIAL]** 301, press **[ON]** once, then key in 10 and press **[ON]** again. The display should look like:  
301: Diag. Module 10.
10. Set the voltmeter to monitor the HFOS DC\_POWER sense point (sense line 7) by entering **[SPECIAL]** 304, press **[ON]** once, then key in 7 and press **[ON]** again. The display should look like:  
304: Diag. Mux 7.
11. Set the internal voltmeter mode to DC by entering **[SPECIAL]** 305 then press **[ON]** once. (If DC is not displayed rotate the KNOB until DC is selected, then press **[ON]** again.) The display should look like:  
305: Voltmeter Mode DC.
12. Turn the voltmeter on by entering **[SPECIAL]** 306, then press **[ON]** once.
13. Locate and adjust potentiometer R170 (next to J6 on the HF DRVR) so that the displayed voltmeter value reads the same as the voltage value on the HF DRVR calibration sticker (ADJUST TO [cal value].)
14. Re-calibrate by entering **[SPECIAL]** 171 (ReCal) and pressing the **[ON]** key twice. A displayed `Result code = 0` indicates that the instrument is calibrated.
15. Return the instrument to operation.

### **Attenuator/RPP ROM Replacement**

Whenever the Attenuator/RPP Assembly is replaced, the Attenuator/RPP Cal Data ROM needs replacing also.

1. Turn off the instrument.
2. Remove U32 from the I/O Assembly and replace it with the EEPROM (U32) that came with the replacement Attenuator/RPP Assembly.
3. Turn on the instrument and perform an instrument re-cal by keying in **[SPECIAL]** 171 (ReCal), and pressing the **[ON]** key twice. A displayed `Result code = 0` indicates that the instrument is calibrated.

**Cal Data Recovery  
for HP 8665A Only**

The following RMB program can be used to recover from an ERROR Code of 12,030,XXX or 5,030,XXX while performing routine maintenance. If this program does not recover the calibration data, contact your local Hewlett-Packard Service Center.

```

10 !*****
20 !ALC AND MWEXT CAL RECOVERY PROGRAM
30 !Matt Dixon 09/23/91
40 ! "/USERS/MATT/ALC_CAL:REMOTE 21,12"
50 !*****
51 CLEAR SCREEN
60 DISP "Set the Unit Under Test (UUT) address to 19. Press
CONTINUE when set."
70 PAUSE
80 DISP "Service Mode must be enabled on the UUT. Press CON-
TINUE when enabled."
90 PAUSE
100 OUTPUT 719;"*RST" !Performs Instrument Preset.
110 !
120 DISP "Downloading data from UUT...."
130 WAIT 5
140 OUTPUT 719;"DIAG:LATCH:MOD";12
150 OUTPUT 719;"DIAG:LATCH:NUMBER";100
160 OUTPUT 719;"DIAG:LATCH:DATA";0
170 OUTPUT 719;"DIAG:LATCH:NUMBER";101
180 OUTPUT 719;"DIAG:LATCH:DATA?"
190 ENTER 719;Mwext_elements
200 Vern_elements=25
210 Alc_elements=38
220 Total_elements=Alc_elements+Vern_elements+Mwext_elements
230 !
240 ALLOCATE Data(0:Total_elements-1)
250 !
260 OUTPUT 719;"DIAG:LATCH:MOD";5
270 FOR Freq=0 TO Alc_elements-1
280 OUTPUT 719;"DIAG:LATCH:NUMBER";100
290 OUTPUT 719;"DIAG:LATCH:DATA";0
300 OUTPUT 719;"DIAG:LATCH:NUMBER";104
310 OUTPUT 719;"DIAG:LATCH:DATA";Freq
320 OUTPUT 719;"DIAG:LATCH:NUMBER";105
330 OUTPUT 719;"DIAG:LATCH:DATA?"
340 ENTER 719;Data(Freq)
350 NEXT Freq

```

```
360 OUTPUT 719;"DIAG:LATCH:MOD";12
370 FOR Vern=0 TO Vern_elements-1
380 OUTPUT 719;"DIAG:LATCH:NUMBER";100
390 OUTPUT 719;"DIAG:LATCH:DATA";1
400 OUTPUT 719;"DIAG:LATCH:NUMBER";104
410 OUTPUT 719;"DIAG:LATCH:DATA";Vern
420 OUTPUT 719;"DIAG:LATCH:NUMBER";105
430 OUTPUT 719;"DIAG:LATCH:DATA?"
440 ENTER 719;Data(Vern+Alc_elements)
450 NEXT Vern
460 FOR Freq=0 TO Mnext_elements-1
470 OUTPUT 719;"DIAG:LATCH:NUMBER";100
480 OUTPUT 719;"DIAG:LATCH:DATA";0
490 OUTPUT 719;"DIAG:LATCH:NUMBER";104
500 OUTPUT 719;"DIAG:LATCH:DATA";Freq
510 OUTPUT 719;"DIAG:LATCH:NUMBER";105
520 OUTPUT 719;"DIAG:LATCH:DATA?"
530 ENTER 719;Data(Freq+Alc_elements+Vern_elements)
540 NEXT Freq
550 !
560 DISP "Performing ALC and MWEXT Calibration on UUT..."
570 OUTPUT 719;"DIAG:CAL:OS:START"
580 FOR Cal_step=0 TO Total_elements
590 OUTPUT 719;"FREQ: CW?"
600 ENTER 719;Cal_freq
610 IF Cal_freq=0 THEN
620 OUTPUT 719;"DIAG:CAL:OS:STOP 0"
621 OUTPUT 719;"DIAG:CAL:AM:ALC:SCAL"
623 OUTPUT 719;"DIAG:CAL:AM:MWX:SCAL"
624 DISP "Performing Instrument Self Cal. Please wait."
626 OUTPUT 719;"*CAL?"
627 ENTER 719;Result_code
630 DISP "ALC and MWEXT Calibration COMPLETE."
640 GOTO Done
650 END IF
660 IF Cal_freq<3.E+9 THEN Amplitude=8
670 IF Cal_freq=3.E+9 THEN
680 OUTPUT 719;"AMPL:LEV?"
690 ENTER 719;Amplitude
700 END IF
710 IF Cal_freq>3.E+9 THEN Amplitude=10
```

---

```
720 ! DISP "Performing ALC and MWEXT Calibration on UUT,  
      FREQ=";Cal_freq;"DATA=";Amplitude-Data(Cal_step)/110  
730 OUTPUT 719;"DIAG:CAL:OS ";Amplitude-Data(Cal_step)/110  
740 ! PRINT Cal_freq,Amplitude, Data(Cal_step),  
      Amplitude-Data(Cal_step)/110  
750 NEXT Cal_step  
760 Done:!  
770 OUTPUT 719;"*RST"  
780 DEALLOCATE Data(*)  
790 END
```





# TABLE OF CONTENTS

## Replaceable Parts

Introduction . . . . .	4-1
Reference Designations and Abbreviations Used . . . . .	4-2
Replaceable Parts List (Explanation) . . . . .	4-2
Ordering Information . . . . .	4-3
Assembly Exchange Program . . . . .	4-4
Parts List Updating . . . . .	4-4
Assembly Locations (HP 8643A, HP 8644A, HP 8644B) . . . . .	4-5
Assembly Locations (HP 8645A, HP 8664A, HP 8665A/B) . . . . .	4-6
Code List of Manufacturers . . . . .	4-7
Service Kit Part Numbers List . . . . .	4-8
Replaceable Parts List . . . . .	4-9
HP 8643A . . . . .	4-9
HP 8644A . . . . .	4-17
HP 8644B . . . . .	4-27
HP 8645A . . . . .	4-35
HP 8664A . . . . .	4-43
HP 8665A . . . . .	4-53
HP 8665B . . . . .	4-63
Common Cabinet Parts . . . . .	4-73



# 4

## Replaceable Parts

---

### **Introduction**

This section contains information for ordering parts needed for Assembly Level replacement.

Tables 4-1a through 4-1f give locations for assemblies in the instrument. Use the reference designator (A2-A16) stamped on the instrument casting for RF and Controller assembly referencing. (Reference designators A1, and A17-A20 are not marked on the instrument.)

Table 4-2. *Code List of Manufacturers* contains the manufacturer names and addresses that correspond to the manufacturer's codes used in Table 4-4.

Tables 4-3a and 4-3b list Service Kit parts and tools.

Table 4-4. *Replaceable Parts* lists the part numbers for new, and restored assemblies and cables.

Table 4-4a. *Cabinet Parts* lists cabinet parts for instruments except those for Option 010. Table 4-4b. *Cabinet Parts Unique to Option 010*, lists cabinet parts specific to Option 010.

Table 4-4c. *Miscellaneous Replaceable Parts* lists the parts called out in the illustrated parts breakdowns, located at the end of this section.

Assemblies are available in Assembly Replacement Kits. Each Assembly Replacement Kit includes:

- The assembly (in an Electrostatic Discharge protective package).
- The appropriate Calibration EEPROM (for assemblies that require calibration data).
- Miscellaneous installation parts where required.
- The shipping package, designed for reuse in returning defective assemblies.

**Reference  
Designations And  
Abbreviations Used  
In This Manual**

**How To Find Part Numbers**

Because of the unique design of the Performance Signal Generators, the Assemblies may not have the same reference designator from product to product. When locating a part number or assembly, select the appropriate product model first.

Cables, miscellaneous electrical and mechanical parts will have reference designations assigned to them where appropriate.

The assembly names are printed in abbreviated form on the top edges of the assembly for location purposes.

**Replaceable Parts List**

Table 4-4, *Replaceable Parts* is organized as follows:

- a. New assemblies and assembly replacement kits are listed by specific product, then by reference designator.
- b. Cables are listed by specific product, then by reference designator (see figure 2-10 for cable locations).
- c. Miscellaneous electrical and mechanical parts (See figures 4-1 to 4-6).

Within table 4-4, the following information is given for each part:

- a. The reference designator.
- b. The Hewlett-Packard part number.
- c. The part number check digit (CD).
- d. The description of the part.
- e. Typical manufacturer of the part in a five-digit code.
- f. The manufacturer's number for the part.

---

**Ordering Information****Instrument and Assembly Identification Numbers**

The Instrument Serial Number and assembly Configuration Codes help to identify the correct part numbers for ordering.

**Serial Numbers** Attached to the rear of the instrument is a serial number plate. The first four digits and the letter form the serial prefix. The last five digits (suffix) are unique to each instrument. The contents of this manual apply directly to instruments having the same serial prefix(es) as those listed on the title page.

**Option Labels** Attached to the rear of the instrument near the serial number plate is a label with all the option numbers for your instrument. Some part numbers are specific to instrument options.

**Assembly Configuration Codes** Each assembly in the instrument has a Assembly Configuration Code. This code is made up of two separate numbers on a label for each assembly:

One number is the ten digit assembly number: 0864X-60XXX, that identifies a specific assembly.

The other number is the nine digit assembly identification code: XXXX/00000. The first four digits of the nine digit code comprise the Assembly Configuration Code. The last five digits are the EEPROM software date code, that identifies which version of the calibration code that is stored in the assembly's EEPROM.

**Ordering a Part**

To order a part listed in the Replaceable Parts List, call or write the nearest Hewlett-Packard Sales Office. Have the following information compiled to speed the ordering process:

1. The Hewlett-Packard part number and the check digit. (The check digit will ensure accurate and timely processing of your order.)
2. The quantity required.
3. An approved purchase order number (which may/or may not be required).

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**Note**

*Within the USA, it is preferable to order directly from the HP Support Materials Organization (SMO), Roseville, California. Ask your nearest HP office for information and forms for the "Direct Order System".*

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**Assembly  
Exchange Program**

All assemblies may be replaced by new assemblies, and most are also available as restored (factory repaired and calibrated) parts on an exchange basis. The Assembly Exchange program is where the defective assemblies from your instrument are returned to the factory for credit. This provides a considerable cost savings. Restored, factory repaired and tested assemblies are available on a trade-in basis.

To order an Exchange Assembly Kit follow the same ordering information found in the paragraph, *Assembly Ordering Information*. Be sure to use the exchange assembly part number from table 4-4 when ordering.

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**Note**

*Assemblies required for spare parts stock must be ordered by the new Assembly Kit part number.*

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**Assembly Return Packaging Information**

To return a defective assembly, fill out the special tag provided and attach it to the defective assembly. Package the defective assembly in the special packaging material in which the exchange assembly was shipped. Return the defective assembly within thirty days to the factory.

**Parts List Updating**

A "MANUAL UPDATES" packet may be shipped with the manual to provide the most current updating information available at the time of shipment.

Table 4-1a. HP 8643A Assembly Locations

Ref. Des.	Assembly	Ref. Des.	Assembly
A1	Front Panel Assembly	A13	Unused
A2/A3	STD DELAY LINE	A14	Unused
A4	Unused	A15	2 GHz Attenuator
A5	STD VCO	A16	Controller Board
A6	Unused	A17	Digital Motherboard
A7	STD Doubler (option 002)	A18	I/O Assembly
A8	STD MOD/NSM OSC	A19A1	Power Supply Filter Board
A9	FRAC-N	A19A2	Power Supply, Main
A10	Divider	A19A3	Power Supply, Oven
A11	REF OSC/STD ALC	A20	Timebase Assembly
A12	Counter		

Table 4-1b. HP 8644A Assembly Locations

Ref. Des.	Assembly	Ref. Des.	Assembly
A1	Front Panel Assembly	A13	Unused
A2/A3	STD DELAY LINE	A14	Unused
A4	140 ns DELAY LINE (option 004)	A15	2 GHz Attenuator
A5	STD VCO	A16	Controller Board
A6	COAX DSC (option 004)	A17	Digital Motherboard
A7	STD Doubler (option 002)	A18	I/O Assembly
A8	STD MOD (STD MOD/NSM OSC, opt 007)	A19A1	Power Supply Assembly
A9	FRAC-N	A19A2	Power Transistor Board #1
A10	Divider	A19A3	Power Transistor Board #2
A11	REF OSC/STD ALC	A20	Timebase Assembly
A12	Counter (2 GHz Frequency Counter, opt 011)		

Table 4-1c. HP 8644B Assembly Locations

Ref. Des.	Assembly	Ref. Des.	Assembly
A1	Front Panel Assembly	A13	Unused
A2/A3	STD DELAY LINE	A14	Unused
A4	140 ns DELAY LINE	A15	2 GHz Attenuator
A5	STD VCO	A16	Controller Board
A6	COAX DSC	A17	Digital Motherboard
A7	STD Doubler (option 002)	A18	I/O Assembly
A8	STD MOD/NSM OSC	A19A1	Power Supply Assembly
A9	FRAC-N	A19A2	Power Transistor Board #1
A10	Divider	A19A3	Power Transistor Board #2
A11	REF OSC/STD ALC	A20	Timebase Assembly
A12	Counter (2 GHz Frequency Counter)		

*Table 4-1d. HP 8645A Assembly Locations*

<b>Ref. Des.</b>	<b>Assembly</b>	<b>Ref. Des.</b>	<b>Assembly</b>
A1	Front Panel Assembly	A13	REF OSC/FAST ALC
A2/A3	Heated Delay Line	A14	Fast Controller Board
A4	Unused	A15	2 GHz Attenuator
A5	PH SHIFT	A16	Controller Board
A7	Doubler (option 002)	A17	Digital Motherboard
A8	MOD DIST/NSM OSC	A18	I/O Assembly
A9	FRAC-N	A19A1	Power Supply Assembly
A10	Divider	A19A2	Power Transistor Board #1
A11	REF OSC/FAST ALC	A19A3	Power Transistor Board #2
A12	FAST VCO	A20	Timebase Assembly

*Table 4-1e. HP 8664A Assembly Locations*

<b>Ref. Des.</b>	<b>Assembly</b>	<b>Ref. Des.</b>	<b>Assembly</b>
A1	Front Panel Assembly	A13	MW Assembly (YTO)
A2	140 ns DELAY LINE	A14	MW Assembly (GAAS DIVIDERS)
A3	Unused	A15	MW Assembly (Attenuator)
A4	COAX DSC (option 004)	A16	Controller Board
A5	LF Driver	A17	Digital Motherboard
A6	MOD DIST/NSM OSC	A18	I/O Assembly
A7	OUTPUT	A19A1	Power Supply Assembly
A8	HF Driver	A19A2	Power Transistor Board #1
A9	Reference	A19A3	Power Transistor Board #2
A10	FRAC-N	A20	Timebase Assembly
A11	MW LOOP		
A12	MW EXT (option 008)		

*Table 4-1f. HP 8665A/B Assembly Locations*

<b>Ref. Des.</b>	<b>Assembly</b>	<b>Ref. Des.</b>	<b>Assembly</b>
A1	Front Panel Assembly	A13	MW Assembly (YTO)
A2	140 ns DELAY LINE	A14	MW Assembly/GAAS DIVIDERS
A3	Unused	A15	MW Assembly (Attenuator)
A4	COAX DSC (option 004)	A16	Controller Board
A5	LF DRVR	A17	Digital Motherboard
A6	MOD DIST/NSM OSC	A18	I/O Assembly
A7	OUTPUT	A19A1	Power Supply Assembly
A8	HF DRVR	A19A2	Power Transistor Board #1
A9	Reference	A19A3	Power Transistor Board #2
A10	FRAC-N	A20	Timebase Assembly
A11	MW LOOP		
A12	MW EXT		



*Table 4-2. Code List of Manufacturers*

<b>Mfr. Code</b>	<b>Manufacturer Name</b>	<b>Address</b>	<b>Zip Code</b>
00000	ANY SATISFACTORY SUPPLIER		
05245	CORCOM INC	LIBERTYVILLE, IL	60048
28480	HEWLETT-PACKARD CO CORPORATE HQ	PALO ALTO, CA	94304
6E259	AMETEK INC	PAOLI, PA	19301
78553	TINNERMAN PRODUCTS INC	CLEVELAND, OH	44101

*Table 4-3a. Service Kit Part Numbers For HP 8643, 8644 And 8645*

Item Description	Part Number	CD
Service Kit	08645-61116	8
Ribbon Cable Test Board	08645-60143	9
Assembly Extender Rods	08645-60125	7
Extender Board	08645-21034	2
RPP Test Cable	5061-4827	2
Adapter SMA (male) to SMC (male)	1250-1693	1
Adapter SMC (male) to SMC (male)	1250-0827	1
Adapter SMA (female) to SMC (female)	1250-0675	7
Adapter SMC (TEE)	1250-0838	4
Adapter SMA (female) to SMA (male)	1250-1249	3
Adapter BNC (female) to SMC (female)	1250-0832	8
BNC-to-test-lead clips	8120-1292	8
Termination-Coax SMC Female; 50 ohms	1250-0839	5
Socket SMC	08644-61065	5
Coax Cable	08645-61055	4
BNC Coax Cable	8120-1839	9
Ribbon Cable: 15 pin	08645-61039	4
Ribbon Cable: 25 pin	08645-61040	7

*Table 4-3b. Service Kit Part Numbers For HP 8664A, 8665A, And 8665B*

Item Description	Part Number	CD
Service Kit	08665-61116	2
Ribbon Cable Test Board	08645-60143	9
Assembly Extender Rods	08645-60125	7
Extender Board	08645-21034	2
Adapter SMA (male) to SMC (male)	1250-1693	1
Adapter SMC (male) to SMC (male)	1250-0827	1
Adapter SMA (female) to SMC (female)	1250-0675	7
Adapter SMC (TEE)	1250-0838	4
Adapter SMA (female) to SMA (male)	1250-1249	3
Adapter BNC (female) to SMC (female)	1250-0832	8
BNC-to-test-lead clips	8120-1292	8
Termination-Coax SMC Female; 50 ohms	1250-0839	5
Socket SMC	08644-61065	5
Peak Detector	33330B	6
Ribbon Cable: 15 pin "D" (M) to 16 pin "3M" (F)	08665-61110	6
Ribbon Cable: 15 pin "D" (F) to 9 pin "D" (F)	08665-61111	7
Ribbon Cable: 9 pin "D" (F) to 15 pin "D" (M)	08665-61107	1
Coax Cable	08645-61055	4
BNC Coax Cable	8120-1839	9
Ribbon Cable: 15 pin (2 ea)	08645-61039	4
Ribbon Cable: 25 pin (2 ea)	08645-61040	7

# HP 8643A

## Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1				FRONT PANEL ASSEMBLY		
	3101-2720	4	1	SWITCH-PB SPST-NO ALTNQ .125A 115 VAC (POWER SWITCH)	19701	2LL9AAA2000030
	08665-60302	5	1	FRONT PANEL CONTROLLER (NEW)	28480	08665-60202
	08665-69102	2	1	FRONT PANEL CONTROLLER (EXCHANGE)	28480	08665-69102
	08643-61019	8	1	FRONT PANEL KEYBOARD ASSEMBLY W/O FRONT PANEL CONTROLLER	28480	08643-61019
	08643-00007	6	1	NAME PLATE (STD)	28480	08643-00007
	08643-00008	7	1	NAME PLATE (OPTION 002)	28480	08643-00008
A2/A3	08644-61004	2	1	STANDARD DELAY LINE (NEW)	28480	08644-61004
	08644-69004	8	1	STANDARD DELAY LINE (EXCHANGE)	28480	08644-69004
A4				NOT ASSIGNED		
A5	08644-61002	1	1	STANDARD VCO (NEW)	28480	08644-61002
	08644-69002	6	1	STANDARD VCO (EXCHANGE)	28480	08644-69002
A6				NOT ASSIGNED		
A7	08644-61040	6	1	DOUBLER, OPTION 002 (NEW)	28480	08644-61040
	08644-69040	2	1	DOUBLER, OPTION 002 (EXCHANGE)	28480	08644-69040
A8	08644-61003	1	1	STD MOD/NSM OSC (NEW)	28480	08644-61003
	08644-69003	7	1	STD MOD/NSM OSC (EXCHANGE)	28480	08644-69003
A9	08645-61001	8	1	FRACTIONAL N (NEW)	28480	08645-61001
	08645-69001	6	1	FRACTIONAL N (EXCHANGE)	28480	08645-69001
A10	08644-61026	8	1	DIVIDER (NEW)	28480	08645-61026
	08644-69026	4	1	DIVIDER (EXCHANGE)	28480	08645-69026

*Please refer to the beginning of this section for how to find and order part numbers.*

## HP 8643A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11	08643-61022	1	1	REFERENCE OSCILLATOR/STANDARD ALC (NEW)	28480	08643-61022
	08643-69022	7	1	REFERENCE OSCILLATOR/STANDARD ALC (EXCHANGE)	28480	08643-69022
A12	08644-61071	3	1	COUNTER ASSEMBLY (NEW) OPTION 011	28480	08644-61071
	08644-69071	9	1	COUNTER ASSEMBLY (EXCHANGE) OPTION 011	28480	08644-69071
A13				NOT ASSIGNED		
A14				NOT ASSIGNED		
A15	08645-61019	0	1	ATTENUATOR ASSEMBLY OPTION 002 (NEW)	28480	08645-61019
	08645-69019	6	1	ATTENUATOR ASSEMBLY OPTION 002 (EXCHANGE)	28480	08645-69019
	08645-61132	8	1	ATTENUATOR ASSEMBLY OPT 002/003 ONLY	28480	08645-61132
A15	08644-61049	5	1	ELECTRONIC ATTENUATOR ASSEMBLY (NEW) EXCEPT OPTION 002	28480	08645-61049
	08644-69049	1	1	ELECTRONIC ATTENUATOR ASSEMBLY (EXCHANGE) EXCEPT OPTION 002	28480	08645-69049
A16	08645-60101	9	1	CONTROLLER, DCU (NEW) (DOES NOT INCLUDE FIRMWARE)	28480	08645-60101
	08645-69101	7	1	CONTROLLER, DCU (EXCHANGE) (DOES NOT INCLUDE FIRMWARE)	28480	08645-69101
	08643-61018	7	1	FIRMWARE SET	28480	08643-61018
A17	08645-60128	0	1	DIGITAL MOTHERBOARD ASSEMBLY	28480	08645-60128
A18	08645-60326	0	1	INPUT/OUTPUT (NEW)	28480	08645-60226
	08645-69126	6	1	INPUT/OUTPUT (EXCHANGE)	28480	08645-69126
A19				POWER SUPPLY ASSEMBLY		
B1	08643-61017	6	1	FAN ASSEMBLY	28480	08643-61017
A19A1	08643-60102	8	1	POWER SUPPLY FILTER BOARD	28480	08643-60102
A19A2	0950-2293	2	1	POWER SUPPLY, MAIN	28480	0950-2293
A19A3	0950-2278	3	1	POWER SUPPLY, OVEN	28480	0950-2278
	08643-61013	2	1	LINE POWER MODULE (FILTERED) INCLUDES: CABLE TO J1 OVEN SUPPLY AND CABLE TO J5 FILTER BOARD NOTE: THESE TWO CABLES ARE NOT SEPARATELY REPLACEABLE	28480	08643-61013
	2110-0056	3	1	FUSE 6A	28480	2110-0056
A20	08645-61147	5		HIGH STABILITY TIMEBASE (NEW) STANDARD	28480	08645-61147
	08645-69147	1		HIGH STABILITY TIMEBASE (EXCHANGE) STANDARD	28480	08645-69147
A20	08645-61121	5		HIGH STABILITY TIMEBASE (NEW) OPTION 001	28480	08645-61121
	08645-69121	1		HIGH STABILITY TIMEBASE (EXCHANGE) OPTION 001	28480	08645-69121

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8643A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1	08644-61013	3	1	SEMI-RIGID CABLE 2.18 SMC-SMC STD DELAY LINE J1 TO VCO J5	28480	08644-61013
W2				NOT ASSIGNED		
W3				NOT ASSIGNED		
W4	08644-61012	2	1	SEMI-RIGID CABLE 2.18 SMC-SMC VCO J2 TO STD DELAY LINE J2	28480	08644-61012
W5				NOT ASSIGNED		
W6	08644-61025	7	1	RIBBON CABLE I/O J4 TO VCO J4	28480	08644-61025
W7				NOT ASSIGNED		
W8				NOT ASSIGNED		
W9	08644-61016	6	1	COAX CABLE, FEMALE SMC-SMC MOD J2 TO VCO J6	28480	08644-61016
W10	08645-61082	7		COAX CABLE, FEMALE SMC-SMC MOD J3 TO FRAC-N J2	28480	08645-61082
W11	08645-61056	5	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "FM" TO MOD J4 (EXCEPT OPTION 010) FRONT PANEL "FM" TO BULKHEAD MOD J4 (OPTION 010)	28480	08645-61056
W11A	08644-61033	7	1	COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD MOD J4 TO MOD J4	28480	08644-61033
W1104	08644-61073	6	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL MEAS INPUT TO COUNTER J4OPTION 011	28480	08644-61073
W1104A	08644-61079	1	1	COAX CABLE, FEMALE SMC-SMC BULKHEAD COUNTER J4 TO COUNTER J4	28480	08644-61079
W13	08645-61038	3		RIBBON CABLE 15CNDCT I/O J9 TO MOD J6	28480	08645-61038
W14	08645-61058	7	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J1 TO MOD J7	28480	08645-61058
W15	08645-61059	8	1	COAX CABLE, FEMALE BNC-SMC MOD J8 TO FRONT PANEL "AUDIO" (EXCEPT OPTION 010) FRONT PANEL "AUDIO" TO BULKHEAD MOD J8 (OPTION 010)	28480	08645-61059
W15A	08644-61034	8	1	COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD MOD J8 TO MOD J8	28480	08645-61034

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8643A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W16	08645-61060	1	1	COAX CABLE, FEMALE SMC-SMC MOD J9 TO ALC J1	28480	08645-61060
W17	08645-61061	2	1	COAX CABLE, FEMALE BNC-SMC MOD J10 TO FRONT PANEL "AM" (EXCEPT OPTION 010)	28480	08645-61061
W17A	08644-61035	9	1	FRONT PANEL "AM" TO BULKHEAD MOD J10 (OPTION 010) COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD MOD J10 TO MOD J10	28480	08645-61035
W18	08645-61037	2		RIBBON CABLE 15CNDCT NSM OSC J3 TO I/O J8	28480	08645-61037
W19	08645-61062	3	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J4 TO REF OSC J2	28480	08645-61062
W20	08644-61015	5	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J1 TO VCO J3	28480	08644-61015
W21	08645-61040	7	1	RIBBON CABLE 25CNDCT FRAC-N J3 TO I/O J7	28480	08645-61040
W22	08644-61017	7	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO VCO J8	28480	08644-61017
W23	08645-61065	6	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J5 TO REF OSC J4	28480	08645-61065
W24	08645-61044	1	1	RIBBON CABLE 15CNDCT DIVIDER J1 TO ALC J2	28480	08645-61044
W25	08645-61068	9	1	COAX CABLE, FEMALE SMC-SMC DIVIDER J2 TO ALC J5	28480	08645-61068
W26	08644-61014	4	1	COAX CABLE, FEMALE SMC-SMC DIVIDER J3 TO VCO J1	28480	08644-61014
W27	08645-61066	7	1	COAX CABLE, FEMALE SMC-SMC ALC J8 TO DIVIDER J4	28480	08645-61066
W28				NOT ASSIGNED		
W29	08645-61039	4		RIBBON CABLE 15CNDCT REF OSC J3 TO I/O J6	28480	08645-61039
W30				NOT ASSIGNED		
W31				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8643A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W32	08645-61071	4	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "PULSE" TO ALC J4 (EXCEPT OPTION 010) FRONT PANEL "PULSE" TO BULKHEAD ALC J4 (OPTION 010)	28480	08645-61071
W32A	08644-61036	0	1	COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD ALC J4 TO ALC J4	28480	08645-61071
W33	08645-61037	2		RIBBON CABLE 15CNDCT I/O J5 TO ALC J6	28480	08645-61037
W35	08644-61021	3	1	COAX CABLE, FEMALE BNC-SMC (EXCEPT OPTION 011) REAR PANEL "10 MHZ REF OUT" TO REF OSC J1 (FOR OPTION 011 SEE W1102)	28480	08644-61021
W36	08644-61007	5	1	SEMI-RIGID CABLE 2.18 SMA-SMC ALC J7 TO ELECTRONIC ATTENUATOR	28480	08645-61007
W37	08644-61008	6	1	SEMI-RIGID CABLE 2.18 SMA-NONE FRONT PANEL "RF" TO ELECTRONIC ATTENUATOR	28480	08644-61008
W37	08644-61062	2	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 003 OR 003/010 ONLY) REAR PANEL "RF" TO ELECTRONIC ATTENUATOR	28480	08644-61062
W37	08644-61060	0	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 002 ONLY) FRONT PANEL "RF" TO ATTEN/RPP	28480	08644-61060
W37	08645-61051	0	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 002/003 OR 002/003/010) REAR PANEL "RF" TO ATTEN/RPP	28480	08645-61051
W38				NOT SEPARATELY REPLACEABLE ATTENUATOR 2 TO REVERSE POWER PROTECTION		
W39				NOT SEPARATELY REPLACEABLE ATTENUATOR 1 TO ATTENUATOR 2		
W40	08645-61035	0	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "VM IN" TO CONTROLLER J4	28480	08645-61035
W41	08644-61055	6	1	RIBBON CABLE 16NCDCT28AWG (EXCEPT OPTION 010) MOTHERBOARD J1 TO FRONT PANEL CONTROLLER J2	28480	08644-61055
W41	08644-61037	6	1	RIBBON CABLE 16NCDCT28AWG (OPTION 010) FRONT PANEL CONTROLLER J2 TO BULKHEAD J1	28480	08644-61037
W41A	08644-61038	1	1	RIBBON CABLE 16NCDCT28AWG (OPTION 010) BULKHEAD J1 TO MOTHERBOARD J1	28480	08644-61038
W42	08645-61027	0	1	RIBBON CABLE 26NCDCT 28AWG POWER SUPPLY J1 TO MOTHERBOARD J10	28480	08645-61027
W43				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8643A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W44	08645-61030	5	1	RIBBON CABLE 40CNDCT28AWG MOTHERBOARD J12 TO I/O J1	28480	08645-61030
W45	08645-61029	2	1	RIBBON CABLE 26CNDCT22AWG MOTHERBOARD J13 TO REAR PANEL "HP-IB"	28480	08645-61029
	1252-0372	5	1	SCREW KIT-RECT CONN	00779	553636-3
	3050-0425	3	2	WASHER-FL MTLCL NO. 6 .149-IN-ID	80120	AN960C-6
	2190-0587	0		WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
W46	08645-61081	6	1	CABLE HARNESS 6CNDCT I/O J2 TO REAR PANEL "X AXIS", "Z AXIS", "SEQ"	28480	08645-61081
	1250-0083	1	4	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
	2190-0016	0	4	WASHER-LK INTL T 7/16 IN .439-IN-ID	78189	1922-04
	2950-0001	8	5	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
W47	08645-61032	7	1	CABLE HARNESS 2CNDCT (RED/BLACK) POWER SUPPLY TO FAN	28480	08645-61032
W48				NOT ASSIGNED		
W49				CABLE ASSY GROUND JUMPER (GREEN/YELLOW) LINE ASSEMBLY TO CHASSIS GROUND (NOT SEPARATELY REPLACEABLE)		
W50	08645-61036	1	1	CABLE HARNESS 11CNDCT POWER SUPPLY J2 TO I/O J3	28480	08645-61036
W51-99				NOT ASSIGNED		
W100	08645-61089	4	1	CABLE HARNESS 6CNDCT MOTHERBOARD J14 TO TIMEBASE J4	28480	08645-61089
W101				NOT ASSIGNED		
W102				NOT ASSIGNED		
W103	08643-61014	3	1	WIRE HARNESS J2 OVEN SUPPLY TO J7 FILTER BOARD	28480	08643-61014
W104	08643-61015	4	1	WIRE HARNESS J2 MAIN SUPPLY TO J8 FILTER BOARD	28480	08643-61015
W105	08643-61016	5	1	WIRE HARNESS J1 MAIN SUPPLY TO J4 FILTER BOARD	28480	08643-61016

Please refer to the beginning of this section for how to find and order part numbers.



## HP 8643A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W106	08645-61142	0	1	COAX CABLE, BNC-SMC REF OSC J5 TO TIMEBASE J2	28480	08643-61142
W107	08645-61146	4	1	COAX CABLE, BNC-SMC OPTION 001 REAR PANEL "EFC" TO TIMEBASE J3	28480	08643-61146
W108	08645-61144	2	1	COAX CABLE, SMA-SMC OPTION 001 REAR PANEL "EXT REF" TO TIMEBASE J6	28480	08643-61144
W109	08645-61089	4	1	CABLE HARNESS I/O BOARD J14 TO TIMEBASE J8	28480	08643-61089
W110	08645-61149	7	1	COAX CABLE OSC TO TIMEBASE J7	28480	08645-61149
W111-W199				NOT ASSIGNED		
W200	08645-61097	4	1	COAX CABLE, FEMALE SMC-SMC (OPTION 002 ONLY) DOUBLER J2 TO ALC J1	28480	08645-61097
W201	08645-61080	5	1	COAX CABLE FEMALE SMC-SMC (OPTION 002 ONLY) DOUBLER J3 TO MOD J9	28480	08645-61080
W202	08645-61095	2	1	SEMI-RIGID CABLE 2.18, SMA-SMC (OPTION 002 ONLY) DOUBLER J5 TO ATTENUATOR 1	28480	08645-61095
W203	08645-61094	1	1	SEMI-RIGID CABLE 2.18 SMC-SMC (OPTION 002 ONLY) FAST ALC J7 TO DOUBLER J6	28480	08645-61094
W204	08645-61039	4	1	RIBBON CABLE 15CNDCT (OPTION 002 ONLY) DOUBLER J1 TO I/O J10	28480	08645-61039
W205-W303				NOT ASSIGNED		
W304	08644-61078	0	1	COAX CABLE, FEMALE BNC-SMC (OPTION 003/011) REAR PANEL "MEAS INPUT" TO COUNTER J4	28480	08644-61078
W305-W310				NOT ASSIGNED		
W311	08645-61107	7	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "FM" TO MOD J4	28480	08645-61107
W312	08645-61108	8	1	COAX CABLE FEMALE BNC-SMC REAR PANEL "ΦM" TO MOD J5	28480	08645-61108
W313				NOT ASSIGNED		
W314				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8643A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W315	08645-61109	9	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J8 TO REAR PANEL "AUDIO"	28480	08645-61109
W316				NOT ASSIGNED		
W317	08645-61110	2	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J10 TO REAR PANEL "AM"	28480	08645-61110
W318-W331				NOT ASSIGNED		
W332	08645-61111	6	1	COAX CABLE, FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "PULSE" TO ALC J4	28480	08645-61111
W333-W336				NOT ASSIGNED		
W337	08645-61051	0		SEMI-RIGID CABLE 2.18, SMA-SMA (OPTION 002/003) REAR PANEL "RF" TO ATTEN/RPP U2J1	28480	08645-61051
W337	08644-61062	2		SEMI-RIGID CABLE, SMA-SMA (OPTION 003) REAR PANEL "RF" TO ATTEN/RPP	28480	08644-61062
W338-W1100				NOT ASSIGNED		
W1101	08644-61072	4	1	RIBBON CABLE COUNTER J1 TO I/O J13	28480	08644-61072
W1102	08644-61077	9	1	COAX CABLE, FEMALE BNC-SMC (OPTION 011) COUNTER J2 TO REAR PANEL "10 MHZ OUT"	28480	08644-61077
W1103	08644-61076	8	1	COAX CABLE, FEMALE SMC-SMC (OPTION 011) COUNTER J3 TO REF OSC J1	28480	08644-61076
W1104	08644-61073	5	1	COAX CABLE, FEMALE BNC-SMC (OPTION 011) FRONT PANEL "MEAS INPUT" TO COUNTER J4	28480	08644-61073
W1104	08644-61073	5	1	COAX CABLE, FEMALE BNC-SMC (OPTION 011) FRONT PANEL "MEAS INPUT" TO FRONT PANEL BULKHEAD	28480	08644-61073
W1104A	08644-61079	1	1	COAX CABLE (OPTION 010/011 COMBO) FRONT PANEL BULKHEAD COUNTER J4	28480	08644-61079

Please refer to the beginning of this section for how to find and order part numbers.

# HP 8644A

## Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1				FRONT PANEL ASSEMBLY		
	3101-2720	4	1	SWITCH-PB SPST-NO ALTNNG .125A 115 VAC (POWER SWITCH)	19701	2LL9AAA2000030
	08665-60302	5	1	FRONT PANEL CONTROLLER (NEW)	28480	08665-60202
	08665-69102	2	1	FRONT PANEL CONTROLLER (EXCHANGE)	28480	08665-69102
	08644-61056	4	1	FRONT PANEL KEYBOARD ASSEMBLY W/O FRONT PANEL CONTROLLER	28480	08645-61056
	08644-00031	7	1	NAME PLATE (LOGO) OPTION 002	28480	08645-00031
A2/A3	08644-61004	2	1	STANDARD DELAY LINE (NEW)	28480	08644-61004
	08644-69004	8	1	STANDARD DELAY LINE (EXCHANGE)	28480	08644-69004
A4	08644-61044	0	1	140 NANOSECOND DELAY LINE, OPTION 004	28480	08644-61044
A5	08644-61002	1	1	STANDARD VCO (NEW)	28480	08644-61002
	08644-69002	6	1	STANDARD VCO (EXCHANGE)	28480	08644-69002
A6	08645-61007	6	1	COAX DISCRIMINATOR, OPTION 004 (NEW)	28480	08645-61007
	08645-69007	2	1	COAX DISCRIMINATOR, OPTION 004 (EXCHANGE)	28480	08645-69007
A7	08644-61040	6	1	DOUBLER, OPTION 002 (NEW)	28480	08644-61040
	08644-69040	2	1	DOUBLER, OPTION 002 (EXCHANGE)	28480	08644-69040
A8	08644-61001	9	1	STANDARD MODULATION (NEW)	28480	08644-61001
	08644-69001	5	1	STANDARD MODULATION (EXCHANGE)	28480	08644-69001
	08644-61003	1	1	STD MOD/NSM OSC, OPTION 007 (NEW)	28480	08644-61003
	08644-69003	7	1	STD MOD/NSM OSC, OPTION 007 (EXCHANGE)	28480	08644-69003
A9	08645-61001	8	1	FRACTIONAL N (NEW)	28480	08645-61001
	08645-69001	6	1	FRACTIONAL N (EXCHANGE)	28480	08645-69001
A10	08644-61026	8	1	DIVIDER (NEW)	28480	08645-61026
	08644-69026	4	1	DIVIDER (EXCHANGE)	28480	08645-69026

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11	08644-61011	1	1	REFERENCE OSCILLATOR/STANDARD ALC (NEW)	28480	08644-61011
	08644-69011	7	1	REFERENCE OSCILLATOR/STANDARD ALC (EXCHANGE)	28480	08644-69011
A12	08644-61071	3	1	COUNTER ASSEMBLY, (NEW) OPTION 011	28480	08644-61071
	08644-69071	9	1	COUNTER ASSEMBLY, (EXCHANGE) OPTION 011	28480	08644-69071
A13				NOT ASSIGNED		
A14				NOT ASSIGNED		
A15	08645-61019	0	1	ATTENUATOR ASSEMBLY (NEW) FITS STANDARD AND ALL OPTIONS EXCEPT OPTION 005	28480	08645-61019
	08645-69019	6	1	ATTENUATOR ASSEMBLY (EXCHANGE) FITS STANDARD AND ALL OPTIONS EXCEPT OPTION 005	28480	08645-69019
A15	08644-61049	5	1	ELECTRONIC ATTENUATOR ASSEMBLY (NEW) FITS ANY CONFIGURATION WITH OPTION 005	28480	08645-61049
	08644-69049	1	1	ELECTRONIC ATTENUATOR ASSEMBLY (EXCHANGE) FITS ANY CONFIGURATION WITH OPTION 005	28480	08645-69049
A16	08645-60101	9	1	CONTROLLER, DCU (NEW) (DOES NOT INCLUDE FIRMWARE)	28480	08645-60101
	08645-69101	7	1	CONTROLLER, DCU (EXCHANGE) (DOES NOT INCLUDE FIRMWARE)	28480	08645-69101
	08644-61063	3	1	FIRMWARE SET	28480	08644-61063
A17	08645-60128	0	1	DIGITAL MOTHERBOARD ASSEMBLY	28480	08645-60128
A18	08645-60226	9	1	INPUT/OUTPUT (NEW)	28480	08645-60226
	08645-69126	6	1	INPUT/OUTPUT (EXCHANGE)	28480	08645-69126
A19				POWER SUPPLY ASSEMBLY		
B1	08645-61115	7	1	FAN ASSEMBLY	28480	08645-61115
A19A1	08645-60740	2	1	POWER SUPPLY BOARD (NEW)	28480	08645-60740
	08645-61240	9	1	POWER SUPPLY BOARD (EXCHANGE)	28480	08645-61240
A19A2	08645-60134	8	1	POWER TRANSISTOR BOARD #1	28480	08645-60134
A19A3	08645-60132	6	1	POWER TRANSISTOR BOARD #2	28480	08645-60132
	08645-60133	7	1	FUSE BOARD	28480	08645-60133
	08645-61122	6	1	LINE POWER MODULE (FILTERED)	28480	08645-61112
	2110-0055	2	1	FUSE 4A (110/120 VAC)	28480	2110-0010
	2110-0083	6	1	FUSE 2.5A (220/240 VAC)	28480	2110-0083

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<i>3045A AND BELOW</i> A20	08645-61021	4		HIGH STABILITY TIMEBASE ASSY (NEW) OPTION 001 ONLY	28480	08645-61021
	08645-69021	0		HIGH STABILITY TIMEBASE ASSY (EXCHANGE) OPTION 001 ONLY	28480	08645-69021
<i>3203A AND ABOVE</i> A20	08645-61147	5		STANDARD TIMEBASE ASSY (NEW)	28480	08645-61147
	A20A1 08645-60237	2		PRINTED CIRCUIT BOARD	28480	08645-60237
	A20Y1 0950-0411	2		CLK-OSC-XTAL STD 10MHZ	28480	0950-0411
A20	08645-61121	5		HIGH STABILITY TIMEBASE ASSY OPTION 001	28480	08645-61121
A20A1	08645-60237	2		PRINTED CIRCUIT BOARD	28480	08645-60237
A20Y1	10811-60120	9		CLK-OSC-XTAL STD 10MHZ (NEW)	28480	10811-60120
	10811-69120	7		CLK-OSC-XTAL STD 10MHZ (EXCHANGE)	28480	10811-69120

*Please refer to the beginning of this section for how to find and order part numbers.*

## HP 8644A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1	08644-61013	3	1	SEMI-RIGID CABLE 2.18 SMC-SMC STD DELAY LINE J1 TO VCO J5	28480	08644-61013
W2				NOT ASSIGNED		
W3				NOT ASSIGNED		
W4	08644-61012	2	1	SEMI-RIGID CABLE 2.18 SMC-SMC VCO J2 TO STD DELAY LINE J2	28480	08644-61012
W5				NOT ASSIGNED		
W6	08644-61025	7	1	RIBBON CABLE I/O J4 TO VCO J4	28480	08644-61025
W7				NOT ASSIGNED		
W8				NOT ASSIGNED		
W9	08644-61016	6	1	COAX CABLE, FEMALE SMC-SMC MOD J2 TO VCO J6	28480	08644-61016
W10	08645-61082	7		COAX CABLE, FEMALE SMC-SMC MOD J3 TO FRAC-N J2	28480	08645-61082
W11	08645-61056	5	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "FM" TO MOD J4 (EXCEPT OPTION 010) FRONT PANEL "FM" TO BULKHEAD MOD J4 (OPTION 010)	28480	08645-61056
W11A	08644-61033	7	1	COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD MOD J4 TO MOD J4	28480	08644-61033
W12	08644-61073	6	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "FM" TO MOD J5 For Instrument Serial Prefix <3301A Only	28480	08644-61073
W13	08645-61038	3		RIBBON CABLE 15CNDCT I/O J8 TO MOD J6	28480	08645-61038
W14	08645-61058	7	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J1 TO MOD J7	28480	08645-61058
W15	08645-61059	8	1	COAX CABLE, FEMALE BNC-SMC MOD J8 TO FRONT PANEL "AUDIO" (EXCEPT OPTION 010) FRONT PANEL "AUDIO" TO BULKHEAD MOD J8 (OPTION 010)	28480	08645-61059
W15A	08644-61034	8	1	COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD MOD J8 TO MOD J8	28480	08644-61034

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W16	08645-61060	1	1	COAX CABLE, FEMALE SMC-SMC MOD J8 TO ALC J1	28480	08645-61060
W17	08645-61061	2	1	COAX CABLE, FEMALE BNC-SMC MOD J10 TO FRONT PANEL "AM" (EXCEPT OPTION 010)	28480	08645-61061
W17A	08644-61035	9	1	FRONT PANEL "AM" TO BULKHEAD MOD J10 (OPTION 010) COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD MOD J10 TO MOD J10	28480	08645-61035
W18	08645-61037	2		RIBBON CABLE 15CNDCT NSM OSC J3 TO I/O J8	28480	08645-61037
W19	08645-61062	3	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J4 TO REF OSC J2	28480	08645-61062
W20	08644-61015	5	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J1 TO VCO J3	28480	08644-61015
W21	08645-61040	7	1	RIBBON CABLE 25CNDCT FRAC-N J3 TO I/O J7	28480	08645-61040
W22	08644-61017	7	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO VCO J8	28480	08644-61017
W23	08645-61065	6	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J5 TO REF OSC J4	28480	08645-61065
W24	08645-61044	1	1	RIBBON CABLE 15CNDCT DIVIDER J1 TO ALC J2	28480	08645-61044
W25	08645-61068	9	1	COAX CABLE, FEMALE SMC-SMC DIVIDER J2 TO ALC J5	28480	08645-61068
W26	08644-61014	4	1	COAX CABLE, FEMALE SMC-SMC DIVIDER J3 TO VCO J1	28480	08644-61014
W27	08645-61066	7	1	COAX CABLE, FEMALE SMC-SMC ALC J8 TO DIVIDER J4	28480	08645-61066
W28				NOT ASSIGNED		
W29	08645-61039	4		RIBBON CABLE 15CNDCT REF OSC J3 TO I/O J6	28480	08645-61039
W30	08645-61069	0	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "REF IN" TO REF OSC J5	28480	08645-61069
W31				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W32	08645-61071	4	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "PULSE" TO ALC J4 (EXCEPT OPTION 010) FRONT PANEL "PULSE" TO BULKHEAD ALC J4 (OPTION 010)	28480	08645-61071
W32A	08644-61036	0	1	COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD ALC J4 TO ALC J4	28480	08645-61071
W33	08645-61037	2		RIBBON CABLE 15CNDCT I/O J5 TO ALC J6	28480	08645-61037
W35	08644-61021	3	1	COAX CABLE, FEMALE BNC-SMC (EXCEPT OPTION 011) REAR PANEL "10 MHZ REF OUT" TO REF OSC J1 (FOR OPTION 011 SEE W1102)	28480	08644-61021
W36	08645-61049	6	1	SEMI-RIGID CABLE 2.18 SMA-SMC (EXCEPT OPTION 005) ALC J7 TO 2 GHZ ATTENUATOR	28480	08645-61049
W36	08644-61007	5	1	SEMI-RIGID CABLE 2.18 SMA-SMC (OPTION 005 ONLY) ALC J7 TO ELECTRONIC ATTENUATOR	28480	08645-61007
W37	08644-61060	0	1	SEMI-RIGID CABLE 2.18 SMA-NONE (STANDARD) FRONT PANEL "RF" TO 2 GHZ ATTEN (RPP)	28480	08644-61060
W37	08645-61051	9	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 003 OR 003/010, EXCEPT OPT.005) REAR PANEL "RF" TO 2 GHZ ATTEN (RPP)	28480	08645-61051
W37	08644-61008	6	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 005 ONLY) FRONT PANEL "RF" TO ELECTRONIC ATTENUATOR	28480	08644-61008
W37	08644-61062	2	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 003/005 OR 003/005/010 ONLY) REAR PANEL "RF" TO ELECTRONIC ATTENUATOR	28480	08644-61062
W37	08644-61039	3	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 010, EXCEPT OPT. 003, 005) FRONT PANEL "RF" TO 2 GHZ ATTEN (RPP)	28480	08644-61039
W37	08644-61061	0	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 005/010, EXCEPT OPT. 003) FRONT PANEL "RF" TO BULKHEAD 2 GHZ ATTEN	28480	08644-61061
W38				NOT SEPARATELY REPLACEABLE ATTENUATOR 2 TO REVERSE POWER PROTECTION		
W39				NOT SEPARATELY REPLACEABLE ATTENUATOR 1 TO ATTENUATOR 2		

*Please refer to the beginning of this section for how to find and order part numbers.*



## HP 8644A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W40	08645-61035	0	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "VM IN" TO CONTROLLER J4	28480	08645-61035
W41	08644-61055	6	1	RIBBON CABLE 16NCDCT28AWG (EXCEPT OPTION 010) MOTHERBOARD J1 TO FRONT PANEL CONTROLLER J2	28480	08644-61055
W41	08644-61037	6	1	RIBBON CABLE 16NCDCT28AWG (OPTION 010) FRONT PANEL CONTROLLER J2 TO BULKHEAD MOTHERBOARD J1	28480	08644-61037
W41A	08644-61038	1	1	RIBBON CABLE 16NCDCT28AWG (OPTION 010) BULKHEAD MOTHERBOARD J1 TO MOTHERBOARD J1	28480	08644-61038
W42	08645-61027	0	1	RIBBON CABLE 26NCDCT 28AWG POWER SUPPLY J1 TO MOTHERBOARD J10	28480	08645-61027
W43				NOT ASSIGNED		
W44	08645-61030	5	1	RIBBON CABLE 40CNDCT28AWG MOTHERBOARD J12 TO I/O J1	28480	08645-61030
W45	08645-61029	2	1	RIBBON CABLE 26CNDCT22AWG MOTHERBOARD J13 TO REAR PANEL "HP4B"	28480	08645-61029
	1252-0372	5	1	SCREW KIT-RECT CONN	00779	553636-3
	3050-0425	3	2	WASHER-FL MTLCL NO. 6 .149-IN-ID	80120	AN960C-6
	2190-0587	0		WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
W46	08645-61081	6	1	CABLE HARNESS 6CNDCT I/O J2 TO REAR PANEL "X AXIS", "Z AXIS", "SEQ"	28480	08645-61081
	1250-0083	1	4	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
	2190-0016	0	4	WASHER-LK INTL T 7/16 IN .439-IN-ID	78189	1922-04
	2950-0001	8	5	NUT-HEX-DBL-CHAM 3/8-32-THD .084-IN-THK	00000	ORDER BY DESCRIPTION
W47	08645-61032	7	1	CABLE HARNESS 2CNDCT (RED/BLACK) POWER SUPPLY TO FAN	28480	08645-61032
W48				NOT ASSIGNED		
W49				CABLE ASSY GROUND JUMPER (GREEN/YELLOW) LINE ASSEMBLY TO CHASSIS GROUND (NOT SEPARATELY REPLACEABLE)		
W50	08645-61036	1	1	CABLE HARNESS 11CNDCT POWER SUPPLY J2 TO I/O J3	28480	08645-61036
W51-99				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W100	08645-61089	4	1	RIBBON CABLE 6CNDCT MOTHERBOARD J14 TO TIMEBASE J4	28480	08645-61089
W101	08645-61091	8	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "EFC" TO TIMEBASE J3	28480	08645-61091
W102	08645-61090	7	1	COAX CABLE, FEMALE SMA-SMC REAR PANEL "REF OUT" TO TIMEBASE J2	28480	08645-61090
W103	08643-61014	3	1	WIRE HARNESS J2 OVEN SUPPLY TO J7 FILTER BOARD	28480	08643-61014
W104	08643-61015	4	1	WIRE HARNESS J2 MAIN SUPPLY TO J6 FILTER BOARD	28480	08643-61015
W105	08643-61016	5	1	WIRE HARNESS J1 MAIN SUPPLY TO J4 FILTER BOARD	28480	08643-61016
W106	08645-61142	0	1	COAX CABLE, BNC-SMC REF OSC J5 TO TIMEBASE J2	28480	08643-61142
W107	08645-61146	4	1	COAX CABLE, BNC-SMC OPTION 001 REAR PANEL "EFC" TO TIMEBASE J3	28480	08643-61146
W108	08645-61144	2	1	COAX CABLE, SMA-SMC OPTION 001 REAR PANEL "EXT REF" TO TIMEBASE J6	28480	08643-61144
W109	08645-61089	4	1	CABLE HARNESS I/O BOARD J14 TO TIMEBASE J8	28480	08643-61089
W110	08645-61149	7	1	COAX CABLE OSC TO TIMEBASE J7	28480	08645-61149
W111-W199				NOT ASSIGNED		
W200	08645-61097	4	1	COAX CABLE, FEMALE SMC-SMC (OPTION 002 ONLY) DOUBLER J2 TO ALC J1	28480	08645-61097
W201	08645-61080	5	1	COAX CABLE FEMALE SMC-SMC (OPTION 002 ONLY) DOUBLER J3 TO MOD J9	28480	08645-61080
W202	08645-61095	2	1	SEMI-RIGID CABLE 2.18, SMA-SMC (OPTION 002 ONLY) DOUBLER J5 TO ATTENUATOR 1	28480	08645-61095
W203	08645-61094	1	1	SEMI-RIGID CABLE 2.18 SMC-SMC (OPTION 002 ONLY) FAST ALC J7 TO DOUBLER J6	28480	08645-61094

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W204	08645-61039	4	1	RIBBON CABLE 15CONDCT (OPTION 002 ONLY) DOUBLER J1 TO I/O J10	28480	08645-61039
W205-W303				NOT ASSIGNED		
W304	08644-61078	0	1	COAX CABLE, FEMALE BNC-SMC (OPTION 002/011) REAR PANEL "MEAS INPUT" TO COUNTER J4	28480	08644-61078
W305-W310				NOT ASSIGNED		
W311	08645-61107	7	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "FM" TO MOD J4	28480	08645-61107
W312	08645-61108	8	1	COAX CABLE FEMALE BNC-SMC REAR PANEL "ΦM" TO MOD J5	28480	08645-61108
W313				NOT ASSIGNED		
W314				NOT ASSIGNED		
W315	08645-61109	9	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J8 TO REAR PANEL "AUDIO"	28480	08645-61109
W316				NOT ASSIGNED		
W317	08645-61110	2	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J10 TO REAR PANEL "AM"	28480	08645-61110
W318-W331				NOT ASSIGNED		
W332	08645-61111	3	1	COAX CABLE, FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "PULSE" TO ALC J4	28480	08645-61111
W332	08665-61121			COAX CABLE, FEMALE BNC-SMC (OPTION 003/008) REAR PANEL "PULSE" TO ALC J4	28480	08665-61121
W333-W336				NOT ASSIGNED		
W337	08645-61051	0		SEMI-RIGID CABLE 2.18, SMA-SMA REAR PANEL "RF" TO ATTEN/RPP U2J1	28480	08645-61051
W337	08644-61062	2		SEMI-RIGID CABLE, SMA-SMA (OPTION 003/005) REAR PANEL "RF" TO ATTEN/RPP	28480	08644-61062
W338-W399				NOT ASSIGNED		
W400	08644-61059	7	1	SEMI-RIGID CABLE 2.18, SMA-SMC COAX DSC J3 TO 140NS DELAY LINE J3	28480	08644-61059

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W401	08644-61024	6	1	SEMI-RIGID CABLE 3.58, SMA-SMC COAX DSC J4 TO 14ONS DELAY J4	28480	08644-61024
W402	08644-61018	8	1	COAX CABLE FEMALES-MC-SMC COAX DSC J1 TO VCO J1	28480	08644-61018
W403	08645-61073	6	1	COAX CABLE FEMALE, SMC-SMC DIVIDER J3 TO COAX DSC J2	28480	08645-61073
W404	08644-61019	9	1	COAX CABLE FEMALES-MC-SMC COAX DSC J6 TO VCO J7	28480	08644-61019
W405	08645-61076	9	1	COAX CABLE FEMALES-MC-SMC MOD J2 TO COAX DSC J8	28480	08645-61076
W406	08644-61022	4	1	COAX CABLE FEMALE, SMC-SMC COAX DSC J9 TO VCO J6	28480	08644-61022
W407	08645-61078	1	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO COAX DSC J10	28480	08645-61078
W408	08644-61020	2	1	COAX CABLE FEMALE, SMC-SMC COAX DSC J11 TO VCO J8	28480	08644-61020
W409	08645-61038	3	1	RIBBON CABLE 15CNDCT COAX DSC J5 TO I/O J11	28480	08645-61038
W410-W1100				NOT ASSIGNED		
W1101	08644-61072	4	1	RIBBON CABLE (OPTION 011) COUNTER J1 TO I/O J13	28480	08644-61072
W1102	08644-61077	9	1	COAX CABLE, FEMALE BNC-SMC (OPTION 011) COUNTER J2 TO REAR PANEL "10 MHZ OUT"	28480	08644-61077
W1103	08644-61076	8	1	COAX CABLE, FEMALE SMC-SMC (OPTION 011) COUNTER J3 TO REF OSC J1	28480	08644-61076
W1104	08644-61073	5	1	COAX CABLE, FEMALE BNC-SMC (OPTION 011) FRONT PANEL "MEAS INPUT" TO COUNTER J4	28480	08644-61073
W1104	08644-61073	5	1	COAX CABLE, FEMALE BNC-SMC (OPTION 011) FRONT PANEL "MEAS INPUT" TO FRONT PANEL BULKHEAD	28480	08644-61073
W1104A	08644-61079	1	1	COAX CABLE (OPTION 010/011 COMBO) FRONT PANEL BULKHEAD COUNTER J4	28480	08644-61079

Please refer to the beginning of this section for how to find and order part numbers.

# HP 8644B

## Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1				FRONT PANEL ASSEMBLY		
	3101-2720	4	1	SWITCH-PB SPST-NO ALTNNG .125A 115 VAC (POWER SWITCH)	19701	2LL9AAA2000030
	08665-60302	6	1	FRONT PANEL CONTROLLER (NEW)	28480	08665-60202
	08665-69102	2	1	FRONT PANEL CONTROLLER (EXCHANGE)	28480	08665-69102
A2/A3	08644-61004	2	1	STANDARD DELAY LINE (NEW)	28480	08644-61004
	08644-69004	8	1	STANDARD DELAY LINE (EXCHANGE)	28480	08644-69004
A4	08644-61044	0	1	140 NANOSECOND DELAY LINE	28480	08644-61044
A5	08644-61002	1	1	STANDARD VCO (NEW)	28480	08644-61002
	08644-69002	6	1	STANDARD VCO (EXCHANGE)	28480	08644-69002
A6	08645-61007	6	1	COAX DISCRIMINATOR, (NEW)	28480	08645-61007
	08645-69007	2	1	COAX DISCRIMINATOR, (EXCHANGE)	28480	08645-69007
A7	08644-61040	6	1	DOUBLER, OPTION 002 (NEW)	28480	08644-61040
	08644-69040	2	1	DOUBLER, OPTION 002 (EXCHANGE)	28480	08644-69040
	08644-61003	1	1	STD MOD/NSM OSC, (NEW)	28480	08644-61003
	08644-69003	7	1	STD MOD/NSM OSC, (EXCHANGE)	28480	08644-69003
A9	08645-61001	8	1	FRACTIONAL N (NEW)	28480	08645-61001
	08645-69001	6	1	FRACTIONAL N (EXCHANGE)	28480	08645-69001
A10	08644-61026	8	1	DIVIDER (NEW)	28480	08645-61026
	08644-69026	4	1	DIVIDER (EXCHANGE)	28480	08645-69026

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11	08644-81011	1	1	REFERENCE OSCILLATOR/STANDARD ALC (NEW)	28480	08644-81011
	08644-89011	7	1	REFERENCE OSCILLATOR/STANDARD ALC (EXCHANGE)	28480	08644-89011
A12	08644-81071	3	1	COUNTER ASSEMBLY (NEW) OPTION 011	28480	08644-81071
	08644-89071	9	1	COUNTER ASSEMBLY (EXCHANGE) OPTION 011	28480	08644-89071
A13				NOT ASSIGNED		
A14				NOT ASSIGNED		
A15	08645-61019	0	1	ATTENUATOR ASSEMBLY EXCEPT OPTION 003 (NEW)	28480	08645-61019
	08645-69019	6	1	ATTENUATOR ASSEMBLY EXCEPT OPTION 003 (EXCHANGE)	28480	08645-69019
	08645-61132	8	1	ATTENUATOR ASSEMBLY OPTION 003 ONLY	28480	08645-61132
A15	08644-61049	5	1	ELECTRONIC ATTENUATOR ASSEMBLY OPT. 005 (NEW)	28480	08645-61049
	08644-69049	1	1	ELECTRONIC ATTENUATOR ASSEMBLY OPT. 005 (EXCHANGE)	28480	08645-69049
A16	08645-60101	9	1	CONTROLLER, DCU (NEW) (DOES NOT INCLUDE FIRMWARE)	28480	08645-60101
	08645-69101	7	1	CONTROLLER, DCU (EXCHANGE) (DOES NOT INCLUDE FIRMWARE)	28480	08645-69101
	08644-61094	0	1	FIRMWARE SET	28480	08644-61094
A17	08645-60128	0	1	DIGITAL MOTHERBOARD ASSEMBLY	28480	08645-60128
A18	08645-60326	9	1	INPUT/OUTPUT (NEW)	28480	08645-60228
	08645-69126	6	1	INPUT/OUTPUT (EXCHANGE)	28480	08645-69128
A19				POWER SUPPLY ASSEMBLY		
B1	08645-61115	7	1	FAN ASSEMBLY	28480	08645-61115
A19A1	08645-60740	2	1	POWER SUPPLY BOARD (NEW)	28480	08645-60740
	08645-69240	5	1	POWER SUPPLY BOARD (EXCHANGE)	28480	08645-69740
A19A2	08645-60134	8	1	POWER TRANSISTOR BOARD #1	28480	08645-60134
A19A3	08645-60132	6	1	POWER TRANSISTOR BOARD #2	28480	08645-60132
	08645-60133	7	1	FUSE BOARD	28480	08645-60133
	08645-61122	6	1	LINE POWER MODULE (FILTERED)	28480	08645-61112
	2110-0055	2	1	FUSE 4A (110/120 VAC)	28480	2110-0010
	2110-0083	6	1	FUSE 2.5A (220/240 VAC)	28480	2110-0083
A20	08645-61147	5		HIGH STABILITY TIMEBASE (NEW) STANDARD	28480	08645-61147
	08645-69147	1		HIGH STABILITY TIMEBASE (EXCHANGE) STANDARD	28480	08645-69147
A20	08645-61121	5		HIGH STABILITY TIMEBASE (NEW) OPTION 001	28480	08645-61121
	08645-69121	1		HIGH STABILITY TIMEBASE (EXCHANGE) OPTION 001	28480	08645-69121

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1	08644-61013	3	1	SEMI-RIGID CABLE 2.18 SMC-SMC STD DELAY LINE J1 TO VCO J5	28480	08644-61013
W2				NOT ASSIGNED		
W3				NOT ASSIGNED		
W4	08644-61012	2	1	SEMI-RIGID CABLE 2.18 SMC-SMC VCO J2 TO STD DELAY LINE J2	28480	08644-61012
W5				NOT ASSIGNED		
W6	08644-61025	7	1	RIBBON CABLE I/O J4 TO VCO J4	28480	08644-61025
W7				NOT ASSIGNED		
W8				NOT ASSIGNED		
W9	08644-61016	6	1	COAX CABLE, FEMALE SMC-SMC MOD J2 TO VCO J6	28480	08644-61016
W10	08645-61082	7		COAX CABLE, FEMALE SMC-SMC MOD J3 TO FRAC-N J2	28480	08645-61082
W11	08645-61056	5	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "FM" TO MOD J4 (EXCEPT OPTION 010) FRONT PANEL "FM" TO BULKHEAD MOD J4 (OPTION 010)	28480	08645-61056
W11A	08644-61033	7	1	COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD MOD J4 TO MOD J4	28480	08644-61033
W1104	08644-61073	6	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "MEAS INPUT" TO COUNTER J4 (OPTION 011)	28480	08644-61073
W1104A	08644-61079	1	1	COAX CABLE, FEMALE SMC-SMC BULKHEAD COUNTER J4 TO COUNTER J4	28480	08644-61079
W13	08645-61038	3		RIBBON CABLE 15CNDCT I/O J9 TO MOD J6	28480	08645-61038
W14	08645-61058	7	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J1 TO MOD J7	28480	08645-61058
W15	08645-61059	8	1	COAX CABLE, FEMALE BNC-SMC MOD J8 TO FRONT PANEL "AUDIO" (EXCEPT OPTION 010) FRONT PANEL "AUDIO" TO BULKHEAD MOD J8 (OPTION 010)	28480	08645-61059
W15A	08644-61034	8	1	COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD MOD J8 TO MOD J8	28480	08645-61034

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W16	08645-61060	1	1	COAX CABLE, FEMALE SMC-SMC MOD J9 TO ALC J1	28480	08645-61060
W17	08645-61061	2	1	COAX CABLE, FEMALE BNC-SMC MOD J10 TO FRONT PANEL "AM" (EXCEPT OPTION 010)	28480	08645-61061
W17A	08644-61035	9	1	FRONT PANEL "AM" TO BULKHEAD MOD J10 (OPTION 010) COAX CABLE, FEMALE BNC-SMC (OPTION 010) BULKHEAD MOD J10 TO MOD J10	28480	08645-61035
W18	08645-61037	2		RIBBON CABLE 15CNDCT NSM OSC J3 TO I/O J8	28480	08645-61037
W19	08645-61062	3	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J4 TO REF OSC J2	28480	08645-61062
W20	08644-61015	5	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J1 TO VCO J3	28480	08644-61015
W21	08645-61040	7	1	RIBBON CABLE 25CNDCT FRAC-N J3 TO I/O J7	28480	08645-61040
W22				NOT ASSIGNED		
W23	08645-61065	6	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J5 TO REF OSC J4	28480	08645-61065
W24	08645-61044	1	1	RIBBON CABLE 15CNDCT DIVIDER J1 TO ALC J2	28480	08645-61044
W25	08645-61068	9	1	COAX CABLE, FEMALE SMC-SMC DIVIDER J2 TO ALC J5	28480	08645-61068
W26				NOT ASSIGNED		
W27	08645-61066	7	1	COAX CABLE, FEMALE SMC-SMC ALC J8 TO DIVIDER J4	28480	08645-61066
W28				NOT ASSIGNED		
W29	08645-61039	4		RIBBON CABLE 15CNDCT REF OSC J3 TO I/O J8	28480	08645-61039
W30				NOT ASSIGNED		
W31				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.



## HP 8644B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W32	08645-61071	4	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "PULSE" TO ALC J4 (EXCEPT OPTION 010) FRONT PANEL "PULSE" TO BULKHEAD ALC J4 (OPTION 010)	28480	08645-61071
W33	08645-61037	2		RIBBON CABLE 15CNDCT I/O J5 TO ALC J6	28480	08645-61037
W35	08644-61021	3	1	COAX CABLE, FEMALE BNC-SMC (EXCEPT OPTION 011) REAR PANEL "10 MHZ REF OUT" TO REF OSC J1 (FOR OPTION 011 SEE W1102)	28480	08644-61021
W36	08645-61049	6	1	SEMI-RIGID CABLE 2.18 SMA-SMC ALC J7 TO 2 GHZ ATTENUATOR	28480	08645-61049
W37	08644-61060	0	1	SEMI-RIGID CABLE 2.18 SMA-NONE (STANDARD) FRONT PANEL "RF" TO 2 GHZ ATTEN (RPP)	28480	08644-61060
W37	08645-61051	9	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 003 OR 004/010) REAR PANEL "RF" TO 2 GHZ ATTEN (RPP)	28480	08645-61051
W37	08644-61039	3	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 010, EXCEPT OPT. 003) FRONT PANEL "RF" TO 2 GHZ ATTEN (RPP)	28480	08644-61039
W38				NOT SEPARATELY REPLACEABLE ATTENUATOR 2 TO REVERSE POWER PROTECTION		
W39				NOT SEPARATELY REPLACEABLE ATTENUATOR 1 TO ATTENUATOR 2		
W40	08645-61035	0	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "VM IN" TO CONTROLLER J4	28480	08645-61035
W41	08644-61055	6	1	RIBBON CABLE 16NCDCT28AWG (EXCEPT OPTION 010) MOTHERBOARD J1 TO FRONT PANEL CONTROLLER J2	28480	08644-61055
W41	08644-61037	6	1	RIBBON CABLE 16NCDCT28AWG (OPTION 010) FRONT PANEL CONTROLLER J2 TO BULKHEAD J1	28480	08644-61037
W41A	08644-61038	1	1	RIBBON CABLE 16NCDCT28AWG (OPTION 010) BULKHEAD J1 TO MOTHERBOARD J1	28480	08644-61038
W42	08645-61027	0	1	RIBBON CABLE 26NCDCT 28AWG POWER SUPPLY J1 TO MOTHERBOARD J10	28480	08645-61027
W43				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W44	08645-61030	5	1	RIBBON CABLE 40CNDCT28AWG MOTHERBOARD J12 TO I/O J1	28480	08645-61030
W45	08645-61029	2	1	RIBBON CABLE 26CNDCT22AWG MOTHERBOARD J13 TO REAR PANEL "HP-1B"	28480	08645-61029
	1252-0372	5	1	SCREW KIT-RECT CONN	00779	553636-3
	3050-0425	3	2	WASHER-FL MTLCL NO. 6 .149-IN-ID	80120	AN960C-6
	2190-0587	0		WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
W46	08645-61081	6	1	CABLE HARNESS 6CNDCT I/O J2 TO REAR PANEL "X AXIS", "Z AXIS", "SEQ"	28480	08645-61081
	1250-0083	1	4	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
	2190-0016	0	4	WASHER-LK INTL T 7/16 IN .439-IN-ID	78189	1922-04
	2950-0001	8	5	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
W47	08645-61032	7	1	CABLE HARNESS 2CNDCT (RED/BLACK) POWER SUPPLY TO FAN	28480	08645-61032
W48				NOT ASSIGNED		
W49				CABLE ASSY GROUND JUMPER (GREEN/YELLOW) LINE ASSEMBLY TO CHASSIS GROUND (NOT SEPARATELY REPLACEABLE)		
W50	08645-61036	1	1	CABLE HARNESS 11CNDCT POWER SUPPLY J2 TO I/O J3	28480	08645-61036
W51-99				NOT ASSIGNED		
W100	08645-61089	4	1	CABLE HARNESS, 6CNDCT MOTHERBOARD J14 TO TIMEBASE J4	28480	08645-61089
W101-W105				NOT ASSIGNED		
W106	08645-61142	0	1	COAX CABLE, BNC-SMC REF OSC J5 TO TIMEBASE J2	28480	08643-61142
W107	08645-61146	4	1	COAX CABLE, BNC-SMC OPTION 001 REAR PANEL "EFC" TO TIMEBASE J3	28480	08643-61146
W108	08645-61144	2	1	COAX CABLE, SMA-SMC OPTION 001 REAR PANEL "EXT REF" TO TIMEBASE J6	28480	08643-61144
W109	08645-61089	4	1	CABLE HARNESS I/O BOARD J14 TO TIMEBASE J8	28480	08643-61089
W110	08645-61149	7	1	COAX CABLE OSC TO TIMEBASE J7	28480	08645-61149
W111-W199				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W200	08645-61097	4	1	COAX CABLE, FEMALE SMC-SMC (OPTION 002 ONLY) DOUBLER J2 TO ALC J1	28480	08645-61097
W201	08645-61080	5	1	COAX CABLE FEMALE SMC-SMC (OPTION 002 ONLY) DOUBLER J3 TO MOD J9	28480	08645-61080
W202	08645-61095	2	1	SEMI-RIGID CABLE 2.18, SMA-SMC (OPTION 002 ONLY) DOUBLER J5 TO ATTENUATOR 1	28480	08645-61095
W203	08645-61084	1	1	SEMI-RIGID CABLE 2.18 SMC-SMC (OPTION 002 ONLY) FAST ALC J7 TO DOUBLER J6	28480	08645-61084
W204	08645-61039	4	1	RIBBON CABLE 15CNDCT (OPTION 002 ONLY) DOUBLER J1 TO I/O J10	28480	08645-61039
W205-W303				NOT ASSIGNED		
W304	08644-61078	0	1	COAX CABLE, FEMALE BNC-SMC (OPTION 003/011) REAR PANEL "MEAS INPUT" TO COUNTER J4	28480	08644-61078
W305-W310				NOT ASSIGNED		
W311	08645-61107	7	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "FM" TO MOD J4	28480	08645-61107
W312	08645-61108	8	1	COAX CABLE FEMALE BNC-SMC REAR PANEL "FM" TO MOD J5	28480	08645-61108
W313				NOT ASSIGNED		
W314				NOT ASSIGNED		
W315	08645-61109	9	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J8 TO REAR PANEL "AUDIO"	28480	08645-61109
W316				NOT ASSIGNED		
W317	08645-61110	2	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J10 TO REAR PANEL "AM"	28480	08645-61110
W318-W331				NOT ASSIGNED		
W332	08645-61111	3	1	COAX CABLE, FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "PULSE" TO ALC J4	28480	08645-61111
W333-W336				NOT ASSIGNED		
W337	08645-61051	0		SEMI-RIGID CABLE 2.18, SMA-SMA (OPTION 003) REAR PANEL "RF" TO ATTN/RPP U2J1	28480	08645-61051
W337	08644-61062	2		SEMI-RIGID CABLE, SMA-SMA (OPTION 003/005) REAR PANEL "RF" TO ATTN/RPP	28480	08644-61062
W338-W399				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8644B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W400	08644-61059	7	1	SEMI-RIGID CABLE 2.18, SMA-SMC COAX DSC J3 TO 140NS DELAY LINE J3	28480	08644-61059
W401	08644-61024	6	1	SEMI-RIGID CABLE 3.58, SMA-SMC COAX DSC J4 TO 140NS DELAY J4	28480	08644-61024
W402	08644-61018	8	1	COAX CABLE FEMALESMC-SMC COAX DSC J1 TO VCO J1	28480	08644-61018
W403	08645-61073	6	1	COAX CABLE FEMALE, SMC-SMC DIVIDER J3 TO COAX DSC J2	28480	08645-61073
W404	08644-61019	9	1	COAX CABLE FEMALESMC-SMC COAX DSC J6 TO VCO J7	28480	08644-61019
W405	08645-61076	9	1	COAX CABLE FEMALESMC-SMC MOD J2 TO COAX DSC J8	28480	08645-61076
W406	08644-61022	4	1	COAX CABLE FEMALE, SMC-SMC COAX DSC J9 TO VCO J6	28480	08644-61022
W407	08645-61078	1	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO COAX DSC J10	28480	08645-61078
W408	08644-61020	2	1	COAX CABLE FEMALE, SMC-SMC COAX DSC J11 TO VCO J8	28480	08644-61020
W409	08645-61038	3	1	RIBBON CABLE 15CNDCT COAX DSC J5 TO I/O J11	28480	08645-61038
W410-W1100				NOT ASSIGNED		
W1101	08644-61072	4	1	RIBBON CABLE (OPTION 011) COUNTER J1 TO I/O J13	28480	08644-61072
W1102	08644-61077	9	1	COAX CABLE, FEMALE BNC-SMC (OPTION 011) COUNTER J2 TO REAR PANEL "10 MHZ OUT"	28480	08644-61077
W1103	08644-61076	8	1	COAX CABLE, FEMALE SMC-SMC (OPTION 011) COUNTER J3 TO REF OSC J1	28480	08644-61076
W1104	08644-61073	5	1	COAX CABLE, FEMALE BNC-SMC (OPTION 011) FRONT PANEL "MEAS INPUT" TO COUNTER J4	28480	08644-61073
W1104	08644-61073	5	1	COAX CABLE, FEMALE BNC-SMC (OPTION 011) FRONT PANEL "MEAS INPUT" TO FRONT PANEL BULKHEAD	28480	08644-61073
W1104A	08644-61079	1	1	COAX CABLE (OPTION 010/011 COMBO) FRONT PANEL BULKHEAD COUNTER J4	28480	08644-61079

Please refer to the beginning of this section for how to find and order part numbers.

# HP 8645A

## Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1				FRONT PANEL ASSEMBLY		
	3101-2720	4	1	SWITCH-PB SPST-NO ALTNG .125A 115 VAC (POWER SWITCH)	19701	2LL9AAA2000030
	08665-60302	6	1	FRONT PANEL CONTROLLER (NEW)	28480	08665-60202
	08665-69102	2	1	FRONT PANEL CONTROLLER (EXCHANGE)	28480	08665-69102
	08645-61124	8	1	FRONT PANEL KEYBOARD ASSEMBLY W/O FRONT PANEL CONTROLLER	28480	08645-61124
A2/A3	08645-61020	3	1	HEATED DELAY LINE, STANDARD	28480	08645-61020
	08645-61112	4	1	HEATED DELAY LINE, OPTION 004	28480	08645-61112
A4				NOT ASSIGNED		
A5	08645-61005	4	1	PHASE SHIFTER (NEW)	28480	08645-61005
	08645-69005	0	1	PHASE SHIFTER (EXCHANGE)	28480	08645-69005
A6	08645-61007	6	1	COAX DISCRIMINATOR, OPTION 004 (NEW)	28480	08645-61007
	08645-69007	2	1	COAX DISCRIMINATOR, OPTION 004 (EXCHANGE)	28480	08645-69007
A7	08645-61008	7	1	FAST DOUBLER, OPTION 002 (NEW)	28480	08645-61008
	08645-69008	3	1	FAST DOUBLER, OPTION 002 (EXCHANGE)	28480	08645-69008
A8	08645-61004	3	1	MOD DISTRIB/NUMERIC SYNTH MOD OSC (NEW)	28480	08645-61004
	08645-69004	9	1	MOD DISTRIB/NUMERIC SYNTH MOD OSC (EXCHANGE)	28480	08645-69004
A9	08645-61001	8	1	FRACTIONAL N (NEW)	28480	08645-61001
	08645-69001	6	1	FRACTIONAL N (EXCHANGE)	28480	08645-69001
A10	08645-61006	5	1	DIVIDER (NEW)	28480	08645-61006
	08645-69006	1	1	DIVIDER (EXCHANGE)	28480	08645-69006
A11	08645-61003	2	1	REFERENCE OSCILLATOR/FAST ALC (NEW)	28480	08645-61003
	08645-69003	8	1	REFERENCE OSCILLATOR/FAST ALC (EXCHANGE)	28480	08645-69003

*Please refer to the beginning of this section for how to find and order part numbers.*

**HP 8645A****Table 4-4. Replaceable Parts**

<b>Reference Designation</b>	<b>HP Part Number</b>	<b>C D</b>	<b>Qty.</b>	<b>Description</b>	<b>Mfr. Code</b>	<b>Mfr. Part Number</b>	
A12	08645-61009	8	1	FAST VCO (NEW)	28480	08645-61009	
	08645-69009	4	1	FAST VCO (EXCHANGE)	28480	08645-69009	
<b>2925A AND ABOVE</b>							
A13	08645-60145	1		FAST AMPLITUDE CONTROLLER (NEW)	28480	08645-60145	
	08645-69145	9		FAST AMPLITUDE CONTROLLER (EXCHANGE)	28480	08645-69145	
A14	08645-60211	2	1	FAST CONTROLLER (NEW)	28480	08645-60211	
	08645-69111	9	1	FAST CONTROLLER (EXCHANGE)	28480	08645-69111	
A15	08645-61019	0	1	ATTENUATOR ASSEMBLY (NEW)	28480	08645-61019	
	08645-69019	6	1	ATTENUATOR ASSEMBLY (EXCHANGE)	28480	08645-69019	
A16	08645-60101	9	1	CONTROLLER, DCU (NEW) (DOES NOT INCLUDE FIRMWARE)	28480	08645-60101	
	08645-69101	7	1	CONTROLLER, DCU (EXCHANGE) (DOES NOT INCLUDE FIRMWARE)	28480	08645-69101	
	08645-61134	0	1	FIRMWARE SET (8000 CHANNEL)	28480	08645-61134	
	08645-61136	2	1	FIRMWARE SET (2400 CHANNEL)	28480	08645-61136	
A17	08645-60128	0	1	DIGITAL MOTHERBOARD ASSEMBLY	28480	08645-60128	
A18	08645-60226	9	1	INPUT/OUTPUT (NEW)	28480	08645-60226	
	08645-69126	6	1	INPUT/OUTPUT (EXCHANGE)	28480	08645-69126	
A19				POWER SUPPLY ASSEMBLY			
	B1	08645-61115	7	1	FAN ASSEMBLY	28480	08645-61115
	A19A1	08645-60740	2	1	POWER SUPPLY BOARD (NEW)	28480	08645-60740
		08645-69740	5	1	POWER SUPPLY BOARD (EXCHANGE)	28480	08645-69740
	A19A2	08645-60134	8	1	POWER TRANSISTOR BOARD #1	28480	08645-60134
	A19A3	08645-60132	6	1	POWER TRANSISTOR BOARD #2	28480	08645-60132
		08645-60133	7	1	FUSE BOARD	28480	08645-60133
		08645-61122	6	1	LINE POWER MODULE (FILTERED)	28480	08645-61122
		2110-0010	9	1	FUSE 5A (110/120 VAC)	28480	2110-0010
	2110-0083	6	1	FUSE 2.5A (220/240 VAC)	28480	2110-0083	
<b>3026A AND BELOW</b>							
A20	08645-61021	4	1	HIGH STABILITY TIMEBASE (NEW) (OPTION 001 ONLY)	28480	08645-61021	
	08645-69021	0		HIGH STABILITY TIMEBASE (EXCHANGE) (OPTION 001 ONLY)	28480	08645-69021	
<b>3203A AND ABOVE</b>							
A20	08645-61147	5		HIGH STABILITY TIMEBASE (NEW) STANDARD	28480	08645-61147	
	08645-69147	1		HIGH STABILITY TIMEBASE (EXCHANGE) STANDARD	28480	08645-69147	
A20	08645-61121	5		HIGH STABILITY TIMEBASE (NEW) OPTION 001	28480	08645-61121	
	08645-69121	1		HIGH STABILITY TIMEBASE (EXCHANGE) OPTION 001	28480	08645-69121	

*Please refer to the beginning of this section for how to find and order part numbers.*

## HP 8645A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1	08645-61103	3	1	SEMI-RIGID CABLE 2.18 SMC-SMC HEATED DELAY LINE J1 TO VCO J9	28480	08645-61103
W2	08645-61102	2	1	SEMI-RIGID CABLE 2.18 SMA-SMC PH SHIFT J2 TO HEATED DELAY LINE J2	28480	08645-61102
W3	08645-61104	4	1	SEMI-RIGID CABLE 2.18 SMC-SMC PH SHIFT J5 TO VCO J10	28480	08645-61104
2727A TO 2846A W4	08645-61101	1	1	SEMI-RIGID CABLE 2.18 SMA-SMC VCO J2 TO PH SHIFT J1	28480	08645-61101
2915A AND ABOVE W4	08645-61125	9	1	SEMI-RIGID CABLE 2.18 SMA-SMC VCO J2 TO PH SHIFT J1	28480	08645-61125
W5	08645-61105	5	1	SEMI-RIGID CABLE 2.18 SMC-SMC VCO J4 TO PH SHIFT J4	28480	08645-61105
W6-8				NOT ASSIGNED		
W9	08645-61055	4	1	COAX CABLE, FEMALE SMC-SMC MOD J2 TO VCO J13	28480	08645-61055
W10	08645-61082	7		COAX CABLE, FEMALE SMC-SMC MOD J3 TO FRAC-N J2	28480	08645-61082
W11	08645-61056	5	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "FM" TO MOD J4	28480	08645-61056
W12	08645-61057	6	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "ΦM" TO MOD J5	28480	08645-61057
W13	08645-61038	3		RIBBON CABLE 15CNDCT I/O J9 TO MOD J6	28480	08645-61038
W14	08645-61058	7	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J1 TO MOD J7	28480	08645-61058
W15	08645-61059	8	1	COAX CABLE, FEMALE BNC-SMC MOD J8 TO FRONT PANEL "AUDIO"	28480	08645-61059
W16	08645-61060	1	1	COAX CABLE, FEMALE SMC-SMC MOD J9 TO ALC J1	28480	08645-61060

*Please refer to the beginning of this section for how to find and order part numbers.*

**HP 8645A****Table 4-4. Replaceable Parts**

<b>Reference Designation</b>	<b>HP Part Number</b>	<b>C D</b>	<b>Qty.</b>	<b>Description</b>	<b>Mfr. Code</b>	<b>Mfr. Part Number</b>
W17	08645-61061	2	1	COAX CABLE, FEMALE BNC-SMC MOD J10 TO FRONT PANEL "AM"	28480	08645-61061
W18	08645-61037	2		RIBBON CABLE 15CNDCT NSM OSC J3 TO I/O J8	28480	08645-61037
W19	08645-61062	3	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J4 TO REF OSC J2	28480	08645-61062
W20	08645-61064	5	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J1 TO VCO J1	28480	08645-61064
W21	08645-61040	7	1	RIBBON CABLE 25CNDCT FRAC-N J3 TO I/O J7	28480	08645-61040
W22	08645-61063	4	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO VCO J6	28480	08645-61063
W23	08645-61065	6	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J5 TO REF OSC J4	28480	08645-61065
W24	08645-61044	1	1	RIBBON CABLE 15CNDCT DIVIDER J1 TO ALC J2	28480	08645-61044
W25	08645-61068	9	1	COAX CABLE, FEMALE SMC-SMC DIVIDER J2 TO ALC J5	28480	08645-61068
W26	08645-61067	8	1	COAX CABLE, FEMALE SMC-SMC DIVIDER J3 TO VCO J5	28480	08645-61067
W27	08645-61066	7	1	COAX CABLE, FEMALE SMC-SMC ALC J8 TO DIVIDER J4	28480	08645-61066
W28	08645-61070	3	1	COAX CABLE, FEMALE SMC-SMC REF OSC J1 TO 10 MHz REF J6	28480	08645-61070
W29	08645-61039	4		RIBBON CABLE 15CNDCT REF OSC J3 TO I/O J6	28480	08645-61039
W30				NOT ASSIGNED		
<b>2945A TO 2915A</b>						
W31	08645-61042	9	1	RIBBON CABLE 48CNDCT VCO J3/J7, FAST ALC J3 TO FAST CONTROLLER J3	28480	08645-61042
<b>2920A AND ABOVE</b>						
W31				SEE W82		
W32	08645-61071	4	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "PULSE" TO ALC J4	28480	08645-61071

*Please refer to the beginning of this section for how to find and order part numbers.*



## HP 8645A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W33	08645-61037	2		RIBBON CABLE 15CNDCT I/O J5 TO ALC J6	28480	08645-61037
W34	08645-61043	0	1	RIBBON CABLE 50CNDCT 28AWG FAST CONTROLLER J4 TO VCO J8/J11, PH SHIFT J3	28480	08645-61043
W35	08645-61093	0	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "10 MHZ OUT" TO FAST CONTROLLER J7	28480	08645-61093
W36	08645-61049	6	1	SEMI-RIGID CABLE 2.18 SMA-SMC ALC J7 TO 2 GHZ ATTENUATOR	28480	08645-61049
W37	08645-61060	9	1	SEMI-RIGID CABLE 2.18 SMA-NONE (EXCEPT OPTION 003) FRONT PANEL "RF" TO 2 GHZ ATTN (RPP)	28480	08645-61060
W37	08645-61051	0	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPTION 003 ONLY) FRONT PANEL "RF" TO 2 GHZ ATTN (RPP)	28480	08645-61051
W38				NOT SEPARATELY REPLACEABLE ATTENUATOR 2 TO REVERSE POWER PROTECTION		
W39				NOT SEPARATELY REPLACEABLE ATTENUATOR 1 TO ATTENUATOR 2		
W40	08645-61035	0	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "VM IN" TO CONTROLLER J4	28480	08645-61035
W41	08644-61055	6	1	RIBBON CABLE 16NCDCT28AWG MOTHERBOARD J1 TO FRONT PANEL CONTROLLER J2	28480	08644-61055
W42	08645-61027	0	1	RIBBON CABLE 26NCDCT 28AWG POWER SUPPLY J1 TO MOTHERBOARD J10	28480	08645-61027
W43	08645-61028	1	1	RIBBON CABLE 25CNDCT MOTHERBOARD J11 TO REAR PANEL "FAST HOP BUS"	28480	08645-61028
	2260-0002	6	4	NUT-HEX-DBL-CHAM 4-40-THD .062-IN-THK	00000	ORDER BY DESCRIPTION
	0380-2079	9		SCREWLOCK FEMALE-AMP HD CONN	00779	205818-2
	2190-0583	9	4	WASHER-LK HLCL 2.5 MM 2.6-MM-ID	28480	2190-0583
W44	08645-61030	5	1	RIBBON CABLE 40CNDCT28AWG MOTHERBOARD J12 TO I/O J1	28480	08645-61030
W45	08645-61029	2	1	RIBBON CABLE 26CNDCT22AWG MOTHERBOARD J13 TO REAR PANEL "HP-IB"	28480	08645-61029
	1252-0372	5	1	SCREW KIT-RECT CONN	00779	553636-3
	3050-0425	3	2	WASHER-FL MTLC NO. 6 .149-IN-ID	80120	AN960C-6
	2190-0587	0		WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
W46	08645-61081	6	1	CABLE HARNESS 6CNDCT I/O J2 TO REAR PANEL "X AXIS", "Z AXIS", "SEQ"	28480	08645-61081
	1250-0083	1	4	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
	2190-0016	0	4	WASHER-LK INTL T 7/16 IN .439-IN-ID	78189	1922-04
	2950-0001	8	5	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8645A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W47	08645-61032	7	1	CABLE HARNESS 2CNDCT (RED/BLACK) POWER SUPPLY TO FAN	28480	08645-61032
W48				NOT ASSIGNED		
W49				CABLE ASSY GROUND JUMPER (GREEN/YELLOW) LINE ASSEMBLY TO CHASSIS GROUND (NOT SEPARATELY REPLACEABLE)		
W50	08645-61036	1	1	CABLE HARNESS 11CNDCT POWER SUPPLY J2 TO I/O J3	28480	08645-61036
W51-81				NOT ASSIGNED		
2845A TO 2915A W82-W84 2920A AND ABOVE W82	08645-61128	2	1	RIBBON CABLE FAST CONTROLLER J3 TO FAST VCO J3/J7 AND FAST AMPLITUDE CONTROL J3	28480	08645-61128
W83	08645-61129	3	1	RIBBON CABLE FAST CONTROLLER J5 TO FAST AMPLITUDE CONTROL J4	28480	08645-61129
W84	08645-61130	6	1	RIBBON CABLE FAST AMPLITUDE CONTROL J5 TO FAST ALC J3	28480	08645-61130
W85-W99				NOT ASSIGNED		
W100	08645-61089	4	1	RIBBON CABLE 6CNDCT MOTHERBOARD J14 TO TIMEBASE J4	28480	08645-61089
W101	08645-61091	8	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "EFC" TO TIMEBASE J3	28480	08645-61091
W102	08645-61090	7	1	COAX CABLE, FEMALE SMA-SMC REAR PANEL "REF OUT" TO TIMEBASE J2	28480	08645-61090
W103-W105				NOT ASSIGNED		
W106	08645-61142	0	1	COAX CABLE, BNC-SMC REF OSC J5 TO TIMEBASE J2	28480	08643-61142
W107	08645-61146	4	1	COAX CABLE, BNC-SMC OPTION 001 REAR PANEL "EFC" TO TIMEBASE J3	28480	08643-61146
W108	08645-61144	2	1	COAX CABLE, SMA-SMC OPTION 001 REAR PANEL "EXT REF" TO TIMEBASE J6	28480	08643-61144
W109	08645-61089	4	1	CABLE HARNESS I/O BOARD J14 TO TIMEBASE J8	28480	08643-61089

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8645A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W110	08645-61149	7	1	COAX CABLE OSC TO TIMEBASE J7	28480	08645-61149
W111-W199				NOT ASSIGNED		
W200	08645-61097	4	1	COAX CABLE, FEMALE SMC-SMC (OPTION 002 ONLY) DOUBLER J2 TO ALC J1	28480	08645-61097
W201	08645-61080	5	1	COAX CABLE FEMALE SMC-SMC (OPTION 002 ONLY) DOUBLER J3 TO MOD J9	28480	08645-61080
W202	08645-61095	2	1	SEMI-RIGID CABLE 2.18, SMA-SMC (OPTION 002 ONLY) DOUBLER J5 TO ATTENUATOR 1	28480	08645-61095
W203	08645-61094	1	1	SEMI-RIGID CABLE 2.18 SMC-SMC (OPTION 002 ONLY) FAST ALC J7 TO DOUBLER J6	28480	08645-61094
W204	08645-61039	4	1	RIBBON CABLE 15CNDCT (OPTION 002 ONLY) DOUBLER J1 TO I/O J10	28480	08645-61039
W205	08645-61041	8	1	RIBBON CABLE 25CNDCT (OPTION 002 ONLY) DOUBLER J4 TO FAST CONTROLLER J5	28480	08645-61041
W206	08645-61131	7	1	RIBBON CABLE (OPTION 002 ONLY) FAST DOUBLER J4 TO FAST AMPLITUDE CONTROL J6	28480	08645-61131
W207-W310				NOT ASSIGNED		
W311	08645-61107	7	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "FM" TO MOD J4	28480	08645-61107
W312	08645-61108	8	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "FM" TO MOD J5	28480	08645-61108
W313				NOT ASSIGNED		
W314				NOT ASSIGNED		
W315	08645-61109	9	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J8 TO FRONT PANEL "AUDIO"	28480	08645-61109
W316				NOT ASSIGNED		
W317	08645-61110	2	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J10 TO REAR PANEL "AM"	28480	08645-61110
W318-W331				NOT ASSIGNED		
W332	08645-61111	3	1	COAX CABLE, FEMALE BNC-SMC (OPTION 003) REAR PANEL "PULSE" TO ALC J4	28480	08645-61111

Please refer to the beginning of this section for how to find and order part numbers.

**HP 8645A****Table 4-4. Replaceable Parts**

<b>Reference Designation</b>	<b>HP Part Number</b>	<b>C D</b>	<b>Qty.</b>	<b>Description</b>	<b>Mfr. Code</b>	<b>Mfr. Part Number</b>
W333-W336				NOT ASSIGNED		
W337	08645-81051	0		SEMI-RIGID CABLE 2.18, SMA-SMA REAR PANEL "RF" TO ATTEN/RPP U2J1	28480	08645-81051
W338-W399				NOT ASSIGNED		
2727A TO 2846A W400	08645-61113	5	1	SEMI-RIGID CABLE 2.18, SMA-SMC COAX DSC J3 TO HEATED DELAY LINE J3	28480	08645-61113
2915A AND ABOVE W400	08645-61126	0	1	SEMI-RIGID CABLE 2.18, SMA-SMC COAX DSC J3 TO HEATED DELAY LINE J3	28480	08645-61126
2727A TO 2846A W401	08645-61114	6	1	SEMI-RIGID CABLE 2.18, SMA-SMC COAX DSC J4 TO HEATED DELAY LINE J4	28480	08645-61114
2915A AND ABOVE W401	08645-61127	1	1	SEMI-RIGID CABLE 2.18, SMA-SMC COAX DSC J4 TO HEATED DELAY LINE J4	28480	08645-61127

*Please refer to the beginning of this section for how to find and order part numbers.*

# HP 8664A

## Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1				FRONT PANEL ASSEMBLY		
	3101-2720	4	1	SWITCH-PB SPST-NO ALTN .125A 115 VAC (POWER SWITCH)	19701	2LL9AAA2000030
	08665-60202	5	1	FRONT PANEL CONTROLLER (NEW)	28480	08665-60202
	08665-69102	2	1	FRONT PANEL CONTROLLER (EXCHANGE)	28480	08665-69102
	08665-61106	4	1	FRONT PANEL KEYBOARD ASSEMBLY W/O FRONT PANEL CONTROLLER	28480	08665-61106
A2	08644-61044	0	1	140 NANOSECOND DELAY LINE, OPTION 004	28480	08644-61044
A3				NOT ASSIGNED		
A4	08645-61007	6	1	COAX DISCRIMINATOR, OPTION 004 (NEW)	28480	08645-61007
	08645-69007	2	1	COAX DISCRIMINATOR, OPTION 004 (EXCHANGE)	28480	08645-69007
A5	08665-61205		1	LOW FREQUENCY DRIVER (NEW)	28480	08665-61205
	08665-69205		1	LOW FREQUENCY DRIVER (EXCHANGE)	28480	08665-69205
A6	08645-61004	3	1	MOD DISTRIB/NUMERIC SYNTH MOD OSC (NEW)	28480	08645-61004
	08645-69004	9	1	MOD DISTRIB/NUMERIC SYNTH MOD OSC (EXCHANGE)	28480	08645-69004
A7	08665-61004	7	1	OUTPUT/ALC (NEW)	28480	08665-61004
	08665-69004	3	1	OUTPUT/ALC (EXCHANGE)	28480	08665-69004
A8	08665-61007	0	1	HIGH FREQUENCY DRIVER (NEW)	28480	08665-61007
	08665-69007	6	1	HIGH FREQUENCY DRIVER (EXCHANGE)	28480	08665-69007
<b>3035A AND BELOW</b>						
A9	08665-61006	9	1	REFERENCE (NEW)	28480	08665-61006
	08665-69006	5	1	REFERENCE (EXCHANGE)	28480	08665-69006
<b>3203A AND ABOVE</b>						
A9	08665-61140	2	1	REFERENCE (NEW)	28480	08665-61140
	08665-69140	8	1	REFERENCE (EXCHANGE)	28480	08665-69140
A10	08645-61001	8	1	FRACTIONAL N (NEW)	28480	08645-61001
	08645-69001	6	1	FRACTIONAL N (EXCHANGE)	28480	08645-69001

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8664A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11	08665-61003	6	1	MICROWAVE LOOP (NEW)	28480	08665-61003
	08665-69003	2	1	MICROWAVE LOOP (EXCHANGE)	28480	08665-69003
A12	08664-61006	8	1	PULSE DRIVER (NEW)	28480	08664-61006
	08664-69006	4	1	PULSE DRIVER (EXCHANGE)	28480	08664-69006
A13	08665-61092	3	1	YIG TUNED OSCILLATOR (NEW) P/O MW ASSEMBLY AND ONLY SOLD SEPARATELY	28480	08665-61092
A14	08665-61098	9	1	GAAS DIVIDER (NEW)	28480	08665-61098
	08665-69098	5	1	GAAS DIVIDER (EXCHANGE) P/O MW ASSEMBLY AND ONLY SOLD SEPARATELY	28480	08665-69098
A15	08665-61120	8	1	ATTENUATOR/RPP ASSEMBLY (NEW) FITS STANDARD AND ALL OPTIONS EXCEPT OPTION 008	28480	08665-61120
	08665-69120	4	1	ATTENUATOR/RPP ASSEMBLY (EXCHANGE) FITS STANDARD AND ALL OPTIONS EXCEPT OPTION 008	28480	08665-69120
	08665-61095	6	1	ATTENUATOR/RPP ASSEMBLY (NEW) FITS ANY CONFIGURATION WITH OPTION 008	28480	08665-61095
	08665-69095	2	1	ATTENUATOR/RPP ASSEMBLY (EXCHANGE) FITS ANY CONFIGURATION WITH OPTION 008	28480	08665-69095
A16	08645-60101	9	1	CONTROLLER, DCU (NEW) (DOES NOT INCLUDE FIRMWARE)	28480	08645-60101
	08645-69101	7	1	CONTROLLER, DCU (EXCHANGE) (DOES NOT INCLUDE FIRMWARE)	28480	08645-69101
	08664-61009	1	1	FIRMWARE SET	28480	08664-61009
A17	08645-60128	0	1	DIGITAL MOTHERBOARD ASSEMBLY	28480	08645-60128
A18	08665-60104	6	1	INPUT/OUTPUT (NEW)	28480	08665-60104
	08665-69104	4	1	INPUT/OUTPUT (EXCHANGE)	28480	08665-69104
A19				POWER SUPPLY ASSEMBLY		
B1	08645-61115	7	1	FAN ASSEMBLY	28480	08645-61115
A19A1	08645-60740	2	1	POWER SUPPLY BOARD (NEW)	28480	08645-60740
	08645-69740	5	1	POWER SUPPLY BOARD (EXCHANGE)	28480	08645-69740

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8664A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A19A2	08645-60134	8	1	POWER TRANSISTOR BOARD #1	28480	08645-60134
A19A3	08645-60132	6	1	POWER TRANSISTOR BOARD #2	28480	08645-60132
	08645-60133	7	1	FUSE BOARD	28480	08645-60133
	08645-61122	6	1	LINE POWER MODULE (FILTERED)	28480	08645-61112
	2110-0055	2	1	FUSE 4A (110/120 VAC)	28480	2110-0010
	2110-0083	6	1	FUSE 2.5A (220/240 VAC)	28480	2110-0083
<b>3035A AND BELOW</b>						
A20	08645-61021	4	1	HIGH STABILITY TIMEBASE (NEW) (OPTION 001 ONLY)	28480	08645-61021
	08645-69021	0		HIGH STABILITY TIMEBASE (EXCHANGE) (OPTION 001 ONLY)	28480	08645-69021
<b>3203A AND ABOVE</b>						
A20	08645-61147	5		HIGH STABILITY TIMEBASE (NEW) STANDARD	28480	08645-61147
	08645-69147	1		HIGH STABILITY TIMEBASE (EXCHANGE) STANDARD	28480	08645-69147
A20	08645-61121	5		HIGH STABILITY TIMEBASE (NEW) OPTION 001	28480	08645-61121
	08645-69121	1		HIGH STABILITY TIMEBASE (EXCHANGE) OPTION 001	28480	08645-69121

*Please refer to the beginning of this section for how to find and order part numbers.*

## HP 8664A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1-8				NOT ASSIGNED		
W9	08665-61053	6	1	COAX CABLE, FEMALE SMC-SMC MOD J2 TO PLL-YIG J4	28480	08665-61053
W10	08665-61049	0		COAX CABLE, FEMALE SMC-SMC MOD J3 TO FRAC-N J2	28480	08665-61049
W11	08665-61087	6	1	COAX CABLE, FEMALE BNC-SMC ) FRONT PANEL "FM" TO MOD J5 (EXCEPT OPTION 010) FRONT PANEL "FM" TO BULKHEAD MOD J5 (OPTION 010)	28480	08665-61087
W11A	08644-61033	7	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J4 TO MOD J4	28480	08644-61033
W12	08665-61082	1	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "FM" TO MOD J4 (EXCEPT OPTION 010) FRONT PANEL "FM" TO BULKHEAD MOD J4 (OPTION 010)	28480	08665-61082
W12A	08644-61032	6	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J5 TO MOD J5	28480	08644-61032
W13	08645-61038	3		RIBBON CABLE 15CNDCT I/O J9 TO MOD J8	28480	08645-61038
W14	08645-61058	7	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J1 TO MOD J7	28480	08645-61058
W15	08645-61059	8	1	COAX CABLE, FEMALE BNC-SMC MOD J8 TO FRONT PANEL "AUDIO" (EXCEPT OPTION 010) FRONT PANEL "AUDIO" TO BULKHEAD MOD J8 (OPTION 010)	28480	08645-61059
W15A	08644-61034	8	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J8 TO MOD J8	28480	08645-61034
W16	08665-61048	9	1	COAX CABLE, FEMALE SMC-SMC MOD J9 TO OUT AMP J4	28480	08665-61048
W17	08645-61061	2	1	COAX CABLE, FEMALE BNC-SMC MOD J10 TO FRONT PANEL "AM" (EXCEPT OPTION 010) FRONT PANEL "AM" TO BULKHEAD MOD J10 (OPTION 010)	28480	08645-61061
W17A	08644-61035	9	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J10 TO MOD J10	28480	08645-61035
W18	08645-61037	2		RIBBON CABLE 15CNDCT NSM OSC J3 TO I/O J8	28480	08645-61037
W19	08665-61046	7	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J4 TO REFERENCE J4	28480	08665-61046

Please refer to the beginning of this section for how to find and order part numbers.



## HP 8664A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W20	08665-61061	6	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J1 TO DIVIDER J1	28480	08665-61061
W21	08665-61016	1	1	RIBBON CABLE 25CNDCT FRAC-N J3 TO I/O J7	28480	08665-61016
W22	08665-61062	7	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO PLL YIG J3	28480	08665-61062
W23	08665-61058	1	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J5 TO REFERENCE J5	28480	08665-61058
W24-28				NOT ASSIGNED		
W29	08645-61038	3		RIBBON CABLE 15CNDCT REFERENCE J3 TO I/O J16	28480	08645-61038
W30-W32				NOT ASSIGNED		
W33	08645-61038	3		RIBBON CABLE 15CNDCT I/O J5 TO MW ALC J1	28480	08645-61038
W34				NOT ASSIGNED		
W35	08665-61060	5	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "10 MHZ OUT" TO REFERENCE J6	28480	08665-61060
W36				NOT ASSIGNED		
W37	08665-61025	2	1	SEMI-RIGID CABLE 2.18 SMA-NONE (STD, EXCEPT OPT. 010 OR 003) FRONT PANEL "RF" TO ATTEN/RPP U2J1	28480	08665-61025
W37	08665-61104	2	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPTION 010 ONLY) FRONT PANEL "RF" TO FRONT PANEL BULKHEAD ATTN/RPP	28480	08665-61104
W37	08665-61086	5	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPT. 003 ONLY) REAR PANEL "RF" TO ATTEN/RPP	28480	08665-61086
W38				NOT SEPARATELY REPLACEABLE ATTENUATOR 2 TO REVERSE POWER PROTECTION		
W39				NOT SEPARATELY REPLACEABLE ATTENUATOR 1 TO ATTENUATOR 2		
W40	08645-61035	0	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "VM IN" TO CONTROLLER J4	28480	08645-61035

*Please refer to the beginning of this section for how to find and order part numbers.*

## HP 8664A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W41	08644-61055	6	1	RIBBON CABLE 18NCDCT28AWG (EXCEPT OPTION 010) MOTHERBOARD J1 TO FRONT PANEL CONTROLLER J2	28480	08644-61055
W41	08644-61037	6	1	RIBBON CABLE 18NCDCT28AWG (OPTION 010) FRONT PANEL CONTROLLER J2 TO BULKHEAD MOTHERBOARD J1	28480	08644-61037
W41A	08644-61038	1	1	RIBBON CABLE 18NCDCT28AWG (OPTION 010) BULKHEAD MOTHERBOARD J1 TO MOTHERBOARD J1	28480	08644-61038
W42	08645-61027	0	1	RIBBON CABLE 26NCDCT 28AWG POWER SUPPLY J1 TO MOTHERBOARD J10	28480	08645-61027
W43				NOT ASSIGNED		
W44	08645-61030	5	1	RIBBON CABLE 40CNDCT28AWG MOTHERBOARD J12 TO I/O J1	28480	08645-61030
W45	08645-61029	2	1	RIBBON CABLE 26CNDCT22AWG MOTHERBOARD J13 TO REAR PANEL "HP-IB"	28480	08645-61029
	1252-0372	5	1	SCREW KIT-RECT CONN	00779	553636-3
	3050-0425	3	2	WASHER-FL MTLN NO. 6 .149-IN-ID	80120	AN960C-6
	2190-0587	0		WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
W46	08645-61081	6	1	CABLE HARNESS 6CNDCT I/O J2 TO REAR PANEL "X AXIS", "Z AXIS", "SEQ"	28480	08645-61081
	1250-0083	1	4	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
	2190-0018	0	4	WASHER-LK INTL T 7/16 IN .439-IN-ID	78189	1922-04
	2950-0001	8	5	NUT-HEX-DBL-CHAM 3/8-32-THD .084-IN-THK	00000	ORDER BY DESCRIPTION
W47	08645-61032	7	1	CABLE HARNESS 2CNDCT (RED/BLACK) POWER SUPPLY TO FAN	28480	08645-61032
W48				NOT ASSIGNED		
W49				CABLE ASSY GROUND JUMPER (GREEN/YELLOW) LINE ASSEMBLY TO CHASSIS GROUND (NOT SEPARATELY REPLACEABLE)		
W50	08645-61036	1	1	CABLE HARNESS 11CNDCT POWER SUPPLY J2 TO I/O J3	28480	08645-61036
W51	08665-61045	6	1	COAX CABLE, FEMALE BNC-SMC 1 GHZ MLT J1 TO REAR PANEL "500 MHz"	28480	08665-61045
W52	08665-61043	4	1	COAX CABLE, FEMALE SMC-SMC 1 GHZ MLT J2 TO DN CONV J2	28480	08665-61043
W53	08665-61042	3	1	COAX CABLE, FEMALE SMC-SMC 1 GHZ MLT J3 TO REFERENCE J1	28480	08665-61042
W54	08665-61041	2	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J1 TO OUT AMP J5	28480	08665-61041
W55	08645-61038	3	1	RIBBON CABLE 15CNDCT IF/DIV J2 TO I/O J4	28480	08645-61038

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8664A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W56	08665-61040	1	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J3 TO OUT AMP J7	28480	08665-61040
W57	08665-61044	5	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J4 TO HF DRVR J3	28480	08665-61044
W58	08665-61039	8	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J5 TO DN CONV J1	28480	08665-61039
W59	08665-61010	5	1	RIBBON CABLE 10CNDCT PLL YIG J1 TO YTO J1	28480	08665-61010
W60	08665-61032	1	1	SEMI-RIGID CABLE, SMA-SMA ATTEN/RPP S1J1 TO MW CONV J2	28480	08665-61032
W61	08665-61057	0	1	COAX CABLE, FEMALE SMC-SMC DN CONV J3 TO HF DRVR J5	28480	08665-61057
W62	08645-61038	3		RIBBON CABLE 15CNDCT OUT AMP J1 TO I/O J10	28480	08645-61038
W63	08665-61091	2		SEMI-RIGID CABLE, FEMALE SMA-SMC OUT AMP J3 TO HF DRVR J7	28480	08665-61091
W64				NOT ASSIGNED		
W65	08665-61054	7		COAX CABLE, FEMALE SMC-SMC OUT AMP J8 TO HF DRVR J6	28480	08665-61054
W66	08665-61035	4		SEMI-RIGID CABLE, FEMALE SMA-SMC HF DRVR J1 TO GAAS DIV U17J3	28480	08665-61035
W67	08665-61036	5		SEMI-RIGID CABLE, FEMALE SMA-SMC HF DRVR J2 TO GAAS DIV U16J2	28480	08665-61036
W68	08645-61038	3		RIBBON CABLE 15CNDCT HF DRVR J4 TO I/O J13	28480	08645-61038
W69				NOT SEPARATELY REPLACEABLE ATTEN/RPP S1J2 TO ATTEN/RPP AT2J1		
W70	08665-61019	4	1	SEMI-RIGID CABLE YTO J2 TO GAAS DIV U17J1	28480	08665-61019
W71				NOT ASSIGNED		
W72	08665-61011	6	1	RIBBON CABLE 26CNDCT GAAS DIV J4 TO I/O J15	28480	08665-61011
W73	08665-61017	2	1	RIBBON CABLE 25CNDCT PLL YIG J5 TO I/O J14	28480	08665-61017
W74	08665-61063	8	1	COAX CABLE FEMALE SMA-SMC DIVIDER J3 TO GAAS DIV U17J5	28480	08665-61063
W75	08665-61023	0	1	SEMI-RIGID CABLE SMA-SMA MW CONV J1 TO GAAS DIV U17J2	28480	08665-61023

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8664A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W76				NOT SEPARATELY REPLACEABLE GAAS DIV U17J4 TO GAAS DIV U16J1		
W77	08665-61018	3	1	RIBBON CABLE 16CNDCT ATTENRPP J1 TO GAAS DIV J3	28480	08665-61018
W78				NOT SEPARATELY REPLACEABLE ATTENRPP J2 TO ATTENRPP S1J4		
W79				NOT SEPARATELY REPLACEABLE ATTENRPP U1J2 TO ATTENRPP AT1J1		
W80				NOT SEPARATELY REPLACEABLE ATTENRPP AT1J2 TO ATTENRPP AT2J2		
W81				NOT SEPARATELY REPLACEABLE LINE POWER ASSY "N" TO LINE POWER ASSY "B"		
W82-W99				NOT ASSIGNED		
W100	08645-61089	4	1	RIBBON CABLE 6CNDCT MOTHERBOARD J14 TO TIMEBASE J4	28480	08645-61089
W101-W105				NOT ASSIGNED		
W106	08645-61142	0	1	COAX CABLE, BNC-SMC REF OSC J5 TO TIMEBASE J2	28480	08643-61142
W107	08645-61146	4	1	COAX CABLE, BNC-SMC OPTION 001 REAR PANEL "EFC" TO TIMEBASE J3	28480	08643-61146
W108	08645-61144	2	1	COAX CABLE, SMA-SMC OPTION 001 REAR PANEL "EXT REF" TO TIMEBASE J8	28480	08643-61144
W109	08645-61089	4	1	CABLE HARNESS I/O BOARD J14 TO TIMEBASE J8	28480	08643-61089
W110	08645-61149	7	1	COAX CABLE OSC TO TIMEBASE J7	28480	08645-61149
W111-W310				NOT ASSIGNED		
W311	08665-61083	2	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "FM" TO MOD J5	28480	08665-61083
W312	08665-61084	3	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "FM" TO MOD J4	28480	08665-61084
W313				NOT ASSIGNED		
W314				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8664A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W315	08665-61099	0	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J8 TO FRONT PANEL "AUDIO"	28480	08665-61099
W316				NOT ASSIGNED		
W317	08665-61100	6	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J10 TO REAR PANEL "AM"	28480	08665-61100
W318-W331				NOT ASSIGNED		
W332	08665-61121	5	1	COAX CABLE FEMALE BNC-SMC REAR PANEL "PULSE" TO PM DRIVER J4	28480	08665-61121
W333-W336				NOT ASSIGNED		
W337	08665-61086	5	1	SEMI-RIGID CABLE FEMALE SMA-SMA REAR PANEL "RF" TO ATTEN/RPP U2J1	28480	08665-61086
W338-W399				NOT ASSIGNED		
W400	08644-61059	7	1	SEMI-RIGID CABLE 2.18, SMA-SMC COAX DSC J3 TO 140NS DELAY LINE J3	28480	08644-61059
W401	08644-61024	6	1	SEMI-RIGID CABLE 3.58, SMA-SMC COAX DSC J4 TO 140NS DELAY J4	28480	08644-61024
W402	08665-61073	0	1	COAX CABLE, FEMALE SMC-SMC COAX DSC J1 TO DIVIDER J2	28480	08665-61073
W403				NOT ASSIGNED		
W404	08665-61072	9	1	COAX CABLE, FEMALE SMC-SMC COAX DSC J6 TO PLL YIG J2	28480	08665-61072
W405	08665-61071	8	1	COAX CABLE, FEMALE SMC-SMC MOD J2 TO COAX DSC J8	28480	08665-61071
W406	08665-61070	7	1	COAX CABLE SMC-SMC COAX DSC J9 TO PLL YIG J4	28480	08665-61070
W407	08665-61068	3	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO COAX DSC J11	28480	08645-61068
W408	08665-61069	4	1	COAX CABLE SMC-SMC COAX DSC J10 TO PLL YIG J3	28480	08665-61069
W409	08645-61038	3	1	RIBBON CABLE 15CNDCT COAX DSC J5 TO I/O J11	28480	08645-61038

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8664A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W410	08665-61113	9	1	COAX CABLE, FEMALE SMC-SMC COAX DSC J2 TO COAX DSC J7	28480	08665-61113
W411-W699				NOT ASSIGNED		
W700	08644-61045	1	1	RIBBON CABLE 25CNDCT REAR PANEL "AUDIO TRNG" TO MOTHERBOARD J11	28480	08644-61045
W701-W799				NOT ASSIGNED		
W800	08665-61064	9	1	COAX CABLE FEMALE SMC-SMC NSM OSC J2 PM DRVR J5	28480	08665-61064
W801	08665-61065	0	1	COAX CABLE FEMALE BNC-SMC PM DRVR J1 TO REAR PANEL "SYNC"	28480	08665-61065
W802	08665-61066	1	1	COAX CABLE FEMALE SMA-SMC PM DRVR J2 TO ATTEN/RPP J3	28480	08665-61066
W803	08665-61085	4	1	COAX CABLE FEMALE SMA-BNC ATTEN/RPP J4 TO REAR PANEL "VIDEO"	28480	08665-61085
W804	08645-61037	2		RIBBON CABLE 15CNDCT PM DRVR J3 TO I/O J12	28480	08645-61037
W805	08665-61067	2	1	COAX CABLE FEMALE BNC-SMC FRONT PANEL "PULSE" TO PM DRVR J4 (EXCEPT OPTION 008/010) FRONT PANEL "PULSE" TO BULKHEAD PM DRVR J4 (OPTION 008/010)	28480	08665-61067
W805A	08665-61119	5	1	COAX CABLE FEMALE SMC-SMC (OPTION 008/010) BULKHEAD PM DRVR J4 TO PM DRVR J4	28480	08665-61119
W806	08665-61031	0	1	SEMI-RIGID CABLE SMA-SMA ATTEN/RPP S1J2 TO ATTEN/RPP U3J1	28480	08665-61031
W807	08665-61029	6	1	SEMI-RIGID CABLE SMA-SMA ATTEN/RPP U3J2 TO ATTEN/RPP AT1J1	28480	08665-61029
W808	08665-61109	3	1	CABLE ASSEMBLY HY800J1 TO ATTEN/RPP S1J1	28480	08665-61109
W809	08664-61007	9	1	CABLE ASSEMBLY (EXCEPT OPTION 008) OPTION 015 ATTN TO OUT AMP J2	28480	08664-61007
W809	08664-61008	0	1	CABLE ASSEMBLY (OPTION 008) MICROCIRCUIT (08665-67009) TO OUT AMP J2	28480	08664-61008
W810	08665-61108	2	1	CABLE ASSEMBLY MW CONV J2 TO HY800	28480	08665-61108

Please refer to the beginning of this section for how to find and order part numbers.

# HP 8665A

## Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1				FRONT PANEL ASSEMBLY		
	3101-2720	4	1	SWITCH-PB SPST-NO ALTNG .125A 115 VAC (POWER SWITCH)	19701	2LL9AAA2000030
	08665-60202	5	1	FRONT PANEL CONTROLLER (NEW)	28480	08665-60202
	08665-69102	2	1	FRONT PANEL CONTROLLER (EXCHANGE)	28480	08665-69102
	08665-61106	4	1	FRONT PANEL KEYBOARD ASSEMBLY W/O FRONT PANEL CONTROLLER	28480	08665-61106
A2	08644-61044	0	1	140 NANOSECOND DELAY LINE, OPTION 004	28480	08644-61044
A3				NOT ASSIGNED		
A4	08645-61007	6	1	COAX DISCRIMINATOR, OPTION 004 (NEW)	28480	08645-61007
	08645-69007	2	1	COAX DISCRIMINATOR, OPTION 004 (EXCHANGE)	28480	08645-69007
A5	08665-61205		1	LOW FREQUENCY DRIVER (NEW)	28480	08665-61205
	08665-69205		1	LOW FREQUENCY DRIVER (EXCHANGE)	28480	08665-69205
A6	08645-61004	3	1	MOD DISTRIB/NUMERIC SYNTH MOD OSC (NEW)	28480	08645-61004
	08645-69004	9	1	MOD DISTRIB/NUMERIC SYNTH MOD OSC (EXCHANGE)	28480	08645-69004
A7	08665-61004	7	1	OUTPUT/ALC (NEW)	28480	08665-61004
	08665-69004	3	1	OUTPUT/ALC (EXCHANGE)	28480	08665-69004
A8	08665-61007	0	1	HIGH FREQUENCY DRIVER (NEW)	28480	08665-61007
	08665-69007	6	1	HIGH FREQUENCY DRIVER (EXCHANGE)	28480	08665-69007
<b>3026A AND BELOW</b>						
A9	08665-61006	9	1	REFERENCE (NEW)	28480	08665-61006
	08665-69006	5	1	REFERENCE (EXCHANGE)	28480	08665-69006
<b>3203A AND ABOVE</b>						
A9	08665-61140	2	1	REFERENCE (NEW)	28480	08665-61140
	08665-69140	8	1	REFERENCE (EXCHANGE)	28480	08665-69140
A10	08645-61001	8	1	FRACTIONAL N (NEW)	28480	08645-61001
	08645-69001	6	1	FRACTIONAL N (EXCHANGE)	28480	08645-69001
A11	08665-61003	6	1	MICROWAVE LOOP (NEW)	28480	08665-61003
	08665-69003	2	1	MICROWAVE LOOP (EXCHANGE)	28480	08665-69003

Please refer to the beginning of this section for how to find and order part numbers.

HP 8665A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12	08665-61008	1	1	MICROWAVE EXTENDER (NEW)	28480	08665-61005
	Instrument Serial Prefix <3015A requires a Firmware Upgrade when A12 is replaced.					
	08665-69008	7	1	MICROWAVE EXTENDER (EXCHANGE)	28480	08665-69008
	08665-61097	8	1	MICROWAVE EXTENDER, OPTION 008 (NEW)	28480	08665-61097
	08665-69097	4	1	MICROWAVE EXTENDER, OPTION 008 (EXCHANGE)	28480	08665-69097
A13	08665-61092	3	1	YIG TUNED OSCILLATOR (NEW) P/O MW ASSEMBLY AND ONLY SOLD SEPARATELY	28480	08665-61092
A14	08665-61098	9	1	GAAS DIVIDER (NEW)	28480	08665-61098
	08665-69098	5	1	GAAS DIVIDER (EXCHANGE) P/O MW ASSEMBLY AND ONLY SOLD SEPARATELY	28480	08665-69098
A15	08665-61120	8	1	ATTENUATOR/RFP ASSEMBLY (NEW) FITS STANDARD AND ALL OPTIONS EXCEPT OPTION 008	28480	08665-61120
	08665-69120	4	1	ATTENUATOR/RFP ASSEMBLY (EXCHANGE) FITS STANDARD AND ALL OPTIONS EXCEPT OPTION 008	28480	08665-69120
	08665-61095	6	1	ATTENUATOR/RFP ASSEMBLY (NEW) FITS ANY CONFIGURATION WITH OPTION 008	28480	08665-61095
	08665-69095	2	1	ATTENUATOR/RFP ASSEMBLY (EXCHANGE) FITS ANY CONFIGURATION WITH OPTION 008	28480	08665-69095
A16	08645-60101	9	1	CONTROLLER, DCU (NEW) (DOES NOT INCLUDE FIRMWARE)	28480	08645-60101
	08645-69101	7	1	CONTROLLER, DCU (EXCHANGE) (DOES NOT INCLUDE FIRMWARE)	28480	08645-69101
	08665-61114	0	1	FIRMWARE SET	28480	08665-61114
A17	08645-60128	0	1	DIGITAL MOTHERBOARD ASSEMBLY	28480	08645-60128
A18	08665-60104	6	1	INPUT/OUTPUT (NEW)	28480	08665-60104
	08665-69104	4	1	INPUT/OUTPUT (EXCHANGE)	28480	08665-69104
A19				POWER SUPPLY ASSEMBLY		
B1	08645-61115	7	1	FAN ASSEMBLY	28480	08645-61115
A19A1	08645-60740	2	1	POWER SUPPLY BOARD (NEW)	28480	08645-60740
	08645-69740	5	1	POWER SUPPLY BOARD (EXCHANGE)	28480	08645-69740

Please refer to the beginning of this section for how to find and order part numbers.



## HP 8665A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A19A2	08645-60134	8	1	POWER TRANSISTOR BOARD #1	28480	08645-60134
A19A3	08645-60132	6	1	POWER TRANSISTOR BOARD #2	28480	08645-60132
	08645-60133	7	1	FUSE BOARD	28480	08645-60133
	08645-61122	6	1	LINE POWER MODULE (FILTERED)	28480	08645-61112
	2110-0055	2	1	FUSE 4A (110/120 VAC)	28480	2110-0010
	2110-0083	6	1	FUSE 2.5A (220/240 VAC)	28480	2110-0083
<b>3026A AND BELOW</b>						
A20	08645-61021	4	1	HIGH STABILITY TIMEBASE (NEW) (OPTION 001 ONLY)	28480	08645-61021
	08645-69021	0		HIGH STABILITY TIMEBASE (EXCHANGE) (OPTION 001 ONLY)	28480	08645-69021
<b>3203A AND ABOVE</b>						
A20	08645-61147	5		HIGH STABILITY TIMEBASE (NEW) STANDARD	28480	08645-61147
	08645-69147	1		HIGH STABILITY TIMEBASE (EXCHANGE) STANDARD	28480	08645-69147
A20	08645-61121	5		HIGH STABILITY TIMEBASE (NEW) OPTION 001	28480	08645-61121
	08645-69121	1		HIGH STABILITY TIMEBASE (EXCHANGE) OPTION 001	28480	08645-69121

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8665A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1-8				NOT ASSIGNED		
W9	08665-61053	6	1	COAX CABLE, FEMALE SMC-SMC MOD J2 TO PLL-YIG J4	28480	08665-61053
W10	08665-61049	0		COAX CABLE, FEMALE SMC-SMC MOD J3 TO FRAC-N J2	28480	08665-61049
W11	08665-61087	6	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "FM" TO MOD J5 (EXCEPT OPTION 010) FRONT PANEL "FM" TO BULKHEAD MOD J5 (OPTION 010)	28480	08665-61087
W11A	08644-61033	7	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J4 TO MOD J4	28480	08644-61033
W12	08665-61082	1	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "ΦM" TO MOD J4 (EXCEPT OPTION 010) FRONT PANEL "ΦM" TO BULKHEAD MOD J4 (OPTION 010)	28480	08665-61082
W12A	08644-61032	6	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J5 TO MOD J5	28480	08644-61032
W13	08645-61038	3		RIBBON CABLE 15CNDCT I/O J9 TO MOD J6	28480	08645-61038
W14	08645-61058	7	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J1 TO MOD J7	28480	08645-61058
W15	08645-61059	8	1	COAX CABLE, FEMALE BNC-SMC MOD J8 TO FRONT PANEL "AUDIO" (EXCEPT OPTION 010) FRONT PANEL "AUDIO" TO BULKHEAD MOD J8 (OPTION 010)	28480	08645-61059
W15A	08644-61034	8	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J8 TO MOD J8	28480	08645-61034
W16	08665-61048	9	1	COAX CABLE, FEMALE SMC-SMC MOD J9 TO OUT AMP J4	28480	08665-61048
W17	08645-61061	2	1	COAX CABLE, FEMALE BNC-SMC MOD J10 TO FRONT PANEL "AM" (EXCEPT OPTION 010) FRONT PANEL "AM" TO BULKHEAD MOD J10 (OPTION 010)	28480	08645-61061
W17A	08644-61035	9	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J10 TO MOD J10	28480	08645-61035
W18	08645-61037	2		RIBBON CABLE 15CNDCT NSM OSC J3 TO I/O J8	28480	08645-61037
W19	08665-61046	7	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J4 TO REFERENCE J4	28480	08665-61046

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8665A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W20	08665-61061	6	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J1 TO DIVIDER J1	28480	08665-61061
W21	08665-61016	1	1	RIBBON CABLE 25CNDCT FRAC-N J3 TO I/O J7	28480	08665-61016
W22	08665-61062	7	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO PLL Y1G J3	28480	08665-61062
W23	08665-61058	1	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J5 TO REFERENCE J5	28480	08665-61058
W24-28				NOT ASSIGNED		
W29	08645-61038	3		RIBBON CABLE 15CNDCT REFERENCE J3 TO I/O J16	28480	08645-61038
W30	08665-61059	2	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "REF IN" TO REFERENCE J9	28480	08665-61059
W31				NOT ASSIGNED		
W32				NOT ASSIGNED		
W33	08645-61038	3		RIBBON CABLE 15CNDCT I/O J5 TO MW ALC J1	28480	08645-61038
W34				NOT ASSIGNED		
W35	08665-61060	5	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "10 MHZ OUT" TO REFERENCE J6	28480	08665-61060
W36				NOT ASSIGNED		
W37	08665-61025	2	1	SEMI-RIGID CABLE 2.18 SMA-NONE (STD, EXCEPT OPT. 010 AND 003) FRONT PANEL "RF" TO ATTEN/RPP U2J1	28480	08665-61025
W37	08665-61104	2	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPTION 010) FRONT PANEL "RF" TO FRONT PANEL BULKHEAD ATTN/RPP	28480	08665-61104
W37	08665-61086	5	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPTION 003 ONLY) REAR PANEL "RF" TO ATTEN/RPP	28480	08665-61086
W38				NOT SEPARATELY REPLACEABLE ATTENUATOR 2 TO REVERSE POWER PROTECTION		
W39				NOT SEPARATELY REPLACEABLE ATTENUATOR 1 TO ATTENUATOR 2		
W40	08645-61035	0	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "VM IN" TO CONTROLLER J4	28480	08645-61035

Please refer to the beginning of this section for how to find and order part numbers.

HP 8665A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W41	08644-61055	6	1	RIBBON CABLE 16NCDCT28AWG (EXCEPT OPTION 010) MOTHERBOARD J1 TO FRONT PANEL CONTROLLER J2	28480	08644-61055
W41	08644-61037	6	1	RIBBON CABLE 16NCDCT28AWG (OPTION 010) FRONT PANEL CONTROLLER J2 TO BULKHEAD MOTHERBOARD J1	28480	08644-61037
W41A	08644-61038	1	1	RIBBON CABLE 16NCDCT28AWG (OPTION 010) BULKHEAD MOTHERBOARD J1 TO MOTHERBOARD J1	28480	08644-61038
W42	08645-61027	0	1	RIBBON CABLE 26NCDCT 28AWG POWER SUPPLY J1 TO MOTHERBOARD J10	28480	08645-61027
W43				NOT ASSIGNED		
W44	08645-61030	5	1	RIBBON CABLE 40CNDCT28AWG MOTHERBOARD J12 TO I/O J1	28480	08645-61030
W45	08645-61029	2	1	RIBBON CABLE 26CNDCT22AWG MOTHERBOARD J13 TO REAR PANEL "HP-IB"	28480	08645-61029
	1252-0372	5	1	SCREW KIT-RECT CONN	00779	553636-3
	3050-0425	3	2	WASHER-FL MTLCL NO. 6 .149-IN-ID	80120	AN960C-6
	2190-0587	0		WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
W46	08645-61081	6	1	CABLE HARNESS 6CNDCT I/O J2 TO REAR PANEL "X AXIS", "Z AXIS", "SEQ"	28480	08645-61081
	1250-0083	1	4	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
	2190-0016	0	4	WASHER-LK INTL T 7/16 IN .439-IN-ID	78189	1922-04
	2950-0001	8	5	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
W47	08645-61032	7	1	CABLE HARNESS 2CNDCT (RED/BLACK) POWER SUPPLY TO FAN	28480	08645-61032
W48				NOT ASSIGNED		
W49				CABLE ASSY GROUND JUMPER (GREEN/YELLOW) LINE ASSEMBLY TO CHASSIS GROUND (NOT SEPARATELY REPLACEABLE)		
W50	08645-61036	1	1	CABLE HARNESS 11CNDCT POWER SUPPLY J2 TO I/O J3	28480	08645-61036
W51	08665-61045	6	1	COAX CABLE, FEMALE BNC-SMC 1 GHZ MLT J1 TO REAR PANEL "500 MHz"	28480	08665-61045
W52	08665-61043	4	1	COAX CABLE, FEMALE SMC-SMC 1 GHZ MLT J2 TO DN CONV J2	28480	08665-61043
W53	08665-61042	3	1	COAX CABLE, FEMALE SMC-SMC 1 GHZ MLT J3 TO REFERENCE J1	28480	08665-61042
W54	08665-61041	2	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J1 TO OUT AMP J5	28480	08665-61041
W55	08645-61038	3	1	RIBBON CABLE 15CNDCT IF/DIV J2 TO I/O J4	28480	08645-61038

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8665A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W56	08665-61040	1	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J3 TO OUT AMP J7	28480	08665-61040
W57	08665-61044	5	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J4 TO HF DRVR J3	28480	08665-61044
W58	08665-61039	8	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J5 TO DN CONV J1	28480	08665-61039
W59	08665-61010	5	1	RIBBON CABLE 10CNDCT PLL YIG J1 TO YTO J1	28480	08665-61010
W60	08665-61032	1	1	SEMI-RIGID CABLE, SMA-SMA ATTEN/RPP S1J1 TO MW CONV J2	28480	08665-61032
W61	08665-61057	0	1	COAX CABLE, FEMALE SMC-SMC DN CONV J3 TO HF DRVR J5	28480	08665-61057
W62	08645-61038	3		RIBBON CABLE 15CNDCT OUT AMP J1 TO I/O J10	28480	08645-61038
W63	08665-61091	2		SEMI-RIGID CABLE, FEMALE SMA-SMC OUT AMP J3 TO HF DRVR J7	28480	08665-61091
W64	08665-61055	8		COAX CABLE, FEMALE SMC-SMC OUT AMP J6 TO MW ALC J2	28480	08665-61055
W65	08665-61054	7		COAX CABLE, FEMALE SMC-SMC OUT AMP J8 TO HF DRVR J6	28480	08665-61054
W66	08665-61035	4		SEMI-RIGID CABLE, FEMALE SMA-SMC HF DRVR J1 TO GAAS DIV U17J3	28480	08665-61035
W67	08665-61036	5		SEMI-RIGID CABLE, FEMALE SMA-SMC HF DRVR J2 TO GAAS DIV U16J2	28480	08665-61036
W68	08645-61038	3		RIBBON CABLE 15CNDCT HF DRVR J4 TO I/O J13	28480	08645-61038
W69				NOT SEPARATELY REPLACEABLE ATTEN/RPP S1J2 TO ATTEN/RPP AT2J1		
W70	08665-61019	4	1	SEMI-RIGID CABLE YTO J2 TO GAAS DIV U17J1	28480	08665-61019
W71				NOT ASSIGNED		
W72	08665-61011	6	1	RIBBON CABLE 26CNDCT GAAS DIV J4 TO I/O J15	28480	08665-61011
W73	08665-61017	2	1	RIBBON CABLE 25CNDCT PLL YIG J5 TO I/O J14	28480	08665-61017
W74	08665-61063	8	1	COAX CABLE FEMALE SMA-SMC DIVIDER J3 TO GAAS DIV U17J5	28480	08665-61063
W75	08665-61023	0	1	SEMI-RIGID CABLE SMA-SMA MW CONV J1 TO GAAS DIV U17J2	28480	08665-61023

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8665A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W76				NOT SEPARATELY REPLACEABLE GAAS DIV U17J4 TO GAAS DIV U16J1		
W77	08665-61018	3	1	RIBBON CABLE 16CNDCT ATTEN/RPP J1 TO GAAS DIV J3	28480	08665-61018
W78				NOT SEPARATELY REPLACEABLE ATTEN/RPP J2 TO ATTEN/RPP S1J4		
W79				NOT SEPARATELY REPLACEABLE ATTEN/RPP U1J2 TO ATTEN/RPP AT1J1		
W80				NOT SEPARATELY REPLACEABLE ATTEN/RPP AT1J2 TO ATTEN/RPP AT2J2		
W81				NOT SEPARATELY REPLACEABLE LINE POWER ASSY "N" TO LINE POWER ASSY "B"		
W82-W99				NOT ASSIGNED		
W100	08645-61089	4	1	RIBBON CABLE 6CNDCT MOTHERBOARD J14 TO TIMEBASE J4	28480	08645-61089
W101-W105				NOT ASSIGNED		
W106	08645-61142	0	1	COAX CABLE, BNC-SMC REF OSC J5 TO TIMEBASE J2	28480	08643-61142
W107	08645-61146	4	1	COAX CABLE, BNC-SMC OPTION 001 REAR PANEL "EFC" TO TIMEBASE J3	28480	08643-61146
W108	08645-61144	2	1	COAX CABLE, SMA-SMC OPTION 001 REAR PANEL "EXT REF" TO TIMEBASE J6	28480	08643-61144
W109	08645-61089	4	1	CABLE HARNESS I/O BOARD J14 TO TIMEBASE J8	28480	08643-61089
W110	08645-61149	7	1	COAX CABLE OSC TO TIMEBASE J7	28480	08645-61149
W111-W310				NOT ASSIGNED		
W311	08665-61083	2	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "FM" TO MOD J5	28480	08665-61083
W312	08665-61084	3	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "ΦM" TO MOD J4	28480	08665-61084
W313				NOT ASSIGNED		
W314				NOT ASSIGNED		

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8665A

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W315	08665-61099	0	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J8 TO REAR PANEL "AUDIO"	28480	08665-61099
W316				NOT ASSIGNED		
W317	08665-61100	6	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J10 TO REAR PANEL "AM"	28480	08665-61100
W318-W331				NOT ASSIGNED		
W332	08665-61121	5	1	COAX CABLE FEMALE BNC-SMC REAR PANEL "PULSE" TO PM DRIVER J4	28480	08665-61121
W333-W336				NOT ASSIGNED		
W337	08665-61086	5	1	SEMI-RIGID CABLE FEMALE BNC-SMC REAR PANEL "RF" TO ATTEN/RPP U2J1	28480	08665-61086
W338-W399				NOT ASSIGNED		
W400	08644-61059	7	1	SEMI-RIGID CABLE 2.18, SMA-SMC COAX DSC J3 TO 140NS DELAY LINE J3	28480	08644-61059
W401	08644-61024	6	1	SEMI-RIGID CABLE 3.58, SMA-SMC COAX DSC J4 TO 140NS DELAY J4	28480	08644-61024
W402	08665-61073	0	1	COAX CABLE, FEMALE SMC-SMC COAX DSC J1 TO DIVIDER J2	28480	08665-61073
W403				NOT ASSIGNED		
W404	08665-61072	9	1	COAX CABLE, FEMALE SMC-SMC COAX DSC J6 TO PLL YIG J2	28480	08665-61072
W405	08665-61071	8	1	COAX CABLE, FEMALE SMC-SMC MOD J2 TO COAX DSC J8	28480	08665-61071
W406	08665-61070	7	1	COAX CABLE SMC-SMC COAX DSC J9 TO PLL YIG J4	28480	08665-61070
W407	08665-61068	3	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO COAX DSC J11	28480	08645-61068
W408	08665-61069	4	1	COAX CABLE SMC-SMC COAX DSC J10 TO PLL YIG J3	28480	08665-61069
W409	08645-61038	3	1	RIBBON CABLE 15CNDCT COAX DSC J5 TO I/O J11	28480	08645-61038

*Please refer to the beginning of this section for how to find and order part numbers.*

**HP 8665A****Table 4-4. Replaceable Parts**

<b>Reference Designation</b>	<b>HP Part Number</b>	<b>C D</b>	<b>Qty.</b>	<b>Description</b>	<b>Mfr. Code</b>	<b>Mfr. Part Number</b>
W410	08665-81113	9	1	COAX CABLE, FEMALE SMC-SMC COAX DSC J2 TO COAX DSC J7	28480	08665-81113
W411-W699				NOT ASSIGNED		
W700	08644-81045	1	1	RIBBON CABLE 25CNDCT REAR PANEL "AUDIO TRIG" TO MOTHERBOARD J11	28480	08644-81045
W701-W799				NOT ASSIGNED		
W800	08665-81064	9	1	COAX CABLE FEMALE SMC-SMC NSM OSC J2 PM DRVR J5	28480	08665-81064
W801	08665-81065	0	1	COAX CABLE FEMALE BNC-SMC PM DRVR J1 TO REAR PANEL "SYNC"	28480	08665-81065
W802	08665-81066	1	1	COAX CABLE FEMALE SMA-SMC PM DRVR J2 TO ATTEN/RPP J3	28480	08665-81066
W803	08665-81085	4	1	COAX CABLE FEMALE SMA-BNC ATTEN/RPP J4 TO REAR PANEL "VIDEO"	28480	08665-81085
W804	08645-81037	2		RIBBON CABLE 15CNDCT PM DRVR J3 TO I/O J12	28480	08645-81037
W805	08665-81067	2	1	COAX CABLE FEMALE BNC-SMC FRONT PANEL "PULSE" TO PM DRVR J4 (EXCEPT OPTION 008/010) FRONT PANEL "PULSE" TO BULKHEAD PM DRVR J4 (OPTION 008/010)	28480	08665-81067
W805A	08665-81119	5	1	COAX CABLE FEMALE SMC-SMC (OPTION 008/010) BULKHEAD PM DRVR J4 TO PM DRVR J4	28480	08665-81119
W806	08665-81031	0	1	SEMI-RIGID CABLE SMA-SMA ATTEN/RPP S1J2 TO ATTEN/RPP U3J1	28480	08665-81031
W807	08665-81029	6	1	SEMI-RIGID CABLE SMA-SMA ATTEN/RPP U3J2 TO ATTEN/RPP AT1J1	28480	08665-81029
W808	08665-81109	3	1	CABLE ASSEMBLY HY800J1 TO ATTEN/RPP S1J1	28480	08665-81109
W809	08665-81033	2	1	CABLE ASSEMBLY ATTEN/RPP S1J3 TO OUT AMP J2	28480	08665-81033
W810	08665-81108	2	1	CABLE ASSEMBLY MW CONV J2 TO HY800	28480	08665-81108

*Please refer to the beginning of this section for how to find and order part numbers.*



# HP 8665B

## Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1				FRONT PANEL ASSEMBLY		
	3101-2720	4	1	SWITCH-PB SPST-NO ALTN .125A 115 VAC (POWER SWITCH)	19701	2LL9AAA2000030
	08665-60202	5	1	FRONT PANEL CONTROLLER (NEW)	28480	08665-60202
	08665-69102	2	1	FRONT PANEL CONTROLLER (EXCHANGE)	28480	08665-69102
	08665-61106	4	1	FRONT PANEL KEYBOARD ASSEMBLY W/O FRONT PANEL CONTROLLER	28480	08665-61106
A2	08644-61044	0	1	140 NANOSECOND DELAY LINE, OPTION 004	28480	08644-61044
A3				NOT ASSIGNED		
A4	08645-61007	6	1	COAX DISCRIMINATOR, OPTION 004 (NEW)	28480	08645-61007
	08645-69007	2	1	COAX DISCRIMINATOR, OPTION 004 (EXCHANGE)	28480	08645-69007
A5	08665-61205		1	LOW FREQUENCY DRIVER (NEW)	28480	08665-61205
	08665-69205		1	LOW FREQUENCY DRIVER (EXCHANGE)	28480	08665-69205
A6	08645-61004	3	1	MOD DISTRIB/NUMERIC SYNTH MOD OSC (NEW)	28480	08645-61004
	08645-69004	9	1	MOD DISTRIB/NUMERIC SYNTH MOD OSC (EXCHANGE)	28480	08645-69004
A7	08665-61004	7	1	OUTPUT/ALC (NEW)	28480	08665-61004
	08665-69004	3	1	OUTPUT/ALC (EXCHANGE)	28480	08665-69004
A8	08665-61007	0	1	HIGH FREQUENCY DRIVER (NEW)	28480	08665-61007
	08665-69007	6	1	HIGH FREQUENCY DRIVER (EXCHANGE)	28480	08665-69007
<b>3020A AND BELOW</b>						
A9	08665-61006	9	1	REFERENCE (NEW)	28480	08665-61006
	08665-69006	5	1	REFERENCE (EXCHANGE)	28480	08665-69006
<b>3203A AND ABOVE</b>						
A9	08665-61140	2	1	REFERENCE (NEW)	28480	08665-61140
	08665-69140	8	1	REFERENCE (EXCHANGE)	28480	08665-69140
A10	08645-61001	8	1	FRACTIONAL N (NEW)	28480	08645-61001
	08645-69001	6	1	FRACTIONAL N (EXCHANGE)	28480	08645-69001
A11	08665-61003	6	1	MICROWAVE LOOP (NEW)	28480	08665-61003
	08665-69003	2	1	MICROWAVE LOOP (EXCHANGE)	28480	08665-69003

*Please refer to the beginning of this section for how to find and order part numbers.*

## HP 8665B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12	08665-61115	1	1	MICROWAVE EXTENDER (NEW)	28480	08665-61115
	08665-69115	7	1	MICROWAVE EXTENDER (EXCHANGE)	28480	08665-69008
	08665-61117	1	1	MICROWAVE EXTENDER, OPTION 008 (NEW)	28480	08665-61117
	08665-69117	9	1	MICROWAVE EXTENDER, OPTION 008 (EXCHANGE)	28480	08665-69117
A13	08665-61092	3	1	YIG TUNED OSCILLATOR (NEW) P/O MW ASSEMBLY AND ONLY SOLD SEPARATELY	28480	08665-61092
A14	08665-61098	9	1	GAAS DIVIDER (NEW)	28480	08665-61098
	08665-69098	5	1	GAAS DIVIDER (EXCHANGE) P/O MW ASSEMBLY AND ONLY SOLD SEPARATELY	28480	08665-69098
A15	08665-61131	1	1	ATTENUATOR/RPP ASSEMBLY (NEW) FITS STANDARD AND ALL OPTIONS EXCEPT OPTION 008	28480	08665-61120
	08665-69131	7	1	ATTENUATOR/RPP ASSEMBLY (EXCHANGE) FITS STANDARD AND ALL OPTIONS EXCEPT OPTION 008	28480	08665-69120
A15	08665-61129	7	1	ATTENUATOR/RPP ASSEMBLY (NEW) FITS ANY CONFIGURATION WITH OPTION 008	28480	08665-61129
	08665-69929	3	1	ATTENUATOR/RPP ASSEMBLY (EXCHANGE) FITS ANY CONFIGURATION WITH OPTION 008	28480	08665-69929
A16	08645-60101	9	1	CONTROLLER, DCU (NEW) (DOES NOT INCLUDE FIRMWARE)	28480	08645-60101
	08645-69101	7	1	CONTROLLER, DCU (EXCHANGE) (DOES NOT INCLUDE FIRMWARE)	28480	08645-69101
	08665-61036	5	1	FIRMWARE SET	28480	08665-61036
A17	08645-60128	0	1	DIGITAL MOTHERBOARD ASSEMBLY	28480	08645-60128
A18	08665-60104	6	1	INPUT/OUTPUT (NEW)	28480	08665-60104
	08665-69104	4	1	INPUT/OUTPUT (EXCHANGE)	28480	08665-69104
A19				POWER SUPPLY ASSEMBLY		
B1	08645-61115	7	1	FAN ASSEMBLY	28480	08645-61115
A19A1	08645-60740	2	1	POWER SUPPLY BOARD (NEW)	28480	08645-60740
	08645-69740	5	1	POWER SUPPLY BOARD (EXCHANGE)	28480	08645-69740

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8665B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A19A2	08645-60134	8	1	POWER TRANSISTOR BOARD #1	28480	08645-60134
A19A3	08645-60132	6	1	POWER TRANSISTOR BOARD #2	28480	08645-60132
	08645-60133	7	1	FUSE BOARD	28480	08645-60133
	08645-61122	6	1	LINE POWER MODULE (FILTERED)	28480	08645-61122
	2110-0055	2	1	FUSE 4A (110/120 VAC)	28480	2110-0010
	2110-0083	6	1	FUSE 2.5A (220/240 VAC)	28480	2110-0083
<b>3020A AND BELOW</b>						
A20	08645-61021	4	1	HIGH STABILITY TIMEBASE (NEW) (OPTION 001 ONLY)	28480	08645-61021
	08645-69021	0		HIGH STABILITY TIMEBASE (EXCHANGE) (OPTION 001 ONLY)	28480	08645-69021
<b>3203A AND ABOVE</b>						
A20	08645-61147	5		HIGH STABILITY TIMEBASE (NEW) STANDARD	28480	08645-61147
	08645-69147	1		HIGH STABILITY TIMEBASE (EXCHANGE) STANDARD	28480	08645-69147
A20	08645-61121	5		HIGH STABILITY TIMEBASE (NEW) OPTION 001	28480	08645-61121
	08645-69121	1		HIGH STABILITY TIMEBASE (EXCHANGE) OPTION 001	28480	08645-69121

*Please refer to the beginning of this section for how to find and order part numbers.*

## HP 8665B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1-8				NOT ASSIGNED		
W9	08665-61053	6	1	COAX CABLE, FEMALE SMC-SMC MOD J2 TO PLL-YIG J4	28480	08665-61053
W10	08665-61049	0		COAX CABLE, FEMALE SMC-SMC MOD J3 TO FRAC-N J2	28480	08665-61049
W11	08665-61087	6	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "FM" TO MOD J5 (EXCEPT OPTION 010) FRONT PANEL "FM" TO BULKHEAD MOD J5 (OPTION 010)	28480	08665-61087
W11A	08644-61033	7	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J5 TO MOD J5	28480	08644-61033
W12	08665-61082	1	1	COAX CABLE, FEMALE BNC-SMC FRONT PANEL "FM" TO MOD J4 (EXCEPT OPTION 010) FRONT PANEL "FM" TO BULKHEAD MOD J4 (OPTION 010)	28480	08665-61082
W12A	08644-61032	6	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J4 TO MOD J4	28480	08644-61032
W13	08645-61038	3		RIBBON CABLE 15CNDCT I/O J9 TO MOD J6	28480	08645-61038
W14	08645-61058	7	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J1 TO MOD J7	28480	08645-61058
W15	08645-61059	8	1	COAX CABLE, FEMALE BNC-SMC MOD J8 TO FRONT PANEL "AUDIO" (EXCEPT OPTION 010) FRONT PANEL "AUDIO" TO BULKHEAD MOD J8 (OPTION 010)	28480	08645-61059
W15A	08644-61034	8	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J8 TO MOD J8	28480	08645-61034
W16	08665-61048	9	1	COAX CABLE, FEMALE SMC-SMC MOD J9 TO OUT AMP J4	28480	08665-61048
W17	08645-61061	2	1	COAX CABLE, FEMALE BNC-SMC MOD J10 TO FRONT PANEL "AM" (EXCEPT OPTION 010) FRONT PANEL "AM" TO BULKHEAD MOD J10 (OPTION 010)	28480	08645-61061
W17A	08644-61035	9	1	COAX CABLE, FEMALE SMC-SMC (OPTION 010) BULKHEAD MOD J10 TO MOD J10	28480	08645-61035
W18	08645-61037	2		RIBBON CABLE 15CNDCT NSM OSC J3 TO I/O J8	28480	08645-61037
W19	08665-61046	7	1	COAX CABLE, FEMALE SMC-SMC NSM OSC J4 TO REFERENCE J4	28480	08665-61046

*Please refer to the beginning of this section for how to find and order part numbers.*

## HP 8665B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W20	08665-61061	6	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J1 TO DIVIDER J1	28480	08665-61061
W21	08665-61016	1	1	RIBBON CABLE 25CNDCT FRAC-N J3 TO I/O J7	28480	08665-61016
W22	08665-61062	7	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO PLL YIG J3	28480	08665-61062
W23	08665-61058	1	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J5 TO REFERENCE J5	28480	08665-61058
W24-28				NOT ASSIGNED		
W29	08645-61038	3		RIBBON CABLE 15CNDCT REFERENCE J3 TO I/O J16	28480	08645-61038
W30	08665-61059	2	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "REF IN" TO REFERENCE J9	28480	08665-61059
W31				NOT ASSIGNED		
W32				NOT ASSIGNED		
W33	08645-61038	3		RIBBON CABLE 15CNDCT I/O J5 TO MW ALC J1	28480	08645-61038
W34				NOT ASSIGNED		
W35	08665-61060	5	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "10 MHZ OUT" TO REFERENCE J6	28480	08665-61060
W36				NOT ASSIGNED		
W37	08665-61025	2	1	SEMI-RIGID CABLE 2.18 SMA-NONE (STD, EXCEPT OPT. 010 AND 003) FRONT PANEL "RF" TO ATTEN/RPP U2J1	28480	08665-61025
W37	08665-61104	2	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPTION 010) FRONT PANEL "RF" TO FRONT PANEL BULKHEAD ATTN/RPP	28480	08665-61104
W37	08665-61086	5	1	SEMI-RIGID CABLE 2.18 SMA-NONE (OPTION 003 ONLY) REAR PANEL "RF" TO ATTEN/RPP	28480	08665-61086
W38				NOT SEPARATELY REPLACEABLE ATTENUATOR 2 TO REVERSE POWER PROTECTION		
W39				NOT SEPARATELY REPLACEABLE ATTENUATOR 1 TO ATTENUATOR 2		
W40	08645-61035	0	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "VM IN" TO CONTROLLER J4	28480	08645-61035

Please refer to the beginning of this section for how to find and order part numbers.

**HP 8665B****Table 4-4. Replaceable Parts**

<b>Reference Designation</b>	<b>HP Part Number</b>	<b>C D</b>	<b>Qty.</b>	<b>Description</b>	<b>Mfr. Code</b>	<b>Mfr. Part Number</b>
W41	08644-61055	6	1	RIBBON CABLE 16NCDCT28AWG (EXCEPT OPTION 010) MOTHERBOARD J1 TO FRONT PANEL CONTROLLER J2	28480	08644-61055
W41	08644-61037	6	1	RIBBON CABLE 16NCDCT28AWG (OPTION 010) FRONT PANEL CONTROLLER J2 TO BULKHEAD MOTHERBOARD J1	28480	08644-61037
W41A	08644-61038	1	1	RIBBON CABLE 18NCDCT28AWG (OPTION 010) BULKHEAD MOTHERBOARD J1 TO MOTHERBOARD J1	28480	08644-61038
W42	08645-61027	0	1	RIBBON CABLE 28NCDCT 28AWG POWER SUPPLY J1 TO MOTHERBOARD J10	28480	08645-61027
W43				NOT ASSIGNED		
W44	08645-61030	5	1	RIBBON CABLE 40CNDCT28AWG MOTHERBOARD J12 TO I/O J1	28480	08645-61030
W45	08645-61029	2	1	RIBBON CABLE 26CNDCT22AWG MOTHERBOARD J13 TO REAR PANEL "HP-JB"	28480	08645-61029
	1252-0372	5	1	SCREW KIT-RECT CONN	00779	553636-3
	3050-0425	3	2	WASHER-FL MTLN NO. 6 .149-IN-ID	80120	AN960C-6
	2190-0587	0		WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
W46	08645-61081	6	1	CABLE HARNESS 6CNDCT I/O J2 TO REAR PANEL "X AXIS", "Z AXIS", "SEQ"	28480	08645-61081
	1250-0083	1	4	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
	2190-0016	0	4	WASHER-LK INTL T 7/16 IN .439-IN-ID	78189	1922-04
	2950-0001	8	5	NUT-HEX-DBL-CHAM 3/8-32-THD .084-IN-THK	00000	ORDER BY DESCRIPTION
W47	08645-61032	7	1	CABLE HARNESS 2CNDCT (RED/BLACK) POWER SUPPLY TO FAN	28480	08645-61032
W48				NOT ASSIGNED		
W49				CABLE ASSY GROUND JUMPER (GREEN/YELLOW) LINE ASSEMBLY TO CHASSIS GROUND (NOT SEPARATELY REPLACEABLE)		
W50	08645-61036	1	1	CABLE HARNESS 11CNDCT POWER SUPPLY J2 TO I/O J3	28480	08645-61036
W51	08665-61045	6	1	COAX CABLE, FEMALE BNC-SMC 1 GHZ MLT J1 TO REAR PANEL "500 MHz"	28480	08665-61045
W52	08665-61043	4	1	COAX CABLE, FEMALE SMC-SMC 1 GHZ MLT J2 TO DN CONV J2	28480	08665-61043
W53	08665-61042	3	1	COAX CABLE, FEMALE SMC-SMC 1 GHZ MLT J3 TO REFERENCE J1	28480	08665-61042
W54	08665-61041	2	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J1 TO OUT AMP J5	28480	08665-61041
W55	08645-61038	3	1	RIBBON CABLE 15CNDCT IF/DIV J2 TO I/O J4	28480	08645-61038

*Please refer to the beginning of this section for how to find and order part numbers.*

## HP 8665B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W56	08665-61040	1	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J3 TO OUT AMP J7	28480	08665-61040
W57	08665-61044	5	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J4 TO HF DRVR J3	28480	08665-61044
W58	08665-61039	8	1	COAX CABLE, FEMALE SMC-SMC IF/DIV J5 TO DN CONV J1	28480	08665-61039
W59	08665-61010	5	1	RIBBON CABLE 10CNDCT PLL YIG J1 TO YTO J1	28480	08665-61010
W60	08665-61123	1	1	SEMI-RIGID CABLE, SMA-SMA SWTCH TO MW CONV J2	28480	08665-61032
W61	08665-61057	0	1	COAX CABLE, FEMALE SMC-SMC DN CONV J3 TO HF DRVR J5	28480	08665-61057
W62	08645-61038	3		RIBBON CABLE 15CNDCT OUT AMP J1 TO I/O J10	28480	08645-61038
W63	08665-61091	2		SEMI-RIGID CABLE, FEMALE SMA-SMC OUT AMP J3 TO HF DRVR J7	28480	08665-61091
W64	08665-61133	3		COAX CABLE, FEMALE SMC-SMC MW CONV J4 TO OUT AMP J3	28480	08665-61133
W65	08665-61054	7		COAX CABLE, FEMALE SMC-SMC OUT AMP J8 TO HF DRVR J6	28480	08665-61054
W66	08665-61035	4		SEMI-RIGID CABLE, FEMALE SMA-SMC HF DRVR J1 TO GAAS DIV U17J3	28480	08665-61035
W67	08665-61036	5		SEMI-RIGID CABLE, FEMALE SMA-SMC HF DRVR J2 TO GAAS DIV U16J2	28480	08665-61036
W68	08645-61038	3		RIBBON CABLE 15CNDCT HF DRVR J4 TO I/O J13	28480	08645-61038
W69				NOT SEPARATELY REPLACEABLE ATTEN/RPP S1J2 TO ATTEN/RPP AT2J1		
W70	08665-61019	4	1	SEMI-RIGID CABLE YTO J2 TO GAAS DIV U17J1	28480	08665-61019
W71				NOT ASSIGNED		
W72	08665-61011	6	1	RIBBON CABLE 26CNDCT GAAS DIV J4 TO I/O J15	28480	08665-61011
W73	08665-61017	2	1	RIBBON CABLE 25CNDCT PLL YIG J5 TO I/O J14	28480	08665-61017
W74	08665-61063	8	1	COAX CABLE FEMALE SMA-SMC DIVIDER J3 TO GAAS DIV U17J5	28480	08665-61063
W75	08665-61122	0	1	SEMI-RIGID CABLE SMA-SMA (EXCEPT OPTION 008) MW ASSY TO MW CONV J1	28480	08665-61122

Please refer to the beginning of this section for how to find and order part numbers.

**HP 8665B****Table 4-4. Replaceable Parts**

<b>Reference Designation</b>	<b>HP Part Number</b>	<b>C D</b>	<b>Qty.</b>	<b>Description</b>	<b>Mfr. Code</b>	<b>Mfr. Part Number</b>
W76				NOT SEPARATELY REPLACEABLE GAAS DIV U17J4 TO GAAS DIV U16J1		
W77	08665-81018	3	1	RIBBON CABLE 18CONDCT ATTENVRPP J1 TO GAAS DIV J3	28480	08665-81018
W78				NOT SEPARATELY REPLACEABLE RIBBON CABLE ATTENVRPP J2 TO ATTENVRPP S1J4		
W79				NOT SEPARATELY REPLACEABLE RIBBON CABLE ATTENVRPP U1J2 TO ATTENVRPP AT1J1		
W80				NOT SEPARATELY REPLACEABLE RIBBON CABLE ATTENVRPP AT1J2 TO ATTENVRPP AT2J2		
W81				NOT SEPARATELY REPLACEABLE LINE POWER ASSY "N" TO LINE POWER ASSY "B"		
W82-W99				NOT ASSIGNED		
W100	08645-61089	4	1	RIBBON CABLE 6CONDCT MOTHERBOARD J14 TO TIMEBASE J4	28480	08645-61089
W101	08645-61091	8	1	COAX CABLE, FEMALE BNC-SMC REAR PANEL "EFC" TO TIMEBASE J3	28480	08645-61091
W102-W105				NOT ASSIGNED		
W106	08645-61142	0	1	COAX CABLE, BNC-SMC REF OSC J5 TO TIMEBASE J2	28480	08643-61142
W107	08645-61146	4	1	COAX CABLE, BNC-SMC OPTION 001 REAR PANEL "EFC" TO TIMEBASE J3	28480	08643-61146
W108	08645-61144	2	1	COAX CABLE, SMA-SMC OPTION 001 REAR PANEL "EXT REF" TO TIMEBASE J6	28480	08643-61144
W109	08645-61089	4	1	CABLE HARNESS I/O BOARD J14 TO TIMEBASE J8	28480	08643-61089
W110	08645-61149	7	1	COAX CABLE OSC TO TIMEBASE J7	28480	08645-61149
W111-W310				NOT ASSIGNED		
W311	08665-61083	2	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "FM" TO MOD J5	28480	08665-61083
W312	08665-61084	3	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) REAR PANEL "FM" TO MOD J4	28480	08665-61084
W313				NOT ASSIGNED		
W314				NOT ASSIGNED		

*Please refer to the beginning of this section for how to find and order part numbers.*



## HP 8665B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W315	08665-61099	0	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J8 TO FRONT PANEL "AUDIO"	28480	08665-61099
W316				NOT ASSIGNED		
W317	08665-61100	6	1	COAX CABLE FEMALE BNC-SMC (OPTION 003 ONLY) MOD J10 TO REAR PANEL "AM"	28480	08665-61100
W318-W331				NOT ASSIGNED		
W332	08665-61121	5	1	COAX CABLE FEMALE BNC-SMC REAR PANEL "PULSE" TO PM DRIVER J4	28480	08665-61121
W333-W336				NOT ASSIGNED		
W337	08665-61086	5	1	SEMI-RIGID CABLE FEMALE BNC-SMC REAR PANEL "RF" TO ATTEN/RPP U2J1	28480	08665-61086
W338-W399				NOT ASSIGNED		
W400	08644-61059	7	1	SEMI-RIGID CABLE 2.18, SMA-SMC COAX DSC J3 TO 140NS DELAY LINE J3	28480	08644-61059
W401	08644-61024	6	1	SEMI-RIGID CABLE 3.58, SMA-SMC COAX DSC J4 TO 140NS DELAY J4	28480	08644-61024
W402	08665-61073	0	1	COAX CABLE, FEMALE SMC-SMC COAX DSC J1 TO DIVIDER J2	28480	08665-61073
W403				NOT ASSIGNED		
W404	08665-61072	9	1	COAX CABLE, FEMALE SMC-SMC COAX DSC J6 TO PLL Y1G J2	28480	08665-61072
W405	08665-61071	8	1	COAX CABLE, FEMALE SMC-SMC MOD J2 TO COAX DSC J8	28480	08665-61071
W406	08665-61070	7	1	COAX CABLE SMC-SMC COAX DSC J9 TO PLL Y1G J4	28480	08665-61070
W407	08665-61068	3	1	COAX CABLE, FEMALE SMC-SMC FRAC-N J4 TO COAX DSC J11	28480	08645-61068
W408	08665-61069	4	1	COAX CABLE SMC-SMC COAX DSC J10 TO PLL Y1G J3	28480	08665-61069
W409	08645-61038	3	1	RIBBON CABLE 15CNDCT COAX DSC J5 TO I/O J11	28480	08645-61038

Please refer to the beginning of this section for how to find and order part numbers.

## HP 8665B

Table 4-4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W410	08665-61113	9	1	COAX CABLE, FEMALE SMC-SMC COAX DSC J2 TO COAX DSC J7	28480	08665-61113
W411-W699				NOT ASSIGNED		
W700	08644-61045	1	1	RIBBON CABLE 25CNDCT REAR PANEL "AUDIO TRIG" TO MOTHERBOARD J11	28480	08644-61045
W701-W799				NOT ASSIGNED		
W800	08665-61064	9	1	COAX CABLE FEMALE SMC-SMC NSM OSC J2 PM DRVR J5	28480	08665-61064
W801	08665-61065	0	1	COAX CABLE FEMALE BNC-SMC PM DRVR J1 TO REAR PANEL "SYNC"	28480	08665-61065
W802	08665-61066	1	1	COAX CABLE FEMALE SMA-SMC PM DRVR J2 TO ATTEN/RPP J3	28480	08665-61066
W803	08665-61085	4	1	COAX CABLE FEMALE SMA-BNC ATTEN/RPP J4 TO REAR PANEL "VIDEO"	28480	08665-61085
W804	08645-61037	2		RIBBON CABLE 15CNDCT PM DRVR J3 TO I/O J12	28480	08645-61037
W805	08665-61067	2	1	COAX CABLE FEMALE BNC-SMC FRONT PANEL "PULSE" TO PM DRVR J4 (EXCEPT OPTION 008/010) FRONT PANEL "PULSE" TO BULKHEAD PM DRVR J4 (OPTION 008/010)	28480	08665-61067
W805A	08665-61119	5	1	COAX CABLE FEMALE SMC-SMC (OPTION 008/010) BULKHEAD PM DRVR J4 TO PM DRVR J4	28480	08665-61119
W806	08665-61031	0	1	SEMI-RIGID CABLE SMA-SMA ATTEN/RPP S1J2 TO ATTEN/RPP U3J1	28480	08665-61031
W807	08665-61029	6	1	SEMI-RIGID CABLE SMA-SMA ATTEN/RPP U3J2 TO ATTEN/RPP AT1J1	28480	08665-61029
W808	08665-61109	3	1	CABLE ASSEMBLY HY800J1 TO ATTEN/RPP S1J1	28480	08665-61109
W809	08665-61033	2	1	CABLE ASSEMBLY ATTEN/RPP S1J3 TO OUT AMP J2	28480	08665-61033
W810	08665-61127	5	1	SEMI-RIGID CABLE SMA-SMA (OPTION 008) ISOLATOR TO MW CONV J2	28480	08665-61127

*Please refer to the beginning of this section for how to find and order part numbers.*

Table 4-4a. Cabinet Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<i>2945A to 2905A</i>						
<i>1-7</i>						
<b>NOTE</b>						
<i>At serial prefix 2919A the color of the instrument covers and accessories (items 1-7, and 14-16) were changed. The old color cover and accessories are no longer available. If your instrument has serial prefixes 2905A or below, and you must replace one of these parts, we recommend that you order the full set of covers and accessories as listed for serial prefixes 2919A and above (items 1-7, and 14-16). For option 010 instruments, refer to table 4-4b.</i>						
<i>2919A and above</i>						
<i>1</i>	5041-8802	9	1	TRIM STRIP, TOP	28480	5041-8802
<i>2</i>	08644-81058	6	1	BOTTOM COVER	28480	08644-81058
	0515-1860	5	7	MACH SCREW	28480	0515-1860
	3050-0227	3	7	FLAT WASHER (ATTACHES BOTTOM COVER TO BULKHEAD)	28480	3050-0227
<i>3</i>	08644-00032	8	1	TOP COVER	28480	08644-00032
	0515-0684	7	4	MACH SCREW 6L PNTX	28480	0515-0684
	2190-0586	2	4	LK WASHER M4.0 ID	28480	2190-0586
	3050-0893	9	4	FL WASHER (ATTACHES COVERS ON THE SIDES)	28480	3050-0893
<i>4</i>	5062-3705	5	2	HANDLE STRAP, 21 INCHES	28480	5062-3705
<i>5</i>	5041-8819	8	2	HANDLE CAP, FRONT	28480	5041-8819
<i>6</i>	5041-8820	1	2	HANDLE CAP, REAR	28480	5041-8820
	0515-1132	4	4	MACH SCREW (ATTACHES HANDLES)	28480	0515-1132
<i>7</i>	5001-0540	2	2	SIDE TRIM	28480	5001-0540
<i>8</i>	08644-00038	4	2	TRIM STRIP, SIDE	28480	08644-00038
	0515-1227	8	7	MACH SCREW (ATTACHES TRIM STRIPS)	28480	0515-1227
<i>9</i>	08644-00002	2	1	CARDCAGE COVER (HP8644A ONLY)	28480	08644-00002
<i>9</i>	08645-00019	2	1	CARDCAGE COVER (HP8645A ONLY)	28480	08645-00019
<i>9</i>	08665-00011	8	1	CARDCAGE COVER (HP8665A/B AND 8664A ONLY)	28480	08665-00011
	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6	28480	0515-1860
	0515-1950	4		SCREW-MACH	28480	0515-1950
<i>10</i>	08644-00048	6	1	PLATE COVER REAR (HP8644A)	28480	08644-00048
<i>10</i>	08645-00059	0	1	PLATE COVER REAR (HP8645A)	28480	08645-00059
<i>10</i>	08665-00083	4	1	PLATE COVER REAR (HP8664A, HP8665A/B)	28480	08665-00059
<i>11</i>	08645-00036	3	1	I/O BOARD COVER (HP8644A AND 8645A ONLY)	28480	08645-00036
<i>11</i>	08665-00020	9	1	I/O BOARD COVER (HP8665A/B AND 8664A ONLY)	28480	08665-00020
	0515-1950	4		SCREW-MACH (ATTACHES I/O COVER TO INSTRUMENT)	28480	0515-1950
	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6 (ATTACHES I/O COVER TO INSTRUMENT)	28480	0515-1860
	3050-0227	3	2	WASHER-FL MTLC NO. 6 .149-IN-ID	80120	AN960C-6
<i>12</i>	08645-00003	4	3	RESTRICTOR-AIR	28480	08645-00003
<i>13</i>	08644-00006	6	1	MOTHERBOARD BRACKET	28480	08644-00006

Please refer to the beginning of this section for how to find and order part numbers.

Table 4-4a. Cabinet Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<i>2845A to 2905A</i>						
<i>14-16</i>						
<b>NOTE</b>						
<p><i>At serial prefix 2919A the color of the instrument covers and accessories (items 1-7, and 14-16) were changed. The old color cover and accessories are no longer available. If your instrument has serial prefixes 2905A or below, and you must replace one of these parts, we recommend that you order the full set of covers and accessories as listed for serial prefixes 2919A and above (items 1-7, and 14-16). For option 010 instruments, refer to table 4-4b.</i></p>						
<i>2919A and above</i>						
<i>14</i>	5041-8801	8	4	FOOT, BOTTOM COVER	28480	5041-8801
	1480-1345	5	2	WIRE FORM (FOR FRONT FEET ONLY)	28480	1480-1345
<i>15</i>	5041-8821	2	4	STANDOFF, REAR PANEL	28480	5041-8821
	0515-1232	5	4	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD	28480	0515-1232
<i>16</i>	08645-40015	2	1	FOOT, REAR PANEL	28480	08645-40015
	0515-0447	2		SCREW-MACH M3.5 X 0.6 10MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
<i>17</i>	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6 (ATTACHES MODULES TO INSTRUMENT)	28480	0515-1860
<i>18</i>	6960-0002	4	7	PLUG-HOLE DOME-HD FOR .5-D-HOLE STL (REAR PANEL ONLY)	28480	6960-0002
<i>19</i>	6960-0006	8	3	PLUG-HOLE DOME-HD FOR .25-D-HOLE STL (REAR PANEL ONLY)	28480	6960-0006
	0515-1234	7	8	SCREW, METRIC 3.5 x 8 (FOR FRONT PANEL TO FRAME)	00000	ORDER BY DESCRIPTION
	08644-80018	8	2	INFORMATION LABEL	28480	08644-80018
	08642-00138	3	1	LABEL, "2-PERSON LIFT"	28480	08642-00138
	7120-8138	4	1	WARNING LABEL	28480	7120-8138

Please refer to the beginning of this section for how to find and order part numbers.

Table 4-4b. Cabinet Parts Unique to OPTION 010

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
	08644-21007	1	2	EXTENDER PLATE	28480	08644-21007
	0515-0604	3	2	SCREW, METRIC 5.0 x 8 (FOR CENTER HOLES)	00000	ORDER BY DESCRIPTION
	0515-1101	7	4	SCREW, METRIC 4.0 x 8 (FOR OUTER HOLES)	00000	ORDER BY DESCRIPTION
	08644-61042	8	1	BULKHEAD ASSEMBLY	28480	08644-61042
	0515-0684	9	12	SCREW, METRIC 4.0 x 6	00000	ORDER BY DESCRIPTION
	08665-80074	1	1	LABEL "PM DRIVER J4" (OPTION 000/010)	28480	08665-80074
	9320-5817	8	1	LABEL "COUNTER J4" (OPTION 010/011-HP 8644A ONLY)	28480	9320-5817
	0515-1228	9	8	SCREW, METRIC 4.0 x 6 (FOR SIDE STRUTS)	00000	ORDER BY DESCRIPTION
	0515-1851	4	3	SCREW, METRIC 3.0 x 6 (FOR SEMI-RIGID CABLE GROUNDING PLATE)	00000	ORDER BY DESCRIPTION
	08644-61037	1	1	RIBBON CABLE	28480	08644-61037
	2200-0141	8	2	SCREW, 4-40	00000	ORDER BY DESCRIPTION
	2190-0584	0	2	LOCK WASHER	00000	ORDER BY DESCRIPTION
	08644-61064	4	1	COVER ASSEMBLY	28480	08644-61064
	5062-3990	0	1	FRONT HANDLE KIT	28480	5062-3990
	08644-21020	8	4	REWORK, STANDOFF	28480	08644-21020
	08644-21021	9	2	EXT STIFFENER, LONG	28480	08644-21021
	08644-21019	5	2	EXT STIFFENER, SHORT	28480	08644-21019
	0515-2044	9	48	SCREW, METRIC 4.0 x 7 (FOR STIFFENERS)	00000	ORDER BY DESCRIPTION
	08644-00036	2	2	TRIM STRIP	28480	08644-00036
	08644-00037	3	2	TRIM STRIP	28480	08644-00037
	08644-00046	4	1	TRIM STRIP	28480	08644-00046

Please refer to the beginning of this section for how to find and order part numbers.

Table 4-4c. Miscellaneous Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>FIGURE 4-1</b>						
1			1	FRONT PANEL KEYBOARD ASSEMBLY SEE A1 UNDER SPECIFIC PRODUCT LISTING		
2				DELETED		
3	0515-2383	9	8	SCREW-MACHINE ASSY M3 X 0.5 23MM-LG (INCLUDES CAPTIVE WASHER-ITEM 2)	28480	0515-2383
4	0515-1234	7	8	SCREW-MACH M3.5 X 0.6 8MM-LG	28480	0515-1234
5	5021-8405	4	1	FRONT FRAME	28480	5021-8405
	1250-2444	2	1	ADAPTER-COAX F-SMA (FRONT PANEL RF OUT)	28480	5081-4828
	08665-00016	3	1	CONNECTOR BRACKET (P/O FRONT PANEL RF OUT)	28480	08665-00016
	0515-1382	6	2	MACH SCREW ATTACHES CONNECTOR BRACKET TO FRONT FRAME	28480	0515-1382
6	08665-61101	5	1	ROTARY PULSE GENERATOR (RPG) INPUT POWER: 5VDC	28480	08665-61101
7	2190-0018	3	3	WASHER-LK INTL T 3/8 IN .377-IN-ID	78189	1920-02
8			1	FRONT PANEL CONTROLLER SEE A1 UNDER SPECIFIC PRODUCT LISTING		
9	2950-0001	8	5	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
10	0370-3033	0	1	KNOB-BASE 1-1/2 JGK .25-IN-ID	28480	0370-3033
<b>FIGURE 4-2</b>						
11	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6	28480	0515-1860
<b>FIGURE 4-3</b>						
12	08645-21005	0	1	REAR PANEL	28480	08645-21005
13			1	POWER SUPPLY SEE A19 UNDER SPECIFIC PRODUCT LISTING		
14	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6	28480	0515-1860
15	3050-0892	8	4	WASHER-FL MTLCL 3.5 MM 3.6-MM-ID	28480	3050-0892
<b>FIGURE 4-4</b>						
16	2190-0584	0		WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
17	0515-1137	9	8	SCREW-MACH M3 X 0.5 50MM-LG PAN-HD	28480	0515-1137
18	2360-0229	1	4	SCREW-MACH 6-32 .5-IN-LG PAN-HD-POZI	28480	2360-0229
19	2190-0585	1		WASHER-LK HLCL 3.5 MM 3.6-MM-ID	28480	2190-0585
20			1	POWER TRANSISTOR BOARD #1 SEE A19A2 UNDER SPECIFIC PRODUCT LISTING		
21			1	FUSE BOARD SEE A19A2 (P/O) UNDER SPECIFIC PRODUCT LISTING		
22	0515-1246	1	4	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD	28480	0515-1246
23	0515-1851	4		SCREW-MACHINE ASSEMBLY M3 X 0.5 6MM-LG	28480	0515-1851
24	0380-1362	5	4	STANDOFF-HEX 12-MM-LG M3.0 X 0.5-THD	00000	ORDER BY DESCRIPTION
25	3050-1152	5	12	WASHER-SHLDR 1/8 IN .125-IN-ID .25-IN-OD	55566	5879-N-185-090-125 W/MO
28			1	FAN ASSEMBLY SEE B1 (P/O A19) UNDER SPECIFIC PRODUCT LISTING		
27	0590-1794	2	4	NUT-SHMET-U-TP 6 -32-THD .017-IN-THK	78553	FC9008-3B
28			1	POWER TRANSISTOR BOARD #2 SEE A19A3 UNDER SPECIFIC PRODUCT LISTING		

Please refer to the beginning of this section for how to find and order part numbers.

*Table 4-4c. Miscellaneous Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>FIGURE 4-5</b>						
29	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6	28480	0515-1860
30	08645-21032	3	4	DOUBLE SHOULDERED WASHER	28480	08645-21032
31	9100-4757	5	1	POWER TRANSFORMER	28480	9100-4757
32	08645-21031	3	8	SHOULDERED WASHER	28480	08645-21031
33	3050-0686	8	8	WASHER-FL .156ID	28480	3050-0686
34	08645-00043	2	1	TRANSFORMER BRACKET	28480	08645-00043
35	08645-00040	9	1	TRANSFORMER MOUNTING BRACKET	28480	08645-00040
36	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6	28480	0515-1860
37	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6	28480	0515-1860
38	0515-1331	5	8	SCREW-METRIC SPECIALTY M4 X 0.7 THD; 7MM	28480	0515-1331
39			1	LINE POWER MODULE (FILTERED) SEE A19 (P/O) UNDER SPECIFIC PRODUCT LISTING		
40	08645-21031	3	8	SHOULDERED WASHER	28480	08645-21031
41	3050-0686	8	8	WASHER-FL .156ID	28480	3050-0686
42	2190-0586	2	4	WASHER-LK HLCL 4.0 MM 4.1-MM-ID	28480	2190-0586
43	0515-1960	4	4	SCREW-MACH M4 X 0.7 127MM-LG PAN-HD	28480	0515-1960
<b>FIGURE 4-6</b>						
44	3050-0227	3	2	WASHER-FL MTLC NO. 6 .149-IN-ID	80120	AN960C-6
45	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6	28480	0515-1860
46	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6	28480	0515-1860
47	0515-1860	5		SCREW-MACHINE ASSEMBLY M3.5 X 0.6	28480	0515-1860
<b>FIGURE 4-7</b>						
48	2190-0584	0	21	WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
49	0515-0682	7	14	SCREW-MACH M3 X 0.5 18MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
50	0515-0683	8	5	SCREW-MACH M3 X 0.5 25MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
51	0515-1950	4	2	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-1950
52	0515-1102	8	4	SCREW-MACH M3 X 0.5 8MM-LG 90-DEG-FLH-HD	00000	ORDER BY DESCRIPTION

*Please refer to the beginning of this section for how to find and order part numbers.*





# TABLE OF CONTENTS

## Replaceable Parts - Illustrated Parts Breakdown

Front Panel Illustrated Parts Breakdown . . . . . 4a-1

Digital Motherboard Illustrated Parts Breakdown . . . . . 4a-2

Power Supply and Rear Panel Illustrated Parts Breakdown (1 of 3) (except HP 8643) . . . . . 4a-3

Power Supply and Rear Panel Illustrated Parts Breakdown (2 of 3) (except HP 8643) . . . . . 4a-4

Power Supply and Rear Panel Illustrated Parts Breakdown (3 of 3) (except HP 8643) . . . . . 4a-5

Assembly Removal Illustrated Parts Breakdown . . . . . 4a-6

HP 8664/65 MW Assembly Illustrated Parts Breakdown . . . . . 4a-7



# 4a

## Replaceable Parts - Illustrated Parts Breakdown

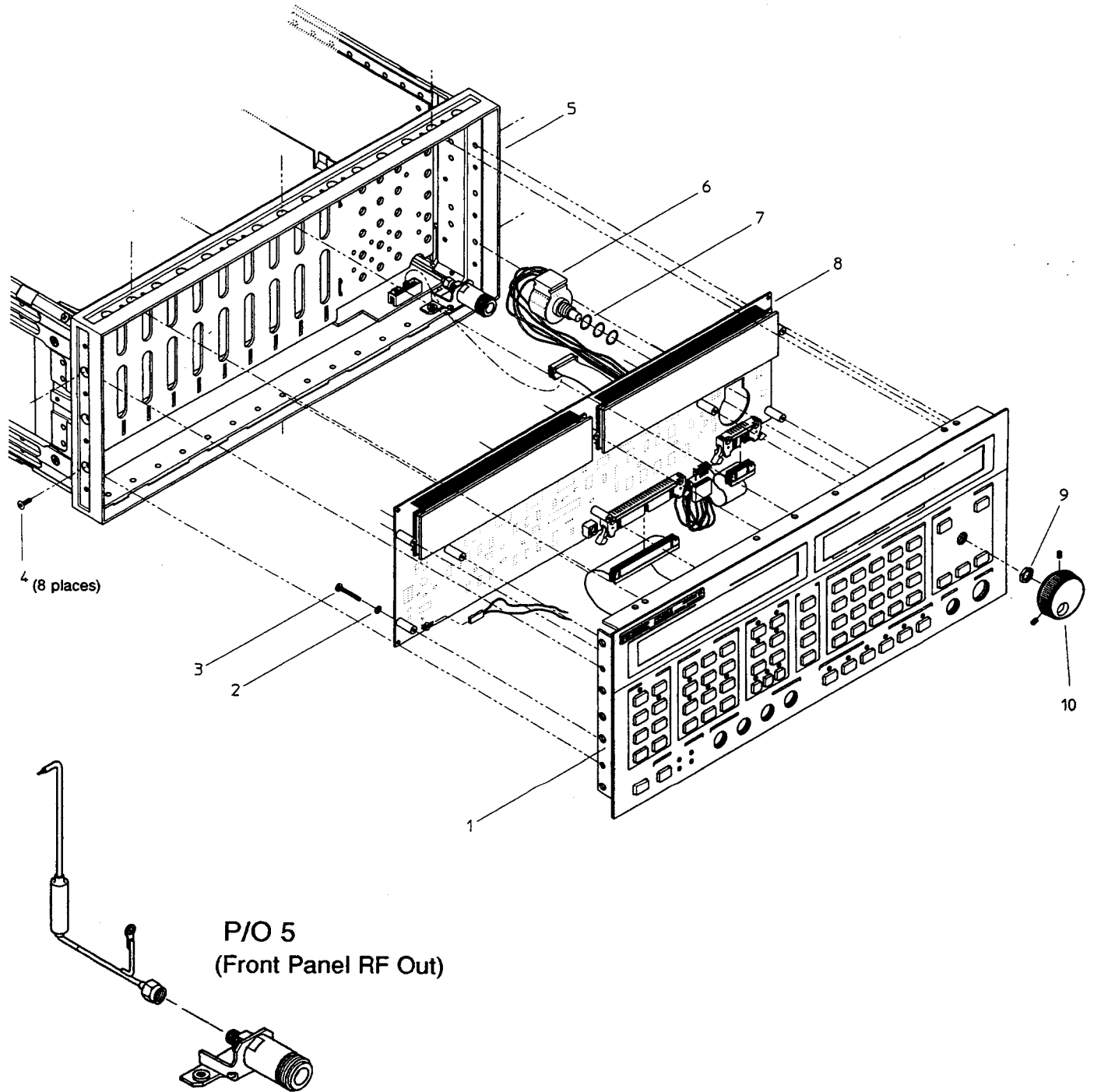


Figure 4a-1. Front Panel Illustrated Parts Breakdown

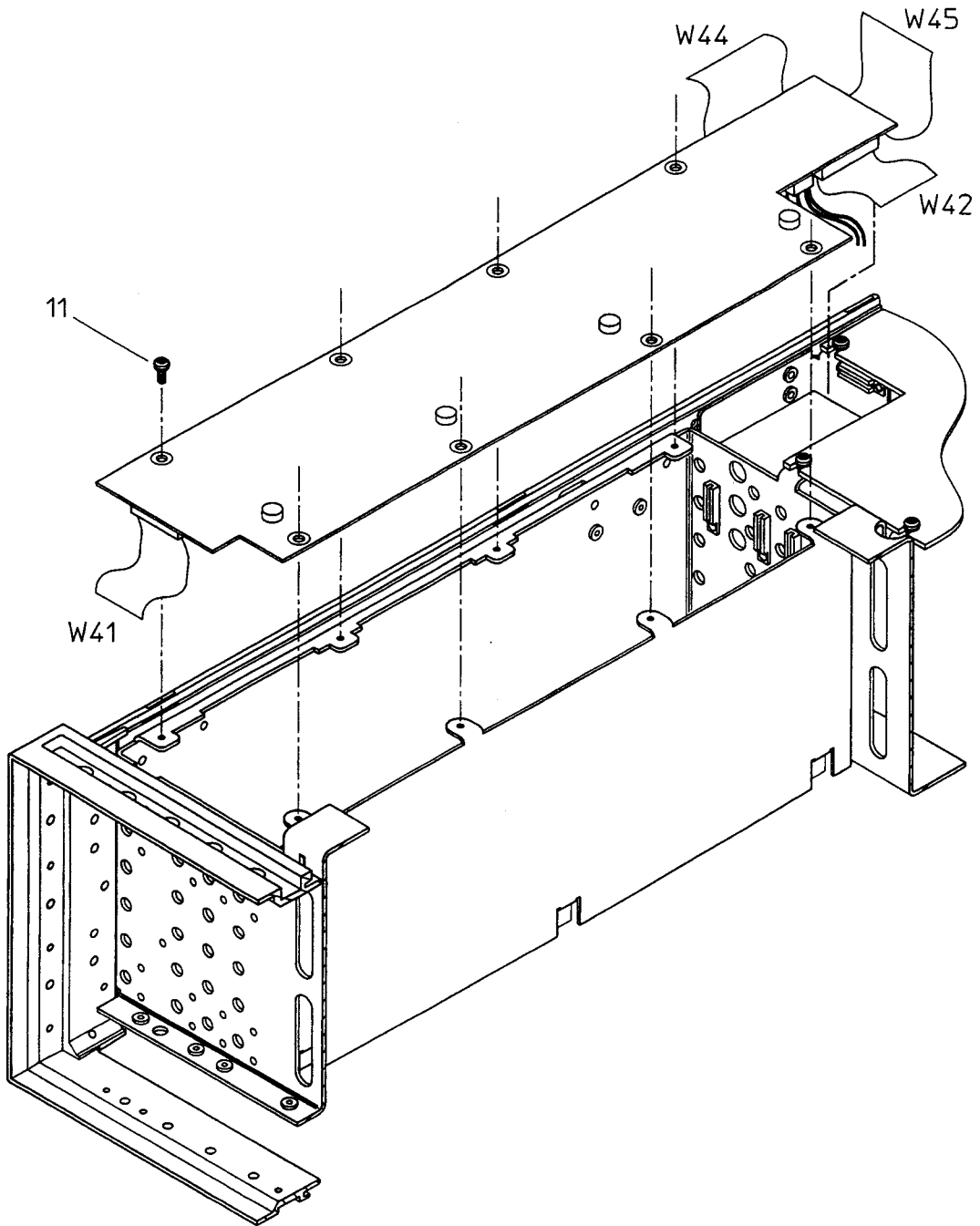


Figure 4a-2. Digital Motherboard Illustrated Parts Breakdown

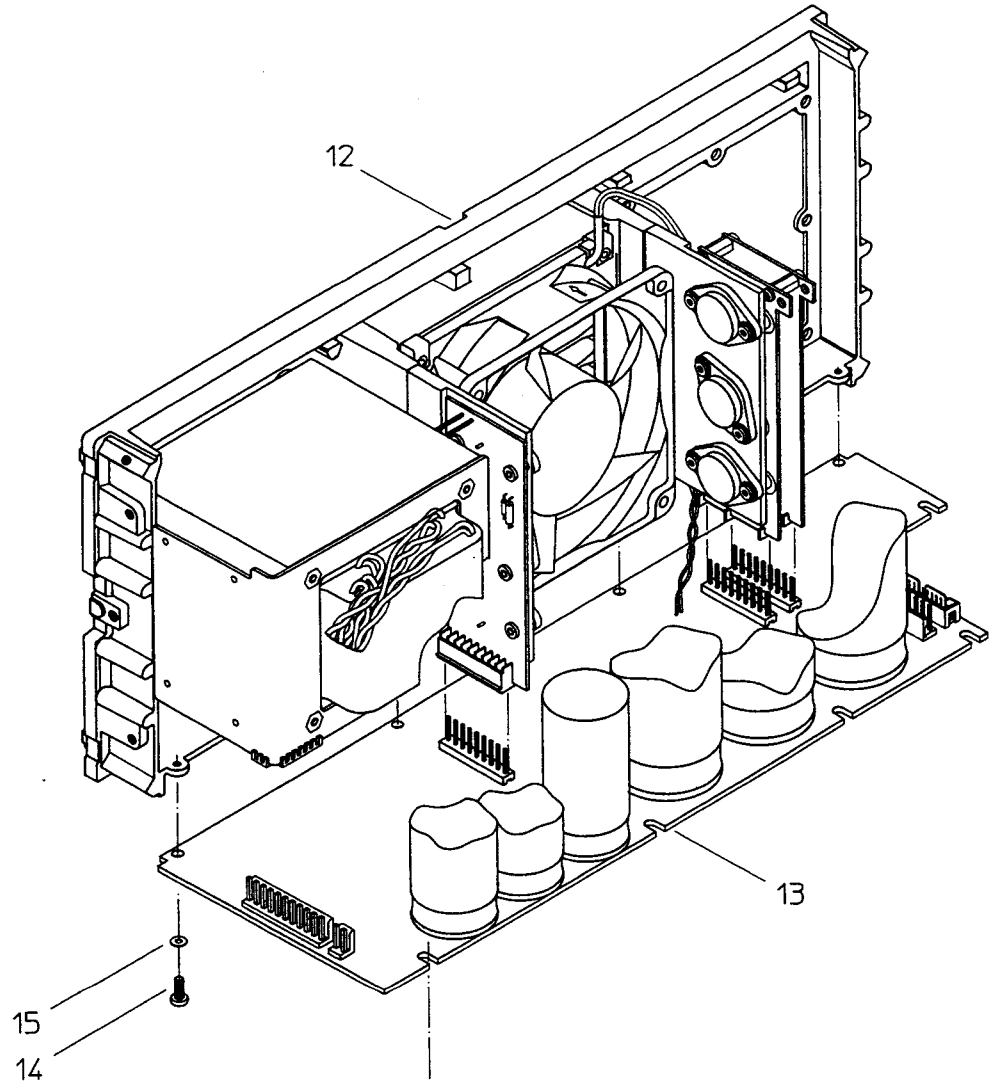


Figure 4a-3. Power Supply and Rear Panel Illustrated Parts Breakdown (1 of 3)

(Except HP 8643A)

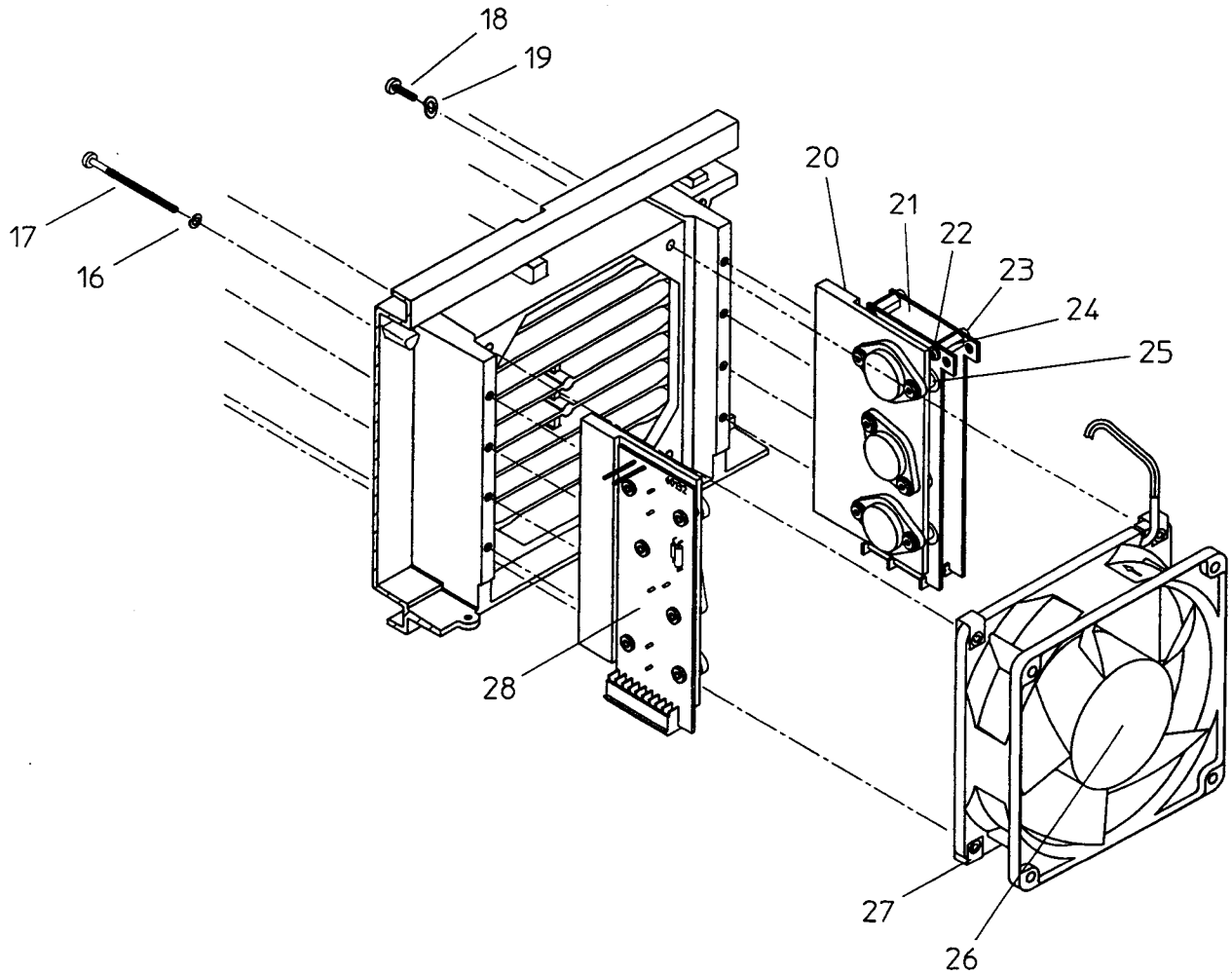


Figure 4a-4. Power Supply and Rear Panel Illustrated Parts Breakdown (2 of 3)

(Except HP 8643A)

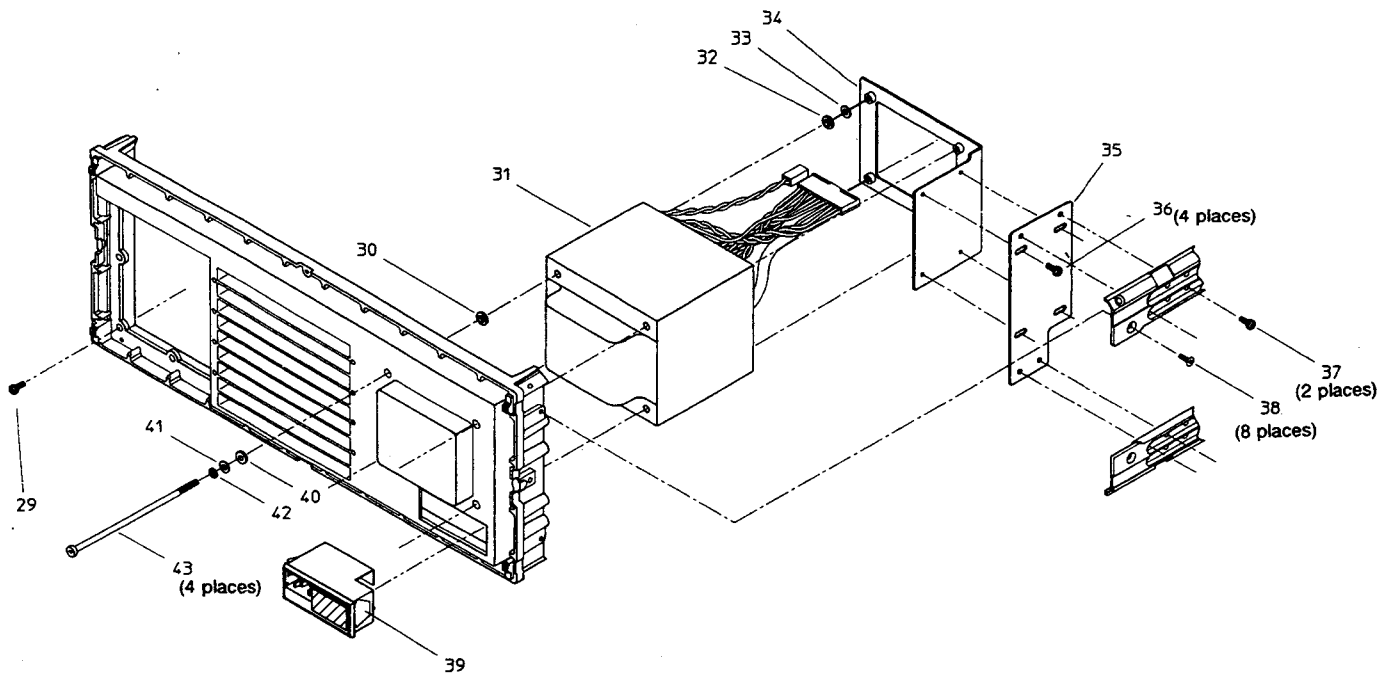


Figure 4a-5. Power Supply and Rear Panel Illustrated Parts Breakdown (3 of 3)

(Except HP 8643A)

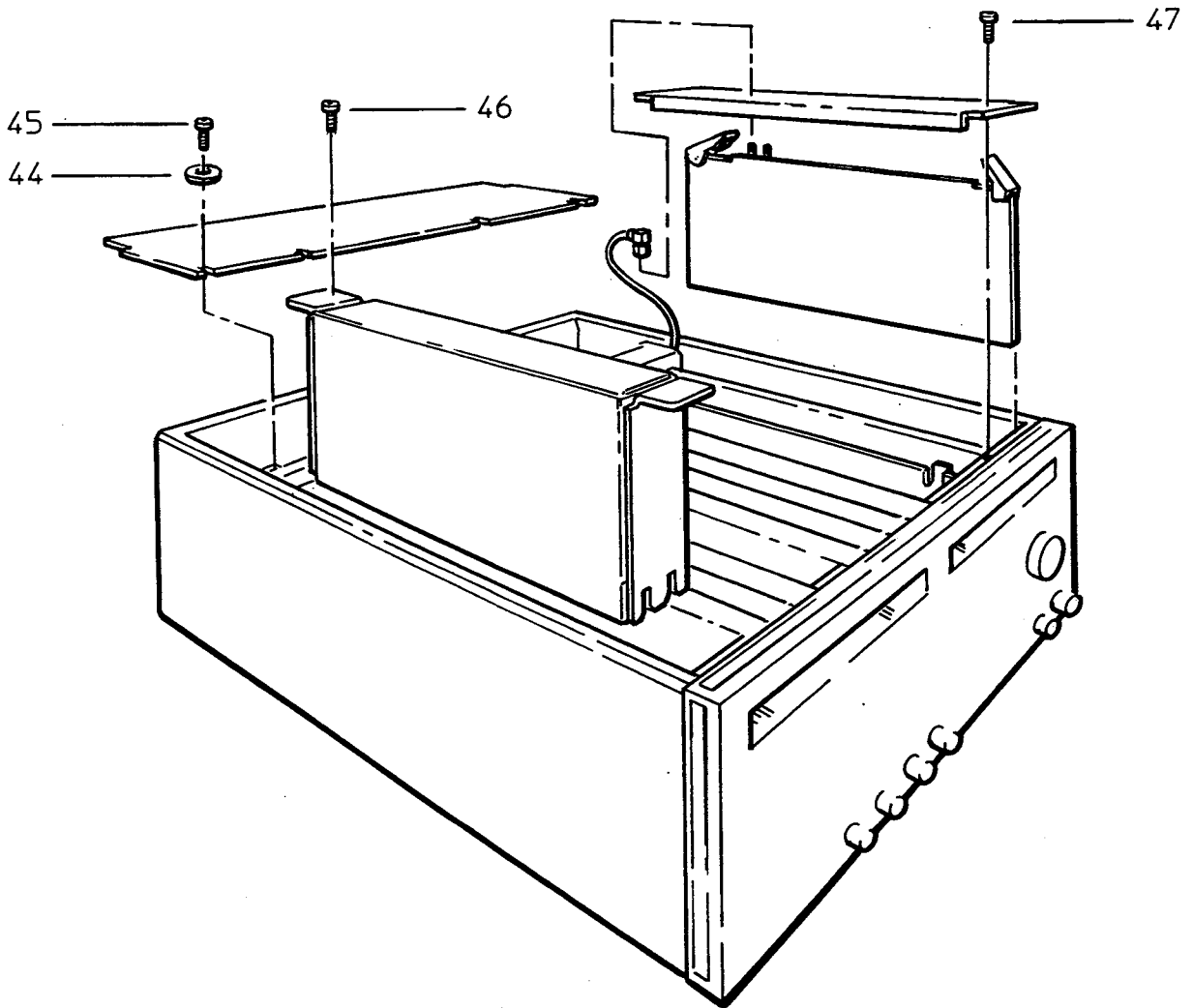


Figure 4a-6. Assembly Removal Illustrated Parts Breakdown



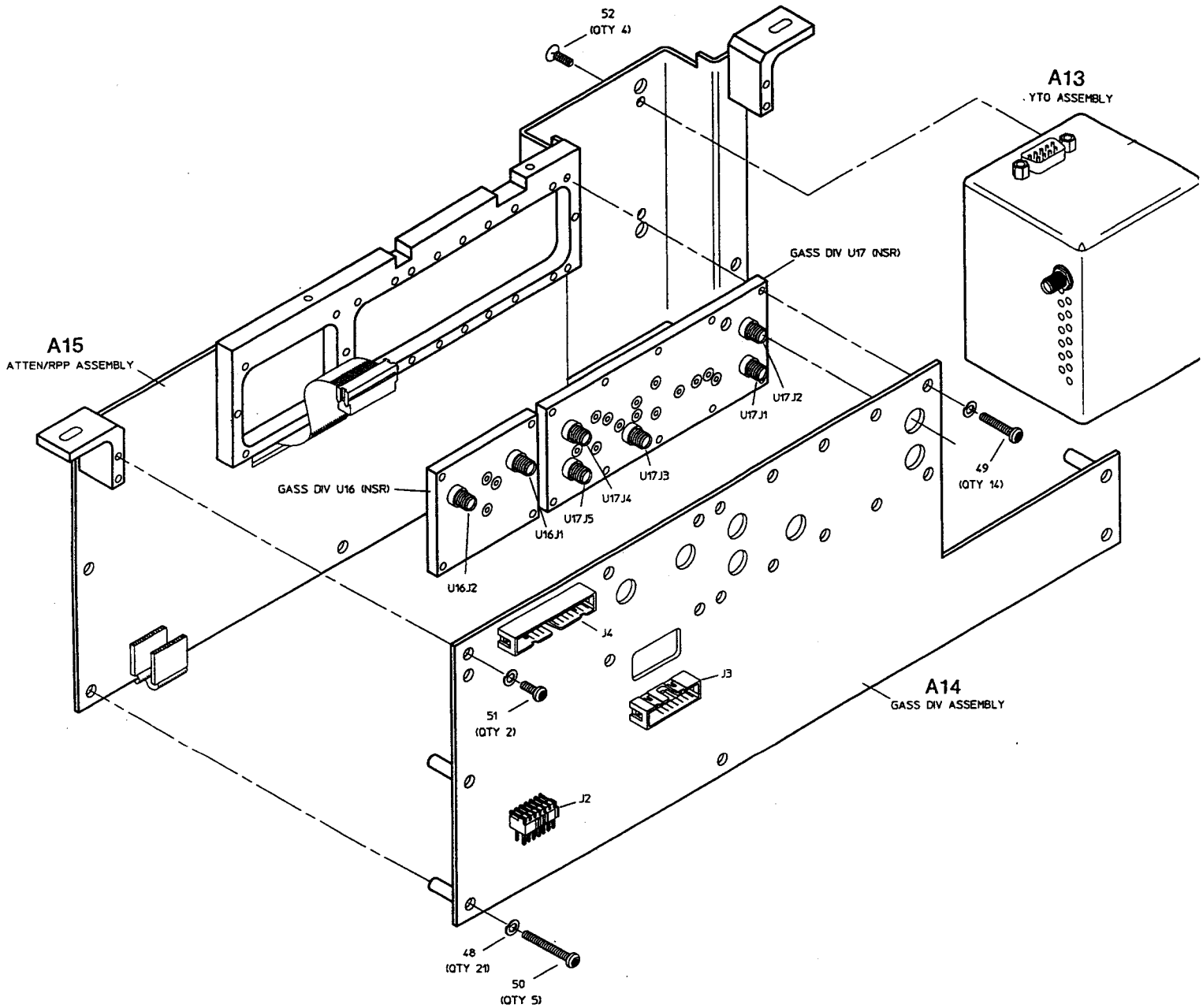


Figure 4a-7. HP 8664/65 MW Assembly Illustrated Parts Breakdown



## TABLE OF CONTENTS

### Replaceable Parts - Assembly Replacement

Screw Torque Settings . . . . .	4b-1
RF Assembly Removal and Verification . . . . .	4b-1
RF Assembly Removal and Replacement . . . . .	4b-2
Card-cage Assembly Removal and Replacement . . . . .	4b-4
HP 8643/44/45 Attenuator Assembly Removal and Replacement . . . . .	4b-6
HP 8664/65 Attenuator Assembly Removal and Replacement . . . . .	4b-8
HP 8664/65 ATTEN/RPP/ROM Replacement . . . . .	4b-10
HP 8664/65 YTO Assembly Removal and Replacement . . . . .	4b-11
HP 8664/65 GAAS DIV Assembly Removal and Replacement . . . . .	4b-13
I/O Assembly Removal and Replacement . . . . .	4b-16
HP 8643 Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-17
HP 8644 Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-17
HP 8645 Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-18
HP 8664 Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-18
HP 8665A Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-18
HP 8665B Ribbon Cable Interconnections for the I/O Assembly . . . . .	4b-19
Front Panel Assembly Removal and Replacement . . . . .	4b-20
Fan Removal and Replacement . . . . .	4b-22
Power Supply Assembly Removal and Replacement (except HP 8643A) . . . . .	4b-23
Fuseboard Removal and Replacement (except HP 8643A) . . . . .	4b-25
Power Transistor Board Removal and Replacement (except HP 8643A) . . . . .	4b-26
Rear Panel Removal and Replacement . . . . .	4b-27
Transformer Removal and Replacement . . . . .	4b-28
Line Power Assembly Removal and Replacement . . . . .	4b-30
Instrument Cover Removal and Replacement . . . . .	4b-32
2 Piece (Clamshell) Cover Removal and Replacement . . . . .	4b-35
1 Piece Cover Removal and Replacement . . . . .	4b-38
Verifying Instrument Operation . . . . .	4b-40
Verifying Assembly Operation . . . . .	4b-41
Returning the Instrument to Operation . . . . .	4b-42



# 4b

## Replaceable Parts - Assembly Replacement

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### Screw Torque Settings

Most screws used in these instruments are metric Torx screws. They require a Torx screwdriver or Torx bit for proper removal and installation. 4 mm screws are size T15, 3 mm and 3.5 mm screws are size T10. Pozidriv screws are also used. Use only a #2 Pozidriv screwdriver or bit.

To avoid potential RFI leakage and prevent connector damage, tighten screws and RF coax cable connectors to the following torque limits:

SMA connectors	8.5 inch-pounds
SMC	5.5 inch-pounds
3mm, T10 Screws	9 inch-pounds
3.5mm, T10 Screws	14 inch-pounds
4mm, T15 Screws	21 inch-pounds

Use the correct wrench to loosen RF coax cable connectors. Use a 15/64" wrench for SMC flexible coax cable connectors, and a 5/16" wrench for SMA semi-rigid coax connectors. To avoid damaging semi-rigid coax cables, loosen both ends of cable before disconnecting.

---

### Note

*When looking at the instrument, some of the mechanical procedures may seem intuitively obvious; however, we strongly recommend that you read through an entire procedure before performing any of the steps.*

*Unless otherwise noted, the directions "left" and "right" given in the instructions are referenced as though you are facing the Front Panel.*

---

### RF Assembly Removal, Replacement, And Verification

Assembly removal, replacement, and verification instructions provide guidance for removing and replacing a defective RF assembly, and to verify the instrument's correct operation when a replacement assembly has been installed.

The RF Assemblies are easily removed and replaced. The main consideration is to firmly connect the numerous flexible and semi-rigid cables to the correct assembly without damaging them.

## **RF Assembly Removal And Replacement**

Whenever two separate electrical sub-assemblies (pc boards) are located together in the same physical frame and one is defective, both must be replaced as one assembly. Examples are the MOD DIST and NSM-OSC, and the REF-OSC and ALC RF Assemblies in the HP 8645A.

### **RF Assembly Removal**

Removal Time: 7 minutes. Tools Needed: Torx T10 Screwdriver or bit.

---

#### **Caution**

*Before removing an assembly disconnect and remove all RF semi-rigid coax cables that are attached, crossing over, or are near enough to the assembly where they could be damaged during the removal process.*

*Bent, nicked, or kinked semi-rigid coax cables will cause SWR mismatch that could result in decreased RF power performance.*

---

1. Turn off the instrument. Remove the top cover (top and bottom cover removal instructions are found at the end of this subsection).
2. Remove the Ribbon cable(s) attached to the assembly. Remove all the RF coax cables attached to the assembly.
3. Unscrew and remove the T10 Torx screws located in the assembly frame mounting ears that secure the assembly to the instrument frame. Lift out the assembly.

### **RF Assembly Replacement**

Replacement Time: 7 minutes. Tools Needed: Torx T10 Screwdriver or bit.

---

#### **Note**

*For instruments with Serial Prefixes 2822A and below, the instrument main frame does not have the holes for assemblies with alignment studs. Unscrew and remove the alignment studs (from the assembly) and discard prior to assembly replacement into older instrument frames.*

---

1. Take the replacement assembly and align it to the instrument so that the assembly name is closest to the rear frame where the assembly numbers are. Carefully lower the assembly into its slot, making sure that the assembly frame engages the instrument frame lugs.

2. Reconnect the assembly cables according to the cable end descriptions, or refer to the Assembly Locator Diagrams (figures 2-12 through 2-26).

---

**Note**

*If replacing either the HP 8664/8665 HF DRVR or GAAS/DIV Assembly turn to and perform the HF DRVR Self-Cal Adjustment in section 5 at this time.*

*If replacing either the HP 8664/8665 MW LOOP or YTO Assembly turn to and perform the MW LOOP Self-Cal Adjustment in section 5 at this time.*

---

3. Turn on the instrument and verify operation (using Special Function 320 as described in *Verifying Instrument Operation*).

## **Card-cage Assembly Removal And Replacement**

These are general removal and replacement procedures for assemblies located in slots A13 through A16. Specific procedures for the HP 8645 Attenuator Assembly and the HP 8664/8665 Attenuator Assembly are found on following pages.

---

### **Note**

*When the instrument is off and the Controller Assembly (Card-cage Slot A16) has been removed from the motherboard connectors, the instrument calibration data located in Controller Assembly RAM is lost. At the next power-up, the instrument will sense a data lost condition and automatically activate the Recal routine. The instrument will be ready for normal operation after approximately 2-5 minutes.*

---

### **Card-cage Assembly Removal**

Removal Time: 10 minutes. Tools Needed: Torx T10 Screwdriver or bit.

1. Turn off the instrument. Remove the top cover.
2. Remove any coax or ribbon cables from the assemblies that would prevent removal of the card cage cover.
3. Remove the card cage cover by removing six Torx T10 screws.
4. Remove assembly hold-down screws (if used on the assembly).
5. Remove the "card" assembly by gently rocking the assembly while pulling up.

### **Card-cage Assembly Replacement**

Replacement Time: 10 minutes. Tools Needed: Torx T10 Screwdriver or bit.

1. Align the "card" assembly to the correct slot guides and gently lower the assembly down towards the Motherboard.
2. With the connectors properly aligned, firmly press the assembly into the Motherboard connectors. If replacing an assembly with ribbon cables that connect to the assembly top, temporarily replace the ribbon cables for assembly repair verification.
3. Turn on the instrument and verify operation (using Special Function 320 as described in *Verifying Instrument Operation*).



4. When the assembly checks out operational, replace the card cage cover and replace the six Torx T10 screws until snug, then tighten them to the required torque specifications. (Note that the four screws on the ends of the cover are 3.5 mm screws, and the two screws in the middle of the cover are 3 mm screws.) Replace any removed cables.

## **HP 8643/44/45 Attenuator Assembly Removal And Replacement**

### **HP 8643/44/45 Attenuator Assembly Removal**

Removal Time: 10 minutes. Tools Needed: Torx T10 Screwdriver or bit, and 1/4" and 5/16" open end wrenches.

---

#### **Note**

*Remove this assembly in a ESD protected environment only.*

---

1. Unscrew the RF Input semi-rigid coax cable (W36) SMA connector with a 5/16" open end wrench and move W36 out of the way of the Attenuator assembly. (You will need to remove W36 from the ALC assembly also.) See the RF Cable Locator Diagrams (figures 2-12 to 2-17) for finding where W36 and W37 are in your instrument.
2. With a legible marker, place a mark on the the RF Output semi-rigid coax cable (W37) at the point where W37 enters the connector that secures it to the RPP (Reverse Power Protection) relay on the Attenuator Assembly.
3. Loosen the nut (on the connector) that secures the RF Output semi-rigid coax cable (W37) into the Reverse Power Protection relay (RPP, on the Attenuator Assembly) with a 1/4" open end wrench.

Gently pull W37 out from the connector and away from the Attenuator assembly. BE CAREFUL not to bend the center conductor of W37.

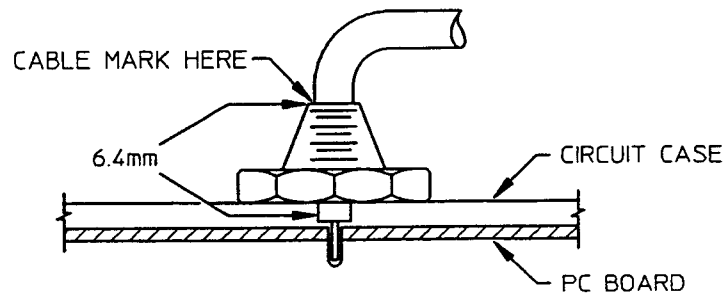
4. Remove the two assembly hold-down screws. Remove the Attenuator assembly by gently rocking while pulling up.

Gently hold W37 away from the Attenuator assembly as it is being lifted out of the card cage.

### HP 8643/44/45 Attenuator Assembly Replacement

Removal Time: 10 minutes. Tools Needed: Torx T10 Screwdriver or bit, and 1/4" and 5/16" open end wrenches.

1. Carefully insert the RF Output semi-rigid coax cable (W37) into the Reverse Power Protection relay (RPP, on the Attenuator Assembly) up to the mark you placed on the cable when you removed the Attenuator.



The center conductor of W37 fits into a gold-plated pin socket inside the connector that secures W37 to the RPP. If W37 is not completely inserted into the RPP, or if the center conductor of W37 is bent, W37 will not make good connection with the RPP and you will not get RF output.

2. Tighten the nut until snug with a 1/4" open end wrench. DO NOT over-tighten (the torque specification is 4.5 in.-lbs).
3. Connect W36 with a 5/16" open end wrench and tighten the SMA connector to the proper torque of 8.5 in.-lbs.
4. Replace the two assembly hold-down screws.

## **HP 8664/65 Attenuator Assembly Removal And Replacement**

The Attenuator Assembly is made up of the GAAS DIV and YTO Assemblies attached to the ATTEN/RPP Assembly deck. If the ATTEN/RPP Assembly is defective remove the GAAS DIV, and YTO Assemblies before replacing.

Procedures for the Removal And Replacement of the GAAS DIV and YTO Assemblies from the ATTEN/RPP Assembly deck are on following pages.

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**Note**      *Remove this assembly in a ESD protected environment only.*

---

### **HP 8664/65 Attenuator Assembly Removal**

Removal Time: 10 minutes. Tools Needed: Torx T10 Screwdriver or bit, and 5/16" open end wrench.

1. Disconnect semi-rigid coax cables: W60 and W75 from MW LOOP connectors J1 and J2, W66 and W67 from HF DRVR connectors J1 and J2, and W71 from OUTPUT connector J2.

Use a 5/16" open end wrench for SMA connectors, and a 15/64" open end wrench for SMC connectors. See the RF Cable Locator Diagrams (figures 2-18 to 2-20) for the locations of these semi-rigid coax cables in your instrument.

2. Disconnect the RF Output semi-rigid coax cable (W37) from the Reverse Power Protection relay (RPP, on the Attenuator Assembly) with a 5/16" open end wrench. Lift W37 up and away from the Attenuator assembly.
3. Disconnect ribbon cable W72 from the GAAS DIV Assembly at J4, and ribbon cable W59 from the YTO at J1.
4. Remove the two assembly hold-down screws. Remove by gently rocking the assembly while pulling up.
5. Disconnect the RF flexible coax cable (W74) from the GAAS DIV Assembly at U17J5 when clearance allows, then remove the assembly from the instrument.

### **HP 8664/65 Attenuator Assembly Replacement**

Removal Time: 10 minutes. Tools Needed: Torx T10 Screwdriver or bit, and 5/16" open end wrench.

1. Connect semi-rigid coax cables: W60, W75, W66, and W67 to the Attenuator assembly before inserting the assembly into the instrument.
2. Connect the RF flexible coax cable (W74) to the GAAS DIV Assembly at U17J5, and tighten to 8.5 in-lbs. (This connection is hard to reach once the Attenuator Assembly is in place. Tightening the connection to the proper torque specification is important to prevent RFI leakage.)
3. Insert assembly into instrument slot A15 (next to the DCU Controller). Seat the assembly onto the Motherboard connector by gently rocking the assembly while pushing down. Replace and tighten the two assembly hold-down screws.
4. Connect ribbon cable W72 to the GAAS DIV Assembly at J4, and ribbon cable W59 to the YTO at J1.
5. Connect semi-rigid coax cables: W60 and W75 to MW LOOP connectors J1 and J2, W66 and W67 to HF DRVR connectors J1 and J2, and W71 to OUTPUT connector J2.
6. Connect the RF Output semi-rigid coax cable (W37) to the Reverse Power Protection relay (RPP, on the Attenuator Assembly) with a 5/16" open end wrench.

Use a 5/16" open end wrench for SMA connectors, and a 15/64" open end wrench for SMC connectors. See figures 2-18 to 2-26 *RF Cable Locator Diagrams* and the parts list cable descriptions for the correct placement and visual identification of cables.

7. Connect and tighten all the SMA connectors to the proper torque of 8.5 inch-pounds.

**HP 8664/65  
ATTEN/RPP ROM  
Replacement**

Whenever the Attenuator/RPP Assembly is replaced, you also need to replace the Attenuator/RPP Cal Data ROM (U32, located on the I/O Assembly).

1. Turn off the instrument.
2. Remove U32 from the I/O Assembly and replace it with the EEPROM (U32) that came with the replacement ATTEN/RPP Assembly.
3. Turn on the instrument and perform an instrument re-cal by keying in **SPECIAL** 171 (ReCal), and pressing the **ON** key twice. A displayed Result code = 0 indicates that the instrument is calibrated.

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## **HP 8664/65 YTO Assembly Removal And Replacement**

To remove or replace the YTO Assembly, you must remove the Attenuator Assembly from the instrument first.

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### **Note**

*Remove this assembly in a ESD protected environment only.*

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### **YTO Assembly Removal**

Removal Time: 7 minutes. Tools Needed: Torx T10 Screwdriver or bit, 5/16" wrench.

1. If still connected, remove ribbon cable W59 from YTO J1.
2. Remove the RF semi-rigid coax cable W70 from between YTO J2 and GAAS DIV U17J1 using a 5/16" wrench.
3. Locate and remove the four (4) countersunk T10 flathead screws (in square pattern) from the ATTEN/RPP Assembly deck.

---

### **Caution**

*Do not remove the three panhead screws (in an inverted triangle pattern) from the YTO Assembly. The top two screws hold the YTO assembly lid in place (along with 6 other panhead screws), and the center panhead screw secures the YIG oscillator microcircuit within the YTO Assembly.*

---

4. Carefully move the YTO away from the Attenuator Assembly.

### **YTO Assembly Replacement**

Replacement Time: 7 minutes. Tools Needed: Torx T10 Screwdriver or bit, 5/16" wrench.

Turn to Section 4 for an illustrated parts breakdown of how the YTO, GAAS DIV, and the ATTEN/RPP Assembly deck fit together.

1. Align the four holes in the side of the YTO "can" to the four (4) countersunk screw holes in the ATTEN/RPP Assembly deck.
2. Attach the YTO Assembly with four (4) T10 flathead screws. Tighten until snug then torque the screws to their correct torque specification of 9 in-lb.

3. Connect RF semi-rigid coax cable W70 between YTO J2 and GAAS DIV U17J1 using a 5/16" wrench. Torque the SMA connections to the correct specification of 8.5 in-lb.

Use the parts list cable descriptions and figures 2-18 through 2-26 for correct placement and visual identification of cables.

4. Connect ribbon cable W59 to YTO J1 and then to PLL YIG J1 when the complete Attenuator Assembly is installed in the instrument.



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## **HP 8664/65 GAAS DIV Assembly Removal And Replacement**

To remove or replace the GAAS DIV Assembly, you must remove the entire microwave assembly first, located beneath the card-age covers.

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### **Note**

*Remove this assembly in a ESD protected environment only.*

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### **GAAS DIV Assembly Removal**

Replacement Time: 13 minutes. Tools Needed: Torx T10 Screwdriver or bit, 5/16" wrench.

1. Remove semi-rigid coax cable W70 from between YTO J2 and GAAS DIV U17J1 using a 5/16" wrench.
2. Remove semi-rigid coax cable W76 from between GAAS DIV U17J4 and GAAS DIV U16J1.
3. Remove gray ribbon cable W77 from GAAS DIV J3.
4. If the instrument has Option 008 (Pulse Modulation) installed, the Isolator (HY800) and cable W808 must be removed before all the panhead screws can be removed from the assembly:

Remove RF semirigid coax cable W808 from between HY800 J2 (the Isolator) and ATTEN/RPP S1J1.

Remove the two (2) T10 panhead screws and washers that hold the Isolator bracket to the GAAS DIV Assembly. Carefully remove the bracket and HY800 Isolator as one "assembly".

---

### **Caution**

*Do not drop or handle the HY800 Isolator without ESD protection. It is fragile.*

---

5. Remove the 21 T10 panhead screws and washers that hold the GAAS DIV Assembly (and the microcircuits) to the ATTEN/RPP Assembly deck.
6. Carefully separate the GAAS DIV Assembly from the ATTEN/RPP Assembly deck making sure that the microcircuits U16 and U17 remain with the GAAS DIV Assembly.

### **GAAS DIV Assembly Replacement**

Replacement Time: 13 minutes. Tools Needed: Torx T10 Screwdriver or bit, 5/16" wrench.

Turn to figure 4a-7 for an illustrated parts breakdown of how the YTO, GAAS DIV, and the ATTEN/RPP deck fit together.

1. Align the GAAS DIV Assembly (complete with the microcircuits) to the ATTEN/RPP deck and attach with 21 T10 panhead screws and washers.
2. If the instrument has Option 008 (Pulse Modulation) installed, the Isolator (HY800) and mounting bracket "assembly" must be replaced after the two panhead screws in the upper corner of the GAAS DIV Assembly (closest to the YTO Assembly) have been installed.

---

#### **Caution**

*Do not drop or handle the HY800 Isolator without ESD protection. It is fragile.*

---

- a. Replace the two (2) T10 panhead screws and washers that hold the Isolator bracket to the GAAS DIV Assembly.
- b. Replace RF semirigid coax cable W808 between HY800 J2 (the Isolator) and ATTEN/RPP S1J1 using a 5/16" wrench. Torque the SMA connections to the correct specification of 8.5 in-lb.
3. Connect the two attenuator control ribbon cables to the GAAS DIV J2 connector as follows:  
  
AT1 (the horizontal attenuator) ribbon cable connects to the inside set of pins 2-14, (closest to the pc board), with the brown wire connecting to J2 Pin 2.  
  
AT2 (the vertical attenuator) ribbon cable connects to the outside set of pins 1-13, (closest to the pc board), with the brown wire connecting to J2 Pin 1.
4. Thread the gray ribbon cable W77 through the square opening in the GAAS DIV Assembly and connect it (W77) to GAAS DIV J3. (The other end of W77 should be connected to ATTEN/RPP J1.)
5. Connect the semi-rigid coax cable W76 between GAAS DIV U17J4 and GAAS DIV U16J1.

6. Connect RF semi-rigid coax cable W70 between YTO J2 and GAAS DIV U17J1 using a 5/16" wrench. Torque the SMA connections to the correct specification of 8.5 in-lb.

## **I/O Assembly Removal And Replacement**

The I/O Assembly can be removed to gain access to the Power Supply and its components.

### **I/O Assembly Removal**

Removal Time: 5 minutes. Tools Required: Pozidriv screwdriver, Torx T10 screwdriver or bit.

1. turn off the instrument and unplug the Mains Power Cord at the Line Power Assembly.
2. In the instrument's right rear corner, disconnect the large gray ribbon cable, the power supply cable (multi-wired with large white connector), and the small black molex connector.

---

### **Note**

*To gain access to the power supply, fan, or fuseboard through the I/O Assembly, you do not need to remove the assembly ribbon cables.*

*Remove all the ribbon cables that connect to the I/O Assembly only if you are replacing the I/O Assembly.*

---

3. Remove all the ribbon cables that connect to the I/O Assembly.
4. Along the front edge of the I/O Assembly, remove the 5 screws that secures the I/O Assembly to the instrument frame. Lift the I/O Assembly away.
5. On a ESD (Electric Static Discharge) protected surface, remove the clear plastic I/O shield using the T10 screwdriver or bit.

### **I/O Assembly Replacement**

Replacement Time: 5 minutes. Tools Required: Pozidriv screwdriver, Torx T10 screwdriver or bit.

---

### **Note**

*When replacing an I/O Assembly in HP 8664/65 signal generators with another I/O Assembly, remove EEPROMs U32 and U64 from the old assembly and insert them into the replacement assembly. These EEPROMs contain RF Assembly Cal Data that must remain with the instrument.*

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1. On a ESD (Electric Static Discharge) protected surface, replace the clear plastic I/O shield.
2. Align the I/O Assembly to the mounting holes on the instrument frame, then attach with the 5 Torx T10 screws.
3. In the instrument's right rear corner, reconnect the large gray ribbon cable, the power supply cable (multi-wired with large white connector) and the cable with the black molex connector.
4. Replace all the assembly ribbon cables to their correct connectors on the I/O Assembly as indicated below:

*Table 4b-1. HP 8643 Ribbon Cable Interconnections for the I/O Assembly*

I/O Assembly	J4	to	STD VCO	J4
I/O Assembly	J5	to	STD ALC	J6
I/O Assembly	J6	to	REF OSC	J3
I/O Assembly	J7	to	FRAC-N	J3
I/O Assembly	J8	to	NSM OSC	J3
I/O Assembly	J9	to	STD MOD	J6
I/O Assembly	J10	to	DOUBLER	J1*
I/O Assembly	J11	to	COAX DSC	J5
I/O Assembly	J13	to	COUNTER	J1
* Option 002				

*Table 4b-2. HP 8644 Ribbon Cable Interconnections for the I/O Assembly*

I/O Assembly	J4	to	STD VCO	J4
I/O Assembly	J5	to	STD ALC	J6
I/O Assembly	J6	to	REF OSC	J3
I/O Assembly	J7	to	FRAC-N	J3
I/O Assembly	J8	to	NSM OSC	J3
I/O Assembly	J9	to	STD MOD	J6
I/O Assembly	J10	to	DOUBLER	J1*
I/O Assembly	J11	to	COAX DSC	J5**
* Option 002				
** Option 004 (HP 8644A only)				

*Table 4b-3. HP 8645 Ribbon Cable Interconnections for the I/O Assembly*

I/O Assembly	J5	to	FAST ALC	J6
I/O Assembly	J6	to	REF OSC	J3
I/O Assembly	J7	to	FRAC-N	J3
I/O Assembly	J8	to	NSM OSC	J3
I/O Assembly	J9	to	MOD DIST	J6
I/O Assembly	J10	to	DOUBLER	J1*
I/O Assembly	J11	to	COAX DSC	J5**
* Option 002				
** Option 004				

*Table 4b-4. HP 8664 Ribbon Cable Interconnections for the I/O Assembly*

I/O Assembly	J12	to	PM DRVR	J3**
I/O Assembly	J14	to	PLL-YIG	J5
I/O Assembly	J7	to	FRAC-N	J3
I/O Assembly	J16	to	REF	J3
I/O Assembly	J13	to	HF DRVR	J4
I/O Assembly	J10	to	OUT AMP	J1
I/O Assembly	J8	to	NSM OSC	J3
I/O Assembly	J9	to	MOD DIST	J6
I/O Assembly	J4	to	IF/DIV	J2
I/O Assembly	J11	to	COAX DSC	J5*
I/O Assembly	J15	to	GAAS DIV	J4
* Option 004				
** Option 008				

*Table 4b-5. HP 8665A Ribbon Cable Interconnections for the I/O Assembly*

I/O Assembly	J5	to	MW ALC	J1
I/O Assembly	J12	to	PM DRVR	J3**
I/O Assembly	J14	to	PLL-YIG	J5
I/O Assembly	J7	to	FRAC-N	J3
I/O Assembly	J16	to	REF	J3
I/O Assembly	J13	to	HF DRVR	J4
I/O Assembly	J10	to	OUT AMP	J1
I/O Assembly	J8	to	NSM OSC	J3
I/O Assembly	J9	to	MOD DIST	J6
I/O Assembly	J4	to	IF/DIV	J2
I/O Assembly	J11	to	COAX DSC	J5*
I/O Assembly	J15	to	GAAS DIV	J4
* Option 004				
** Option 008				

Table 4b-6. HP 8665B Ribbon Cable  
Interconnections for the I/O Assembly

I/O Assembly	J5	to	MW CONV	J3
I/O Assembly	J12	to	PM DRVR	J3**
I/O Assembly	J14	to	PLL-YIG	J5
I/O Assembly	J7	to	FRAC-N	J3
I/O Assembly	J16	to	REF	J3
I/O Assembly	J13	to	HF DRVR	J4
I/O Assembly	J10	to	OUT AMP	J1
I/O Assembly	J8	to	NSM OSC	J3
I/O Assembly	J9	to	MOD DIST	J6
I/O Assembly	J4	to	IF/DIV	J2
I/O Assembly	J11	to	COAX DSC	J5*
I/O Assembly	J15	to	GAAS DIV	J4
* Option 004				
** Option 008				

5. Turn on the instrument and verify operation (using Special Function 320 as described in *Verifying Instrument Operation*).

## **Front Panel Assembly Removal And Replacement**

### **Front Panel Removal**

Removal Time: 6 minutes. Tools Required: #2 Pozidriv and flat, thin-bladed screwdrivers, T10 Torx screwdriver or bit.

1. turn off the instrument and unplug the Mains Power Cord at the Line Power Assembly.
2. Remove any adapters from the RF OUTPUT connector on the Front Panel.
3. Gently pry plastic trim strip from top of front frame by inserting a screwdriver into slots in rear edge of plastic strip.

Remove the three screws (third, eighth, and twelfth holes counting from right).

4. On the sides of the front frame, remove trim strips then remove the two screws (first and third holes counting from top).
5. On bottom of frame, remove the three screws (third, eighth, and twelfth holes counting from right).
6. Grasping the Modulation Input connectors (AM/FM/PULSE/PHIM) and the AUDIO/RF Output connectors, pull the front panel outward until it clears the front frame by about 1/2 inch. Guide the Front Panel away from the frame edge.

---

### **Note**

*If it is difficult to pull the Front Panel out, it may be helpful to loosen slightly the two screws on the front frame bottom, directly under the RF OUTPUT connector.*

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7. Disconnect the ribbon cable to remove the Front Panel away from the instrument.



### **Front Panel Replacement**

Replacement Time: 6 minutes. Tools Required: #2 Pozidriv and flat, thin-bladed screwdrivers, T10 Torx screwdriver or bit.

1. Grasping the Modulation Input connectors (AM/FM/PULSE/PHIM) and the AUDIO/RF Output Connectors, push the front panel straight back into front frame, making sure that the RF Connector fits into the front panel RF Connector opening.
2. Counting from the right, replace screws into the third, eighth, and twelfth holes in top of the front frame; replace screws into the third, eighth, and twelfth holes in bottom of the front frame. (Tighten the two screws under the RF OUTPUT connector if they were loosened when removing the Front Panel.)
3. On the sides of the front frame, replace two screws into the first and third holes (counting from top), then replace the trim strips.
4. Press the top plastic trim strip into place on top of the front frame, with the position slot facing towards rear of the instrument.

## **Fan Removal And Replacement**

The fan assembly can be removed from either the top of the instrument (by removing the I/O Assembly), or from the bottom of the instrument (by removing the Power Supply Assembly).

### **Fan Removal**

Removal Time: 10 minutes. Tools Required: Pozidriv screwdriver.

1. turn off the instrument and unplug the Mains Power Cord at the Line Power Assembly.
2. Remove the top or bottom panel.
3. Remove the I/O Assembly or Power Supply Assembly. (Note that the recommended procedure is to remove the I/O Assembly.)
4. Locate and unscrew the four screws that are "just inside" the rear panel fan shroud.
5. Disconnect the fan power wire connector and remove the fan assembly.

### **Fan Replacement**

Replacement Time: 10 minutes. Tools Required: Pozidriv screwdriver.

1. Align the fan assembly with the mounting holes in the rear panel.
2. Insert the four screws and tighten until snug.
3. Reconnect the fan power wires.
4. Replace the appropriate I/O or Power Supply Assembly and reconnect any disconnected cables.
5. Replace the appropriate top or bottom cover.

---

## **Power Supply Assembly Removal And Replacement (except HP 8643A)**

All the Performance Signal Generator series (PSG) use the same Power Supply Assembly, except HP 8643A.

### **Power Supply Assembly Removal**

Removal Time: 15 minutes. Tools Required: Torx T10 screwdriver or bit, and flat thin-bladed screwdrivers.

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### **Warning**

*Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source of supply. Energy levels at certain points may, if contacted, cause personal injury.*

---

1. turn off the instrument and unplug the Mains Power Cord at the Line Power Assembly.
2. Place the instrument on a flat, well supported level surface. Turn the instrument over so that the bottom panel is up, and you are facing the rear panel.
3. Using the Torx T10 screwdriver, remove the nine pan head screws that secure the power supply assembly.
4. With the thin-bladed flat screwdriver, carefully pry up evenly around the edges of the power supply assembly board to get a finger hold. NOTE: start at your left side of the assembly board and work towards the right until you can raise the assembly board high enough (approx. 1/4 in) to get a firm finger hold.
5. Grasp the four corners of the assembly board and gently rock the board back and forth while pulling up until you feel the assembly "release". (The Power Supply Assembly is connected to the two Power Transistor Boards on either side of the fan to the multi-pin molex connectors on the power supply assembly.)
6. Raise up the left side of the power supply assembly board until you can see and remove the two transformer secondary connectors. Keep raising the left side of the board until you can reach in and remove the multi-wired power supply cable. Hint: If you cannot reach the power cable connector or raise the power supply assembly high enough to reach in with your hand, remove the instrument left side panel and use the thin-bladed screwdriver to pry off the connector.

7. Pivot the assembly board all the way to the right until you can reach and disconnect the fan power wire connector, and remove the gray ribbon connector.
8. Lift away the Power Supply Assembly.

### ***Power Supply Assembly Replacement***

Replacement Time: 15 minutes. Tools Required: Torx T10 screwdriver or bit, and flat thin-bladed screwdrivers.

1. Lower the Power Supply Assembly close enough into place so that the gray ribbon cable, power supply cable, fan power wires, and the transformer secondary wire connectors can be securely connected.
2. Carefully align the assembly board over its mounting holes in the instrument. (This should align the two Power Transistor Assembly boards on either side of the fan to the multi-pin molex connectors on the power supply assembly.)
3. Make sure that the Fuse Assembly board (on the left side of the fan) is correctly aligned with its corresponding connector on the power supply assembly.
4. Gently but firmly push down to seat the the Power Supply Assembly board into place. The assembly should fit flat and snug against the instrument mounting frame without gaps or bends in the assembly board.
5. Insert the nine Torx pan head screws and tighten to the correct torque setting. Make sure that the screws with flat washers go in the assembly board hole slots on the mounting frame edge closet the the center of the instrument.
6. Replace the bottom cover.

---

## **Fuseboard Removal And Replacement (except HP 8643A)**

### **Fuseboard Removal**

Removal Time: 10 minutes. Tools Required: Torx T10 screwdriver or bit.

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### **Caution**

*For continued protection against fire hazard, replace the line fuse(s) only with 250V fuse(s) of the same current rating and type (for example, normal blow, time delay, etc.) Do not use repaired fuses or short circuited fuseholders.*

---

1. Turn off the instrument and unplug the Mains Power Cord at the Line Power Assembly.
2. Remove the Top Cover and the I/O Assembly. (See the Top Cover and I/O Assembly detailed removal procedures in this subsection.)
3. Remove the two T10 Torx screws that secure the Fuseboard to the Power Transistor Board.
4. Pull the Fuseboard up off of the Power Supply Assembly connector pins.

### **Fuseboard Replacement**

Replacement Time: 10 minutes. Tools Required: Torx T10 screwdriver or bit.

1. Turn off the instrument and unplug the Mains Power Cord at the Line Power Assembly.
2. Make sure that the connector is properly aligned to the correct pins, then push the Fuseboard onto the Power Supply Assembly connector pins.
3. Secure the Fuseboard to the Power Transistor Board with two T10 Torx screws.
4. Replace the Top Cover and the I/O Assembly. (See the Top Cover and I/O Assembly replacement procedures in this subsection.)

## **Power Transistor Board Removal And Replacement (except HP 8643A)**

### ***Power Transistor Board Removal***

Removal Time: 10 minutes. Tools Required: Torx T10 screwdriver or bit.

1. Turn off the instrument and unplug the Mains Power Cord at the Line Power Assembly.
2. Remove the Top Cover and the I/O Assembly. (Detailed removal instructions for both the Top Cover and I/O Assembly are written in this sub-section.)
3. Remove the four T10 Torx screws from the Rear Panel (either to the left or right side of the fan shroud) that corresponds to the Power Transistor Board you want to remove.

(If removing the Power Transistor Board that is screwed to the Fuseboard, it is easier to remove both the Fuseboard and transistor board as one unit and separate them later.)

4. Pull the Transistor Board up off of the Power Supply Assembly connector pins.

### ***Power Transistor Board Replacement***

Replacement Time: 15 minutes. Tools Required: Torx T10 screwdriver or bit.

1. Coat heat sink compound on the edge of the transistor board heat sink that mates with the Rear Panel.
2. Carefully align the transistor board connector to the Power Supply Assembly connector pins and push down until it is firmly seated.
3. Secure the transistor board to the Rear Panel with four (long) T10 Torx screws.

## **Rear Panel Removal And Replacement**

### **Rear Panel Removal**

Removal Time: 25 minutes. Tools Required: Pozidriv screwdriver, and Torx T10 screwdriver or bit.

1. Turn off the instrument and unplug the Mains Power cord from the instrument Line Power Assembly.
2. Remove the top, sides, and bottom covers.
3. Remove the Power Supply Assembly.
4. On the left side, remove the 4 screws that attach the transformer (mounting) bracket to the bracket mounting plate (which is attached to the instrument frame). See figure 4-5.
5. Remove the eight T10 Torx screws that attach the rear panel connectors to the Rear Panel.
6. Remove the four Pozidriv screws that attaches the Rear Panel (one in each corner) to the side frame struts.

### **Rear Panel Replacement**

Replacement Time: 25 minutes. Tools Required: Pozidriv screwdriver, and Torx T10 screwdriver or bit.

1. Replace the Power transistor Boards, Fan, Transformer, and Line Power Assembly (if any of them were removed).
2. Replace the eight T10 Torx screws that attach the rear panel connectors plate to the Rear Panel.
3. Fit the Rear Panel to the side frame struts and replace the two screws: one Pozidriv screw in each corner of the panel (where the strut meets the panel, and the other screw on the side of the strut).
4. On the left side, replace the 4 screws that attach the transformer (mounting) bracket to the bracket mounting plate.
5. Replace the instrument side panels.

## **Transformer Removal and Replacement**

### **Transformer Removal**

Removal Time: 20 minutes. Tools Required: Torx T10 screwdriver or bit.

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### **Warning**

*Hazardous voltage is present when the Mains Power cord is plugged in.*

---

1. Turn off the instrument and unplug the Mains Power cord from the instrument Line Power Assembly.
2. Remove the top, side, and bottom covers.
3. Remove the Power Supply Assembly.
4. On the left side, remove the 4 screws that attach the transformer (mounting) bracket to the bracket mounting plate (which is attached to the instrument frame).
5. Remove the Rear Panel.
6. Remove the transformer primary wires from the Line Power Assembly.  
  
Unsolder and remove the clear transformer primary wire from the chassis lug.
7. Remove the 4 transformer mounting screws from the rear panel. (Remember the washer and bushing locations.)
8. Remove the transformer by moving it away from the rear panel.



### **Transformer Replacement**

Replacement Time: 20 minutes. Tools Required: Torx T10 screwdriver or bit.

1. Fit the Transformer to the Rear Panel with the primary wires (single gray) facing down and away from the rear panel, and the colored secondary wires facing up and away from the rear panel.
2. Connect the transformer mounting bracket and the Transformer to the Rear Panel using the 4 long screws.
3. Connect the Transformer primary wires to the Line Power Assembly as follows:

BLK/ORG to pin A,

BLK to pin C,

BLK/GRN to pin D,

BLK/YEL to pin E,

BLK/RED to pin F.

- a. The clear transformer primary wire is soldered to the closest instrument chassis ground lug.
4. Attach the Rear Panel to the instrument side struts.
5. Attach the Transformer mounting bracket to the Bracket mounting plate.
6. Replace the Power Supply Assembly.

## **Line Power Assembly Removal and Replacement**

### **Line Power Assembly Removal**

Removal Time: 20 minutes. Tools Required: Torx T10 screwdriver or bit, and flat thin-bladed screwdrivers.

---

### **Warning**

*Hazardous voltage is present when the Mains Power cord is plugged in.*

---

1. Turn off the instrument and unplug the Mains Power cord from the instrument Line Power Assembly.
2. Remove the Rear Panel from the instrument.
3. Remove the transformer primary leads from the Line Power Assembly, then remove the Transformer from the Rear Panel.
4. Remove the Line Power Assembly by depressing down a metal "tab" on one side of the Line Power Assembly with a flat-bladed screwdriver and your fingers until the metal "tab" is pushed back through the rear panel opening as far as space limitations allow.
5. Depress the metal "tab" on the other side of the Line Power Assembly in the same way (in step 5) until the Line Power Assembly pops out.
6. Clip or unsolder the ground wire between the Line Power Assembly and the Rear Panel.

---

### **Line Power Assembly Replacement**

Replacement Time: 20 minutes. Tools Required: Torx T10 screwdriver or bit, and flat thin-bladed screwdrivers.

1. Align the Line Power Assembly in the slot beneath the Transformer so that the Mains Fuse card is to the right.
2. Push the Line Power Assembly in until the curved metal "tabs" engage the inside edge of the Rear Panel and hold the Line Power Assembly firmly in place.
3. Connect the Transformer primary wires to the Line Power Assembly as follows:

BLK/ORG to pin A,

BLK to pin C,

BLK/GRN to pin D,

BLK/YEL to pin E,

BLK/RED to pin F,

The GRN/YEL wire is soldered to instrument chassis ground lug.

## **Instrument Cover Removal and Replacement**

### **Top Cover Removal**

Removal Time: 2 minutes. Tools Needed: #2 Pozidriv Screwdriver, Torx T10 Screwdriver.

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### **Note**

*Unless otherwise noted, the directions "left" and "right" given in the instructions are referenced as though you are facing the Front Panel.*

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1. Remove the two top rear feet from rear frame of instrument by removing the Pozidriv screw in each foot.
2. With the Pozidriv screwdriver, loosen the screw in the middle of rear edge of the top cover. This is a captive screw (attached to top cover). Loosening it will cause cover to push away from front frame.
3. Slide top cover toward rear of instrument to disengage and lift up and away. (Cover has a tight fit and may need to be worked loose.)

### **Top Cover Replacement**

Replacement Time: 2 minutes. Tools Needed: #2 Pozidriv Screwdriver, Torx T10 Screwdriver.

1. Place top cover onto the instrument. Slide cover toward front of instrument while applying a slight downward pressure at front edge of cover. Guide into slot in top of front frame. (Cover has a tight fit and may need to be worked forward.)
2. When screw on rear edge of cover is in contact with rear frame, tighten screw. (Cover should move forward as screw is tightened.)
3. Replace the two top feet on rear frame using a Pozidriv screw in each.

### **Bottom Cover Removal**

Removal Time: 2 minutes. Tools Needed: #2 Pozidriv Screwdriver, Torx T10 Screwdriver.

1. Remove the two rear feet from rear frame of instrument by removing the Pozidriv screw in each foot.

Remove the bottom center rear foot from rear frame of instrument by removing two T10 Torx screws. Note that these screws are held in place with thread locking compound so removal may be difficult.

2. With the Pozidriv screwdriver, loosen the captive screw (attached to the bottom cover) in the middle of the bottom cover rear edge. Loosening it will cause cover to push away from the front frame.
3. Slide the cover towards you (rear of instrument) to disengage, then lift up and away. (Cover has a tight fit and may need to be worked loose.)

### **Bottom Cover Replacement**

Replacement Time: 2 minutes. Tools Needed: #2 Pozidriv Screwdriver, Torx T10 Screwdriver.

1. Place bottom cover onto the instrument. Slide cover towards the front of the instrument while applying a slight downward pressure at front edge of the cover. Guide the cover edge into the front frame slot. (Cover has a tight fit and may need to be worked forward.)
2. When screw on rear edge of cover is in contact with rear frame, tighten the screw. Cover should move forward as screw is tightened, but you may need to manually guide the edge into the front frame slot.
3. Replace the bottom center foot with two T10 screws. Use thread locking compound to keep the two screws in place. Replace the two rear feet that fit onto the rear frame with a Pozidriv screw in each foot.

### **Side Cover Removal**

Removal Time: 3 minutes. Replacement Time: 3 minutes. Tools Needed: #2 Pozidriv Screwdriver.

1. Remove the rear feet from side of instrument rear frame by removing the Pozidriv screw in each foot.
2. With the Pozidriv screwdriver, remove the screws that attach the (strap) handle caps. Remove the caps and straps also.
3. Slide the cover toward rear of instrument to disengage it from the frame. (Cover has a tight fit and may need to be worked loose.)

### ***Side Cover Replacement***

Replacement Time: 3 minutes. Tools Needed: #2 Pozidriv Screwdriver.

1. Place the cover onto the instrument. Slide cover toward front of instrument while applying a slight downward pressure at front and rear edge of cover. Guide into slot in side of front frame.
2. Insert screws into handle caps, then through the hole in the straps, and thread the screws into the frame.
3. Replace the feet on rear frame with a Pozidriv screw in each foot.

## **2 Piece (Clamshell) Cover Removal And Replacement**

### **2 Piece Top Cover Removal**

Removal Time: 2 minutes. Replacement Time: 2 minutes. Tools Needed: #2 Pozidriv Screwdriver, Torx T10, T15 Screwdrivers.

1. Remove the top rear feet from rear frame of instrument by removing the pozidriv screw in each foot.
2. On each side of the instrument, remove the two Pozidriv screws that attach the (strap) handle caps. Remove the caps and straps also.
3. On each side of the instrument, remove the upper frame "side" T15 Torx screw (located in front and above of the forward strap retaining screw).
4. On each side of the instrument, remove the 5 T10 Torx screws that hold down the cover on the side.
5. With the Pozidriv screwdriver, loosen the screw in the middle of rear edge of the top cover. This is a captive screw (attached to top cover). Loosening it will cause cover to push away from front frame.
6. Slide top cover toward rear of instrument to disengage and lift up and away. (Cover has a tight fit and may need to be worked loose.)

### **2 Piece Top Cover Replacement**

Replacement Time: 2 minutes. Tools Needed: #2 Pozidriv Screwdriver, Torx T10, T15 Screwdrivers.

1. Place top cover onto the instrument. Slide cover toward front of instrument while applying a slight downward pressure at front edge of cover, and slight inward pressure on the sides. Guide into slot in top and sides of front frame. (Cover has a tight fit and may need to be worked forward.)

Be careful so that no RF coax or ribbon cable is caught by the cover edge when sliding the cover towards the front frame.

2. When screw on rear edge of cover is in contact with rear frame, tighten screw. (Cover should move forward as screw is tightened.)
3. Replace the single upper frame "side" T15 Torx screw, and the 5 Torx T10 screws on the sides.
4. Replace the top feet on rear frame, using a pozidriv screw in each.

### **2 Piece Bottom Cover Removal**

Removal Time: 2 minutes. Replacement Time: 2 minutes. Tools Needed: #2 Pozidriv Screwdriver, Torx T10, T15 Screwdrivers.

1. Carefully turn the instrument over so it is resting on its top.
2. Remove the two, bottom rear feet from rear frame of instrument by removing the Pozidriv screw in each foot.

Remove the bottom center rear foot from rear frame of instrument by removing two T10 Torx screws. Note that these screws are held in place with thread locking compound so removal may be difficult.

3. On each side of the instrument, remove the two Pozidriv screws that attach the (strap) handle caps. Remove the caps and straps also.
4. On each side of the instrument, remove the frame "side" T15 Torx screw (located in front and below the forward strap retaining screw).
5. If Top Cover has not been removed, remove the 5 T10 Torx screws that hold down the cover on each side of the instrument.
6. With the Pozidriv screwdriver, loosen the screw in the middle of rear edge of the bottom cover. This is a captive screw (attached to the bottom cover). Loosening it will cause cover to push away from front frame.
7. Slide bottom cover toward rear of instrument to disengage and lift up and away. (Cover has a tight fit and may need to be worked loose.)

### **2 Piece Bottom Cover Replacement**

Replacement Time: 2 minutes. Tools Needed: #2 Pozidriv Screwdriver, Torx T10, T15 Torx Screwdrivers.

1. Carefully turn the instrument over so it is resting on its top.
2. Place bottom cover onto the instrument. Slide cover toward front of instrument while applying a slight downward pressure at front edge of cover, and slight inward pressure on the sides. Guide into slot in bottom and sides of front frame. (Cover has a tight fit and may need to be worked forward.)
3. When screw on rear edge of cover is in contact with rear frame, tighten screw. (Cover should move forward as screw is tightened.)



4. Replace the single lower frame "side" T15 Torx screw, and the 5 Torx T10 screws on the sides (if the Top cover is already in place, otherwise replace these screws when the top cover is replaced).
5. Replace the bottom center foot using two Torx T10 screws. Use thread locking compound to keep the two screws in place. Replace the two rear feet that fit onto the rear frame with a Pozidriv screw in each foot.

## **1 Piece Cover Removal And Replacement**

### **1 Piece Cover Removal**

Removal Time: 7 minutes. Tools Needed: #2 Pozidriv Screwdriver, Torx T10, T15 Screwdrivers.

1. On a stable, flat work surface set the instrument up on its front handles.
2. Remove the four rear feet from rear frame of instrument by removing the Pozidriv screw in each foot.

Remove the bottom center rear foot from rear frame of instrument by removing two T10 Torx screws. Note that these screws are held in place with thread locking compound so removal may be difficult.

3. Remove the four bottom plastic feet from instrument by lifting up the tab on the foot and sliding in direction of arrow (on the foot).
4. Remove the inset trim material that conceals the cover hold down screws in all four of the metal holding straps.
5. Remove all the frame strap screws (48 T10 Torx screws total: 14 each on the top, bottom straps; and 7 on each side strap).

Remove the metal holding straps.

6. With the Pozidriv screwdriver, loosen the screw in the middle of rear edges of the cover. These are captive screws (attached to the cover). Loosening them will cause cover to push away from front frame.
7. Slide cover up and away (toward rear of instrument). Cover may need to be worked loose to keep from binding when removed.

### **1 Piece Cover Replacement**

Replacement Time: 7 minutes. Tools Needed: #2 Pozidriv Screwdriver, Torx T10, T15 Torx Screwdrivers.

1. On a stable, flat work surface set the instrument up on its front handles.
2. Place cover onto the instrument, making sure that you align the cover correctly: top side of cover to instrument top.

Carefully slide cover down towards the front of instrument until close to the front frame. While applying a slight downward pressure at front edge of cover, and slight inward pressure on the

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sides, guide the cover edges into the slots in bottom and sides of front frame.

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**Caution**

*Do not let cover slide forward out of control. Personal injury or instrument damage may result. The cover may be damaged causing reduced RFI protection.*

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3. When captive screws on rear edge of cover are in contact with rear frame, tighten them. (Cover should move forward as screws are tightened.)
4. Replace the trim that conceals all the screws on the holding straps (on each side of the instrument near the front frame).
5. On each side of the instrument replace all the frame strap screws starting with 1) the top holding strap, 2) the bottom strap, and then 3) the side straps (48 T10 Torx screws total: 14 on the top, bottom straps; and 7 on each side strap).

Replace the trim (if possible) over the screws on the cover holding straps. If unable to use the trim pieces, new ones can be ordered from section 4 in the *HP 8644A Performance Signal Generator Series Service Diagnostics Manual: Component Level Repair*.

6. Replace the bottom center foot using two Torx T10 screws. Use thread locking compound to keep the two screws in place.
7. Replace the four rear feet onto rear frame of instrument by replacing the Pozidriv screw in each foot.
8. Replace the four bottom plastic feet.

## **Verifying Instrument Operation**

When a defective assembly or cable has been found and replaced, the ILD is used to confirm the repairs made and check to see if other problems exist that would prevent the instrument from operating correctly.

1. Key in **SPECIAL** 320, press the **ON** key once. Confirm that **320: Test \* Instrument** is displayed, then press the **ON** key again. (If **320: Test \* Instrument** is not displayed turn the KNOB until it is, then press **ON**.)
2. A Result code of zero (+0) indicates that the ILD test passed with no assembly failures detected.

For HP 8643, 8644 and 8645A instruments, the ILD also calibrated the instrument (the ReCal routine was activated when Special Function 320 was entered). Return the instrument to operation.

3. If the result code is any number other than zero (+0), return to the front of this section and begin retesting the instrument according to the ILD procedures.

---

## Verifying Assembly Operation

Assembly Level Diagnostics (ALD) are sub-routines of the ILD that test individual assemblies in the same way that the ILD "Test Instrument" works, but with these limitations: ALDs are used for special situations such as testing an assembly in Diagnostic Test Procedures, and testing an assembly after component level repair (prior to final installation).

To use the ALDs, key in **[SPECIAL]** 320 press **[ON]**, and rotate the KNOB until the desired ALD assembly name is displayed. Press **[ON]** again. A result code will be displayed when the diagnostic routine is finished.

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### Note

*We recommend that you test the entire instrument and not just the replacement assembly. The ILD (Special Function 320: 320: Test \* Instrument) displays a result code only for the first problem the diagnostics detect. Other problems may exist and testing just the swapped assembly would not detect them. Also, using Special Function 320 (when in service mode) activates the recalibration routine that calibrates the complete instrument. Individual assemblies cannot be calibrated using the ALD nor does the ALD activate the re-calibration routine for the instrument.*

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## Returning the Instrument to Operation

1. Locate SW1, the 4-bit Configuration Switch on the Controller (in assembly slot A16). Switch bit 1 (or A) to the left (towards the center of the instrument). See figure 2-23.
2. Replace the removed covers. See the correct Cover Replacement procedures at the end of this section for detailed instructions for your instrument.

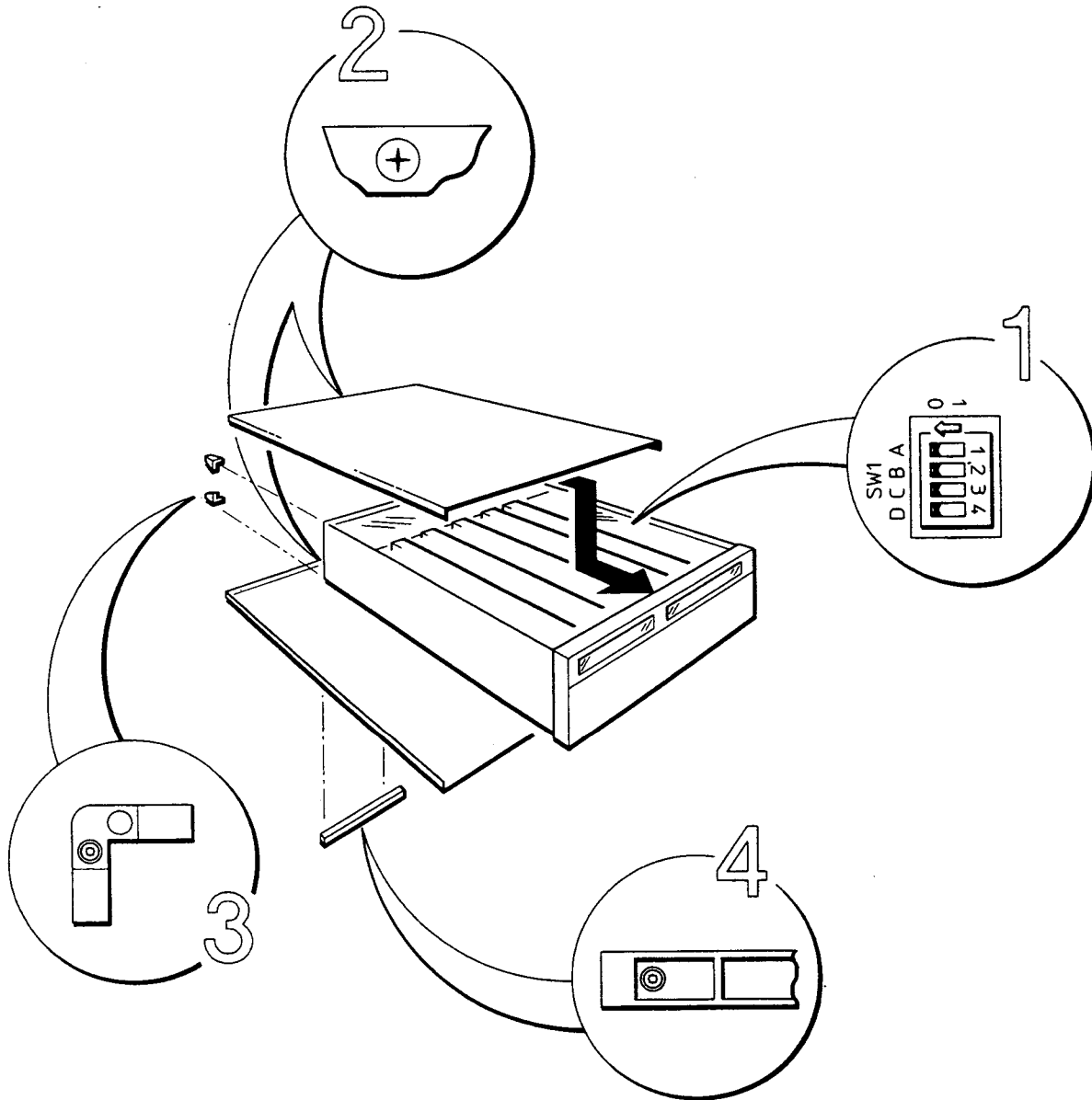


Figure 4b-1. Returning The Instrument To Operation

# TABLE OF CONTENTS

## Replaceable Parts - Cable Locations

How Cables are Marked . . . . .	4c-1
RF Assemblies Diagram . . . . .	4c-2
HP 8643A Cables Table . . . . .	4c-3
HP 8644A Cables Table . . . . .	4c-4
HP 8644B Cables Table . . . . .	4c-5
HP 8645A Cables Table . . . . .	4c-6
HP 8664A Cables Table . . . . .	4c-7
HP 8665A Cables Table . . . . .	4c-8
HP 8665B Cables Table . . . . .	4c-9
HP 8644A Cable Location Illustrations . . . . .	4c-11
HP 8643A (Opt. 002) Cable Location Illustrations . . . . .	4c-13
HP 8644A (Opt. 004) Cable Location Illustrations . . . . .	4c-15
HP 8644A (STD) HP 8644A (Opt. 007) Cable Location Illustrations . . . . .	4c-17
HP 8644A (Opt. 004,007) HP 8644B (No Options) Cable Location Illustrations . . . . .	4c-19
HP 8644A (Opt. 002,004,007) HP 8644B (Opt. 002) Cable Location Illustrations . . . . .	4c-21
HP 8643A,8644A (Opt. 011), and HP 8644B Cable Location Illustrations . . . . .	4c-23
HP 8645A w/ serial prefix <2925A Cable Location Illustrations . . . . .	4c-25
HP 8644A (No Options) Cable Location Illustrations . . . . .	4c-27
HP 8664A (Opt. 004) Cable Location Illustrations . . . . .	4c-29
HP 8644A (Opt. 008) Cable Location Illustrations . . . . .	4c-31
HP 8645A (No Options) Cable Location Illustrations . . . . .	4c-33
HP 8645A (Opt. 004) Cable Location Illustrations . . . . .	4c-35
HP 8665A (Opt. 008) Cable Location Illustrations . . . . .	4c-37
HP 8665B (No Options) Cable Location Illustrations . . . . .	4c-39
HP 8645B (Opt. 004) Cable Location Illustrations . . . . .	4c-41
HP 8665B (Opt. 004) Cable Location Illustrations . . . . .	4c-43





# 4c

## Replaceable Parts - Cable Locations

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### ***How Cables are Marked***

The semi-rigid coax cables are marked with either a modular location and J number or a color-coded band. The color-coded bands represent a module and connector location. To determine the correct location for a disconnected coax cable refer to:

1. The cable label describing the module name and connector (if so marked).
2. The color-coded bands on the cable end and associate the correct module and connector. For example, if a coax cable is marked Brown/Black, the color code is 21 and it should be connected to the 2 module at connector 1. The modules are labeled with the associated color code, i.e. 21.
3. The following tables cross reference each coax cable by W number to either the label/module location or the color code/module location.

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### **Note**

*Replacement cables are supplied without color code bands or labels. If you need to replace any of these cables, you must transfer the color code bands or re-label the cables.*

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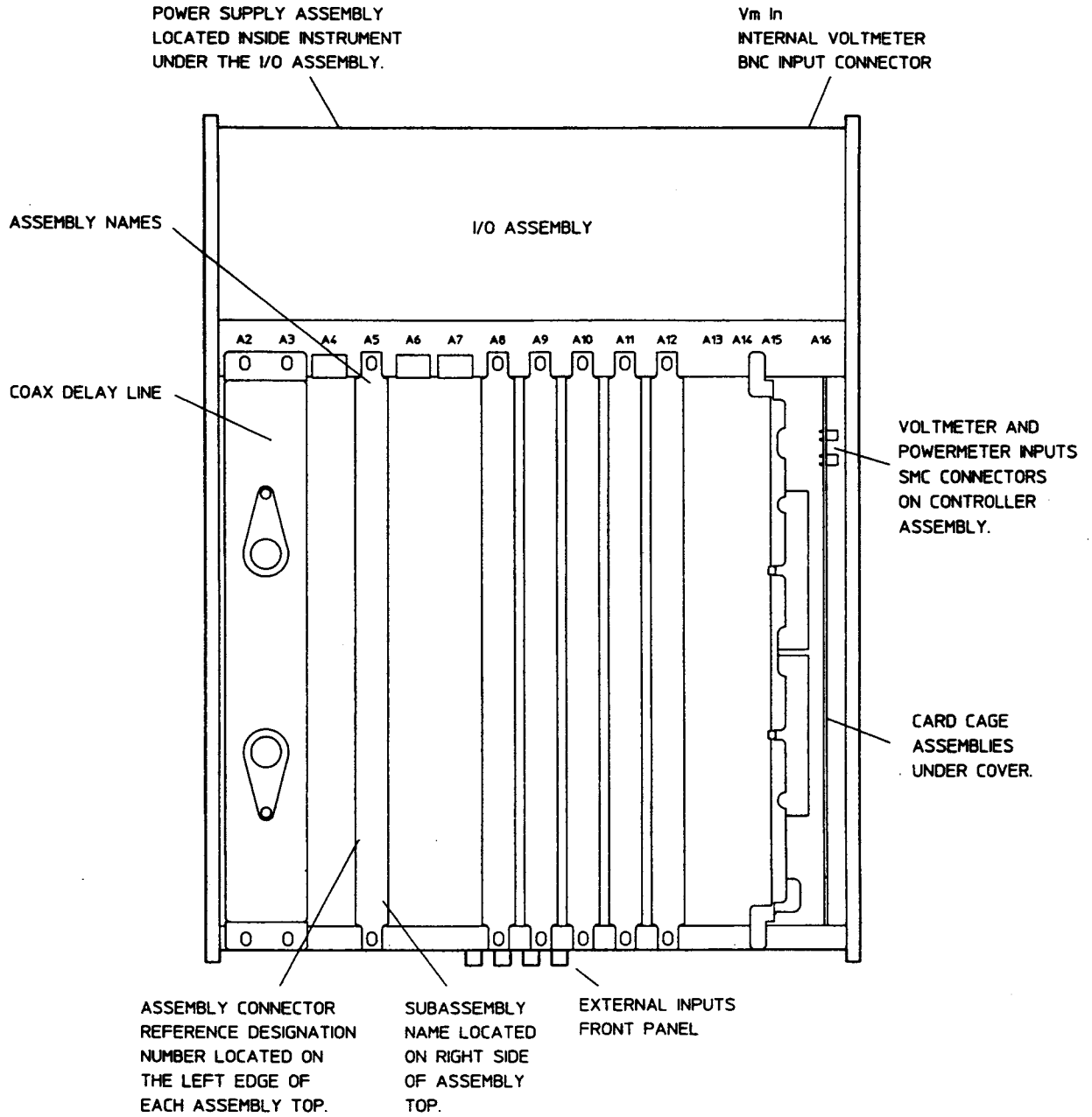


Figure 4c-1. RF Assemblies

Table 4c-1. HP 8643A Cables

Reference Designator	Replacement Cable Part Number	Old Cable Part Number	Cable Clip Designator	Old Cable Label Description
W9	8120-5739	08644-61016	32 to 16	MOD J2 TO VCO J6
W10	8120-5731	08645-61082	33 to 442	MOD J3 TO FRAC-N J2
W11	8120-5824	08645-61056	34 to 2	MOD J4 TO FP FM
W11A	8120-5818	08644-61033	34 to 2	MOD J4 TO BULK HD MOD J4
W14	8120-5816	08645-61058	37 to 41	MOD J7 TO NSM OSC J1
W15	8120-5826	08645-61059	38 to 5	MOD J8 TO FP AUDIO
W15A	8120-5819	08644-61034	38 to 5	MOD J8 TO BULK HD MOD J8
W16	8120-5740	08645-61060	39 to 71	MOD J9 TO ALC J1
W17	8120-5825	08645-61061	310 to 1	MOD J10 TO FP AM
W17A	8120-5819	08644-61035	310 to 1	MOD J10 TO BULK HD MOD J10
W19	8120-5739	08645-61062	44 to 62	NSM OSC J4 TO REF OSC J2
W20	8120-5733	08644-61015	441 to 13	FRAC-N J1 TO VCO J3
W22	8120-5736	08644-61017	444 to 18	FRAC-N J4 TO VCO J8
W23	8120-5739	08645-61065	445 to 64	FRAC-N J5 TO REF OSC J4
W25	8120-5731	08645-61068	75 to 52	ALC J5 TO DIVIDER J2
W26	8120-5739	08644-61014	53 to 11	DIVIDER J3 TO VCO J1
W27	8120-5731	08645-61066	78 to 54	ALC J8 TO DIVIDER J4
W32	8120-5826	08645-61071	74 to 3	ALC J4 TO FP PULSE
W32A	8120-5820	08644-61036	74 to 3	ALC J4 TO BULK HD ALC J4
W35	8120-5711	08644-61021	61 to 01	REF OSC J1 TO RP 10MHZ OUT
W40	8120-5705	08645-61035	335 to 06	CONTROLLER J4 TO RP VM IN
W106	8120-5739	08645-61142	65 to 552	REF OSC J5 TO TIMEBASE J2
W107	8120-5750	08645-61146	010 to 553	RP EFC TO TIMEBASE J3
W108	8120-5750	08645-61144	02 to 556	RP EXT REF TO TIMEBASE J6
W110	8120-5730	08645-61149	0 to 557	OSC TO TIMEBASE J7
W200	8120-5734	08645-61097	71 to 662	ALC J1 TO DOUBLER J2
W201	8120-5731	08645-61080	39 to 663	MOD J9 TO DOUBLER J3
W304	8120-5711	08644-61078	016 to 774	RP MEAS IN TO COUNTER J4
W311	8120-5713	08645-61107	09 to 34	RP FM TO MOD J4
W312	8120-5712	08645-61108	04 to 35	RP OM TO MOD J5
W315	8120-5709	08645-61109	013 to 38	RP AUDIO TO MOD J8
W317	8120-5709	08645-61110	05 to 310	RP AM TO MOD J10
W332	8120-5708	08645-61111	08 to 74	RP PULSE TO ALC J4
W1102	8120-5708	08644-61077	01 to 772	RP 10MHZ OUT TO COUNTER J2
W1103	8120-5734	08644-61076	61 to 773	REF OSC J1 TO COUNTER J3
W1104	8120-5826	08644-61073	4 to 774	FP MEAS IN TO COUNTER J4
W1104A	8120-5820	08644-61079	4 to 774	FP BULK HD TO COUNTER J4

Table 4c-2. HP 8644A Cables

Reference Designator	Replacement Cable Part Number	Old Cable Part Number	Cable Clip Designator	Old Cable Label Description
W9	8120-5739	08644-61016	32 to 16	MOD J2 TO VCO J6
W10	8120-5731	08645-61082	33 to 442	MOD J3 TO FRAC-N J2
W11	8120-5824	08645-61056	34 to 2	MOD J4 TO FP FM
W11A	8120-5818	08644-61033	34 to 2	MOD J4 TO BULK HD MOD J4
W14	8120-5816	08645-61058	37 to 41	MOD J7 TO NSM OSC J1
W15	8120-5826	08645-61059	38 to 5	MOD J8 TO FP AUDIO
W15A	8120-5819	08644-61034	38 to 5	MOD J8 TO BULK HD MOD J8
W16	8120-5740	08645-61060	39 to 71	MOD J9 TO ALC J1
W17	8120-5825	08645-61061	310 to 1	MOD J10 TO FP AM
W17A	8120-5819	08644-61035	310 to 1	MOD J10 TO BULK HD MOD J10
W19	8120-5739	08645-61062	44 to 62	NSM OSC J4 TO REF OSC J2
W20	8120-5733	08644-61015	441 to 13	FRAC-N J1 TO VCO J3
W22	8120-5736	08644-61017	444 to 18	FRAC-N J4 TO VCO J8
W23	8120-5739	08645-61065	445 to 64	FRAC-N J5 TO REF OSC J4
W25	8120-5731	08645-61068	75 to 52	ALC J5 TO DIVIDER J2
W26	8120-5739	08644-61014	53 to 11	DIVIDER J3 TO VCO J1
W27	8120-5731	08645-61066	78 to 54	ALC J8 TO DIVIDER J4
W32	8120-5826	08645-61071	74 to 3	ALC J4 TO FP PULSE
W32A	8120-5820	08644-61036	74 to 3	ALC J4 TO BULK HD ALC J4
W35	8120-5711	08644-61021	61 to 01	REF OSC J1 TO RP 10MHZ OUT
W40	8120-5705	08645-61035	335 to 06	CONTROLLER J4 TO RP VM IN
W106	8120-5739	08645-61142	65 to 552	REF OSC J5 TO TIMEBASE J2
W107	8120-5750	08645-61146	010 to 553	RP EFC TO TIMEBASE J3
W108	8120-5750	08645-61144	02 to 556	RP EXT REF TO TIMEBASE J6
W110	8120-5730	08645-61149	0 to 557	OSC TO TIMEBASE J7
W110	8120-5730	08645-61141		OSC TO TIMEBASE J7 OBS.
W200	8120-5734	08645-61097	71 to 662	ALC J1 TO DOUBLER J2
W201	8120-5731	08645-61080	39 to 663	MOD J9 TO DOUBLER J3
W304	8120-5711	08644-61078	016 to 774	RP MEAS IN TO COUNTER J4
W311	8120-5713	08645-61107	09 to 34	RP FM TO MOD J4
W312	8120-5712	08645-61108	04 to 35	RP $\phi$ M TO MOD J5
W315	8120-5709	08645-61109	013 to 38	RP AUDIO TO MOD J8
W317	8120-5709	08645-61110	05 to 310	RP AM TO MOD J10
W332	8120-5708	08645-61111	08 to 74	RP PULSE TO ALC J4
W402	8120-5731	08644-61018	221 to 11	COAX DSC J1 TO VCO J1
W403	8120-5739	08645-61073	53 to 222	DIVIDER J3 TO COAX DSC J2
W404	8120-5735	08644-61019	226 to 17	COAX DSC J6 TO VCO J7
W405	8120-5736	08645-61076	32 to 228	MOD J2 TO COAX DSC J8
W406	8120-5734	08644-61022	229 to 16	COAX DSC J9 TO VCO J6
W407	8120-5736	08645-61078	444 to 2210	FRAC-N J4 TO COAX DSC J10
W408	8120-5731	08644-61020	2211 to 18	COAX DSC J11 TO VCO J8
W1102	8120-5708	08644-61077	01 to 772	RP 10MHZ OUT TO COUNTER J2
W1103	8120-5734	08644-61076	61 to 773	REF OSC J1 TO COUNTER J3
W1104	8120-5826	08644-61073	4 to 774	FP MEAS IN TO COUNTER J4
W1104A	8120-5820	08644-61079	4 to 774	FP BULK HD TO COUNTER J4

Table 4c-3. HP 8644B Cables

Reference Designator	Replacement Cable Part Number	Old Cable Part Number	Cable Clip Designator	Old Cable Label Description
W9	8120-5739	08644-61016	32 to 16	MOD J2 TO VCO J6
W10	8120-5731	08645-61082	33 to 442	MOD J3 TO FRAC-N J2
W11	8120-5824	08645-61056	34 to 2	MOD J4 TO FP FM
W11A	8120-5818	08644-61033	34 to 2	MOD J4 TO BULK HD MOD J4
W14	8120-5816	08645-61058	37 to 41	MOD J7 TO NSM OSC J1
W15	8120-5826	08645-61059	38 to 5	MOD J8 TO FP AUDIO
W15A	8120-5819	08644-61034	38 to 5	MOD J8 TO BULK HD MOD J8
W16	8120-5740	08645-61060	39 to 71	MOD J9 TO ALC J1
W17	8120-5825	08645-61061	310 to 1	MOD J10 TO FP AM
W17A	8120-5819	08644-61035	310 to 1	MOD J10 TO BULK HD MOD J10
W19	8120-5739	08645-61062	44 to 62	NSM OSC J4 TO REF OSC J2
W20	8120-5733	08644-61015	441 to 13	FRAC-N J1 TO VCO J3
W22	8120-5736	08644-61017	444 to 18	FRAC-N J4 TO VCO J8
W23	8120-5739	08645-61065	445 to 64	FRAC-N J5 TO REF OSC J4
W25	8120-5731	08645-61068	75 to 52	ALC J5 TO DIVIDER J2
W26	8120-5739	08644-61014	53 to 11	DIVIDER J3 TO VCO J1
W27	8120-5731	08645-61066	78 to 54	ALC J8 TO DIVIDER J4
W32	8120-5826	08645-61071	74 to 3	ALC J4 TO FP PULSE
W32A	8120-5820	08644-61036	74 to 3	ALC J4 TO BULK HD ALC J4
W35	8120-5711	08644-61021	61 to 01	REF OSC J1 TO RP 10MHZ OUT
W40	8120-5705	08645-61035	335 to 06	CONTROLLER J4 TO RP VM IN
W106	8120-5739	08645-61142	65 to 552	REF OSC J5 TO TIMEBASE J2
W107	8120-5750	08645-61146	010 to 553	RP EFC TO TIMEBASE J3
W108	8120-5750	08645-61144	02 to 556	RP EXT REF TO TIMEBASE J6
W110	8120-5730	08645-61149	0 to 557	OSC TO TIMEBASE J7
W110	8120-5730	08645-61141		OSC TO TIMEBASE J7 OBS.
W200	8120-5734	08645-61097	71 to 662	ALC J1 TO DOUBLER J2
W201	8120-5731	08645-61080	39 to 663	MOD J9 TO DOUBLER J3
W304	8120-5711	08644-61078	016 to 774	RP MEAS IN TO COUNTER J4
W311	8120-5713	08645-61107	09 to 34	RP FM TO MOD J4
W312	8120-5712	08645-61108	04 to 35	RP $\phi$ M TO MOD J5
W315	8120-5709	08645-61109	013 to 38	RP AUDIO TO MOD J8
W317	8120-5709	08645-61110	05 to 310	RP AM TO MOD J10
W332	8120-5708	08645-61111	08 to 74	RP PULSE TO ALC J4
W402	8120-5731	08644-61018	221 to 11	COAX DSC J1 TO VCO J1
W403	8120-5739	08645-61073	53 to 222	DIVIDER J3 TO COAX DSC J2
W404	8120-5735	08644-61019	226 to 17	COAX DSC J6 TO VCO J7
W405	8120-5736	08645-61076	32 to 228	MOD J2 TO COAX DSC J8
W406	8120-5734	08644-61022	229 to 16	COAX DSC J9 TO VCO J6
W407	8120-5736	08645-61078	444 to 2210	FRAC-N J4 TO COAX DSC J10
W408	8120-5731	08644-61020	2211 to 18	COAX DSC J11 TO VCO J8
W1102	8120-5708	08644-61077	01 to 772	RP 10 MHZ OUT TO COUNTER J2
W1103	8120-5734	08644-61076	61 to 773	REF OSC J1 TO COUNTER J3
W1104	8120-5826	08644-61073	4 to 774	FP MEAS IN TO COUNTER J4
W1104A	8120-5820	08644-61079	4 to 774	FP BULK HD TO COUNTER J4

Table 4c-4. HP 8645A Cables

Reference Designator	Replacement Cable Part Number	Old Cable Part Number	Cable Clip Designator	Old Cable Label Description
W9	8120-5740	08645-61055	32 to 813	MOD J2 TO VCO J13
W10	8120-5731	08645-61082	33 to 442	MOD J3 TO FRAC-N J2
W11	8120-5824	08645-61056	34 to 2	MOD J4 TO FP FM
W12	8120-5824	08645-61057	35 to 4	MOD J5 TO FRNT PNL PHIM
W14	8120-5816	08645-61058	37 to 41	MOD J7 TO NSM OSC J1
W15	8120-5826	08645-61059	38 to 5	MOD J8 TO FP AUDIO
W16	8120-5740	08645-61060	39 to 71	MOD J9 TO ALC J1
W17	8120-5825	08645-61061	310 to 1	MOD J10 TO FP AM
W19	8120-5739	08645-61062	44 to 62	NSM OSC J4 TO REF OSC J2
W20	8120-5731	08645-61064	441 to 81	FRAC-N J1 TO VCO J1
W22	8120-5741	08645-61063	444 to 86	FRAC-N J4 TO VCO J6
W23	8120-5739	08645-61065	445 to 64	FRAC-N J5 TO REF OSC J4
W25	8120-5731	08645-61068	75 to 52	ALC J5 TO DIVIDER J2
W26	8120-5738	08645-61067	85 to 53	VCO J5 TO DIVIDER J3
W27	8120-5731	08645-61066	78 to 54	ALC J8 TO DIVIDER J4
W28	8120-5735	08645-61070	61 to 96	REF OSC J1 TO 10MHZ REF J6
W32	8120-5826	08645-61071	74 to 3	ALC J4 TO FP PULSE
W35	8120-5708	08645-61093	01 to 97	RP 10MHZOUT TO 10MHZREF J7
W40	8120-5705	08645-61035	335 to 06	CONTROLLER J4 TO RP VM IN
W106	8120-5739	08645-61142	65 to 552	REF OSC J5 TO TIMEBASE J2
W107	8120-5750	08645-61146	010 to 553	RP EFC TO TIMEBASE J3
W108	8120-5750	08645-61144	02 to 556	RP EXT REF TO TIMEBASE J6
W110	8120-5730	08645-61141		OSC TO TIMEBASE J7 OBS.
W110	8120-5730	08645-61149	0 to 557	OSC TO TIMEBASE J7
W200	8120-5734	08645-61097	71 to 662	ALC J1 TO DOUBLER J2
W201	8120-5731	08645-61080	39 to 663	MOD J9 TO DOUBLER J3
W311	8120-5713	08645-61107	09 to 34	RP FM TO MOD J4
W312	8120-5712	08645-61108	04 to 35	RP $\phi$ M TO MOD J5
W315	8120-5709	08645-61109	013 to 38	RP AUDIO TO MOD J8
W317	8120-5709	08645-61110	05 to 310	RP AM TO MOD J10
W332	8120-5708	08645-61111	08 to 74	RP PULSE TO ALC J4

Table 4c-5. HP 8664A Cables

Reference Designator	Replacement Cable Part Number	Old Cable Part Number	Cable Clip Designator	Old Cable Label Description
W9	8120-5734	08665-61053	32 to 94	MOD J2 TO PLL-YIG J4
W10	8120-5732	08665-61049	33 to 442	MOD J3 TO FRAC-N J2
W11	8120-5823	08665-61087	2 to 35	FP FM TO MOD J5
W11A	8120-5818	08644-61033	34 to 2	MOD J4 TO BULK HD MOD J4
W12	8120-5823	08665-61082	3 to 34	FP PHIM TO MOD J4
W12A	8120-5818	08644-61032	34 to 3	MOD J4 TO BULK HD MOD J4
W14	8120-5816	08645-61058	37 to 41	MOD J7 TO NSM OSC J1
W15	8120-5826	08645-61059	38 to 5	MOD J8 TO FP AUDIO
W15A	8120-5819	08644-61034	38 to 5	MOD J8 TO BULK HD MOD J8
W16	8120-5736	08665-61048	39 to 64	MOD J9 TO OUT AMP J4
W17	8120-5825	08645-61061	310 to 1	MOD J10 TO FP AM
W17A	8120-5819	08644-61035	310 to 1	MOD J10 TO BULK HD MOD J10
W19	8120-5736	08665-61046	44 to 84	NSM OSC J4 TO REF J4
W20	8120-5734	08665-61061	441 to 101	FRAC-N J1 TO DIVIDER J1
W22	8120-5735	08665-61062	444 to 93	FRAC-N J4 TO PLL-YIG J3
W23	8120-5735	08665-61058	445 to 85	FRAC-N J5 TO REF J5
W30	8120-5708	08665-61059	02 to 89	EXT REF IN TO REF J9
W35	8120-5709	08665-61060	01 to 86	RP 10 MHZ OUT TO REF J6
W40	8120-5705	08645-61035	335 to 06	CONTROLLER J4 TO RP VM IN
W51	8120-5715	08665-61045	11 to 014	1 GHZ MLT J1 TO RP 500 MHZ
W52	8120-5731	08665-61043	12 to 52	1 GHZ MLT J2 TO DN CONV J2
W53	8120-5733	08665-61042	13 to 81	1 GHZ MLT J3 TO REF J1
W54	8120-5738	08665-61041	21 to 65	IF/DIV J1 TO OUT AMP J5
W56	8120-5734	08665-61040	23 to 67	IF/DIV J3 TO OUT AMP J7
W57	8120-5738	08665-61044	24 to 73	IF/DIV J4 TO HF DRVR J3
W58	8120-5738	08665-61039	25 to 51	IF/DIV J5 TO DN CONV J1
W61	8120-5733	08665-61057	53 to 75	DN CONV J3 TO HF DRVR J5
W65	8120-5734	08665-61054	68 to 76	OUT AMP J8 TO HF DRVR J6
W74	8120-5772	08665-61063	103 to 155	DIVIDER J3 TO GAAS DIV U17J5
W107	8120-5750	08645-61146	010 to 553	RP EFC TO TIMEBASE J3
W110	8120-5730	08645-61141		OSC TO TIMEBASE J7 OBS.
W110	8120-5730	08645-61149	0 to 557	OSC TO TIMEBASE J7
W111	8120-5736	08665-61138	552 to 88	TIMEBASE J2 TO REF J8
W311	8120-5715	08665-61083	09 to 35	RP FM TO MOD J5
W312	8120-5715	08665-61084	04 to 34	RP PHIM TO MOD J4
W315	8120-5714	08665-61099	013 to 38	RP AUDIO TO MOD J8
W317	8120-5713	08665-61100	05 to 310	RP AM TO MOD J10
W332	8120-5706	08665-61121	08 to 144	RP PULSE TO PM DRIVER J4
W402	8120-5737	08665-61073	221 to 102	COAX DSC J1 TO DIVIDER J2
W404	8120-5741	08665-61072	226 to 92	COAX DSC J6 TO PLL-YIG J2
W405	8120-5735	08665-61071	228 to 32	COAX DSC J8 TO MOD J2
W406	8120-5740	08665-61070	229 to 94	COAX DSC J9 TO PLL-YIG J4
W407	8120-5741	08665-61068	2211 to 444	COAX DSC J11 TO FRAC-N J4
W408	8120-5741	08665-61069	2210 to 93	COAX DSC J10 TO PLL-YIG J3
W410	8120-5730	08665-61113	222 to 227	COAX DSC J2 TO COAX DSC J7
W800	8120-5736	08665-61064	145 to 42	PM DRVR J5 TO NSM OSC J2
W801	8120-5707	08665-61065	141 to 015	PM DRVR J1 TO RP SYNC
W802	8120-5731	08665-61066	142 to 153	PM DRVR J2 TO ATTEN/RPP J3
W803	8120-5707	08665-61085	154 to 016	RP VIDEO TO ATTEN/RPP J4
W805	8120-5827	08665-61067	144 to 4	PM DRVR J4 TO FP PULSE
W805A	8120-5821	08665-61119	114 to 4	BULK HD PM DRVR J4 TO PM DRVR J4

Table 4c-6. HP 8665A Cables

Reference Designator	Replacement Cable Part Number	Old Cable Part Number	Cable Clip Designator	Old Cable Label Description
W9	8120-5734	08665-61053	32 to 94	MOD J2 TO PLL-YIG J4
W10	8120-5732	08665-61049	33 to 442	MOD J3 TO FRAC-N J2
W11	8120-5823	08665-61087	2 to 35	FP FM TO MOD J5
W11A	8120-5818	08644-61033	34 to 2	MOD J4 TO BULK HD MOD J4
W12	8120-5823	08665-61082	3 to 34	FP PHIM TO MOD J4
W12A	8120-5818	08644-61032	34 to 3	MOD J4 TO BULK HD MOD J4
W14	8120-5816	08645-61058	37 to 41	MOD J7 TO NSM OSC J1
W15	8120-5826	08645-61059	38 to 5	MOD J8 TO FP AUDIO
W15A	8120-5819	08644-61034	38 to 5	MOD J8 TO BULK HD MOD J8
W16	8120-5736	08665-61048	39 to 64	MOD J9 TO OUT AMP J4
W17	8120-5825	08645-61061	310 to 1	MOD J10 TO FP AM
W17A	8120-5819	08644-61035	310 to 1	MOD J10 TO BULK HD MOD J10
W19	8120-5736	08665-61046	44 to 84	NSM OSC J4 TO REF J4
W20	8120-5734	08665-61061	441 to 101	FRAC-N J1 TO DIVIDER J1
W22	8120-5735	08665-61062	444 to 93	FRAC-N J4 TO PLL-YIG J3
W23	8120-5735	08665-61058	445 to 85	FRAC-N J5 TO REF J5
W30	8120-5708	08665-61059	02 to 89	EXT REF IN TO REF J9
W35	8120-5709	08665-61060	01 to 86	RP 10 MHZ OUT TO REF J6
W40	8120-5705	08645-61035	335 to 06	CONTROLLER J4 TO RP VM IN
W51	8120-5715	08665-61045	11 to 014	1 GHZ MLT J1 TO RP 500 MHZ
W52	8120-5731	08665-61043	12 to 52	1 GHZ MLT J2 TO DN CONV J2
W53	8120-5733	08665-61042	13 to 81	1 GHZ MLT J3 TO REF J1
W54	8120-5738	08665-61041	21 to 65	IF/DIV J1 TO OUT AMP J5
W56	8120-5734	08665-61040	23 to 67	IF/DIV J3 TO OUT AMP J7
W57	8120-5738	08665-61044	24 to 73	IF/DIV J4 TO HF DRVR J3
W58	8120-5738	08665-61039	25 to 51	IF/DIV J5 TO DN CONV J1
W61	8120-5733	08665-61057	53 to 75	DN CONV J3 TO HF DRVR J5
W64	8120-5736	08665-61055	66 to 132	OUT AMP J6 TO MW ALC J2
W65	8120-5734	08665-61054	68 to 76	OUT AMP J8 TO HF DRVR J6
W74	8120-5772	08665-61063	103 to 155	DVDR J3 TO GAAS DIV U17J5
W107	8120-5750	08645-61146	010 to 553	RP EFC TO TIMEBASE J3
W110	8120-5730	08645-61149	0 to 557	OSC TO TIMEBASE J7
W110	8120-5730	08645-61141		OSC TO TIMEBASE J7 OBS.
W111	8120-5736	08665-61138	552 to 88	TIMEBASE J2 TO REF J8
W311	8120-5715	08665-61083	09 to 35	RP FM TO MOD J5
W312	8120-5715	08665-61084	04 to 34	RP PHIM TO MOD J4
W315	8120-5714	08665-61099	013 to 38	RP AUDIO TO MOD J8
W317	8120-5713	08665-61100	05 to 310	RP AM TO MOD J10
W332	8120-5706	08665-61121	08 to 144	RP PULSE TO PM DRIVER J4
W402	8120-5737	08665-61073	221 to 102	COAX DSC J1 TO DIVIDER J2
W404	8120-5741	08665-61072	226 to 92	COAX DSC J6 TO PLL-YIG J2
W405	8120-5735	08665-61071	228 to 32	COAX DSC J8 TO MOD J2
W406	8120-5740	08665-61070	229 to 94	COAX DSC J9 TO PLL-YIG J4
W407	8120-5741	08665-61068	2211 to 444	COAX DSC J11 TO FRAC-N J4
W408	8120-5741	08665-61069	2210 to 93	COAX DSC J10 TO PLL-YIG J3
W410	8120-5730	08665-61113	222 to 227	COAX DSC J2 TO COAX DSC J7
W800	8120-5736	08665-61064	145 to 42	PM DRVR J5 TO NSM OSC J2
W801	8120-5707	08665-61065	141 to 015	PM DRVR J1 TO RP SYNC
W802	8120-5731	08665-61066	142 to 153	PM DRVR J2 TO ATTEN/RPP J3
W803	8120-5707	08665-61085	154 to 016	RP VIDEO TO ATTEN/RPP J4
W805	8120-5827	08665-61067	144 to 4	PM DRVR J4 TO FP PULSE
W805A	8120-5821	08665-61119	114 to 4	BULK HD PM DRVR J4 TO PM DRVR J4



Table 4c-7. HP 8665B Cables

Reference Designator	Replacement Cable Part Number	Old Cable Part Number	Cable Clip Designator	Old Cable Label Description
W9	8120-5734	08665-61053	32 to 94	MOD J2 TO PLL-YIG J4
W10	8120-5732	08665-61049	33 to 442	MOD J3 TO FRAC-N J2
W11	8120-5823	08665-61087	2 to 35	FP FM TO MOD J5
W11A	8120-5818	08644-61033	34 to 2	MOD J4 TO BULK HD MOD J4
W12	8120-5823	08665-61082	3 to 34	FP PHIM TO MOD J4
W12A	8120-5818	08644-61032	34 to 3	MOD J4 TO BULK HD MOD J4
W14	8120-5816	08645-61058	37 to 41	MOD J7 TO NSM OSC J1
W15	8120-5826	08645-61059	38 to 5	MOD J8 TO FP AUDIO
W15A	8120-5819	08644-61034	38 to 5	MOD J8 TO BULK HD MOD J8
W16	8120-5736	08665-61048	39 to 64	MOD J9 TO OUT AMP J4
W17	8120-5825	08645-61061	310 to 1	MOD J10 TO FP AM
W17A	8120-5819	08644-61035	310 to 1	MOD J10 TO BULK HD MOD J10
W19	8120-5736	08665-61046	44 to 84	NSM OSC J4 TO REF J4
W20	8120-5734	08665-61061	441 to 101	FRAC-N J1 TO DIVIDER J1
W22	8120-5735	08665-61062	444 to 93	FRAC-N J4 TO PLL-YIG J3
W23	8120-5735	08665-61058	445 to 85	FRAC-N J5 TO REF J5
W30	8120-5708	08665-61059	02 to 89	EXT REF IN TO REF J9
W35	8120-5709	08665-61060	01 to 86	RP 10 MHZ OUT TO REF J6
W40	8120-5705	08645-61035	335 to 06	CONTROLLER J4 TO RP VM IN
W51	8120-5715	08665-61045	11 to 014	1 GHZ MLT J1 TO RP 500 MHZ
W52	8120-5731	08665-61043	12 to 52	1 GHZ MLT J2 TO DN CONV J2
W53	8120-5733	08665-61042	13 to 81	1 GHZ MLT J3 TO REF J1
W54	8120-5738	08665-61041	21 to 65	IF/DIV J1 TO OUT AMP J5
W56	8120-5734	08665-61040	23 to 67	IF/DIV J3 TO OUT AMP J7
W57	8120-5738	08665-61044	24 to 73	IF/DIV J4 TO HF DRVR J3
W58	8120-5738	08665-61039	25 to 51	IF/DIV J5 TO DN CONV J1
W61	8120-5733	08665-61057	53 to 75	DN CONV J3 TO HF DRVR J5
W64	8120-5736	08665-61133	66 to 134	MW CONV J4 TO OUT AMP J6
W65	8120-5734	08665-61054	68 to 76	OUT AMP J8 TO HF DRVR J6
W74	8120-5772	08665-61063	103 to 155	DVDR J3 TO GAAS DIV U17J5
W107	8120-5750	08645-61146	010 to 553	RP EFC TO TIMEBASE J3
W110	8120-5730	08645-61149	0 to 557	OSC TO TIMEBASE J7
W110	8120-5730	08645-61141		OSC TO TIMEBASE J7 OBS.
W111	8120-5736	08665-61138	552 to 88	TIMEBASE J2 TO REF J8
W311	8120-5715	08665-61083	09 to 35	RP FM TO MOD J5
W312	8120-5715	08665-61084	04 to 34	RP PHIM TO MOD J4
W315	8120-5714	08665-61099	013 to 38	RP AUDIO TO MOD J8
W317	8120-5713	08665-61100	05 to 310	RP AM TO MOD J10
W332	8120-5706	08665-61121	08 to 144	RP PULSE TO PM DRIVER J4
W402	8120-5737	08665-61073	221 to 102	COAX DSC J1 TO DIVIDER J2
W404	8120-5741	08665-61072	226 to 92	COAX DSC J6 TO PLL-YIG J2
W405	8120-5735	08665-61071	228 to 32	COAX DSC J8 TO MOD J2
W406	8120-5740	08665-61070	229 to 94	COAX DSC J9 TO PLL-YIG J4
W407	8120-5741	08665-61068	2211 to 444	COAX DSC J11 TO FRAC-N J4
W408	8120-5741	08665-61069	2210 to 93	COAX DSC J10 TO PLL-YIG J3
W410	8120-5730	08665-61113	222 to 227	COAX DSC J2 TO COAX DSC J7
W800	8120-5736	08665-61064	145 to 42	PM DRVR J5 TO NSM OSC J2
W801	8120-5707	08665-61065	141 to 015	PM DRVR J1 TO RP SYNC
W802	8120-5731	08665-61066	142 to 153	PM DRVR J2 TO ATTEN/RPP J3
W803	8120-5707	08665-61085	154 to 016	RP VIDEO TO ATTEN/RPP J4
W805	8120-5827	08665-61067	144 to 4	PM DRVR J4 TO FP PULSE
W805A	8120-5821	08665-61119	114 to 4	BULK HD PM DRVR J4 TO PM DRVR J4



RIBBON AND SEMI-RIGID CABLES

COAX CABLES

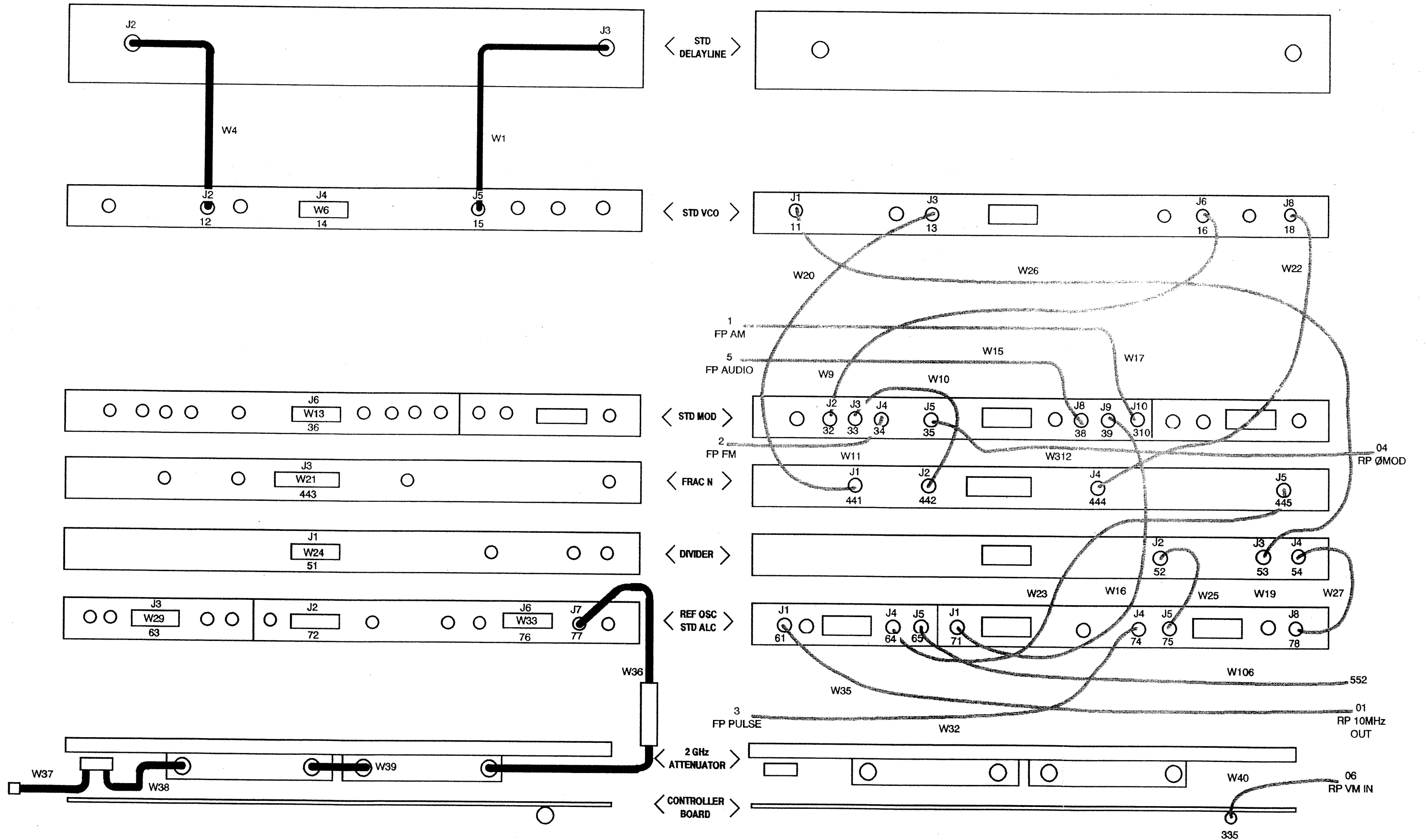
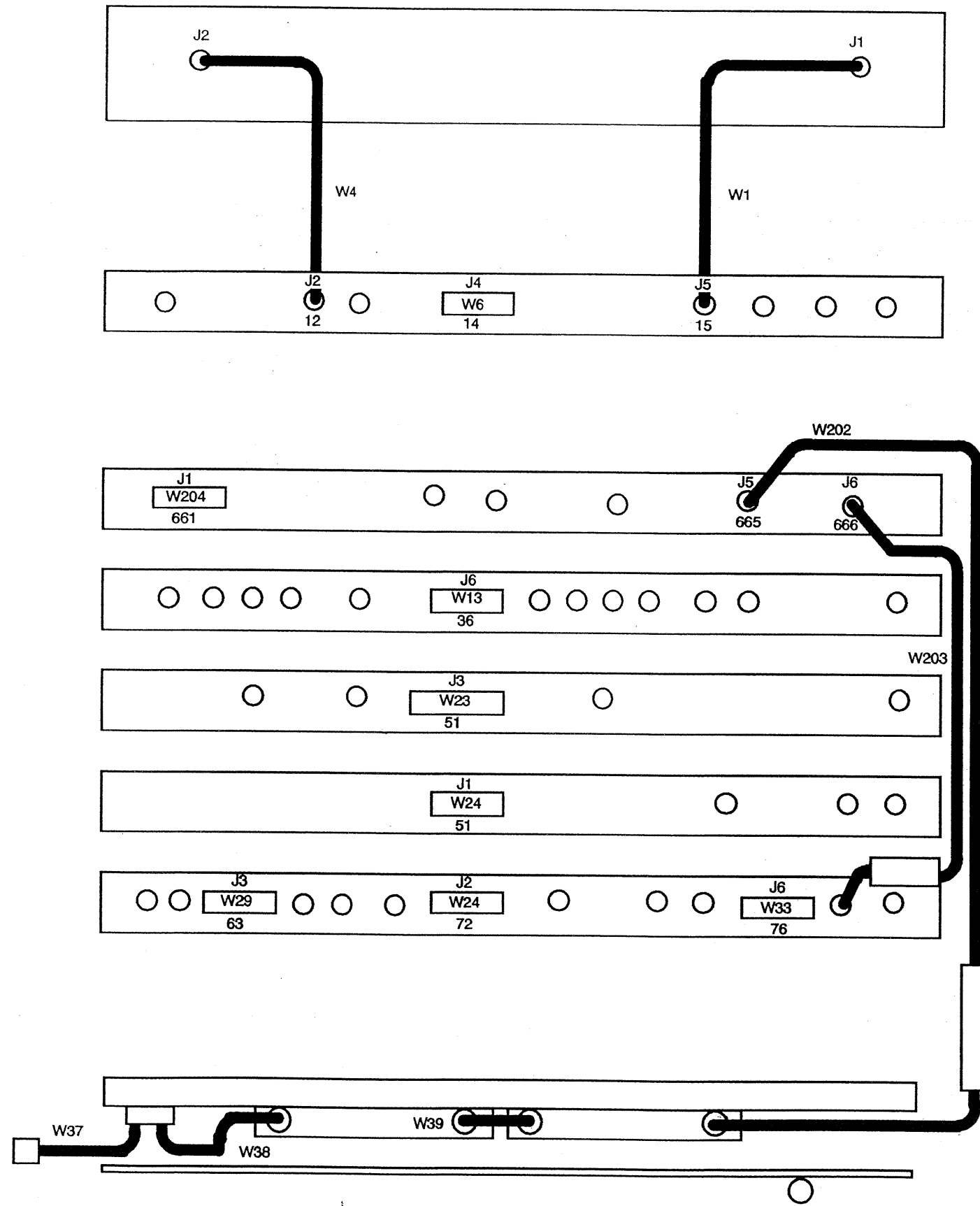


Figure 4c-1. RF Cable Locator Diagrams: HP 8644A (No Options)

RIBBON AND SEMI-RIGID CABLES



COAX CABLES

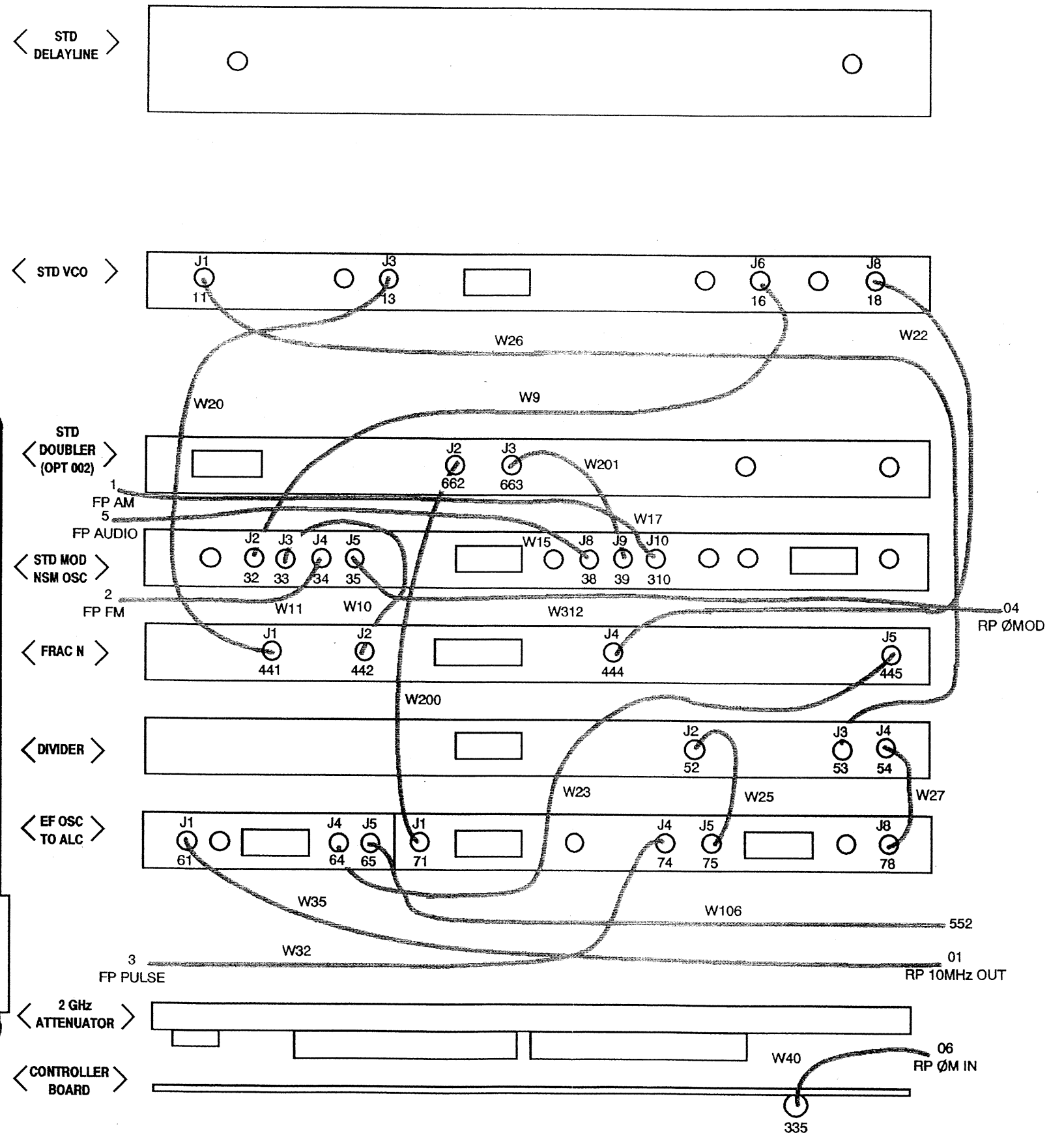


Figure 4c-2. RF Cable Locator Diagrams: HP 8643A (Opt. 002)



RIBBON AND SEMI-RIGID CABLES

COAX CABLES

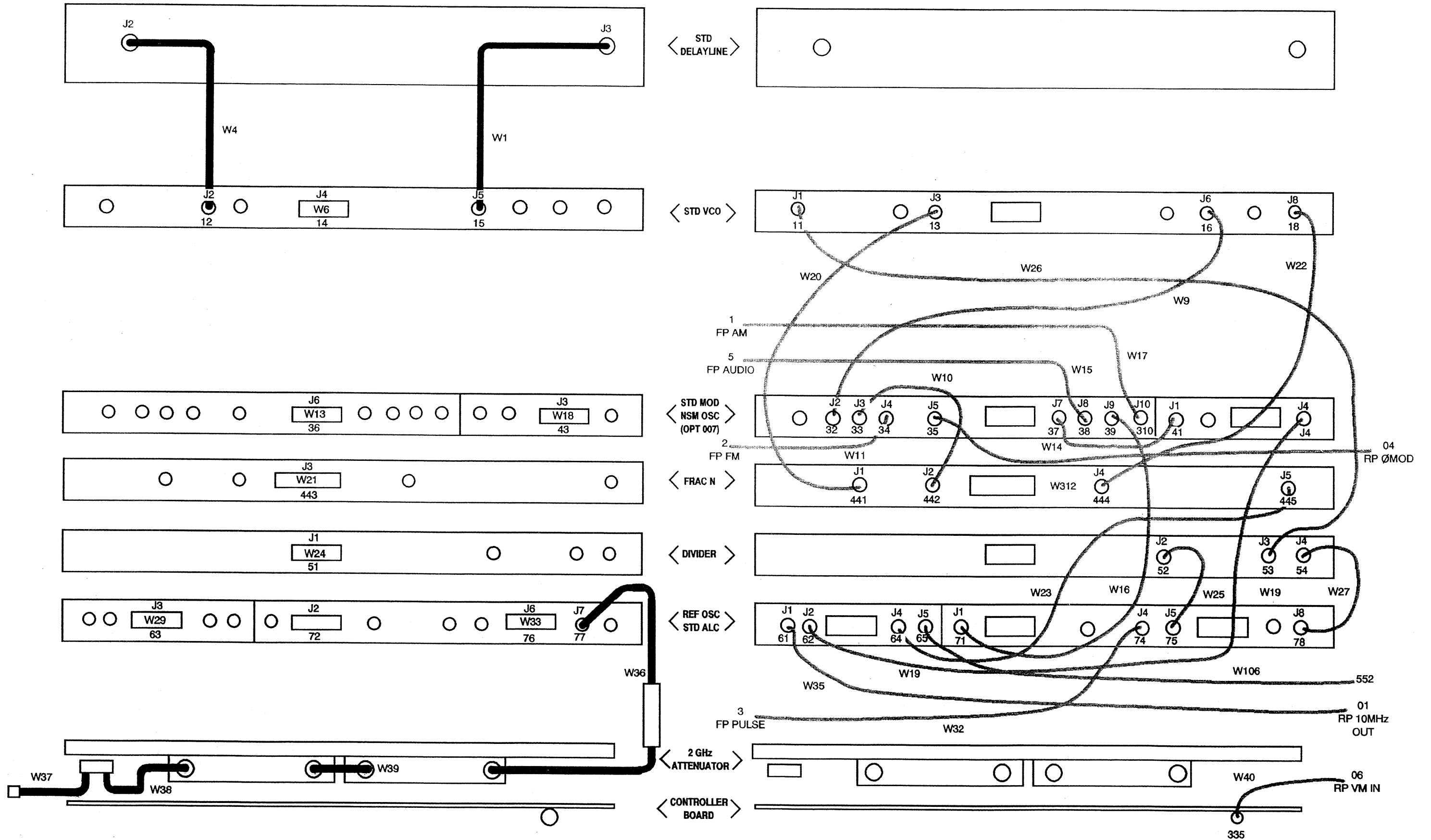


Figure 4c-4. RF Cable Locator Diagrams: HP 8643A (STD) and HP 8644A (Opt 007)

RIBBON AND SEMI-RIGID CABLES

COAX CABLES

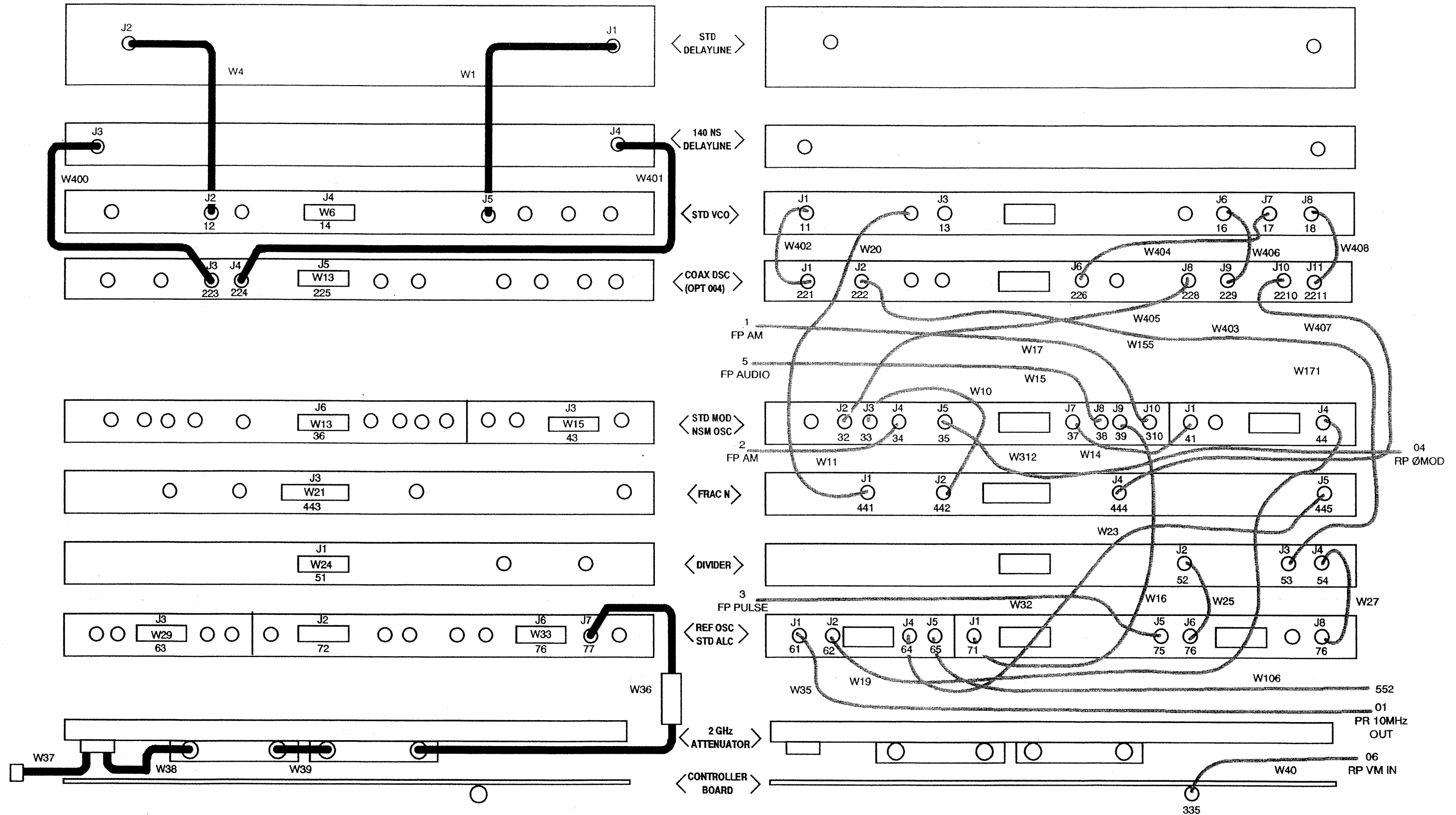
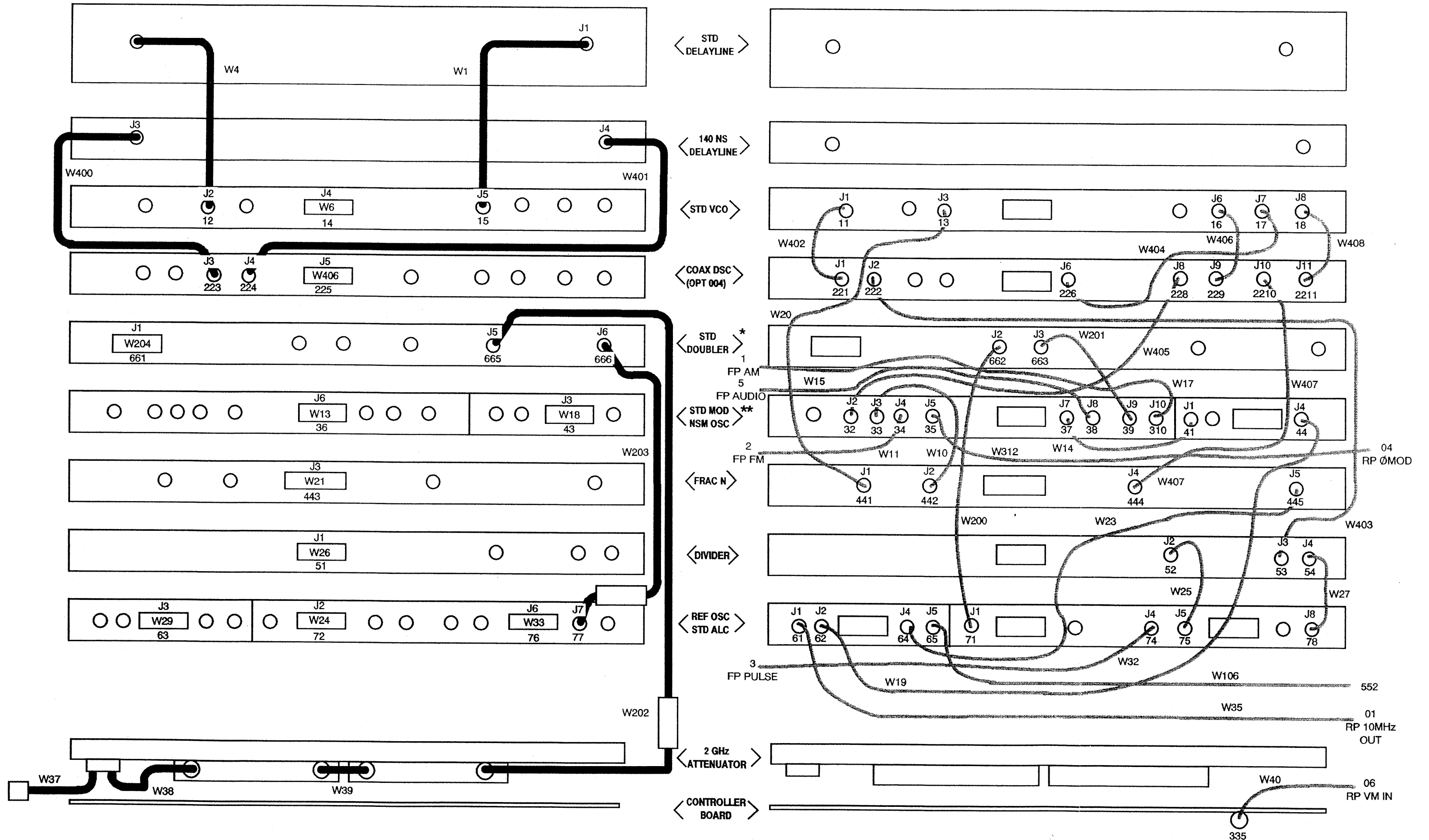


Figure 4c-5. RF Cable Locator Diagrams: HP 8644A (Opt 004,007) and HP 8644B (No Options)

RIBBON AND SEMI-RIGID CABLES

COAX CABLES



\* ON 44A (OPT 004) ON 44B STD

\*\* ON 44A (OPT 007) ON 44B STD

Figure 4c-6. RF Cable Locator Diagrams: HP 8644A (Opt 002,004,007) and HP 8644B (Opt 002)



RIBBON AND SEMI-RIGID CABLES

COAX CABLES

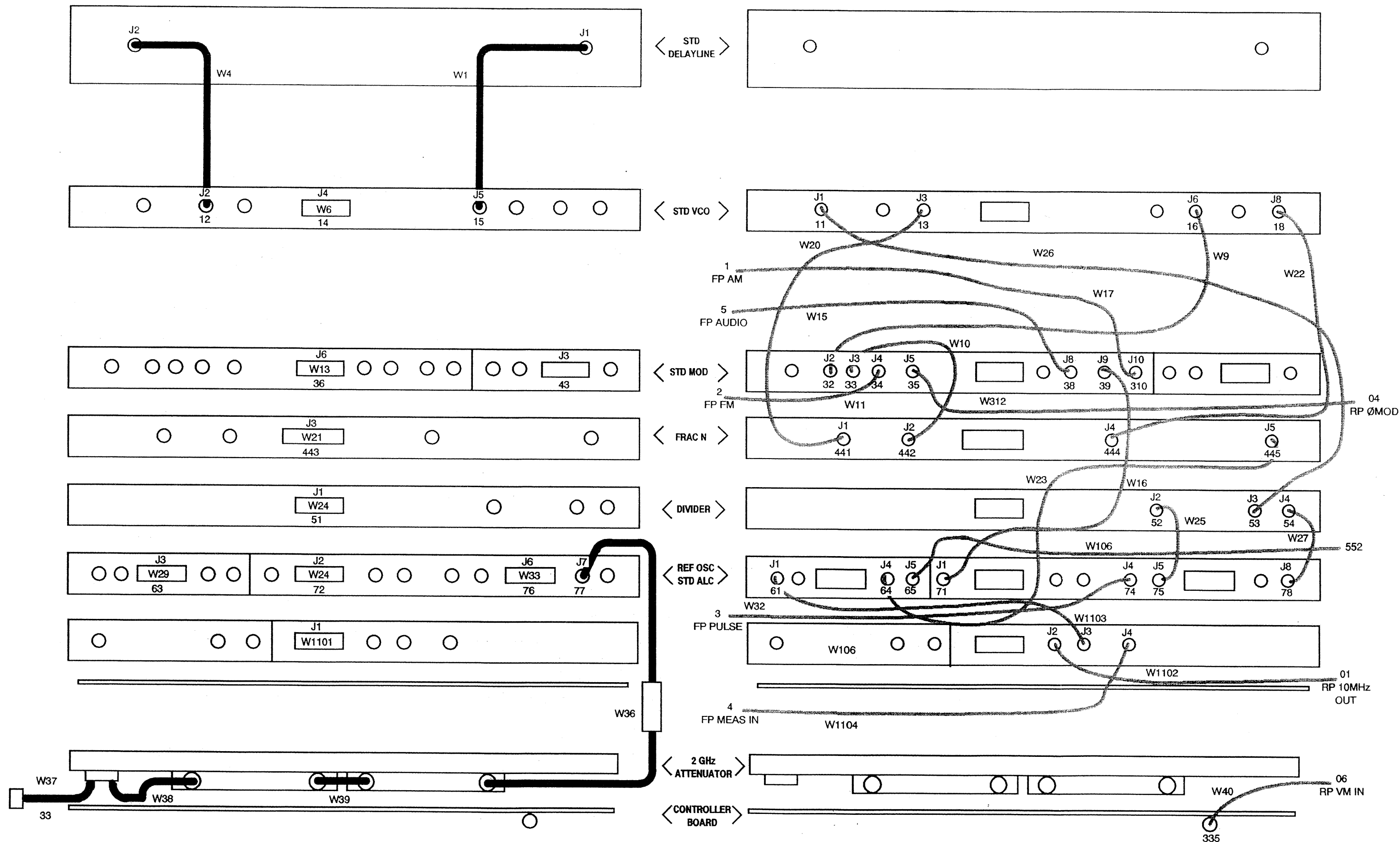


Figure 4c-7. RF Cable Locator Diagrams: HP 8643A, HP 8644A (Opt 011), and HP 8644B

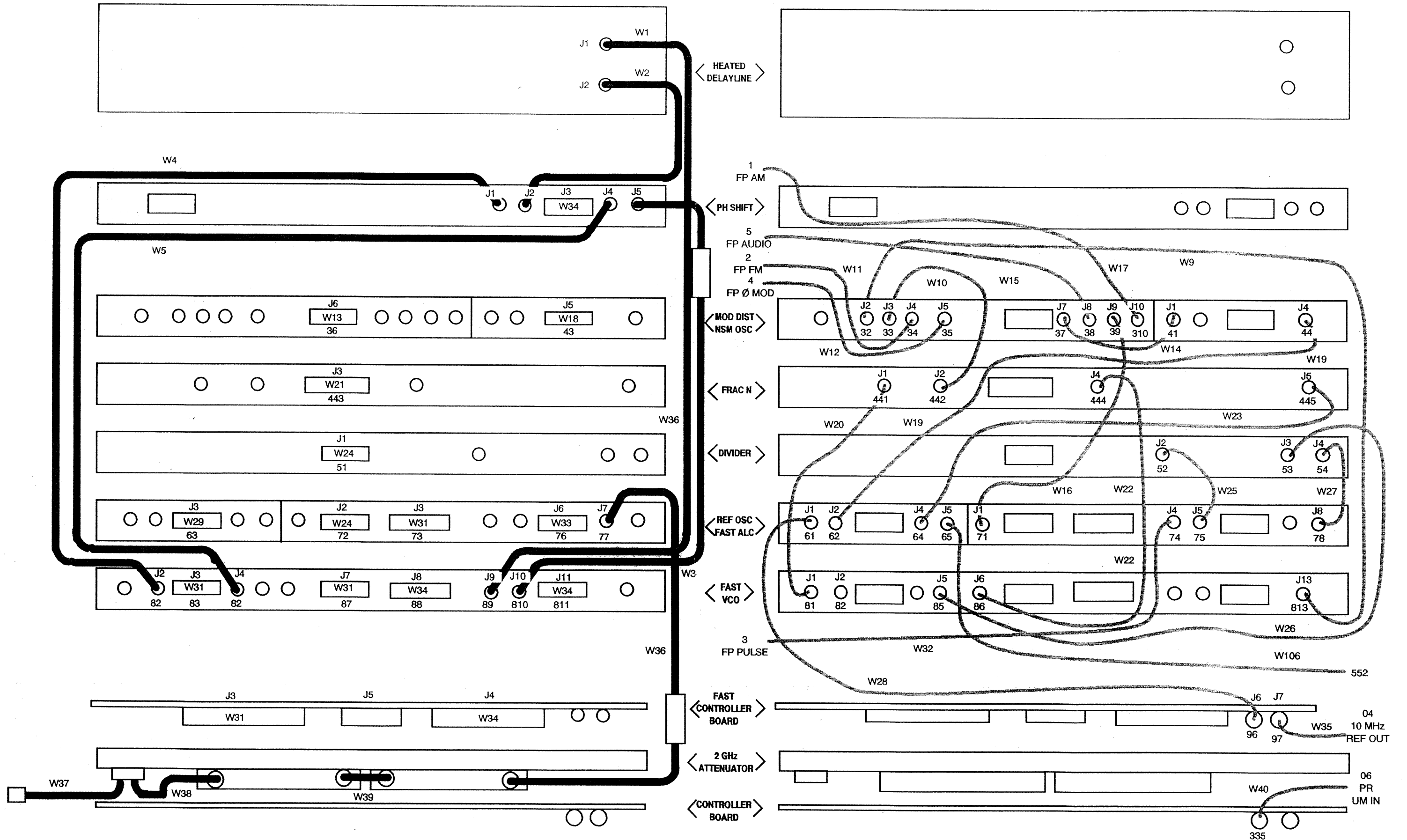
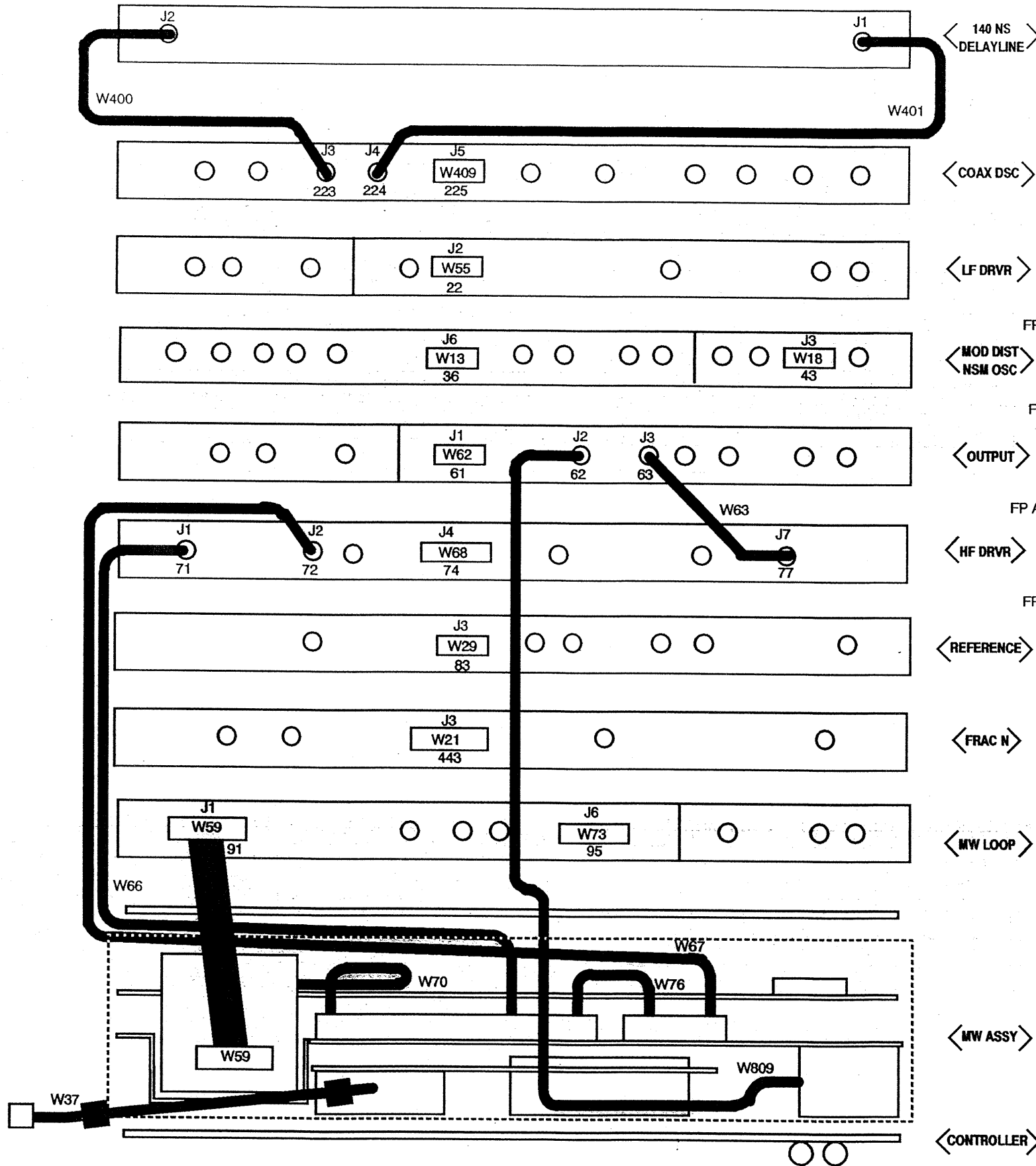


Figure 4c-8. RF Cable Locator Diagrams: HP 8645A (No Options) w/serial prefix <2925A



RIBBON AND SEMI-RIGID CABLES



COAX CABLES

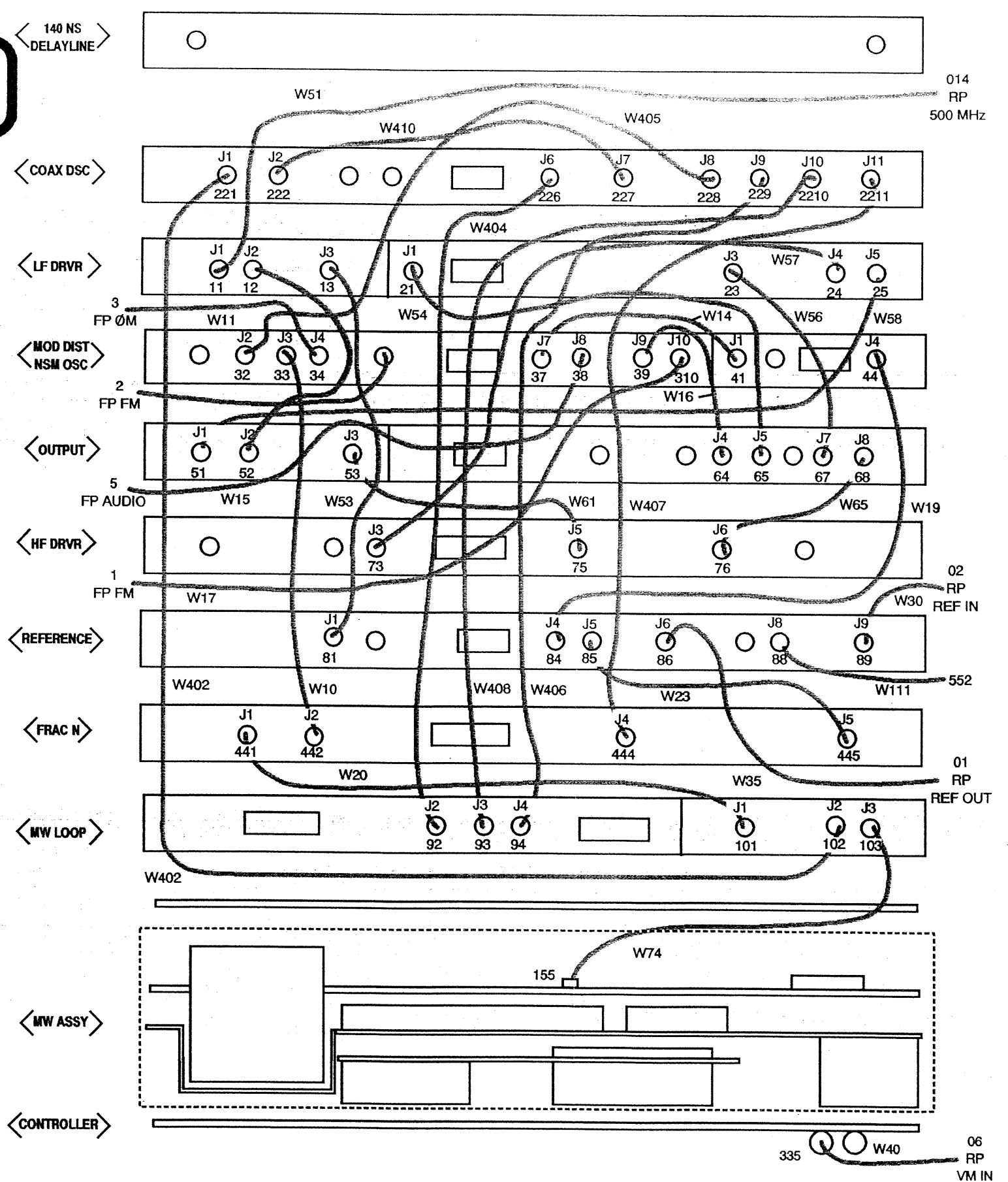
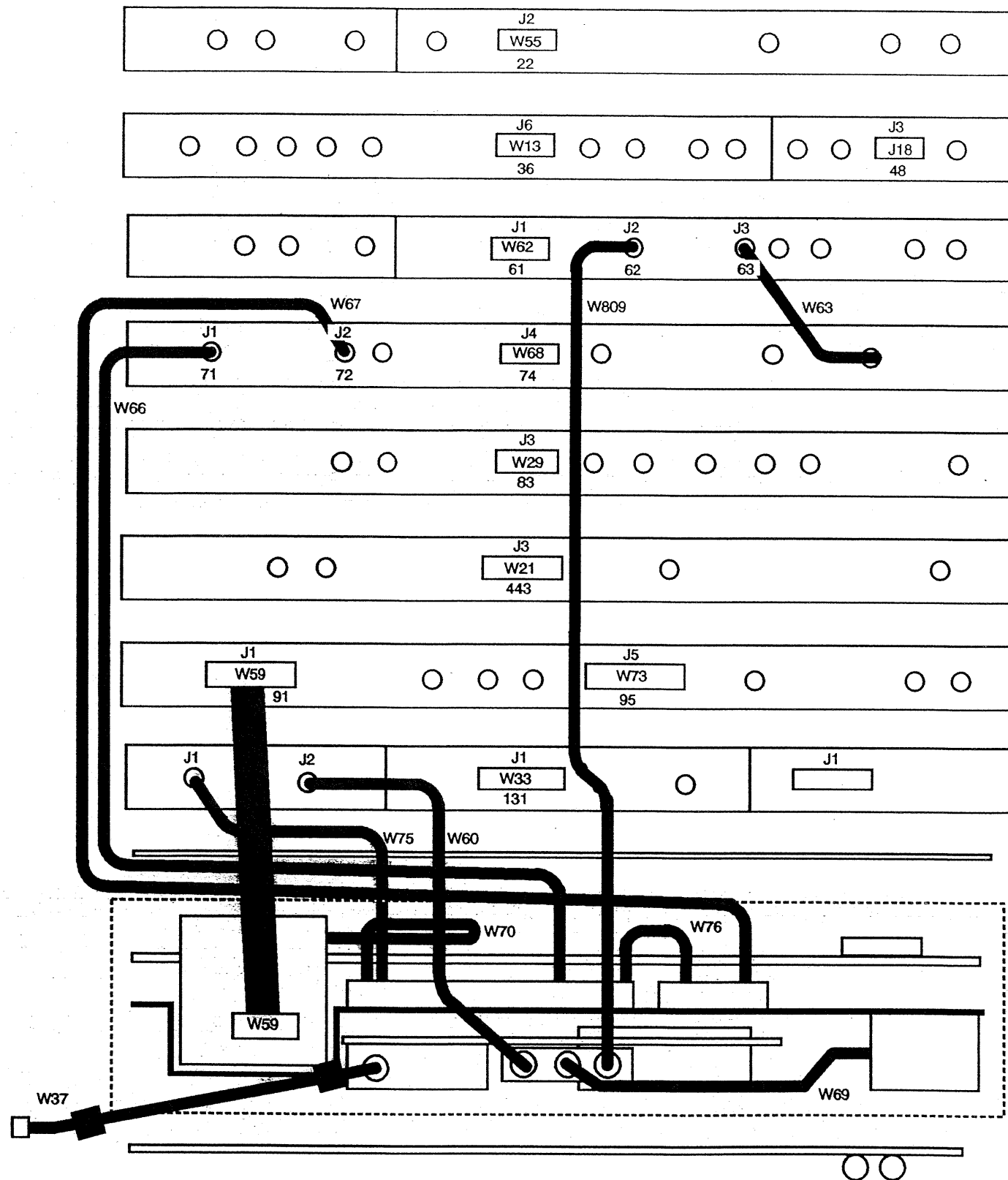


Figure 4c-10. RF Cable Locator Diagrams: HP 8644A (Opt 004)



RIBBON AND SEMI-RIGID CABLES



COAX CABLES

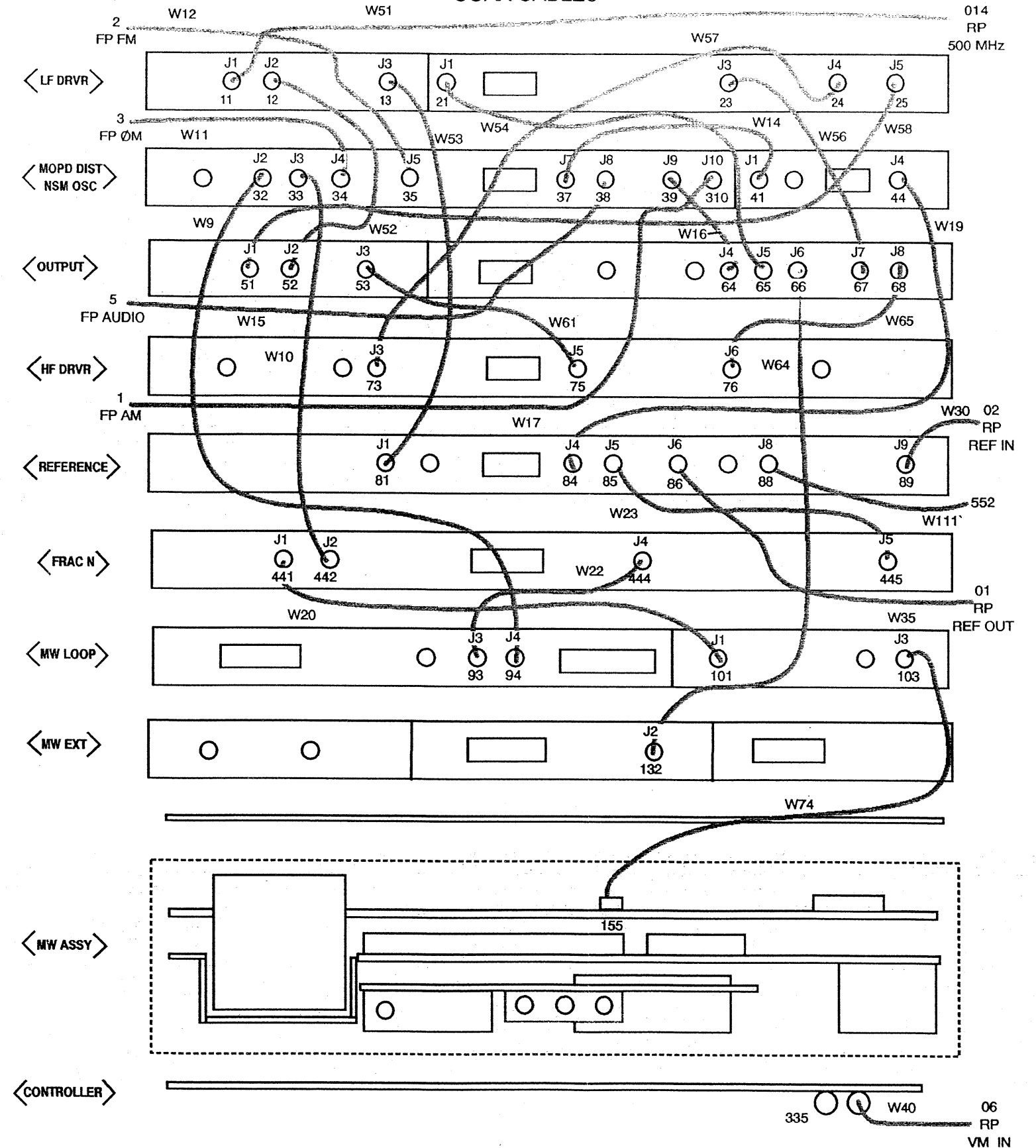
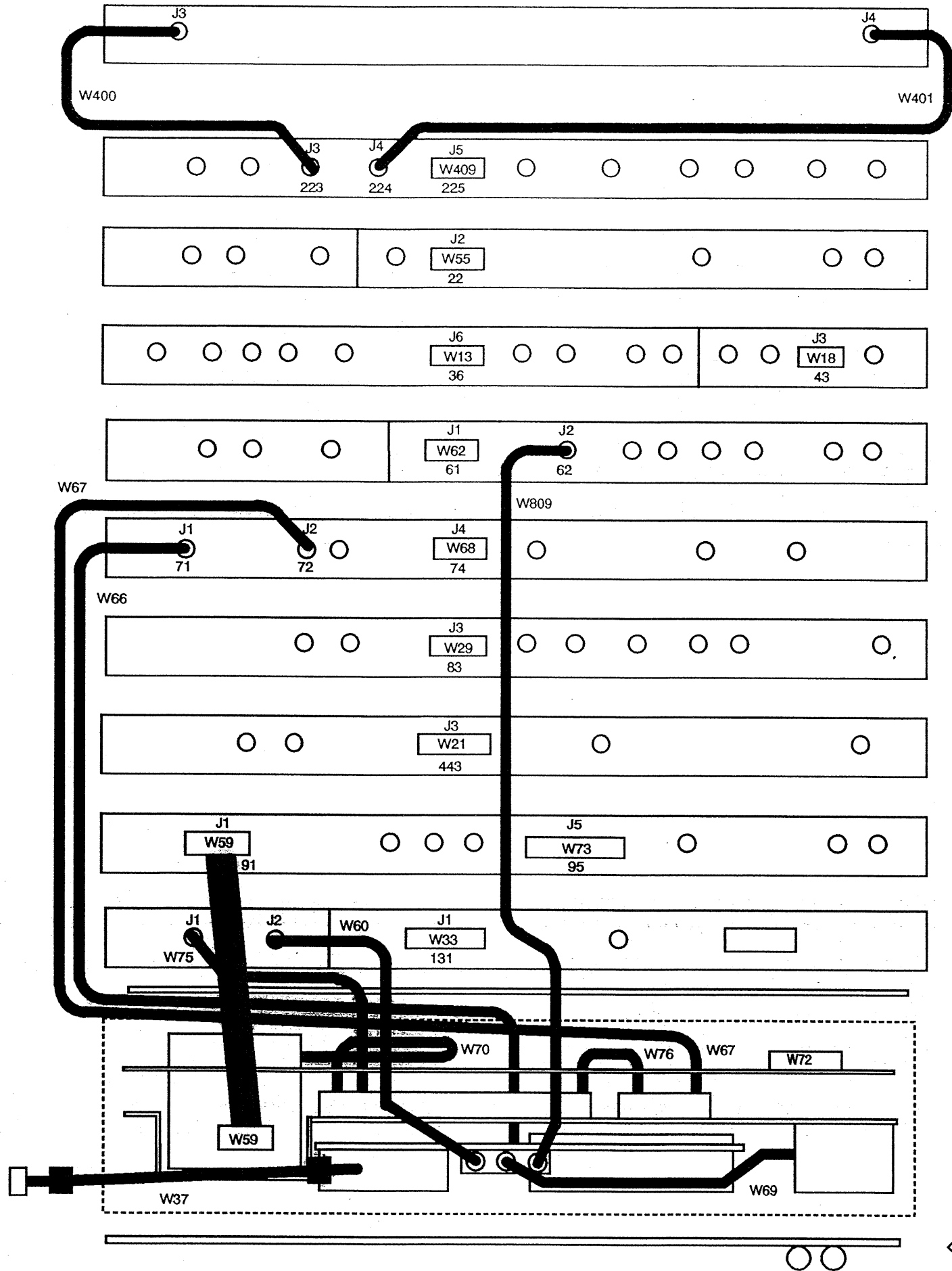


Figure 4c-12. RF Cable Locator Diagrams: HP 8645A (No Options)

RIBBON AND SEMI-RIGID CABLES



COAX CABLES

Cable Location

4c-35

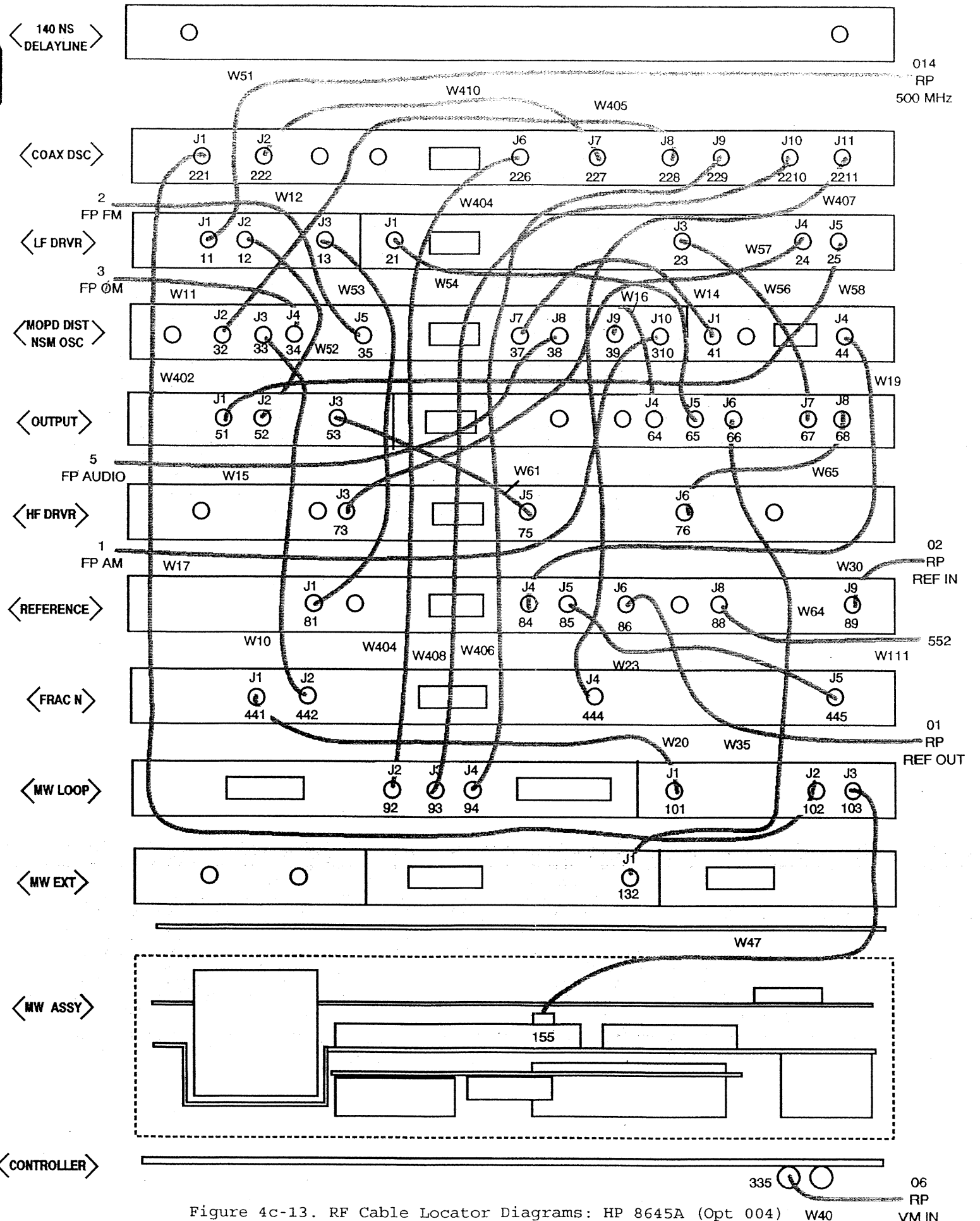


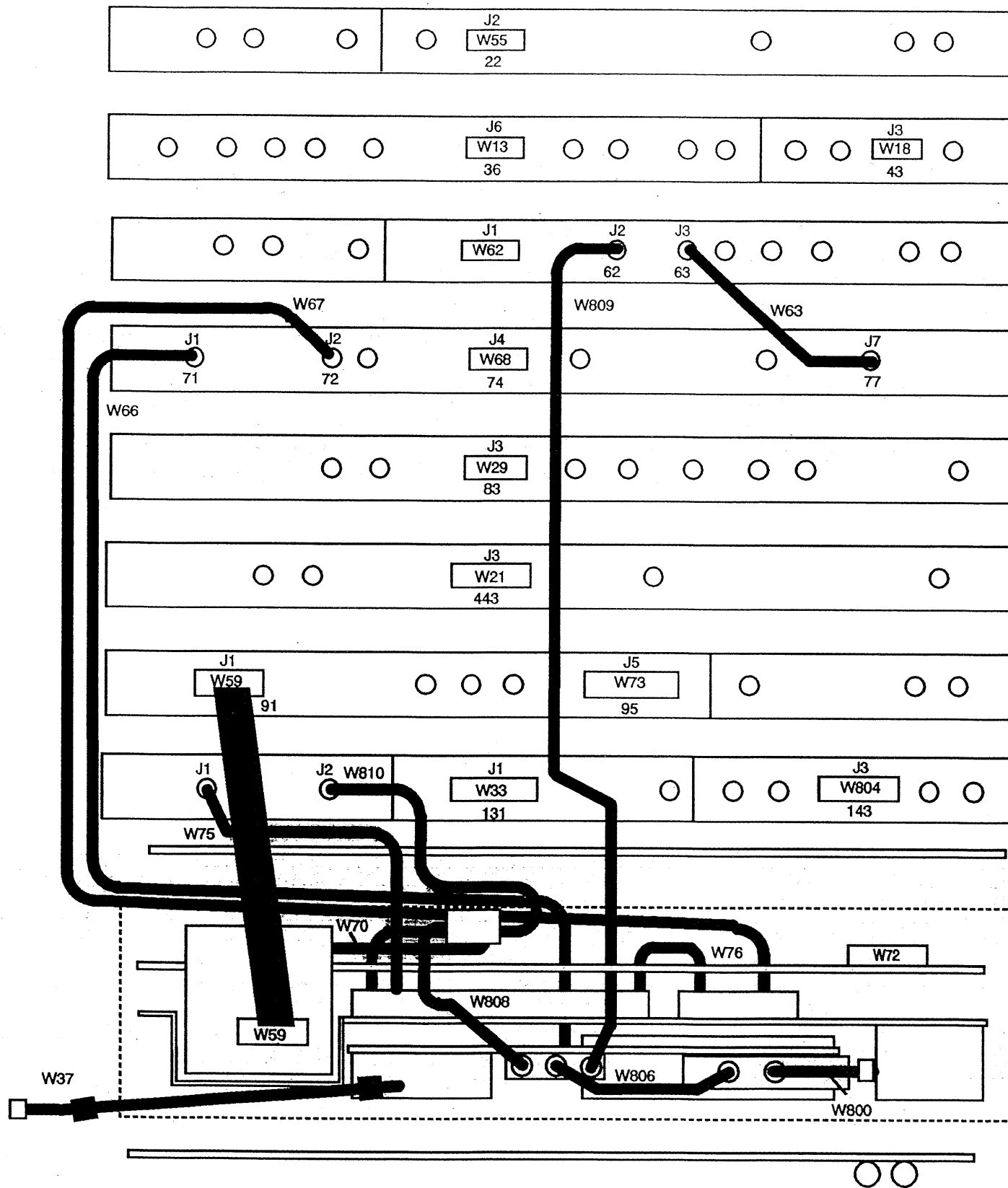
Figure 4c-13. RF Cable Locator Diagrams: HP 8645A (Opt 004)

W40

06  
RP  
VM IN



RIBBON AND SEMI-RIGID CABLES



COAX CABLES

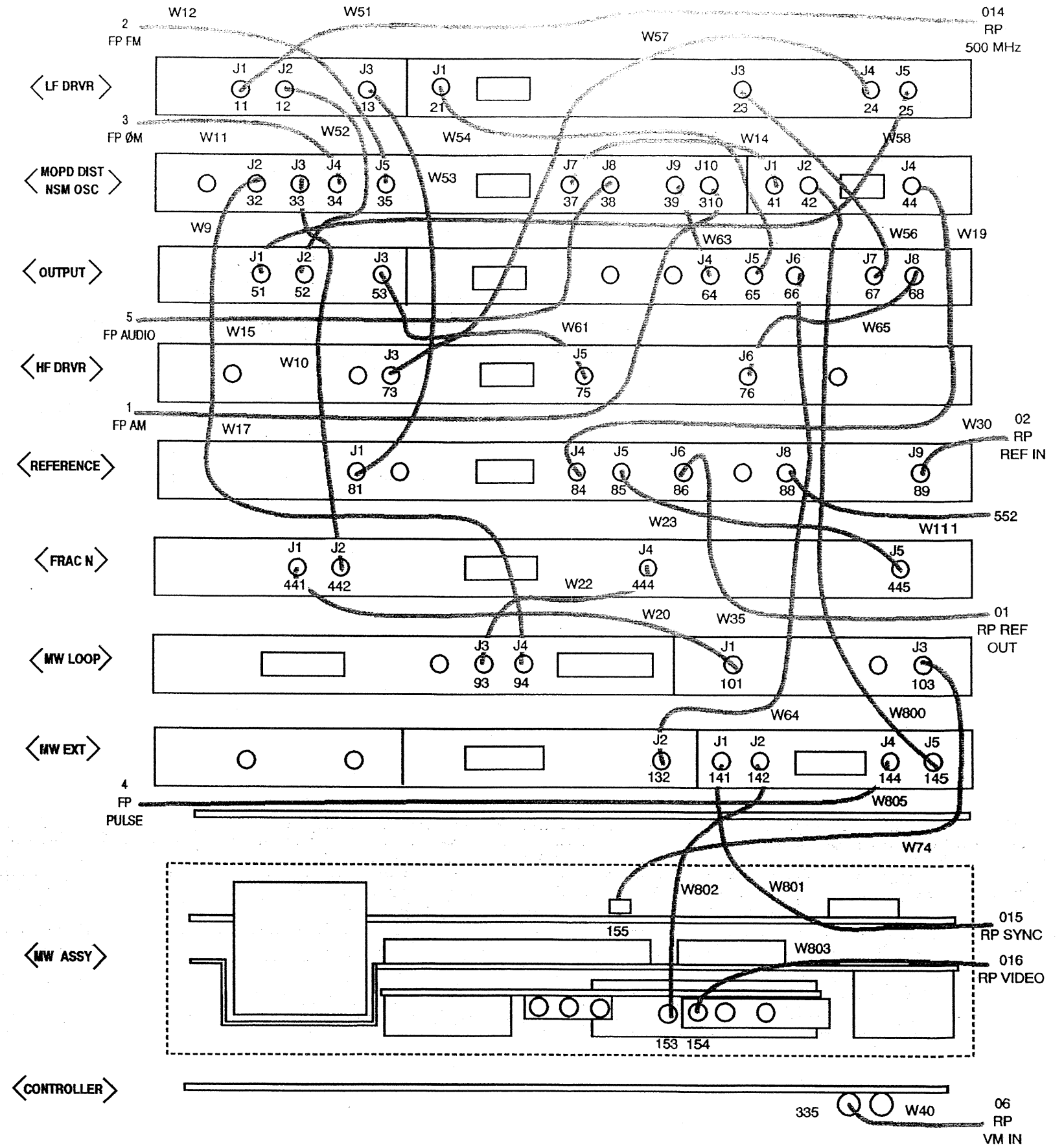
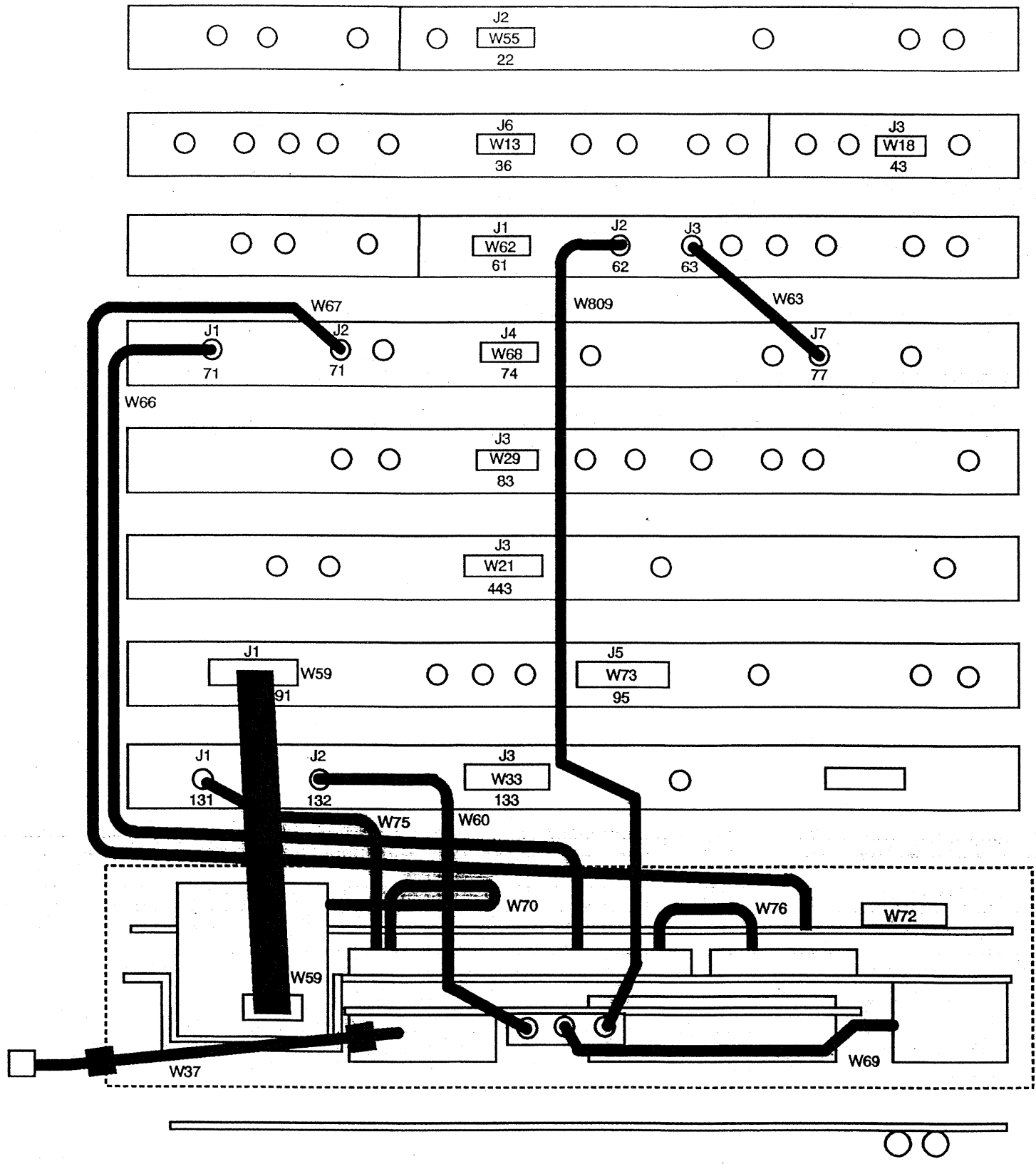


Figure 4c-14. RF Cable Locator Diagrams: HP 8665A (Opt 008)



RIBBON AND SEMI-RIGID CABLES



COAX CABLES

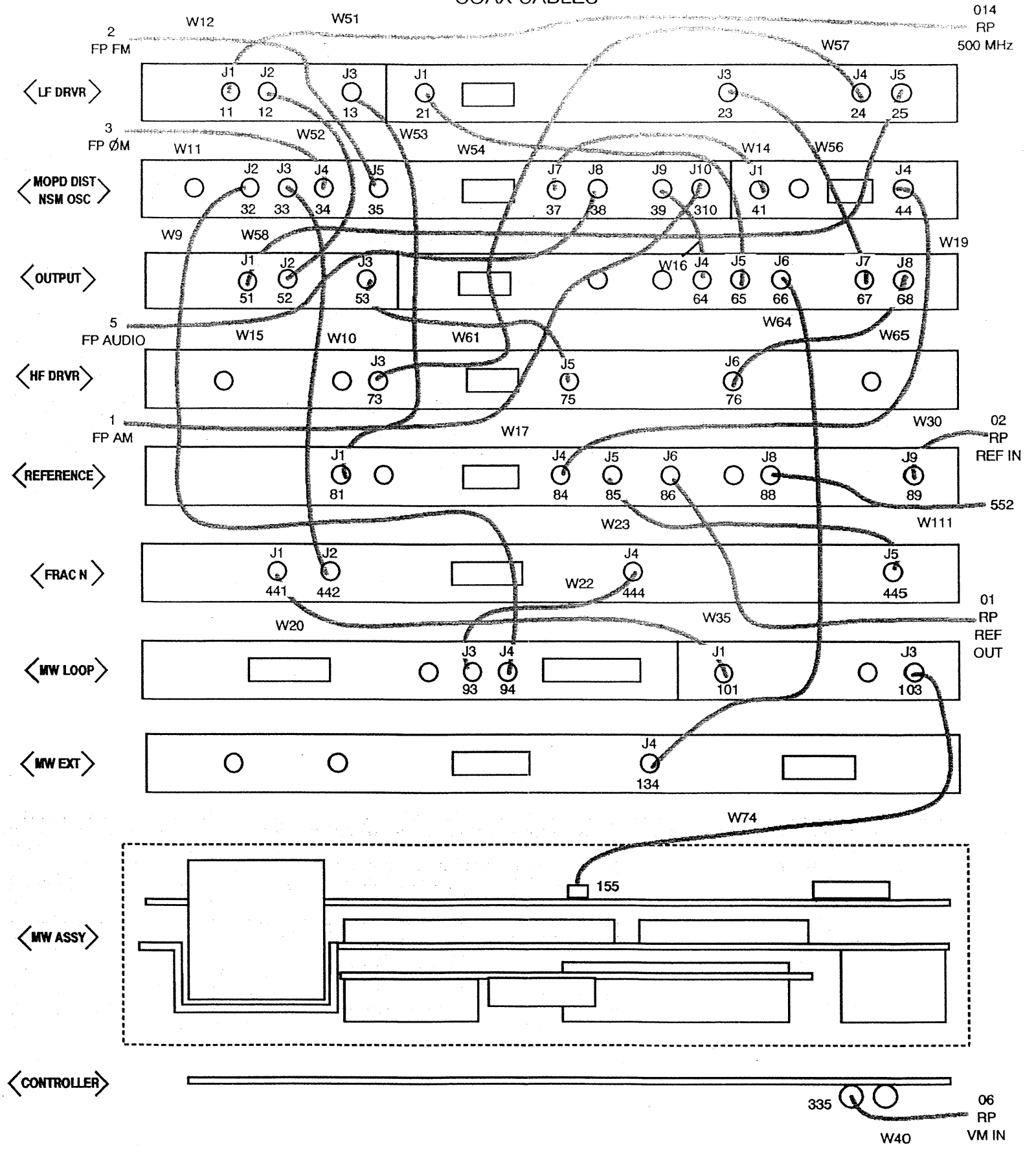
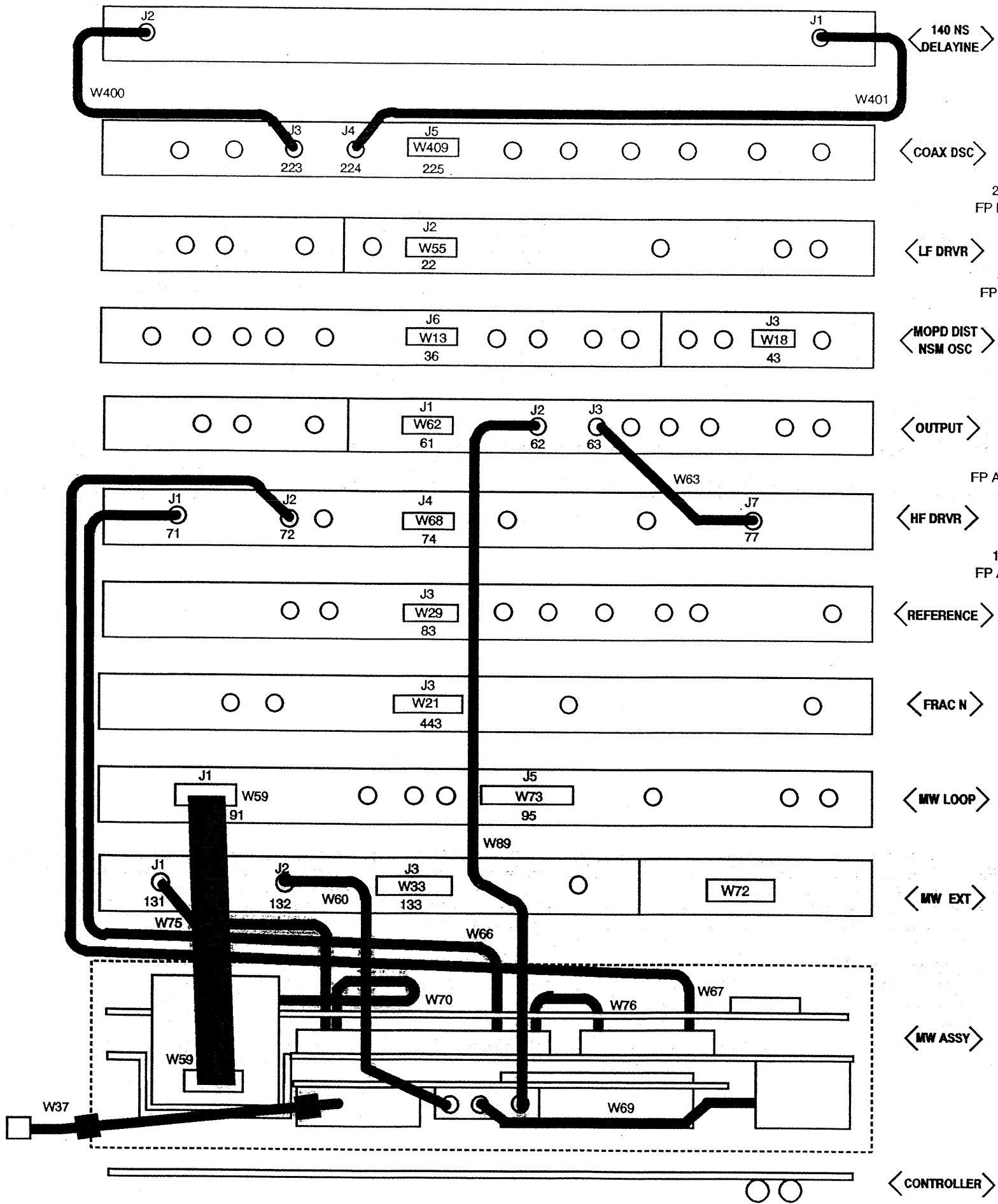


Figure 4c-15. RF Cable Locator Diagrams: HP 8665B (No Options)

RIBBON AND SEMI-RIGID CABLES



COAX CABLES

Cable Location 4c-41

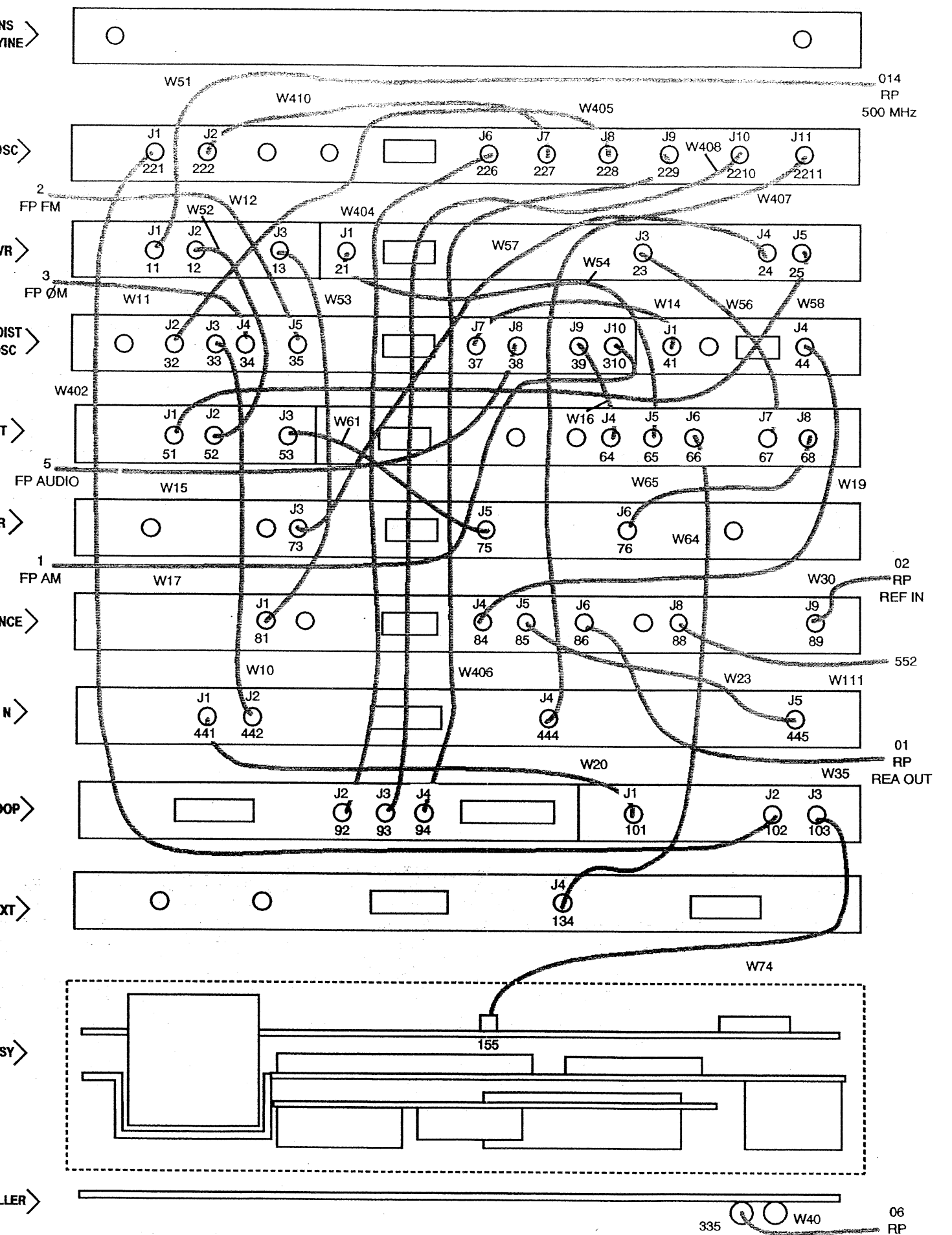
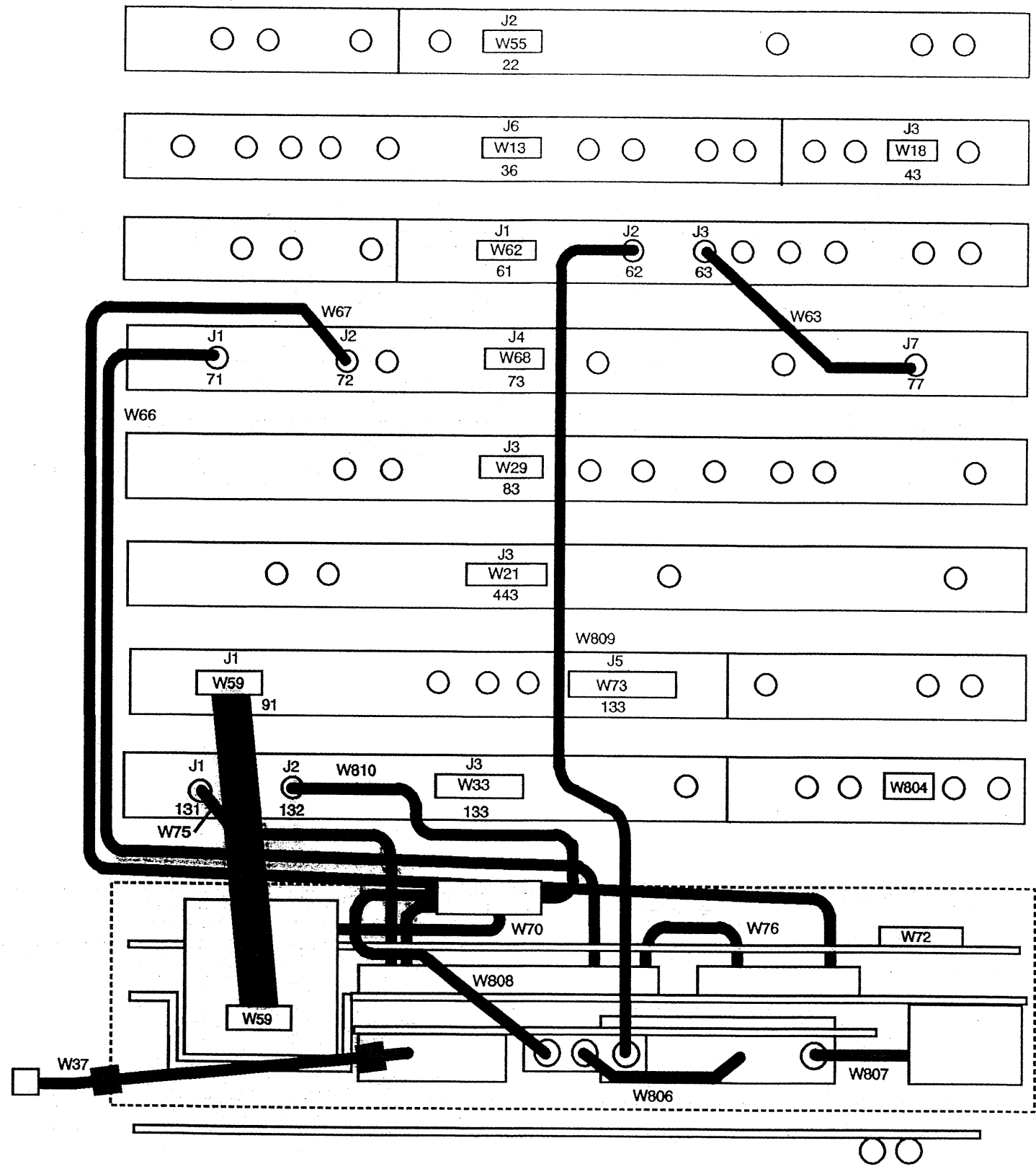


Figure 4c-16. RF Cable Locator Diagrams: HP 8665B (Opt 004)

RIBBON AND SEMI-RIGID CABLES



COAX CABLES

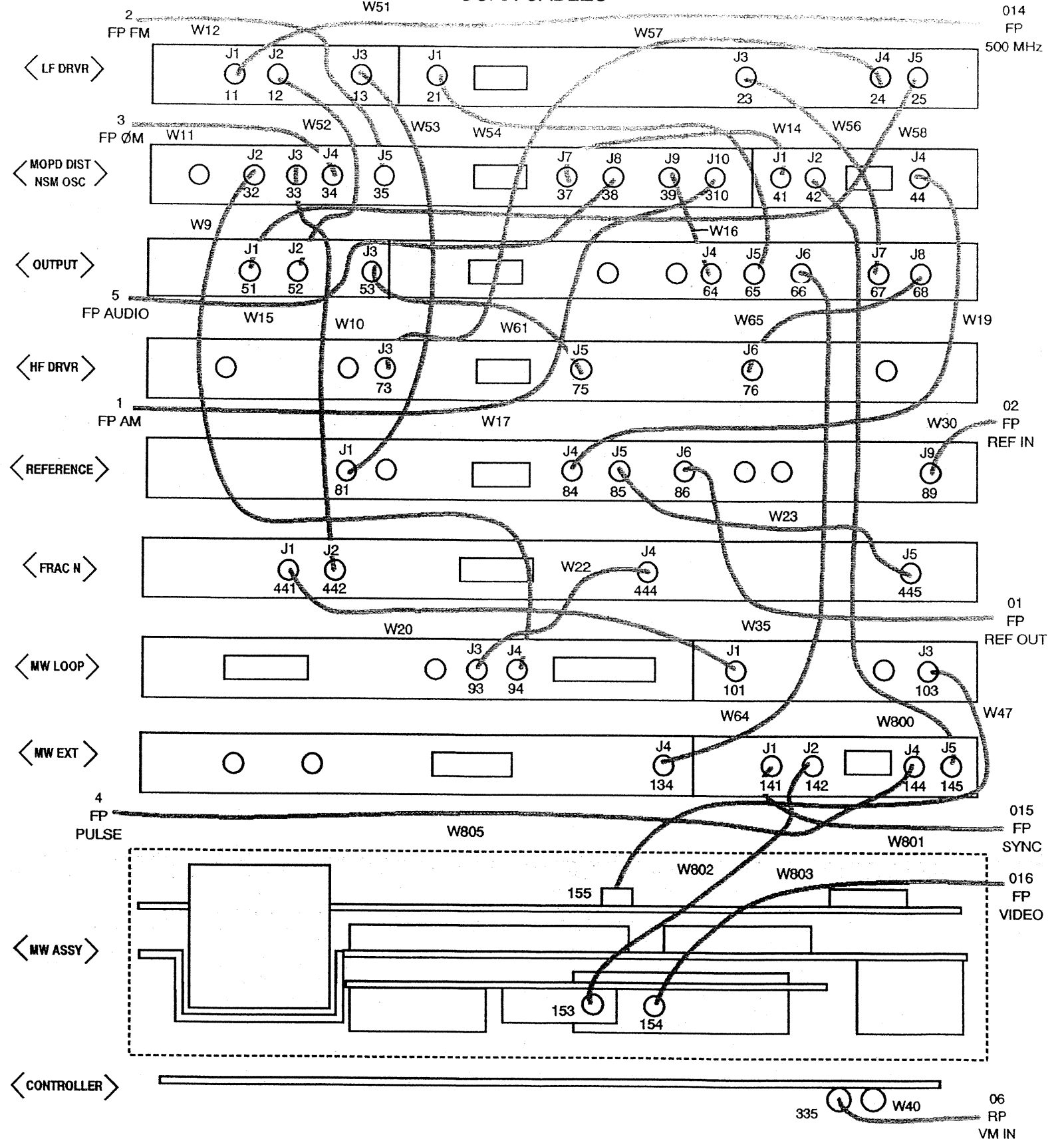


Figure 4c-17. RF Cable Locator Diagrams: HP 8665B (Opt 004)

# TABLE OF CONTENTS

## Replaceable Parts - Retrofit Kits

PSG Option Retrofit Kits Table .....	4d-1
--------------------------------------	------



### PSG Option Retrofit Kits

MODEL #	001 Timebase	002 Doublers	003 Rear Panel (Factory)	004 Low Noise	005 Elec Atten
HP 8643A	08645-61154	08644-61082	HP 8643A-G06	NA	NA
HP 8644A	08645-61154 <sup>(1)</sup>	08644-61082	HP 8644A-G11/G06	08644-61084	!!!!
HP 8644B	08645-61154 <sup>(1)</sup>	08644-61082		NA	!!!!
HP 8645A	08645-61154 <sup>(1)</sup>	08644-61082	HP 8645A-G01	NA	NA
HP 8664A	08645-61154 <sup>(1)</sup>	NA	HP 8664A-G01	08644-61084	NA
HP 8665A	08645-61154 <sup>(1)</sup>	NA	HP 8665A-G01	08644-61084	NA
HP 8665B	08645-61154 <sup>(1)</sup>	NA		08644-61084	NA
HP 70320A	08645-61154 <sup>(1,2)</sup>	08644-61082		08644-61084 <sup>(2)</sup>	!!!!
HP 70322A	08645-61154 <sup>(1,2)</sup>	NA		08644-61084 <sup>(2)</sup>	NA

....continued

MODEL #	007 NSM Source	008 Fast Pulse (Factory)	009 Avionics	010 Leakage	011 Counter Not Available w/010
HP 8643A	STD	NA			
HP 8644A	08644-61087	NA			
HP 8644B	STD	NA			
HP 8645A	STD	NA	NA	NA	NA
HP 8664A	STD	HP 8664A-G03	NA		NA
HP 8665A	STD	HP 8665A-G02/G03	NA		NA
HP 8665B	STD	HP 8665B-G03	NA		NA
HP 70320A	08644-61087 <sup>(2)</sup>	NA		NA	NA
HP 70322A	STD		NA	NA	NA

<sup>(1)</sup> Earlier instruments prefix <3203A require kit 08645-61153

<sup>(2)</sup> Although not specific instructions, parts should be correct. Recommend only HP service center install these kits.

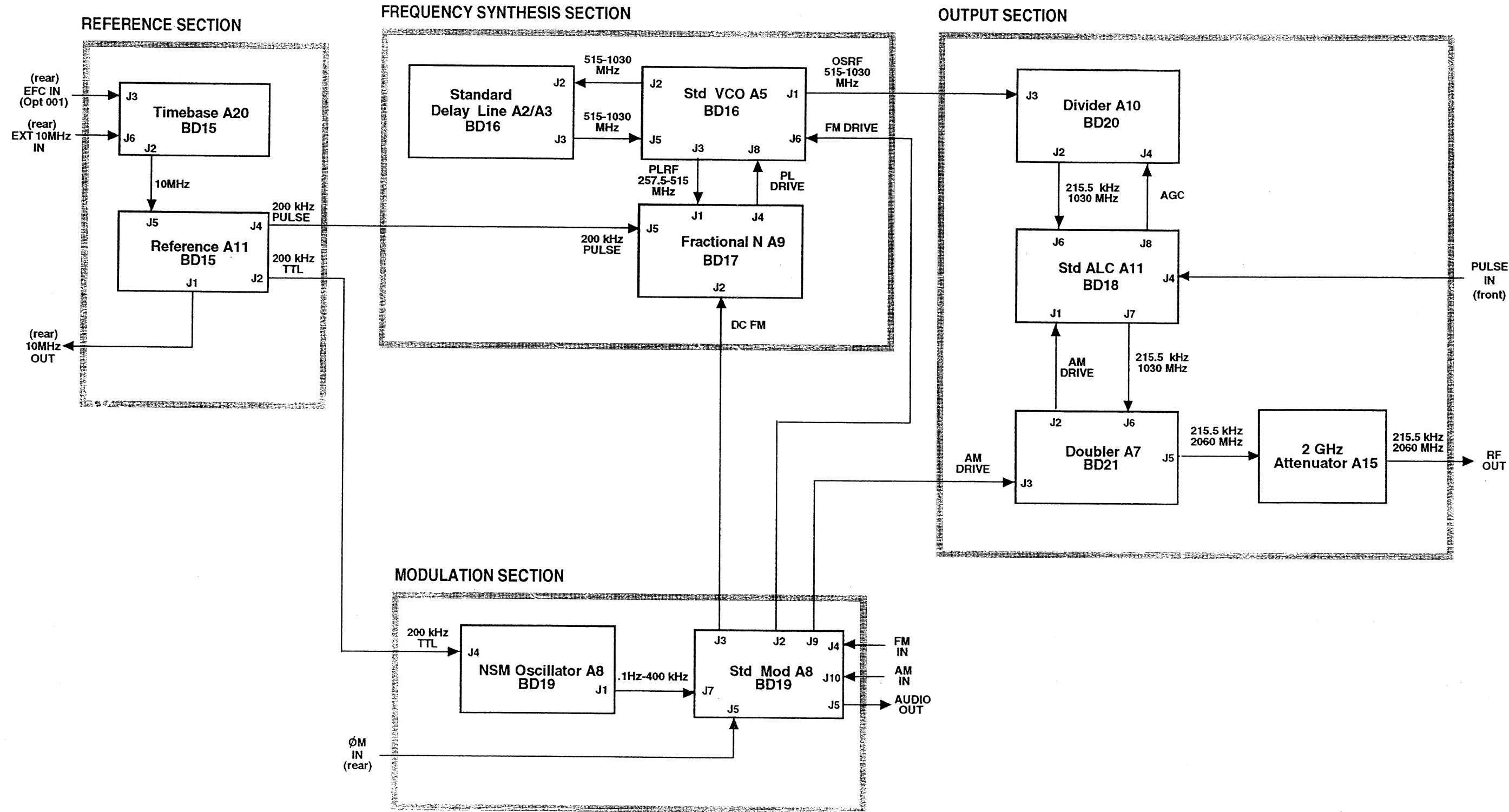


# TABLE OF CONTENTS

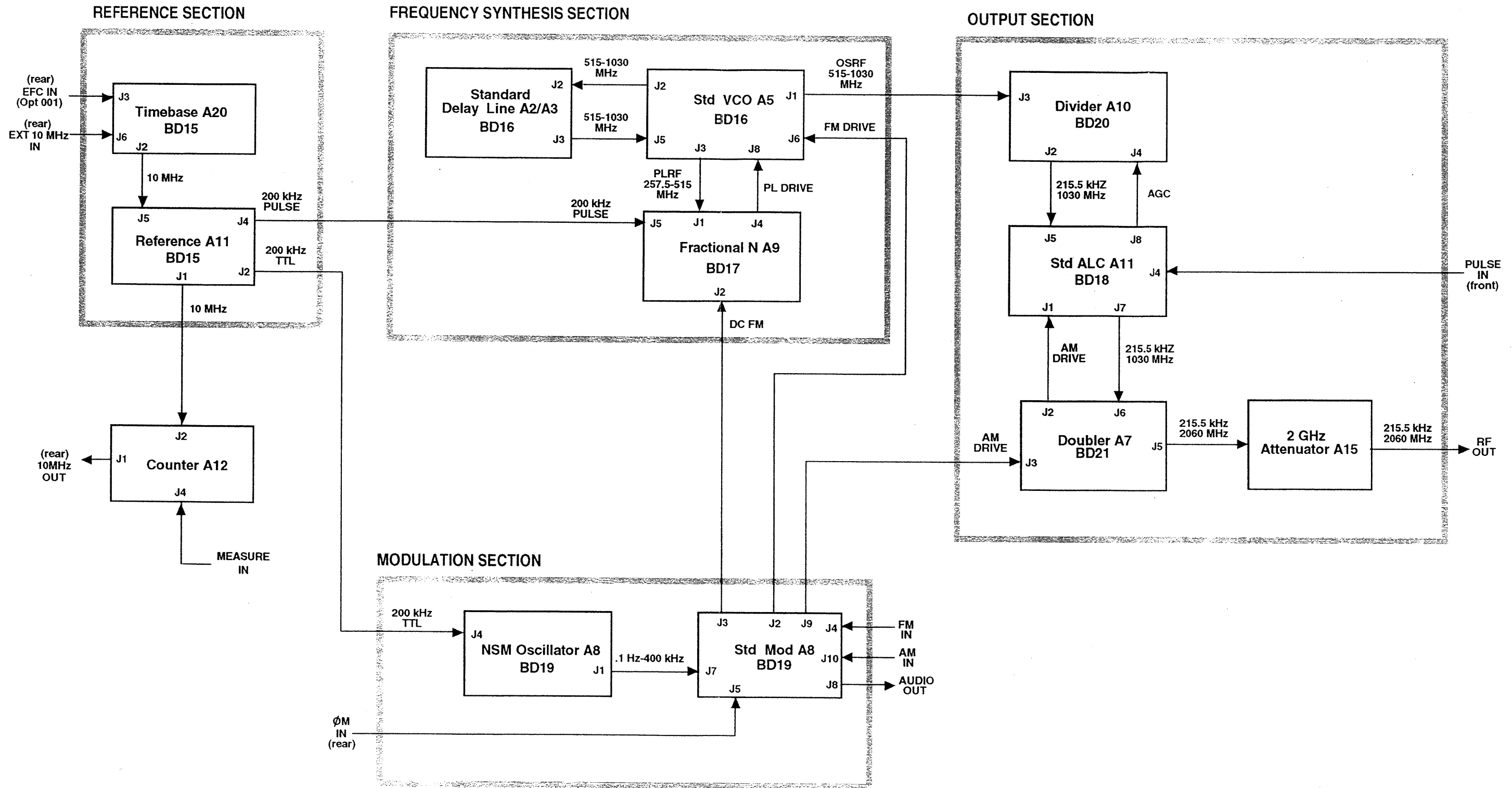
## Block Diagrams

HP 8643A Std.....	BD 1
HP 8643A Optioned .....	BD 2
HP 8644A Std.....	BD 3
HP 8644A Optioned .....	BD 4
HP 8664D Std.....	BD 5
HP 8644B Optioned .....	BD 6
HP 8645A .....	BD 7
HP 8645A Optioned .....	BD 8
HP 8664A Std.....	BD 9
HP 8664A Optioned .....	BD 10
HP 8665A Std.....	BD 11
HP 8665A Optioned .....	BD 12
HP 8665B Std.....	BD 13
HP 8665B Optioned .....	BD 14
Reference 8643A/ 44A/ 44B/ 45A .....	BD 15
Standard VCO 8643A/ 44A/ 44B.....	BD 16
Fractional N 8643A/ 44A/ 44B/ 45A/ 8664A 65A/ 65B .....	BD 17
Standard ALC 8643A/ 44A/ 44B .....	BD 18
NSM/ Std Mod 8643A/ 44A/ 44B .....	BD 19
Divider 8643A/ 44A/ 44B/ 45A .....	BD 20
Doubler 8643A/ 44A/ 44B/ 45A .....	BD 21
Comm Discriminator 8644A/ 44B/ 8664A 65A/ 65B .....	BD 22
Reference 8664A/ 65A/ 65B .....	BD 23
NSM Mod Distribution 8645A/ 64A/ 65A/ 65B .....	BD 24
1 GHZ Multiplier/ LF Driver 8664A/ 65A/ 65B .....	BD 25
Down Converter Output 8664A/ 65A/ 65B .....	BD 26
HF Driver 8664A/ 65A/ 65B .....	BD 27
Microwave Loop 8664A/ 65A/ 65B .....	BD 28
Pulse Driver (opt 008) 8664A .....	BD 29
MW Extender Pulse Driver (opt 008) 8665A .....	BD 30
MW Extender Pulse Driver (opt 008) 8665B .....	BD 31
Microwave Assembly 8664A .....	BD 32
Microwave Assembly 8665A .....	BD 33
Microwave Assembly 8665B .....	BD 34

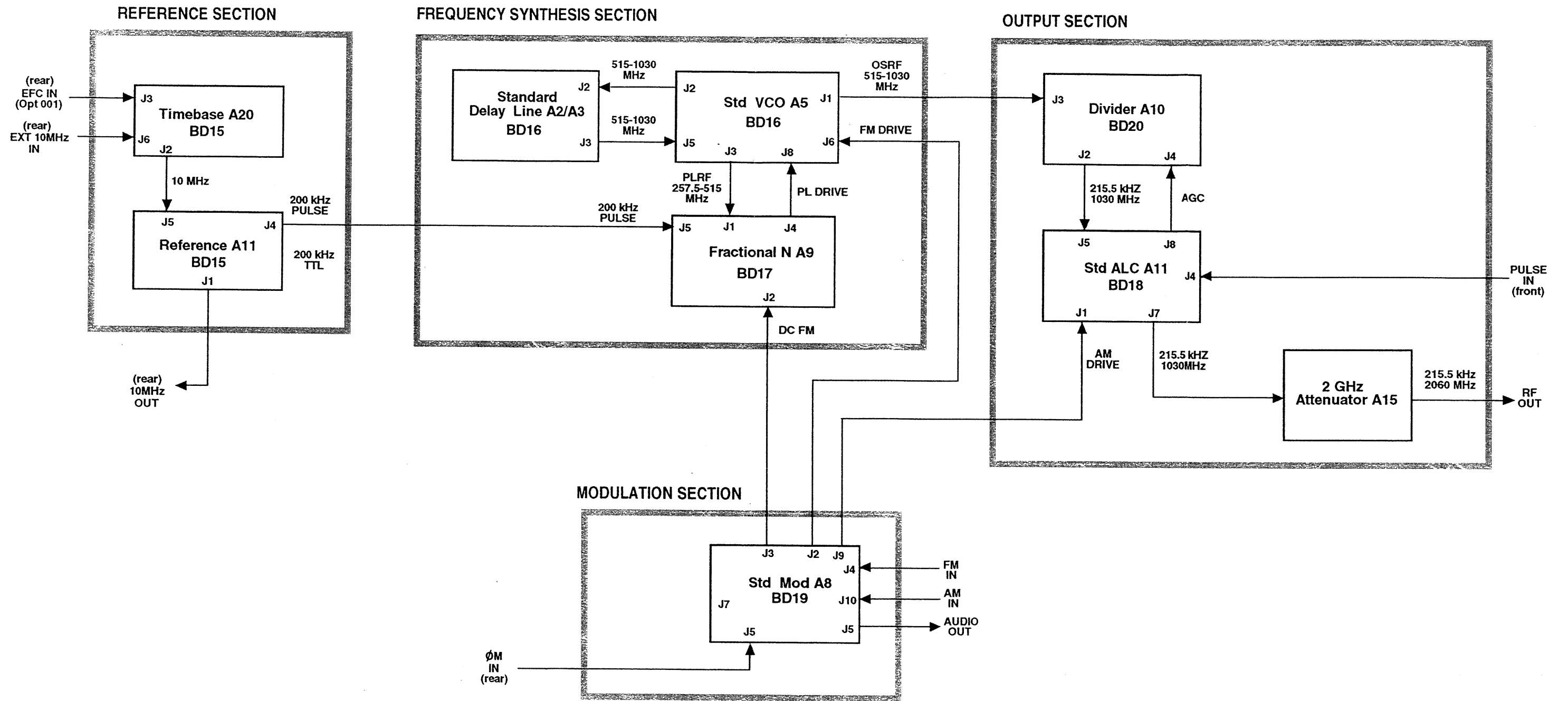




Interconnect  
8643A Std  
BD 1

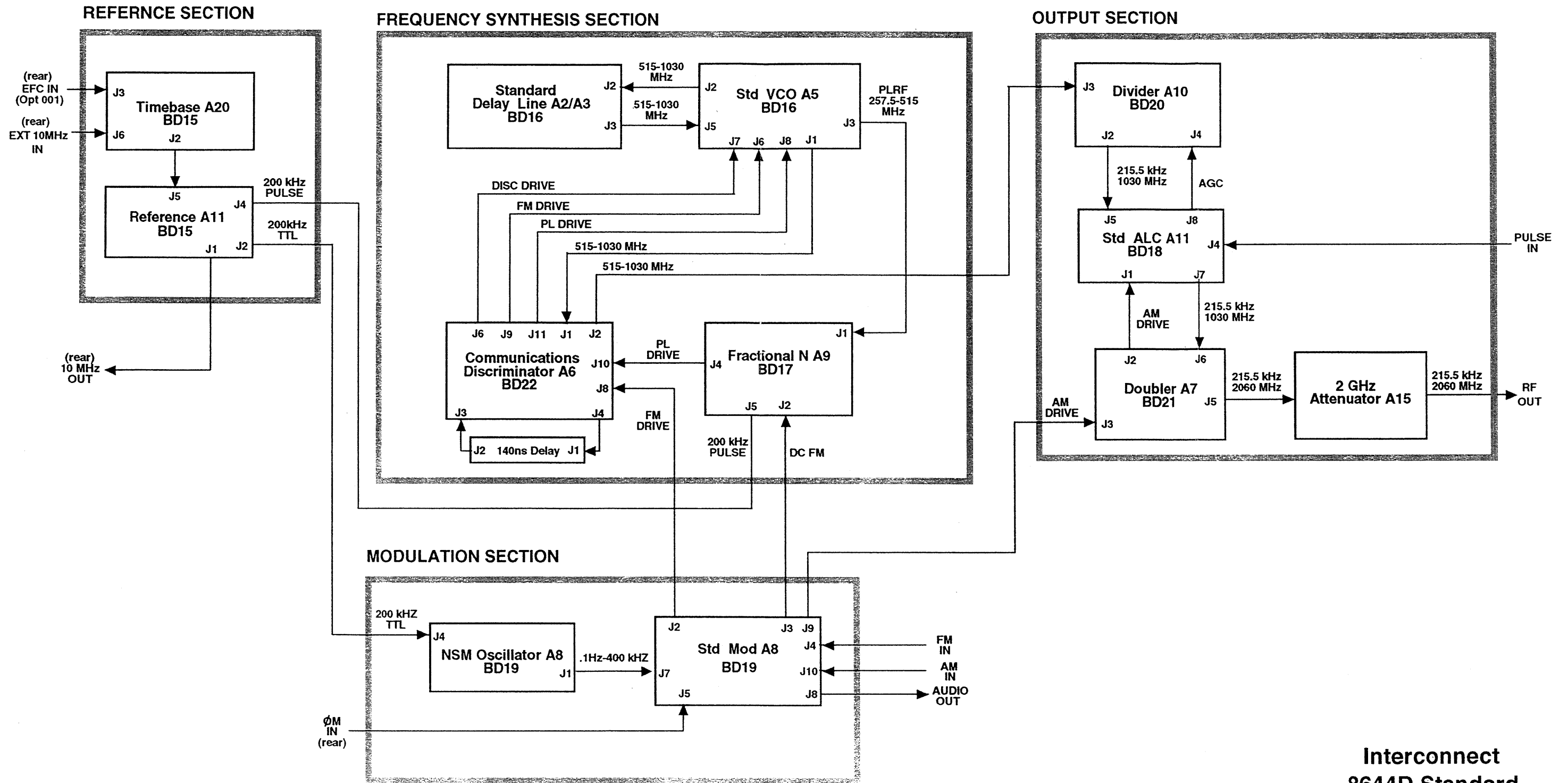


Interconnect  
8643A Optioned  
BD 2

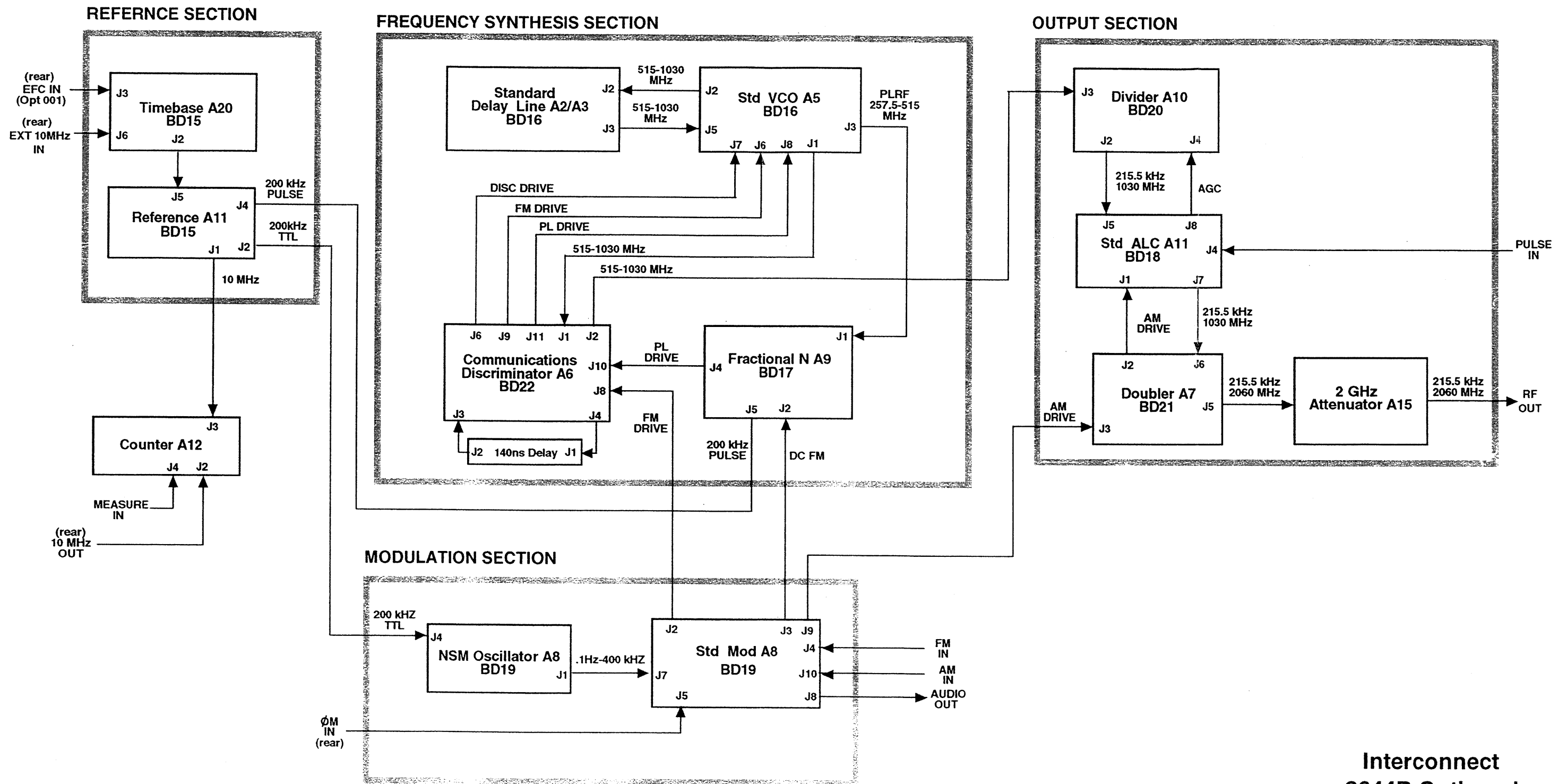


Interconnect  
8644A Standard  
BD 3

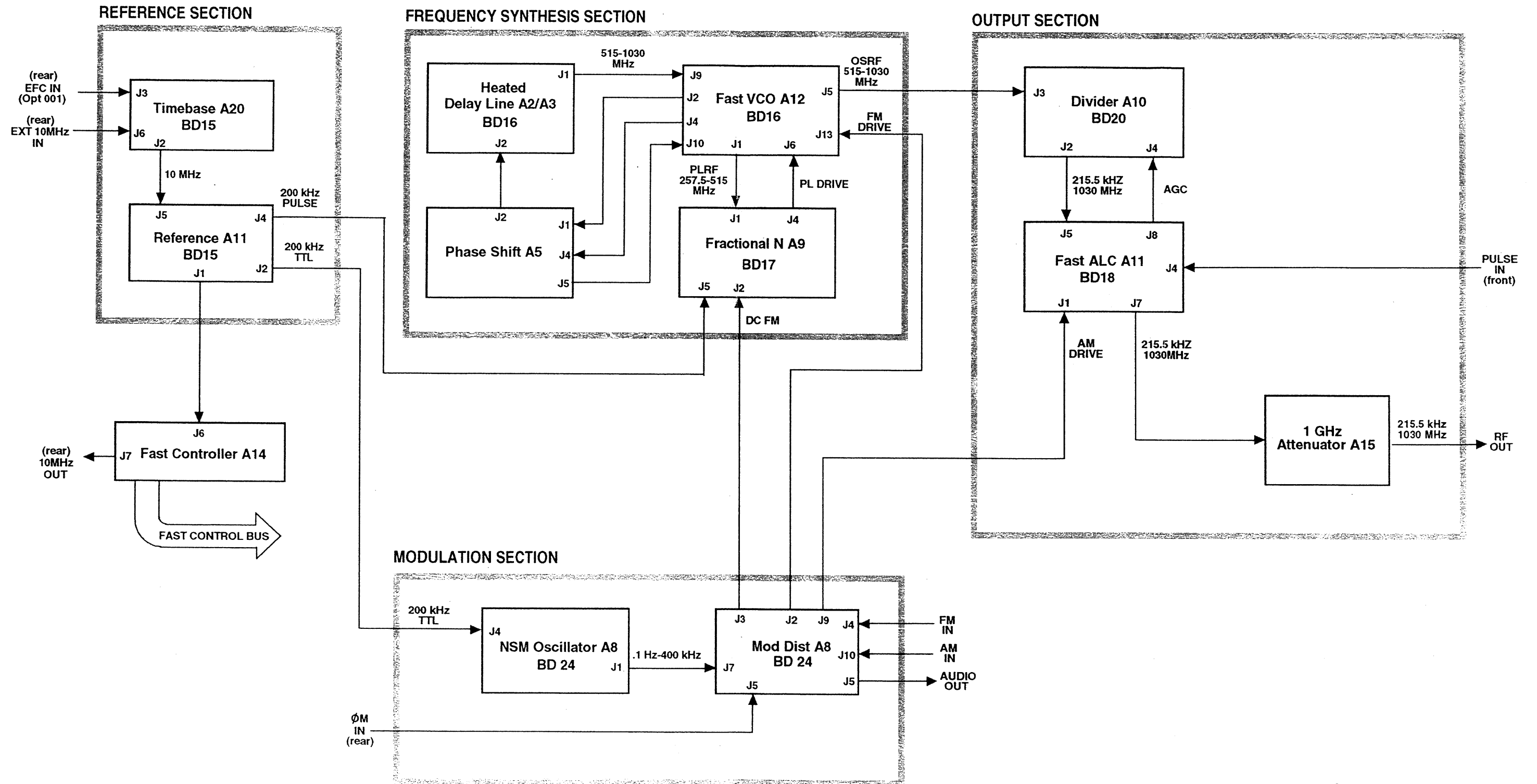




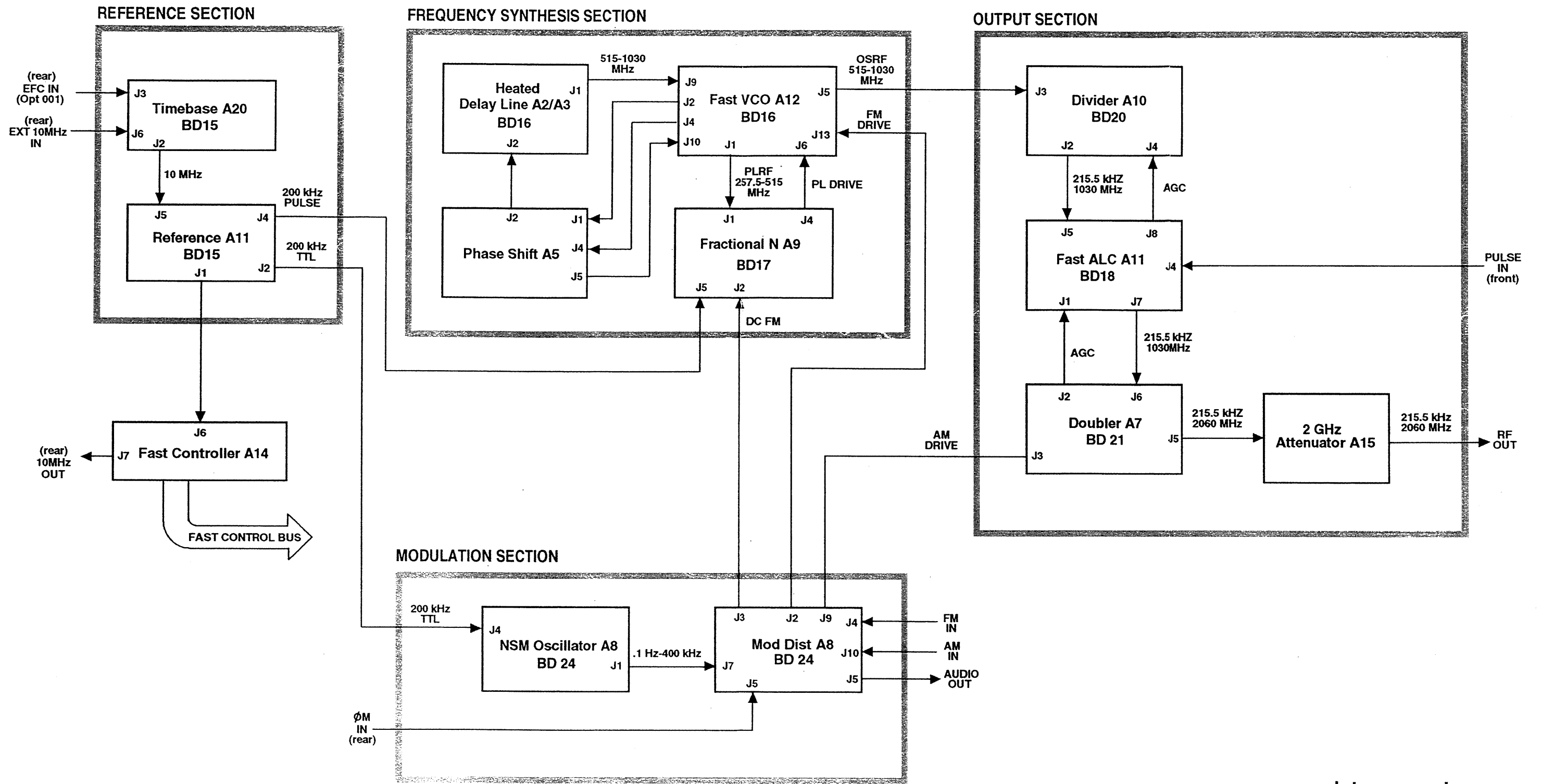
Interconnect  
8644D Standard  
BD 5



Interconnect  
8644B Optioned  
BD 6

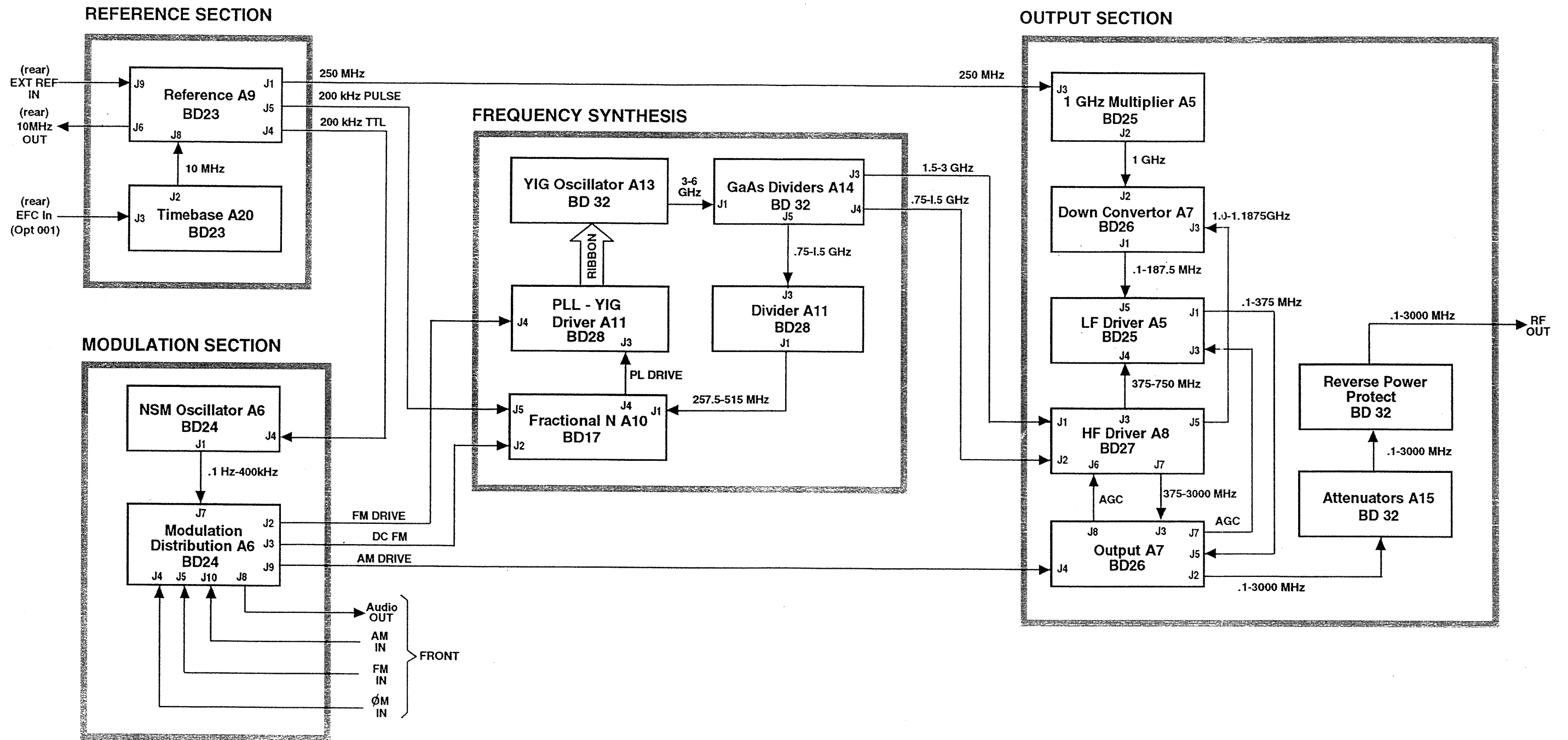


Interconnect  
8645A  
BD 7

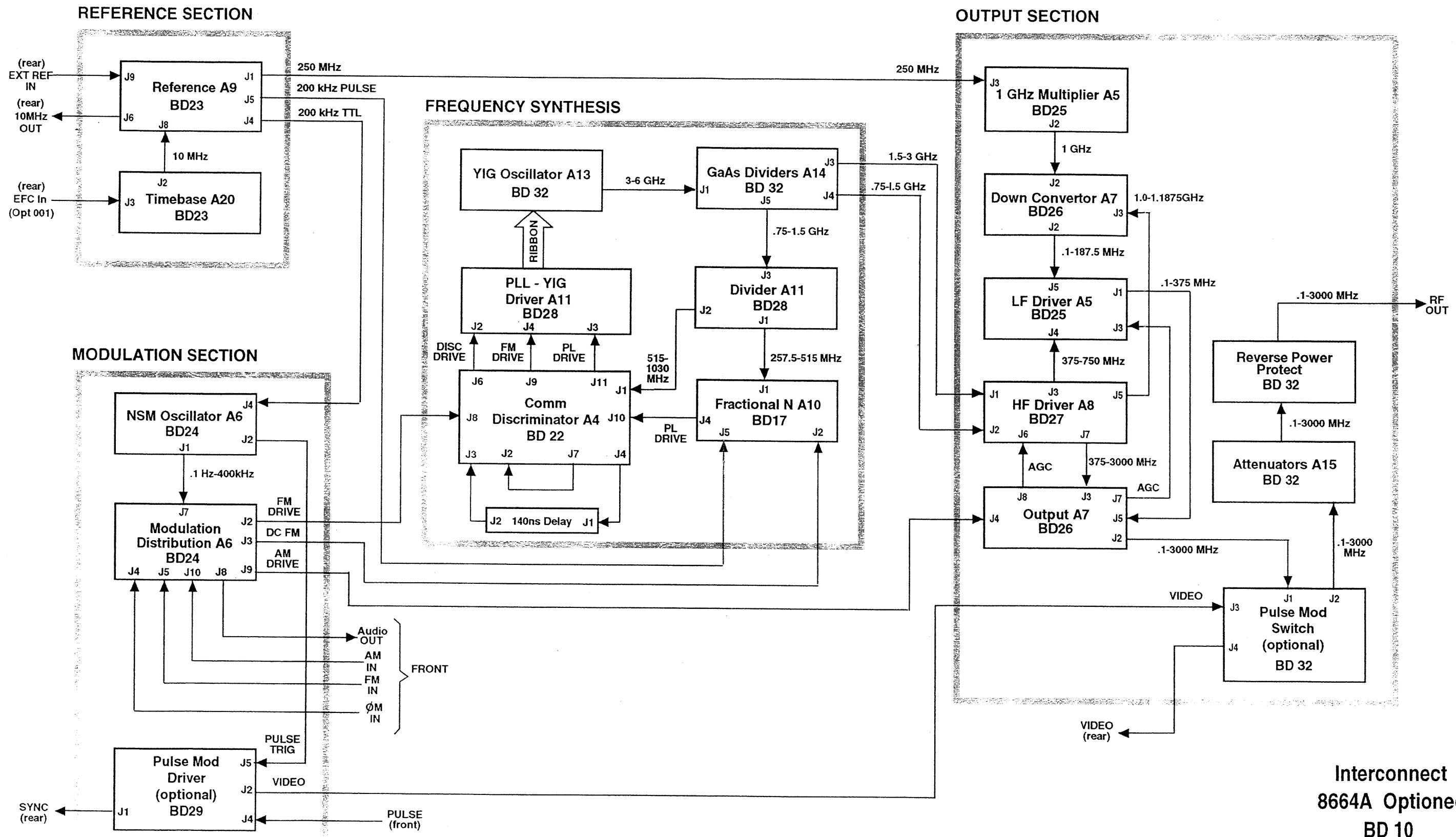


Interconnect  
8645A Optioned  
BD 8

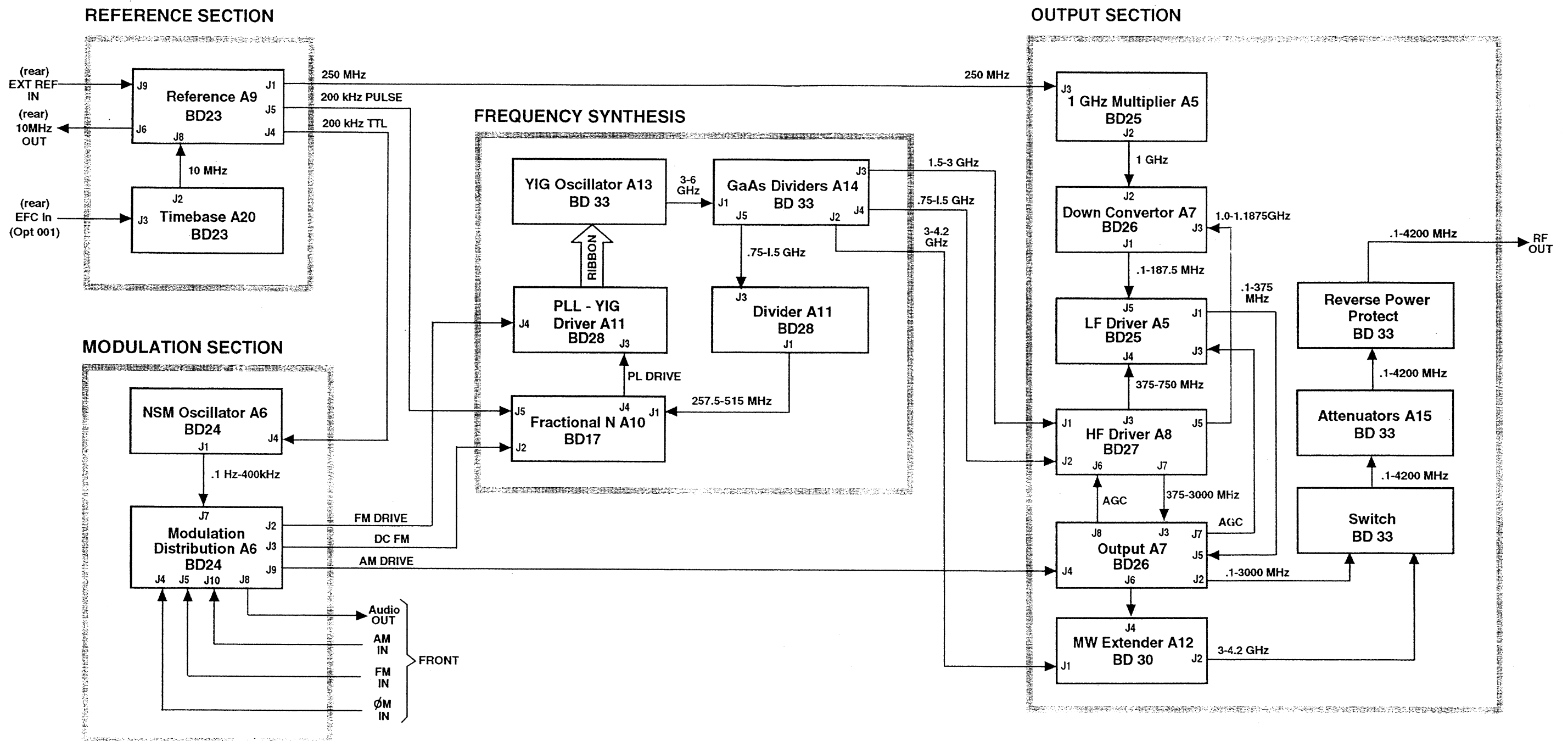




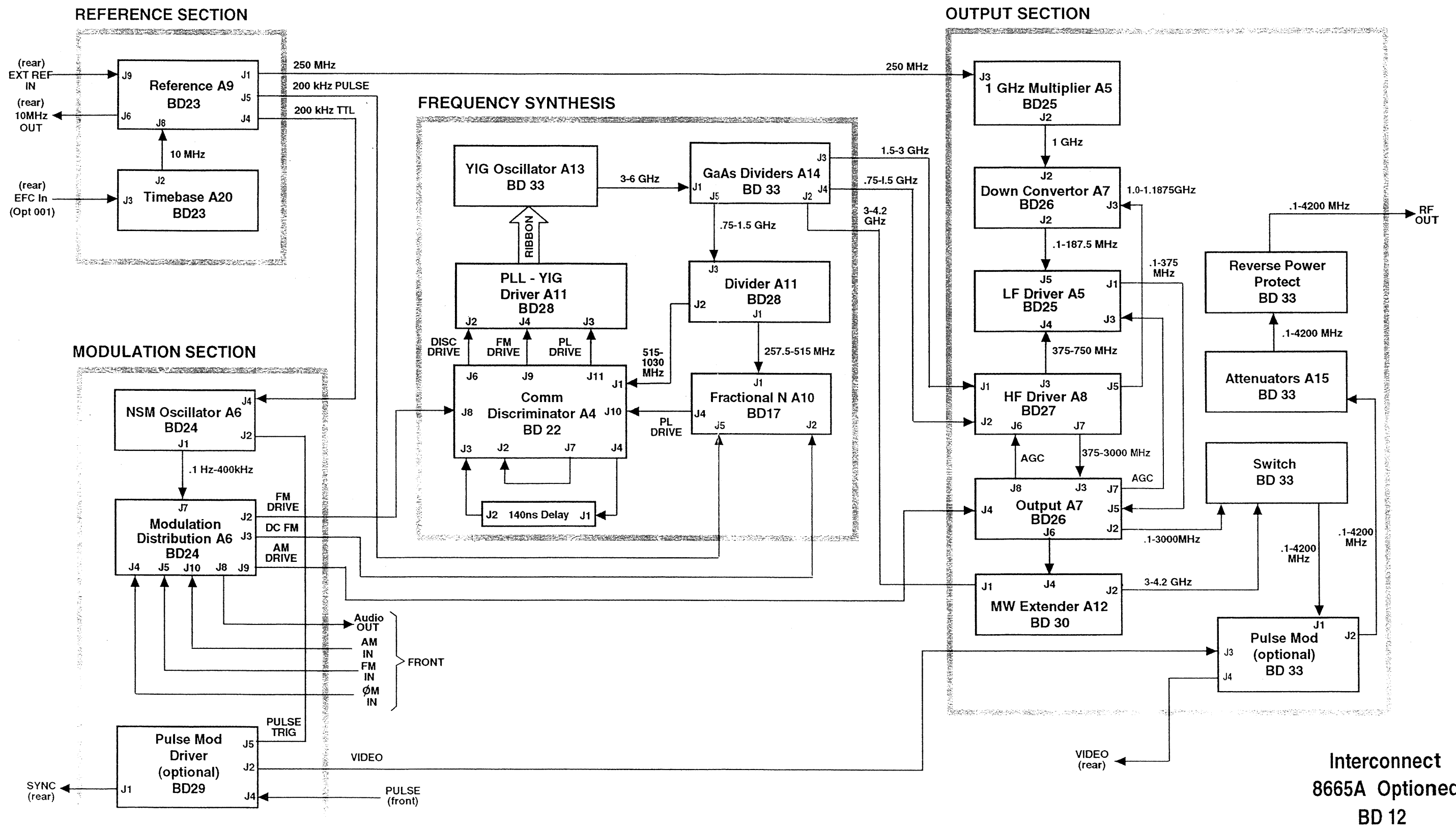
Interconnect  
8664A Standard  
BD 9

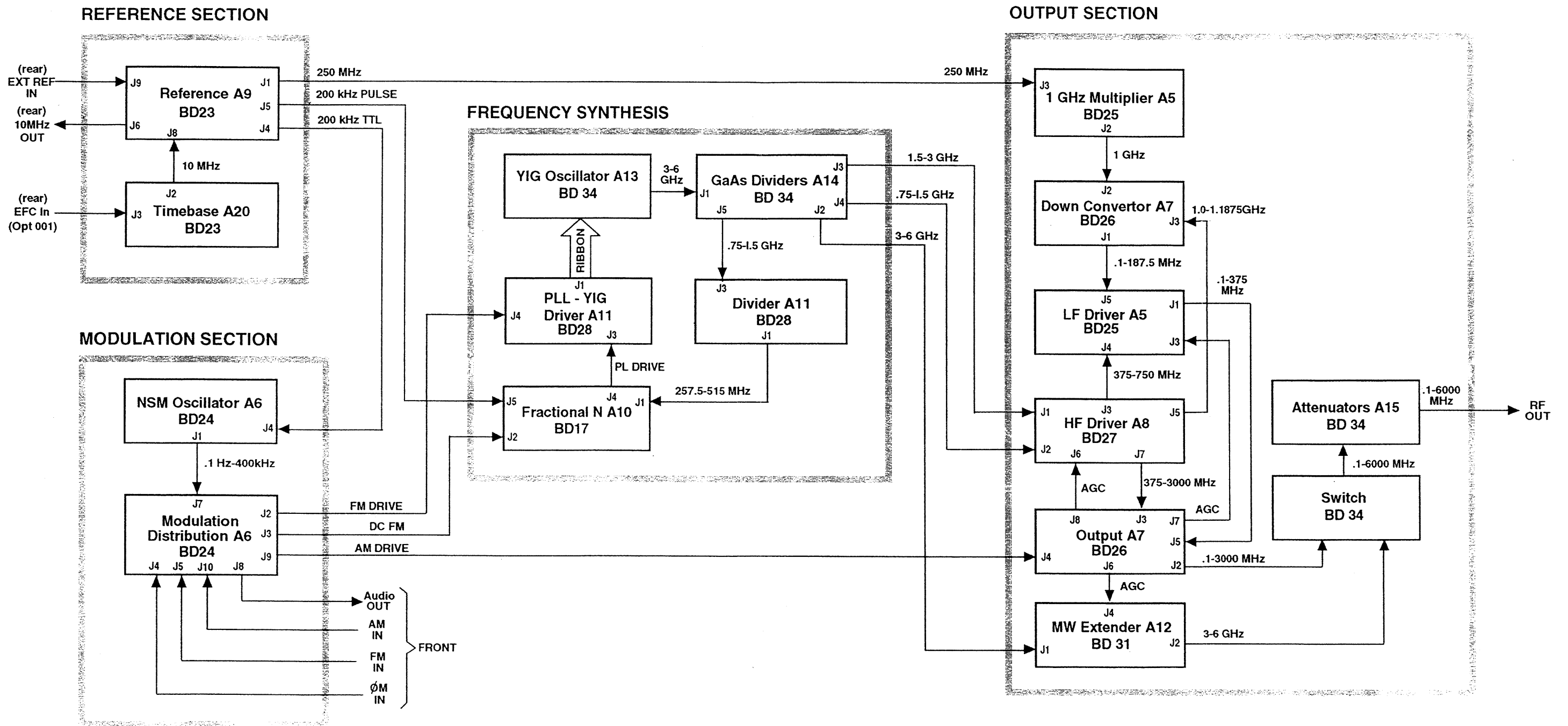


Interconnect  
8664A Optioned  
BD 10

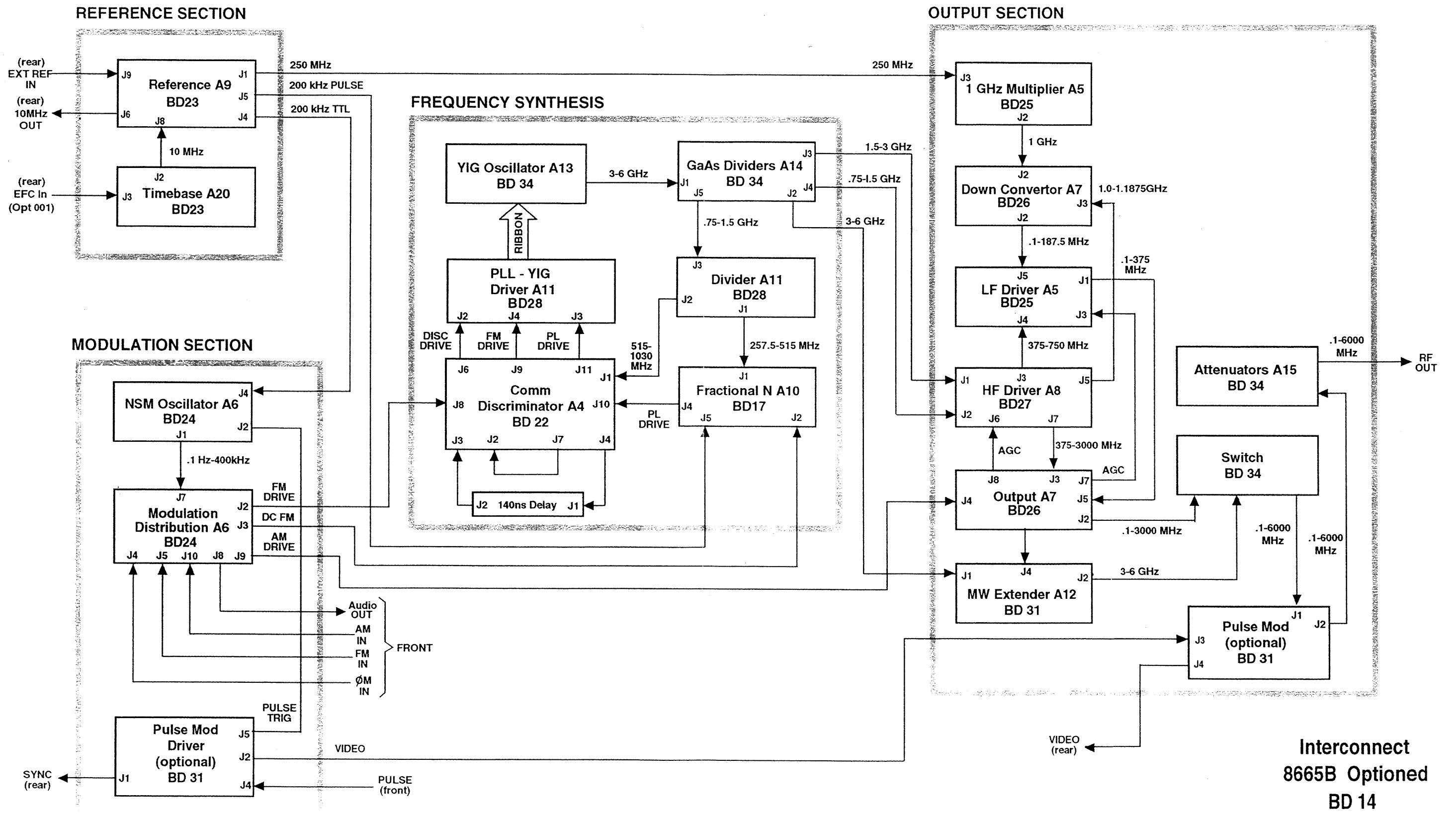


Interconnect  
8665A Standard  
BD 11

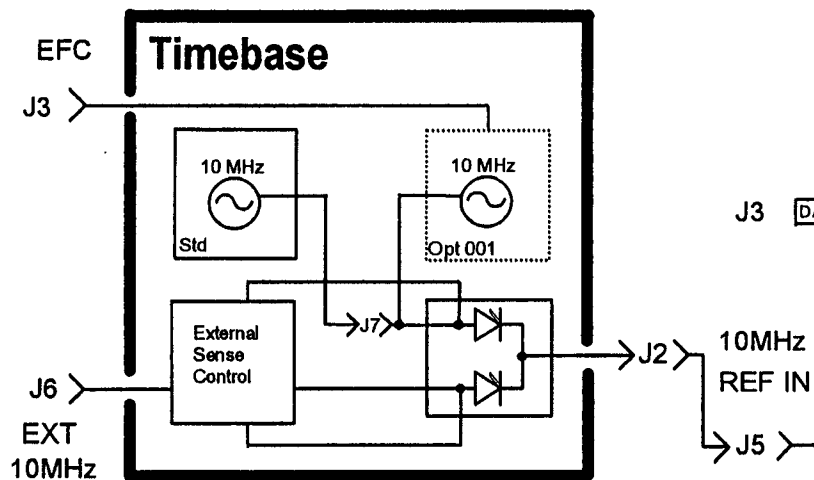




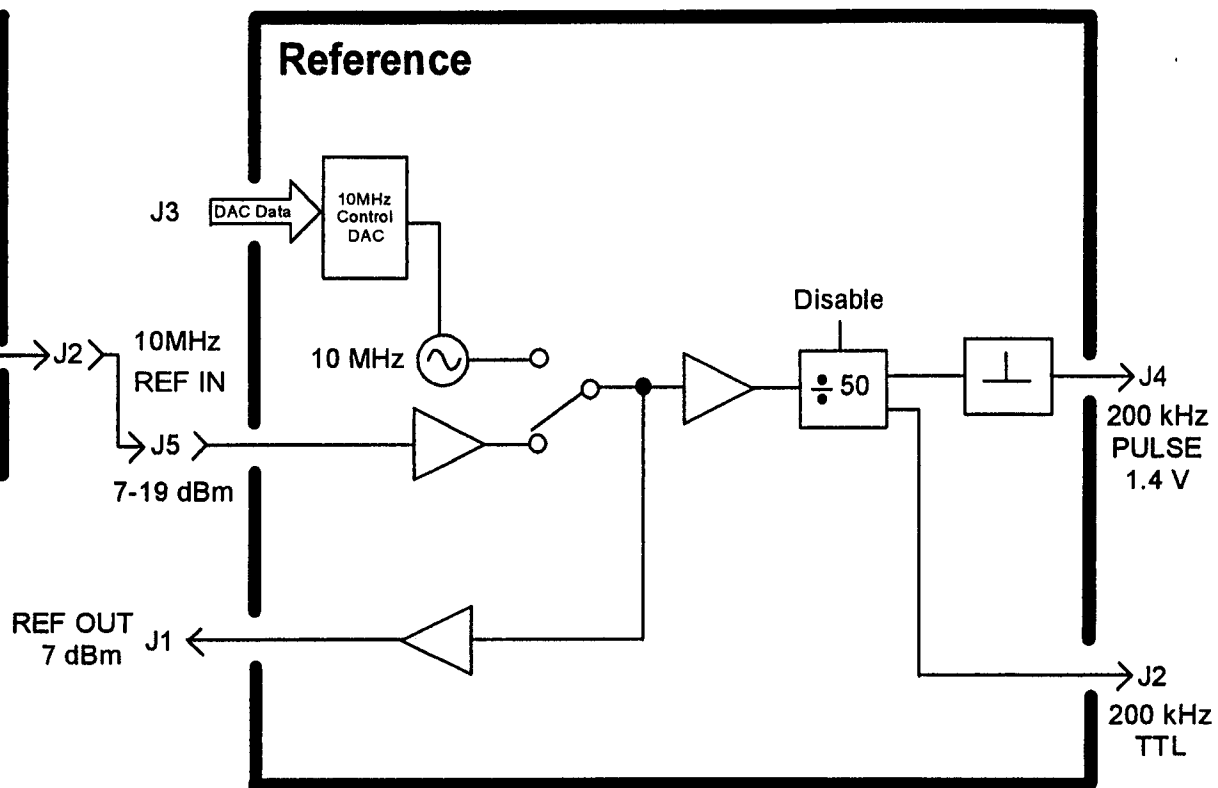
Interconnect  
8665B Standard  
BD 13



### Instrument Location - A20



### Instrument Location - A11

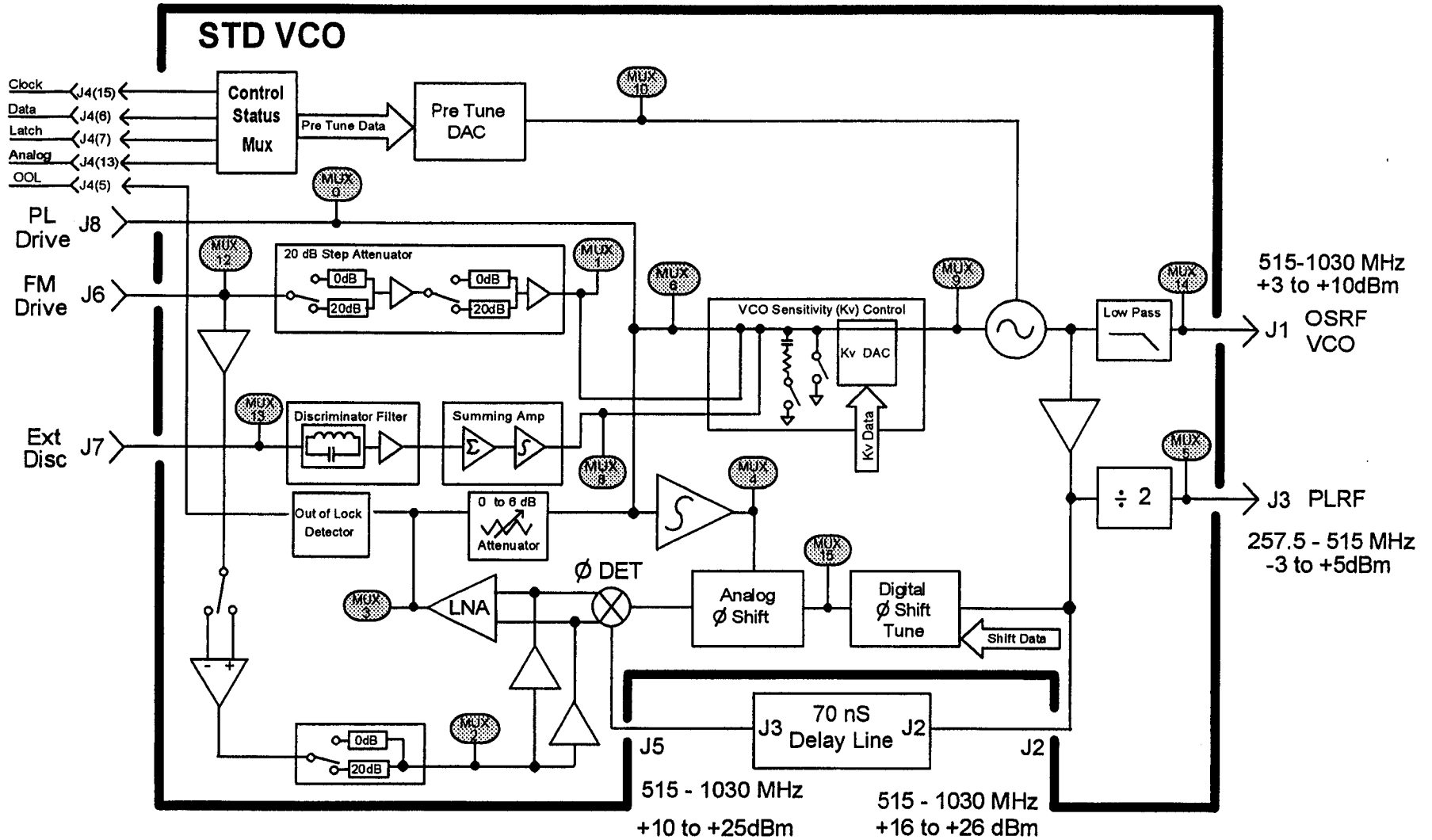


Timebase	
Power Supply Pinout	
Pin No.	Typical Value
J4 (5)	+21 VDC
J4 (6)	+15 VDC
J4 (1,2)	Gnd
J4 (4)	Oven Cold
J4 (4)	Ext Switch
J5 (2)	+21 VDC
J5 (4)	+15 VDC
J5 (1,3)	Gnd

Reference	
Power Supply Pinout	
Pin No.	Typical Value
J3 (9)	-15 VDC
J3 (1)	+15 VDC
J3 (2)	+5 VDC
J3 (8)	Gnd

**Reference**  
**8643A / 44A / 44B / 45A**  
**BD15**

# Instrument Location A5



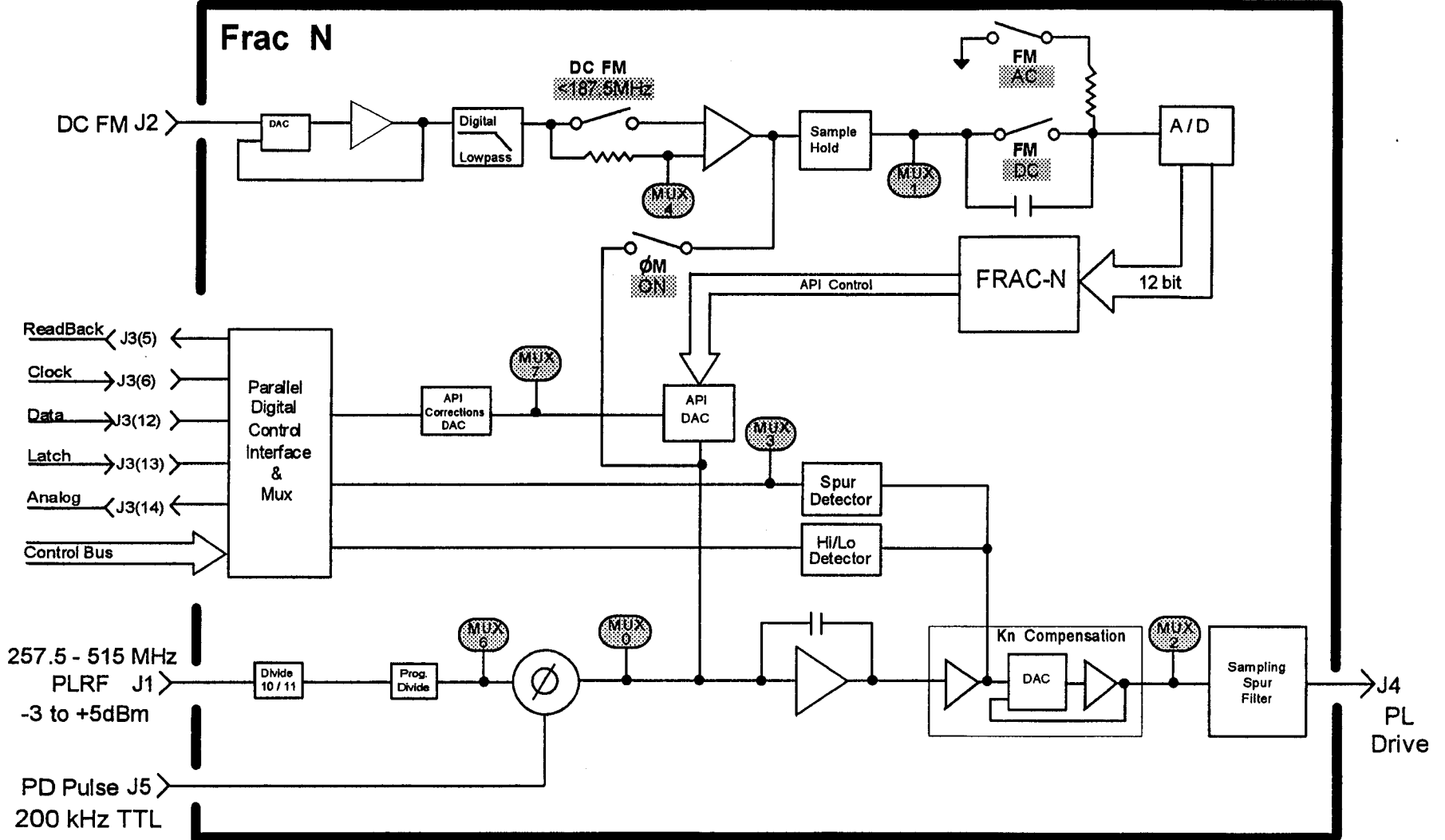
Std VCO		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	2	0	0	8	0
Settings: 7.5 dBm 1 GHz		1	0	9	0
		2	0	10	+8
		3	0	11	+7.5
		4	0	12	0
		5	-.3	13	0
		6	0	14	-1.0
		7	Gnd	15	0

Power Supply Pinout	
Pin No.	Typical Value
J4 (1)	-5 VDC
J4 (2)	-15 VDC
J4 (3,11)	+15 VDC
J4 (4,12)	+5 VDC
J4 (8)	Gnd
J4 (9)	+10 VDC
J4 (10)	+38 VDC

**Standard VCO**  
**8643A / 44A / 44B**  
**BD 16**



Instrument Location - A9 (8643/44/45) A10 (8664/65)

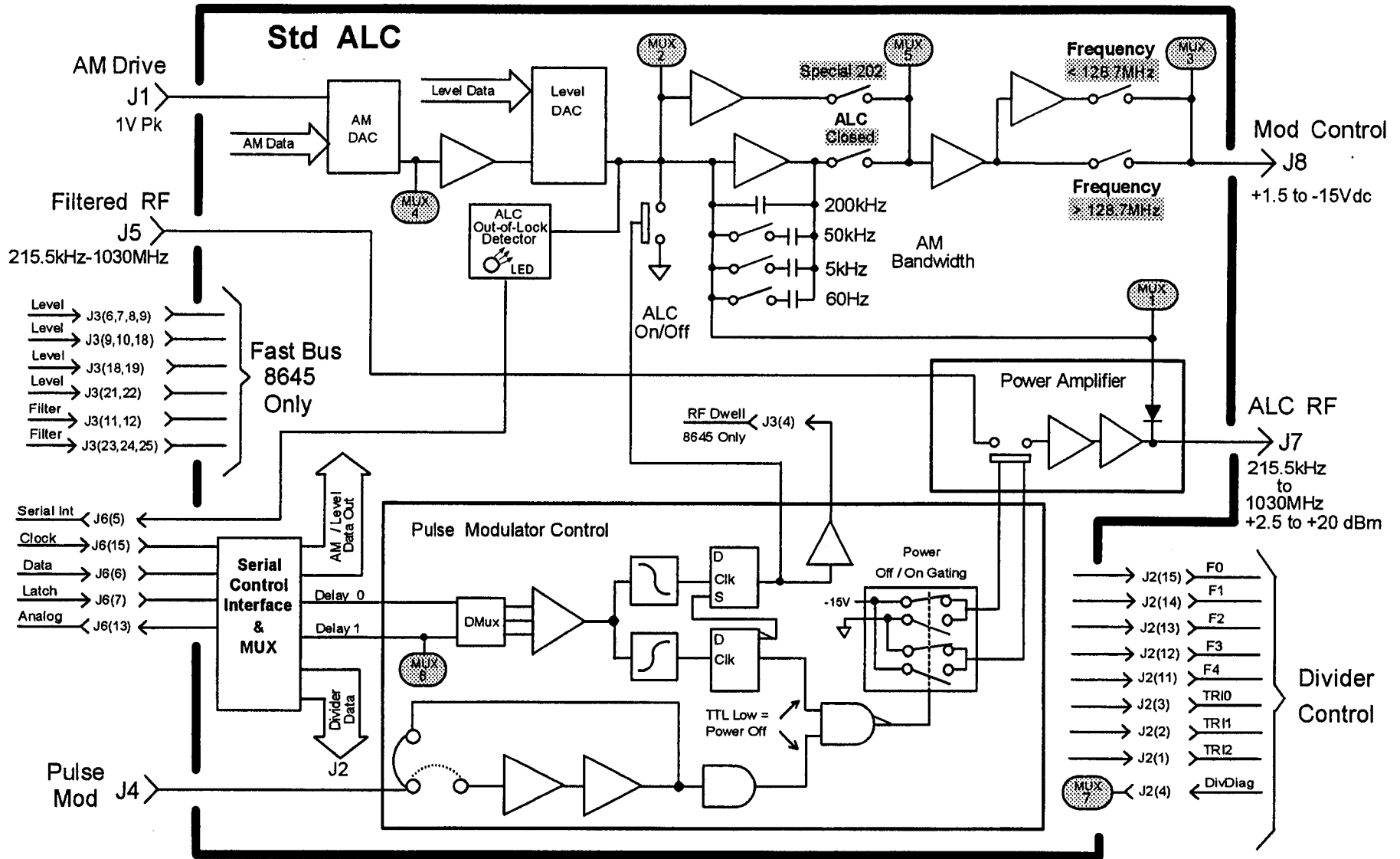


Fractional - N		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	3	0	.076	4	0
Settings: 10dBm 1 GHz		1	4.49	5	4.8
(64/65) Mode 1		2	.076	6	.38
(44A/B) Mode 2		3	0	7	1.14
(43) Default					

Power Supply Pinout	
Pin No.	Typical Value
J3 (2)	-15 VDC
J3 (14)	+15 VDC
J3 (3,15)	+5 VDC
J3 (4,5)	-5 VDC
J3 (17,18)	-5 VDC
J3 (1)	Gnd
J3 (12,13)	Gnd

**Fractional N**  
**8643A / 44A / 44B / 45A**  
**8664A / 65A / 65B**  
**BD 17**

# Instrument Location - A11



Standard ALC		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	5	0	0	4	10
Settings:					
7.5dBm 1 GHz		1	-1.7	5	-2.5
		2	1.3	6	-7
		3	-2.5	7	-15 to +15

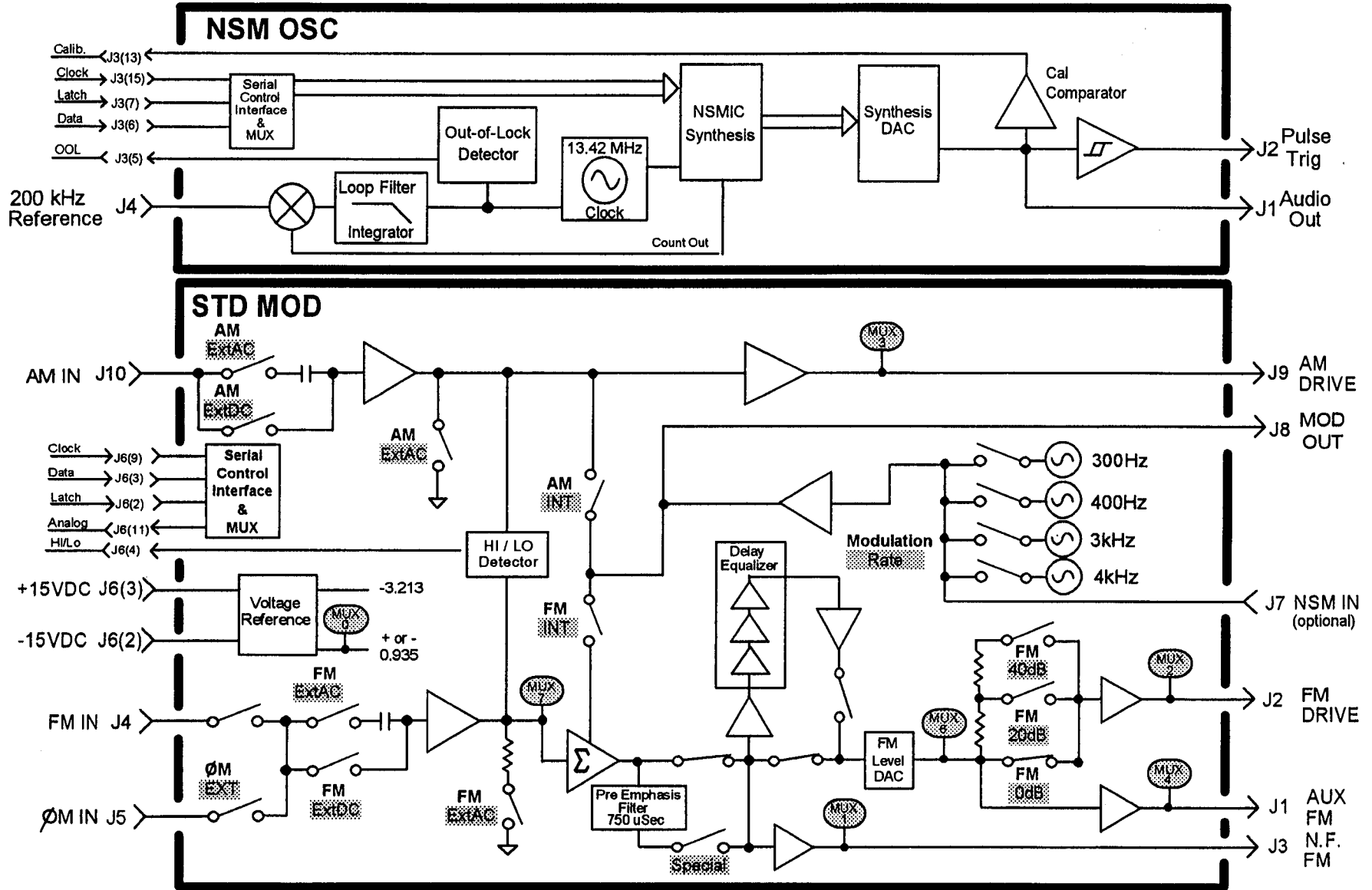
Power Supply Input	
Pin No.	Typical Value
J6 (8)	Gnd
J6 (1,9)	-5 VDC
J6 (2)	-15 VDC
J6 (3,11)	+15 VDC
J6 (4,12)	+5 VDC

Power Supply to Divider	
J2 (8)	Gnd
J2 (7,10)	-5 VDC
J2 (5)	-15 VDC
J2 (6)	+15 VDC
J2 (9)	+5 VDC

**Standard ALC**  
**8643A / 44A / 44B**

**BD 18**

# Instrument Location - A8



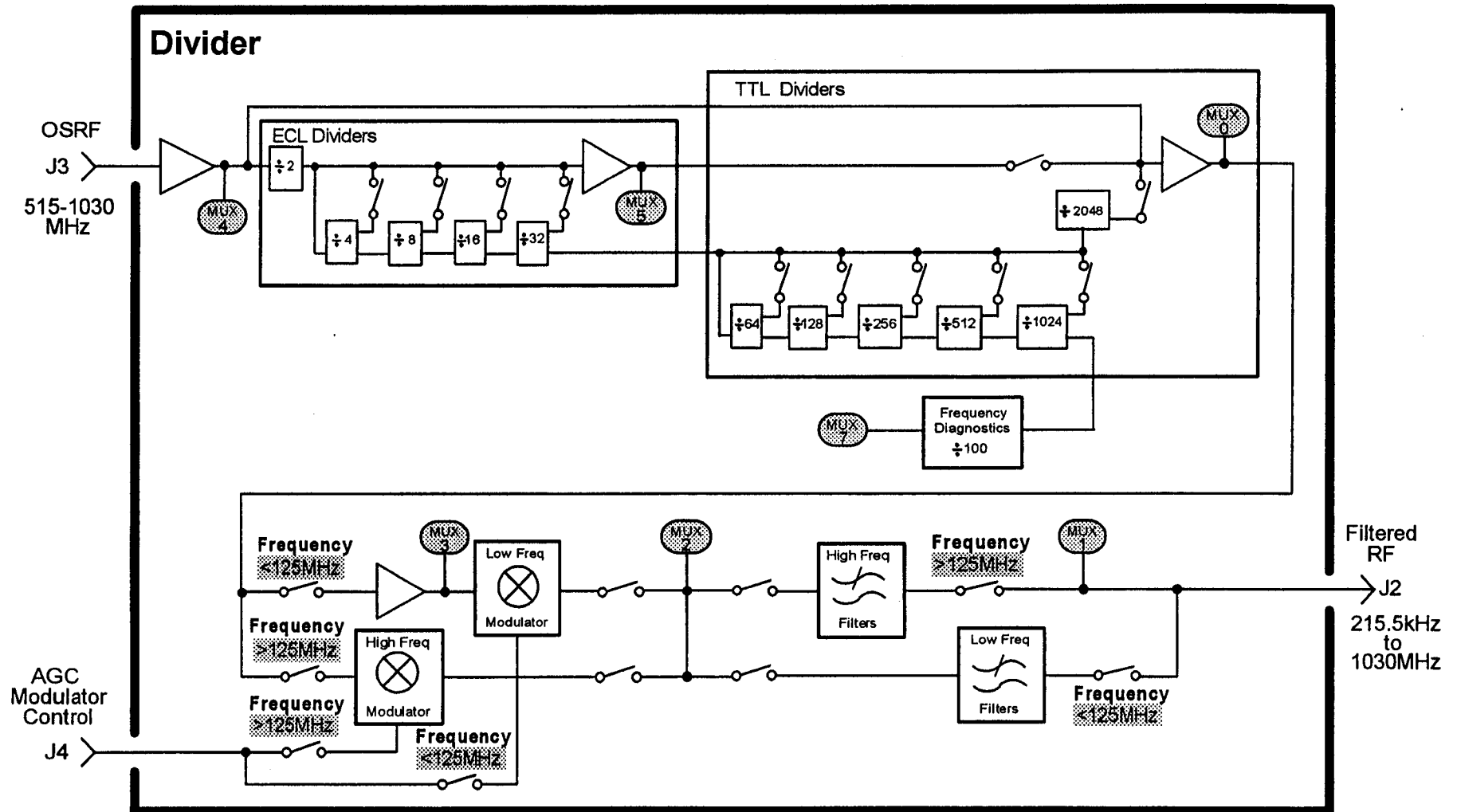
Standard Mod		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	4	0	-.9	4	0
Settings: 7.5dBm 1 GHz		1	0	5	5.0
		2	0	6	0
		3	0	7	0

NSM	
Power Supply Pinout	
Pin No.	Typical Value
J3 (2)	-15 VDC
J3 (3)	+15 VDC
J3 (4)	+5 VDC
J3 (8)	Gnd

Power Supply Pinout	
Pin No.	Typical Value
J6 (1)	Gnd
J6 (5)	+5 VDC
J6 (6)	+15 VDC
J6 (7)	-15 VDC

**NSM / Std Mod**  
**8643A / 44A / 44B**  
**BD 19**

# Instrument Location - A10

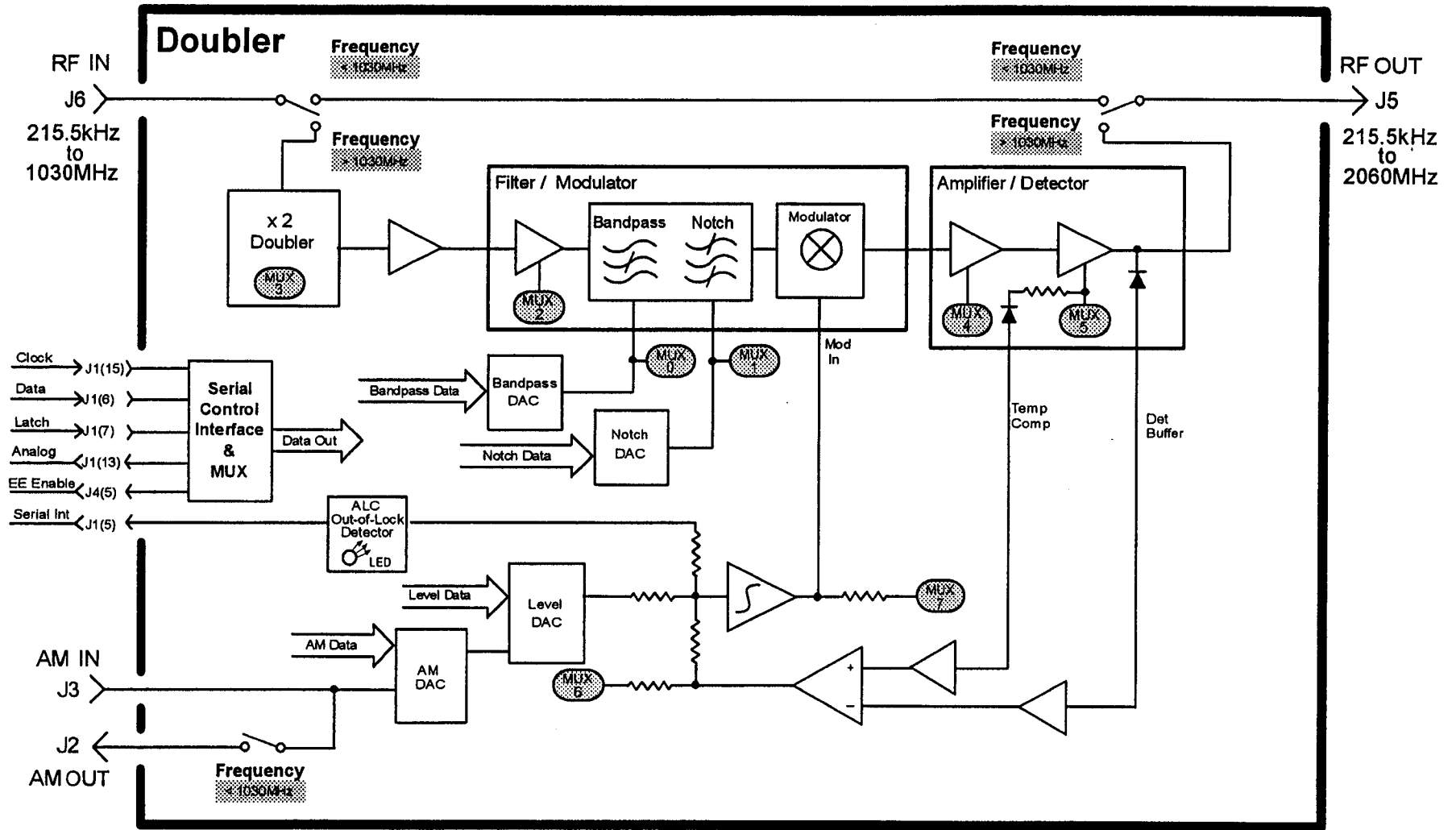


Divider		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	5	10	9.0	14	3.8
Settings: 7.5 dBm 1 GHz		11	-.30	15	4.6
		12	-.25	16	5.0
		13	.70	17	.152

Power Supply Pinout	
Pin No.	Typical Value
J1 (8)	Gnd
J1 (7,10)	-5 VDC
J1 (6)	+15 VDC
J1 (5)	-15 VDC
J1 (9)	+5 VDC

**Divider**  
**8643A / 44A / 44B / 45A**  
**BD 20**

# Instrument Location - A7

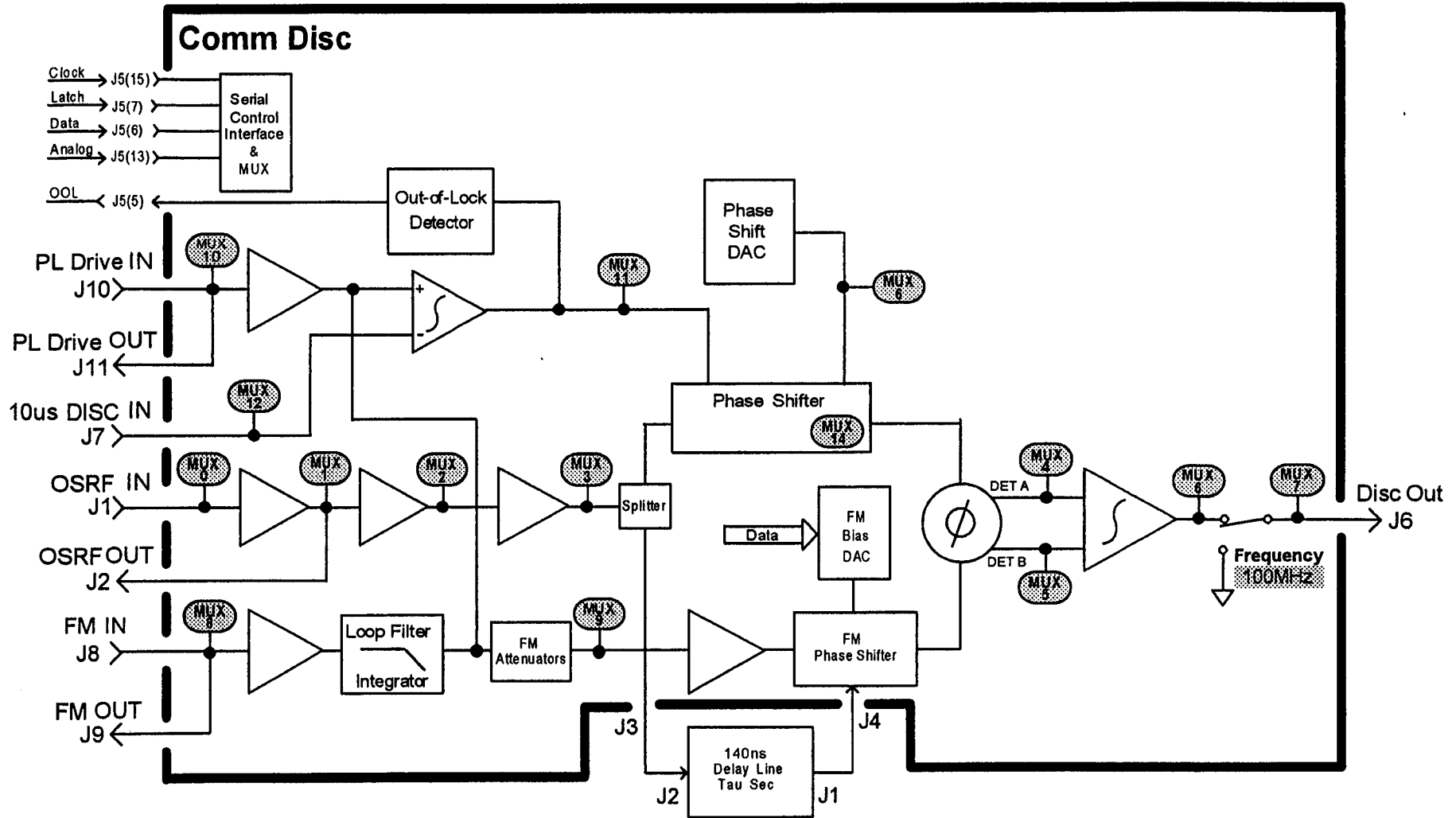


Doubler		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	9	0	5.9	4	4.79
Settings: 7.5 dBm 2 GHz		1	12.13	5	7.0
		2	9.5	6	1.3
		3	5.0	7	3.0

Power Supply Pinout	
Pin No.	Typical Value
J1 (8)	Grnd
J4 (1,13)	
J1 (1)	-5 VDC
J1 (2)	-15 VDC
J1 (3,11)	+15 VDC
J1 (4,12)	+5 VDC
J1 (9)	+10 VDC
J1 (10)	+38 VDC

**Doubler**  
**8643A / 44A / 44B / 45A**  
**BD 21**

Instrument Location - A6 (8644A/B) A4 (8664/65)

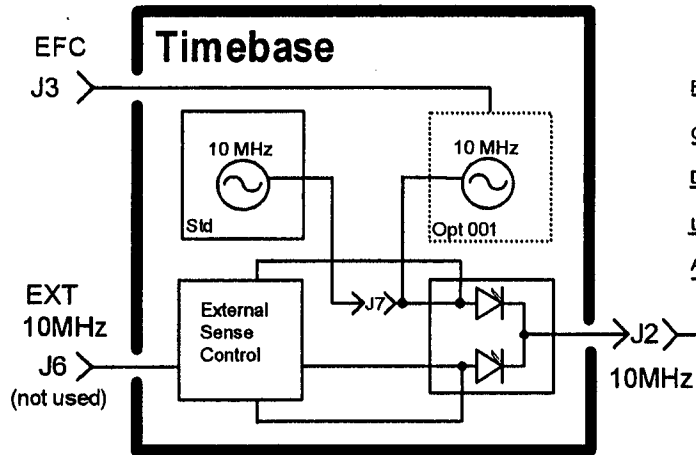


Doublers		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	1	0	.50	8	0
Settings: 7.5 dBm 1 GHz		1	1.5	9	0
		2	3.7	10	-25
		3	12.4	11	0
		4	-1.8	12	0
		5	-1.8	13	7.9
		6	0	14	7.3
		7	0	15	12.5

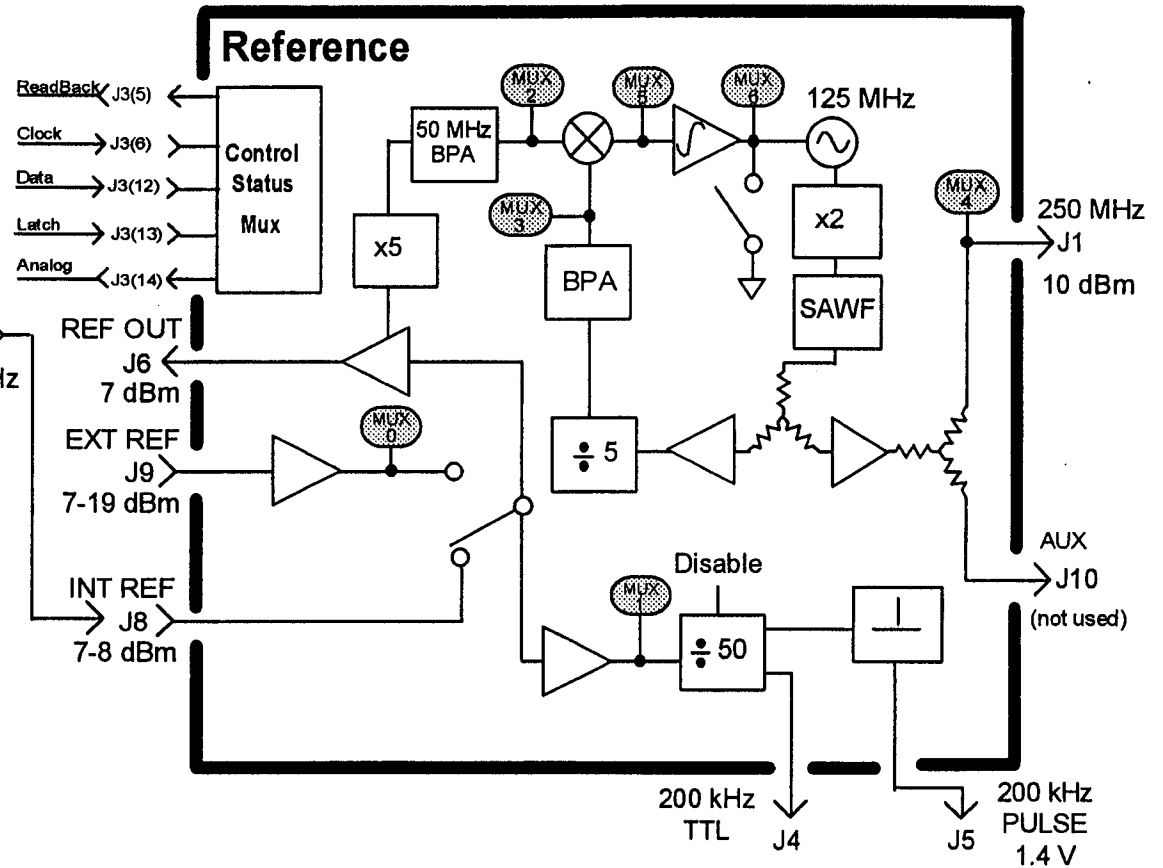
Power Supply Pinout	
Pin No.	Typical Value
J5 (2)	-15 VDC
J5 (3,11)	+15 VDC
J5 (4,12)	+5 VDC
J5 (9)	+10 VDC
J5 (10)	+38 VDC
J5 (8)	Gnd

**Comm Discriminator**  
**8644A / 44B**  
**8664A / 65A / 65B**  
**BD 22**

### Instrument Location - A20



### Instrument Location - A9



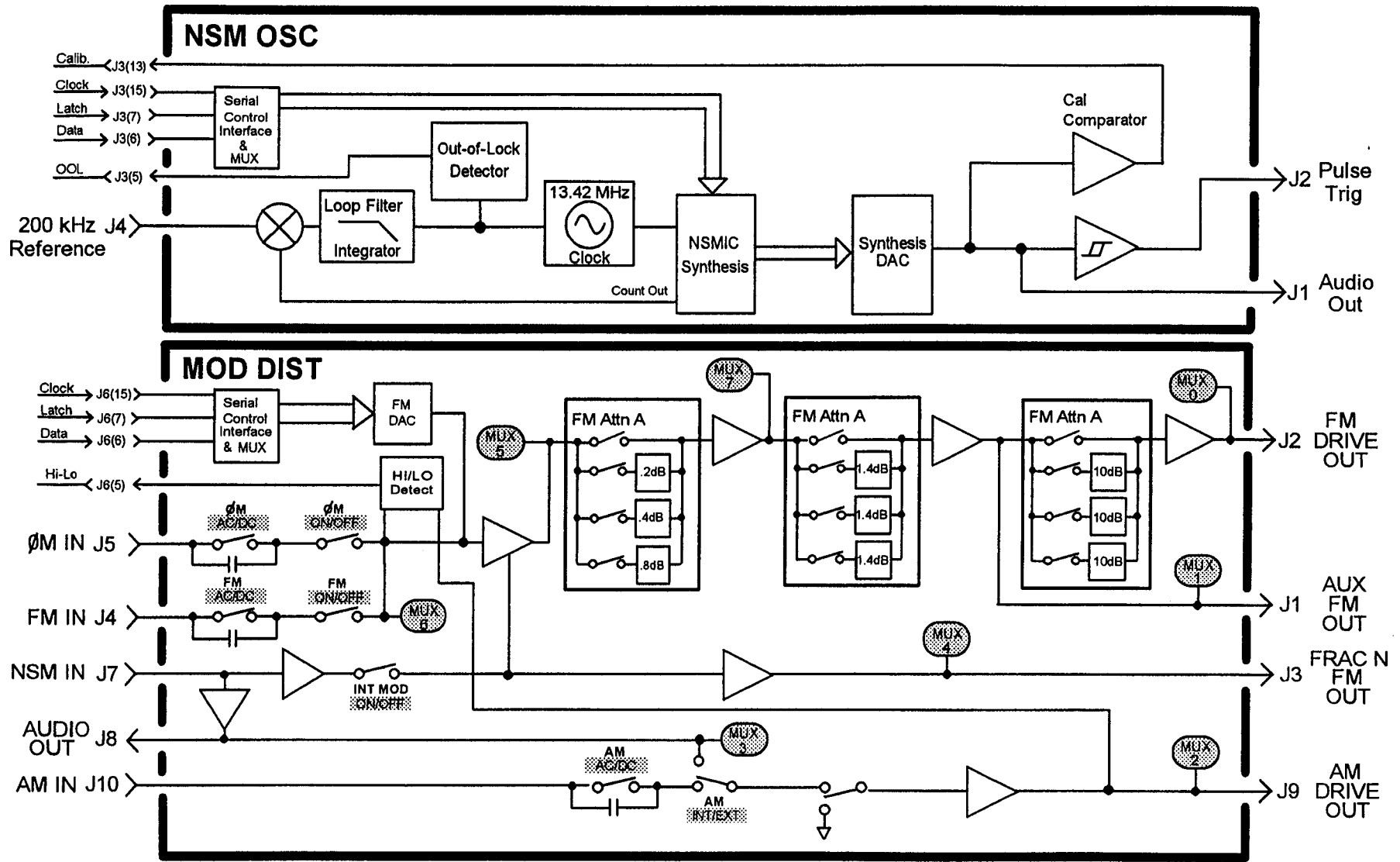
Reference		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	8	0	.380	4	1.928
Settings: 7.5 dBm 3 GHz		1	.152	5	0
		2	.482	6	-3.578
		3	1.776	7	0

Timebase	
Pin No.	Typical Value
J4 (5)	+21 VDC
J4 (6)	+15 VDC
J4 (1,2)	Grnd
J4 (4)	Oven Cold
J4 (4)	Ext Switch
J5 (2)	+21 VDC
J5 (4)	+15 VDC
J5 (1,3)	Grnd

Reference	
Pin No.	Typical Value
J3 (10)	-15 VDC
J3 (2)	+15 VDC
J3 (1)	+5 VDC
J3 (3)	+10 VDC
J3 (11)	+21 VDC
J3 (9)	-5 VDC
J3 (8)	Grnd

**Reference**  
**8664A / 65A / 65B**  
**BD 23**

# Instrument Location A6



Modulation Dist		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	4	3	0	4	0
Settings:					
7.5 dBm 3 GHz		FM 1kHz Dev 1kHz Rate (AC Volts)			
		0	.025	6	0
		1	.609	7	.989
		5	1.192		
		AM 90% 1 kHz Rate (AC Volts)			
		2	.634		

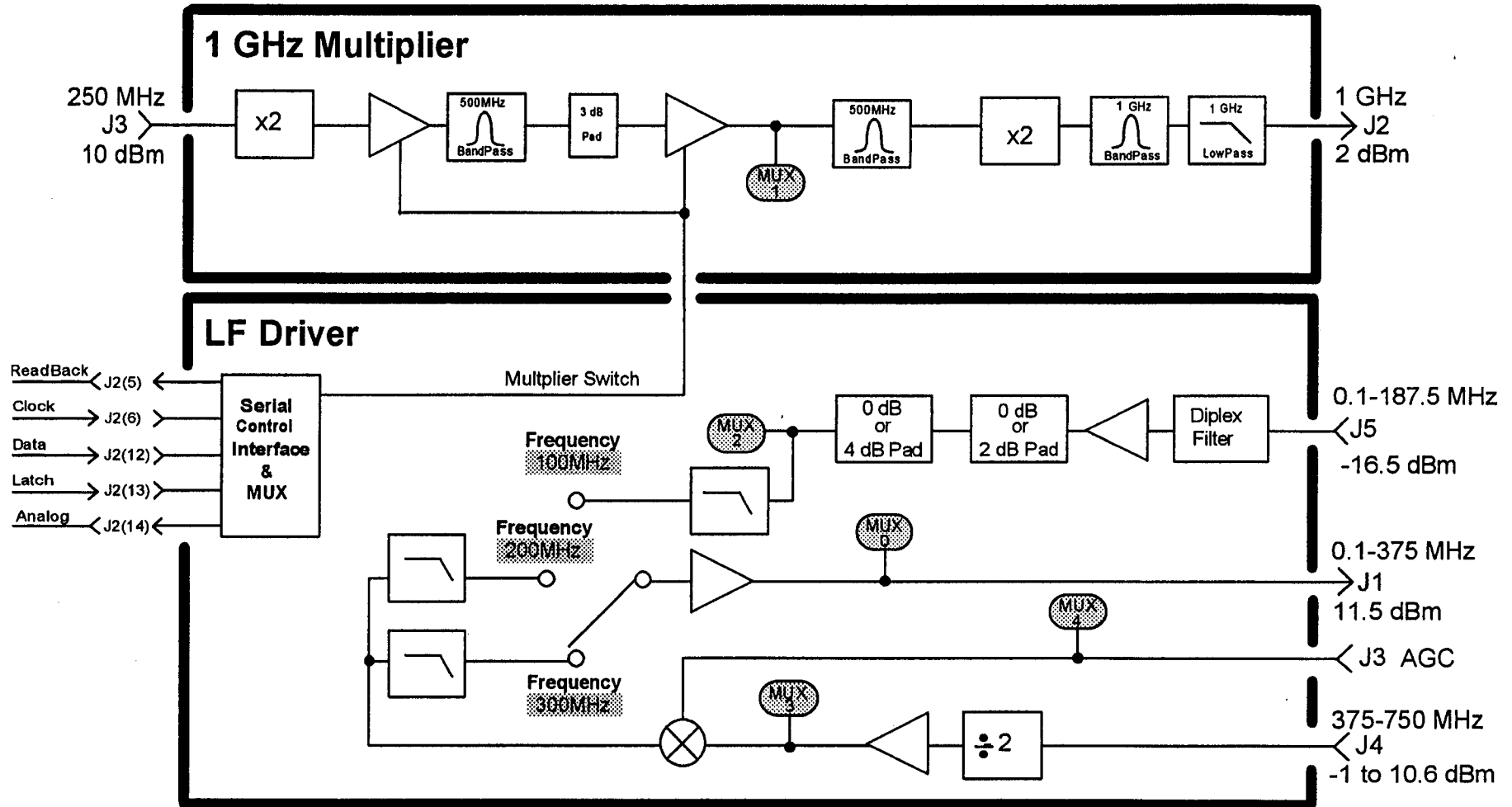
Modulation Dist		Typical Value
Power Supply Pinout		
Pin No.		Typical Value
J6 (2)		-15 VDC
J6 (3)		+15 VDC
J6 (4)		+5 VDC
J6 (12)		+10 VDC
J6 (8,10,11)		Gnd

NSM		Typical Value
Power Supply Pinout		
Pin No.		Typical Value
J3 (2)		-15 VDC
J3 (3)		+15 VDC
J3 (4)		+5 VDC
J3 (8)		Gnd

**NSM**  
**Mod Distribution**  
**8645A / 64A / 65A / 65B**  
**BD 24**



## Instrument Location - A5

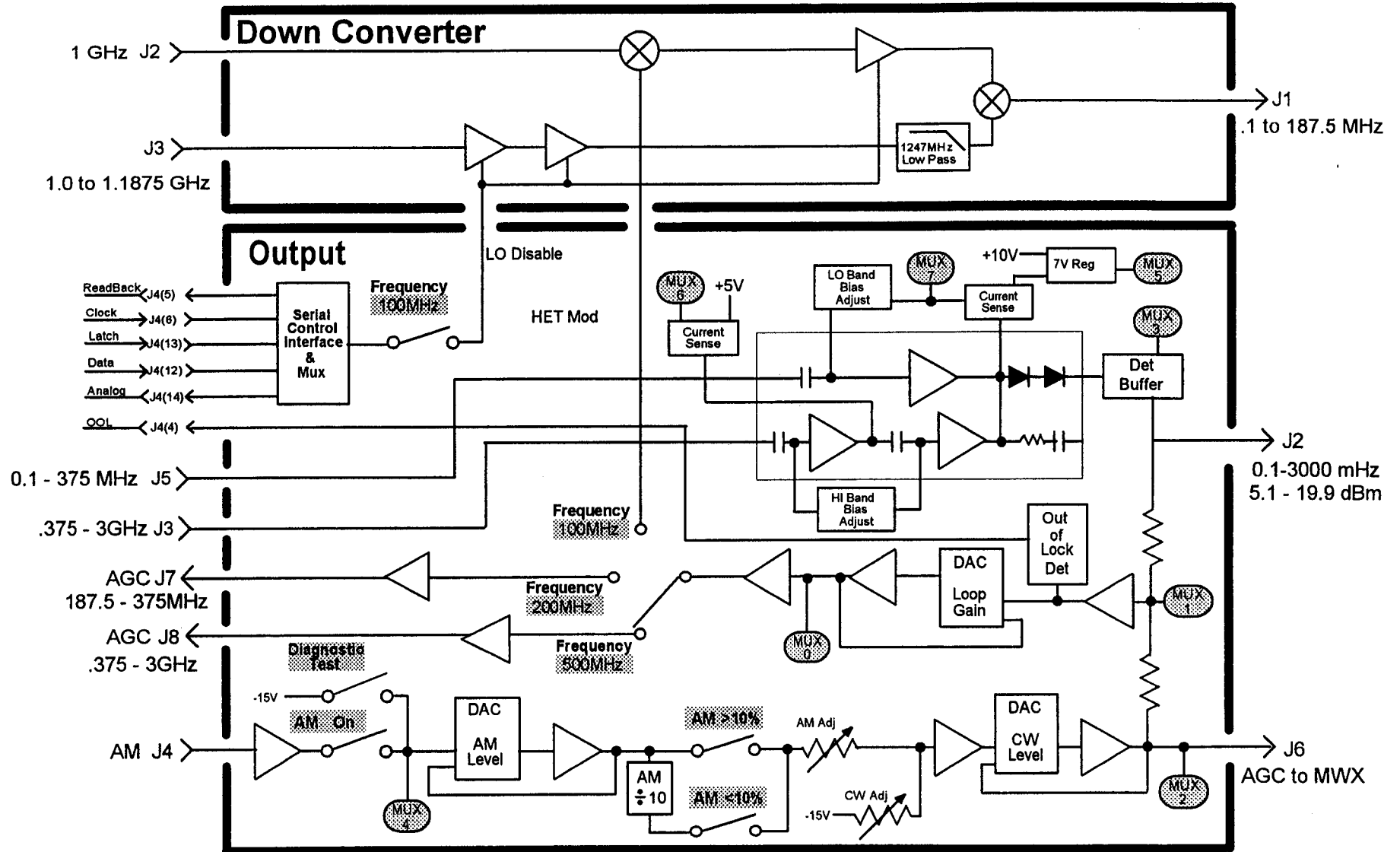


LF Drvr / 1GHz Mult	MUX No.	Typical Value	MUX No.	Typical Value	
Module Number	11	0	-3	4	+2.66
Settings: 10dBm 188MHz	1	+1.18	5	N.C.	
	2	+2.25	6	N.C.	
	3	-1.88	7	Gnd	
10dBm 100MHz	1	-2.36			
	2	+1			

Power Supply Pinout	
Pin No.	Typical Value
J2 (1)	+5 VDC
J2 (2)	+15 VDC
J2 (3)	+10 VDC
J2 (10)	-15 VDC
J (7,8,15)	Gnd

**1 GHz Multiplier / LF Driver**  
**8664A / 65A / 65B**  
**BD 25**

# Instrument Location - A7

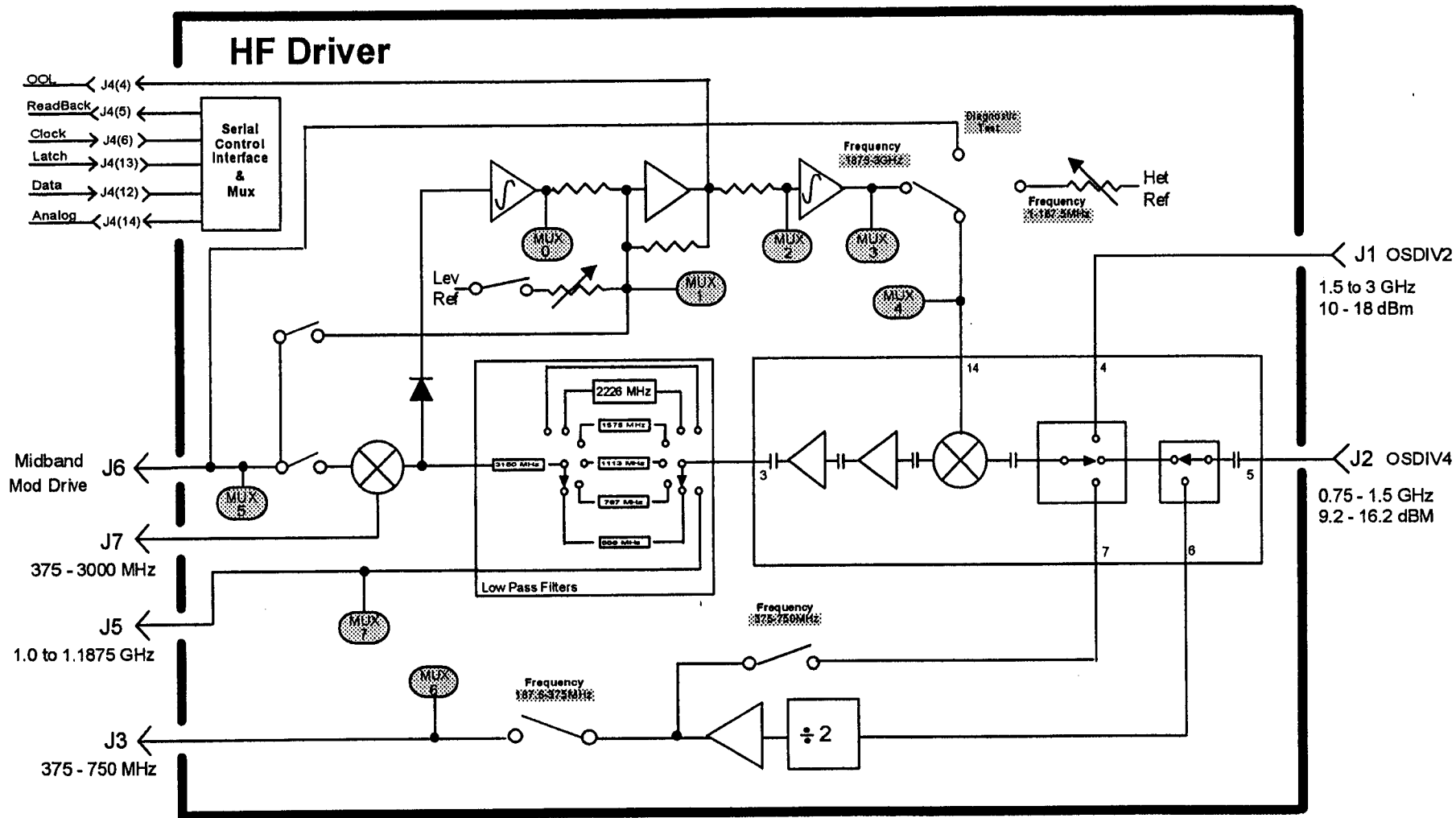


Output		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	5	0	+7.8	4	0
Settings: 10dBm 1 GHz AM Off		1	+2.5	5	+6.6 to +7.3
		2	-2.7	6	+.64 to +1.8
		3	0	7	+.64 to +3.6
10dBm 1 GHz 90% AM		3	+9		
		4	2.9VAC		

Power Supply Pinout	
Pin No.	Typical Value
J1 (9)	-5 VDC
J1 (10)	-15 VDC
J1 (2)	+15 VDC
J1 (1)	+5 VDC
J1 (8)	Gnd
J1 (3)	+10 VDC

**Down Converter  
Output  
8664A / 65A / 65B  
BD26**

# Instrument Location - A8

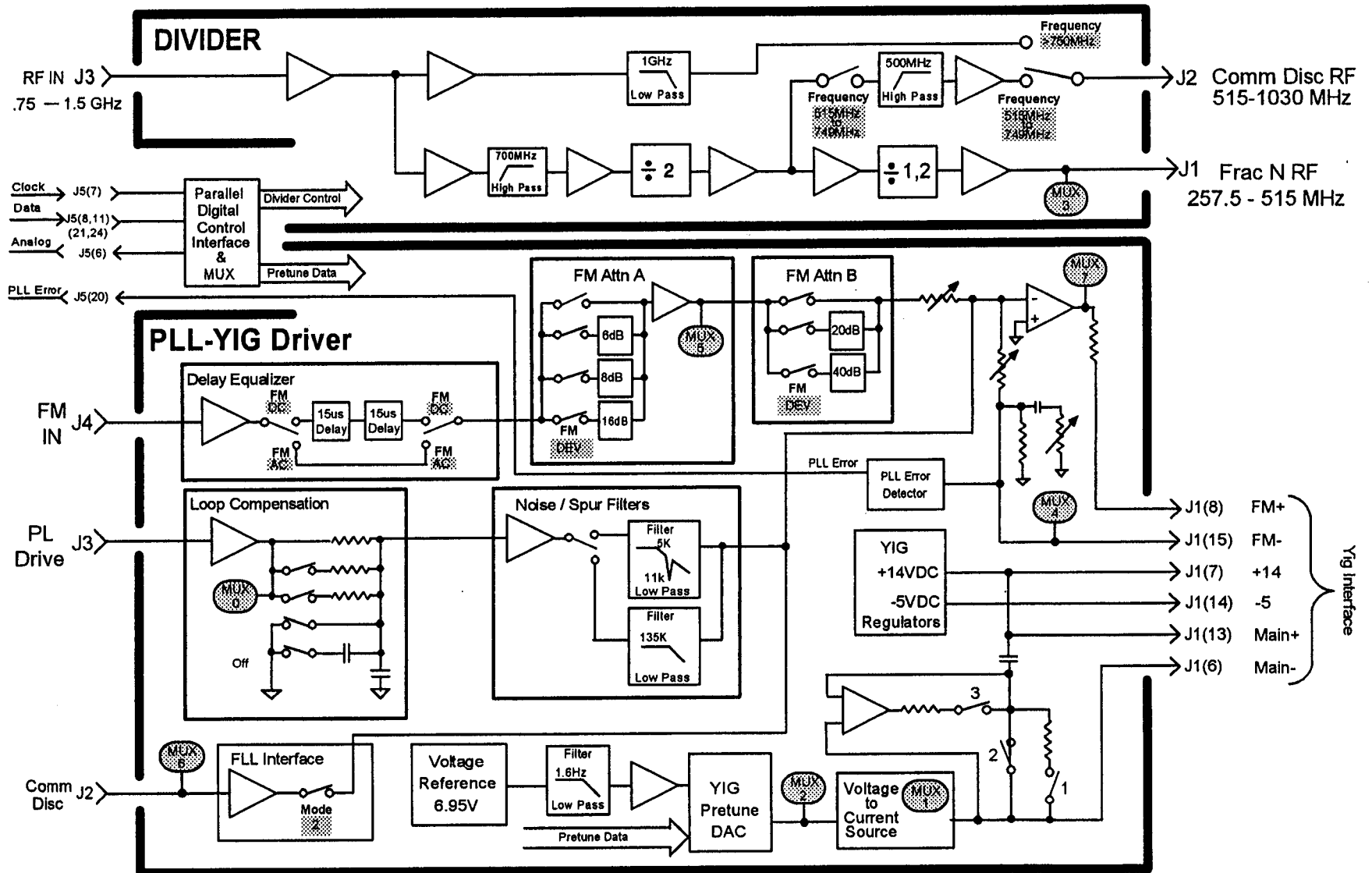


High Frequency Driver		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	10	0	-0.55	4	+4.1
Settings: 10dBm 1 GHz		1	+0.63	5	+7.0
		2	+0.05	6	+0.02
		3	+6.1	7	+0.02
10dBm 187.5 MHz		6	+0.7		
		7	+1.5		

Power Supply Pinout	
Pin No.	Typical Value
J4 (1)	+5 VDC
J4 (2)	+15 VDC
J4 (10)	-15 VDC
J4 (9)	-5 VDC
J4 (7,8)	Gnd
J4 (3)	+10 VDC

**HF Driver**  
**8664A / 65A / 65B**  
**BD 27**

# Instrument Location A11

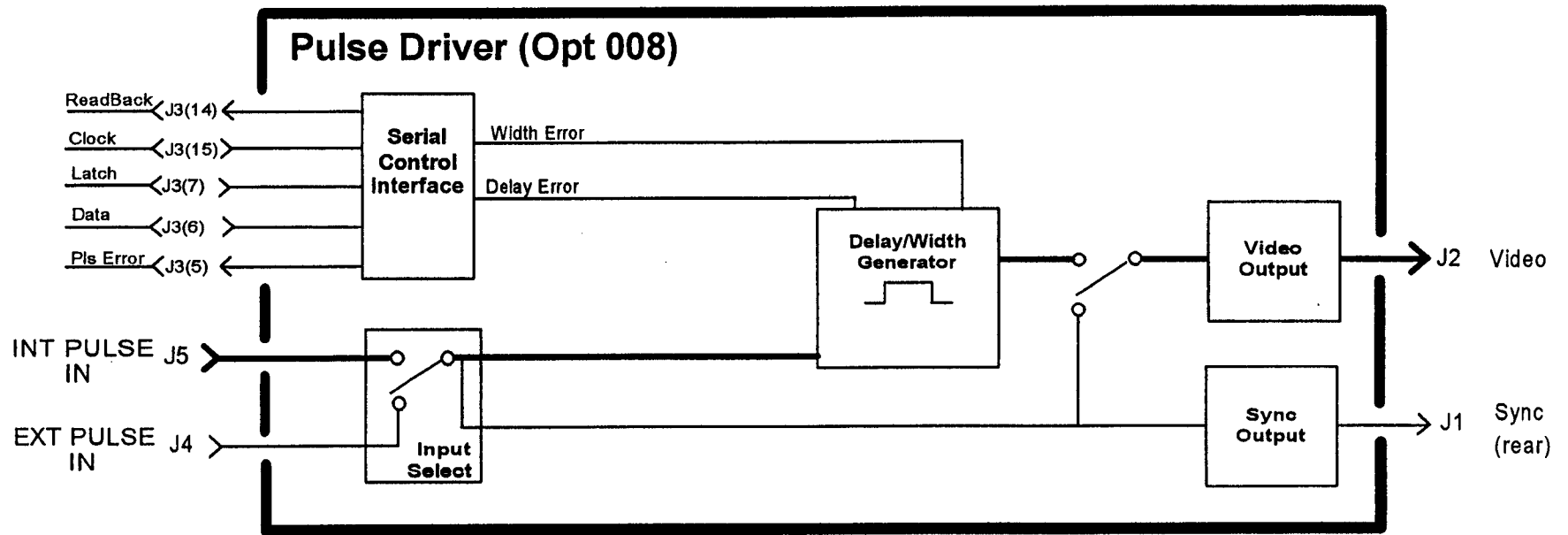


Divider/YIG Driver		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	2	0	0	4	-.18
Settings: 10dBm 1 GHz Mode 1		1	+2.1	5	+.02
		2	-2.0	6	+.02
		3	-.4	7	-.23

Power Supply Pinout	
Pin No.	Typical Value
J5 (2)	-15 VDC
J5 (3,15)	+15 VDC
J5 (14)	+10 VDC
J5 (25)	+21 VDC
J5 (1,18)	Gnd
J5 (12,13)	

**Microwave Loop  
8664A / 65A / 65B  
BD 28**

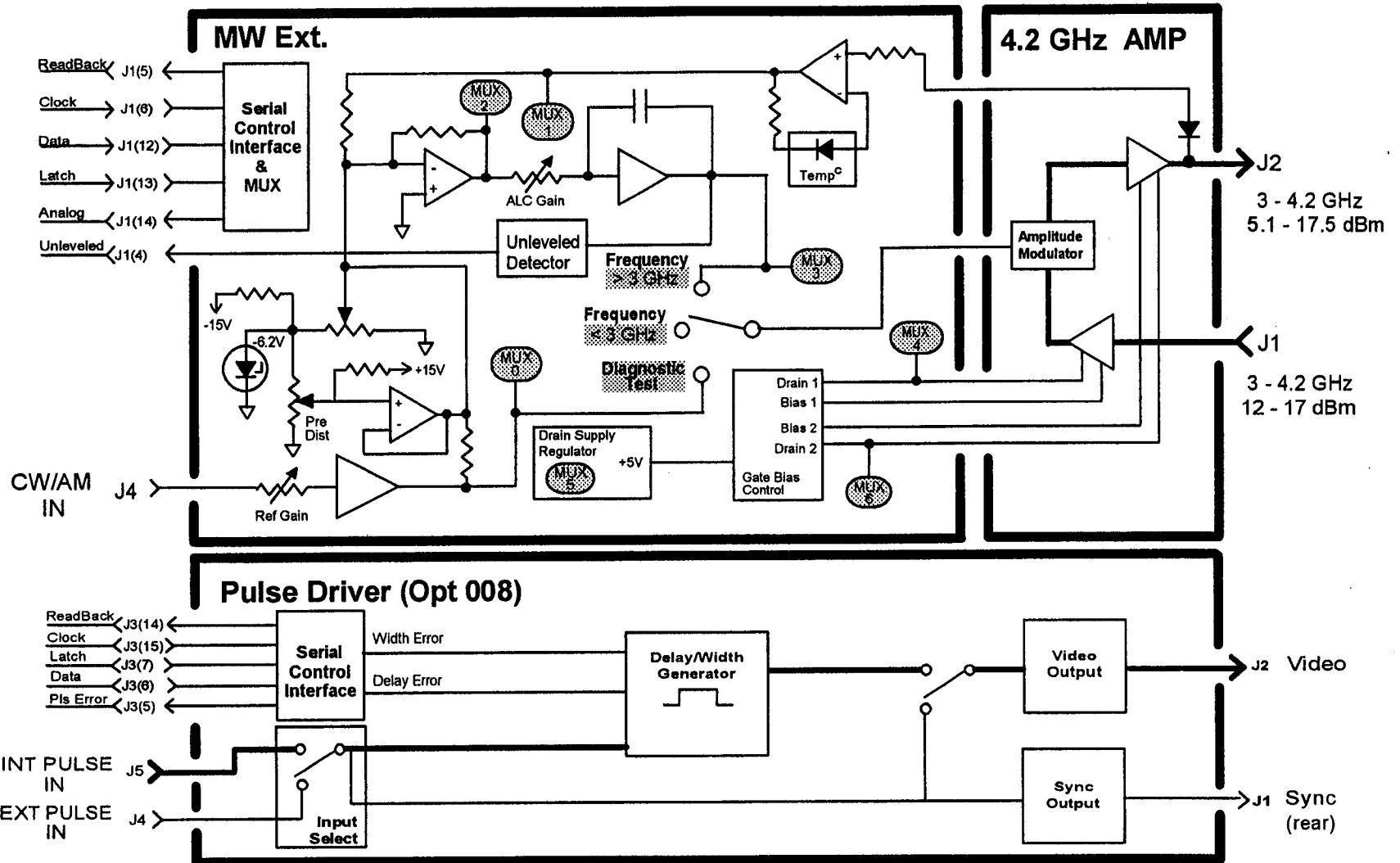
## Instrument Location - A12



Power Supply Pinout	
Pin No.	Typical Value
J3 (1,9)	-5 VDC
J3 (2)	-15 VDC
J3 (3,11)	+15 VDC
J3 (4,12)	+5 VDC
J3 (10,13)	Gnd

**Pulse Driver (opt 008)**  
**8664A**  
**BD 29**

## Instrument Location - A12

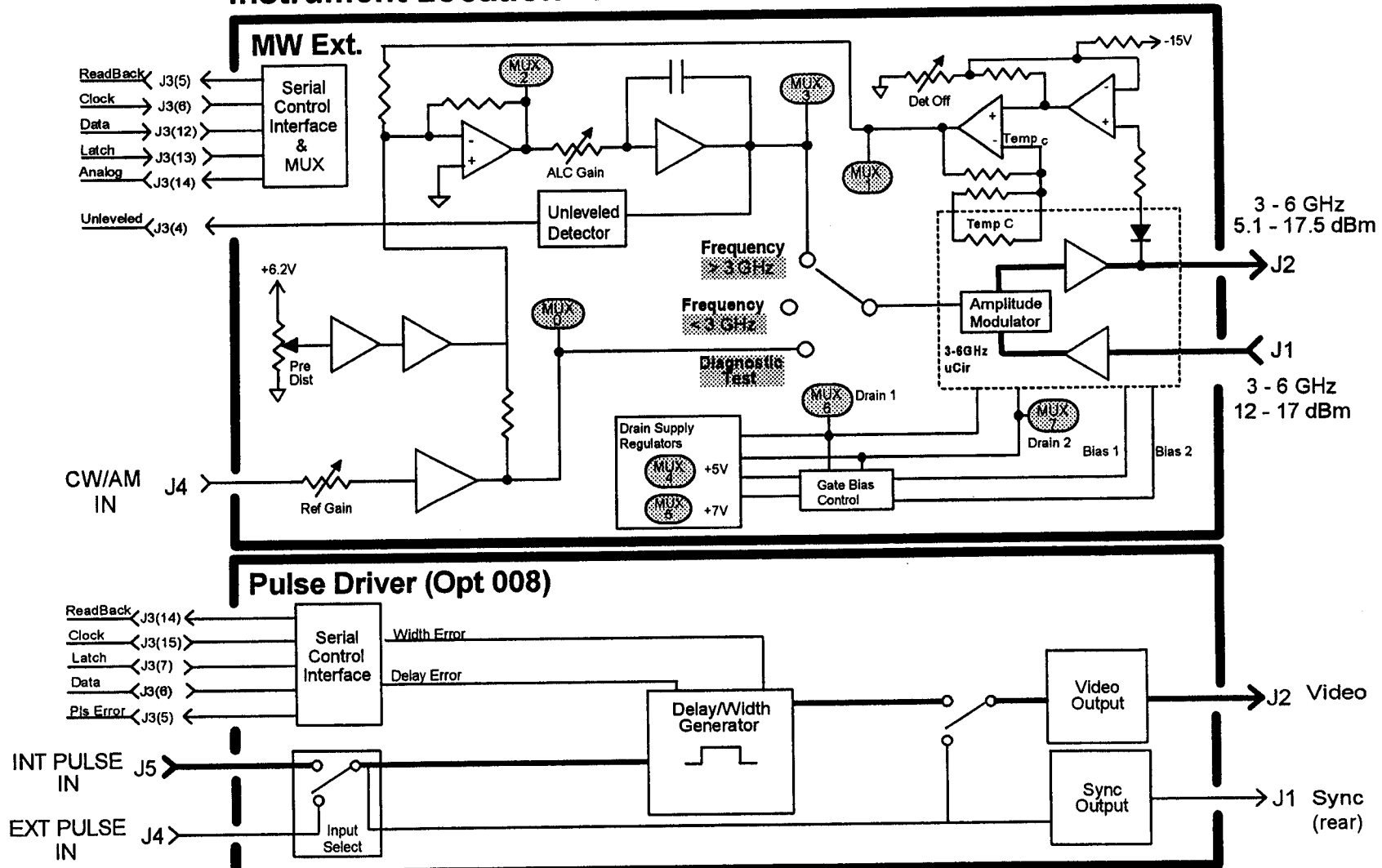


Microwave Extender		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	12	0	+ 1.9	4	+ 5.1
Settings: 7.5dBm 3 GHz		1	- 1.7	5	+ 4.97
		2	+ 0.0	6	+ 5.0
		3	+ 5.0	7	Gnd

Power Supply Pinout	
Pin No.	Typical Value
J1 (9)	-5 VDC
J1 (10)	-15 VDC
J1 (2)	+15 VDC
J1 (1)	+5 VDC
J1 (11)	+21 VDC
J1 (3,15)	+10 VDC
J1 (7,8)	Gnd

**MW Extender  
Pulse Driver (opt 008)  
8665A  
BD 30**

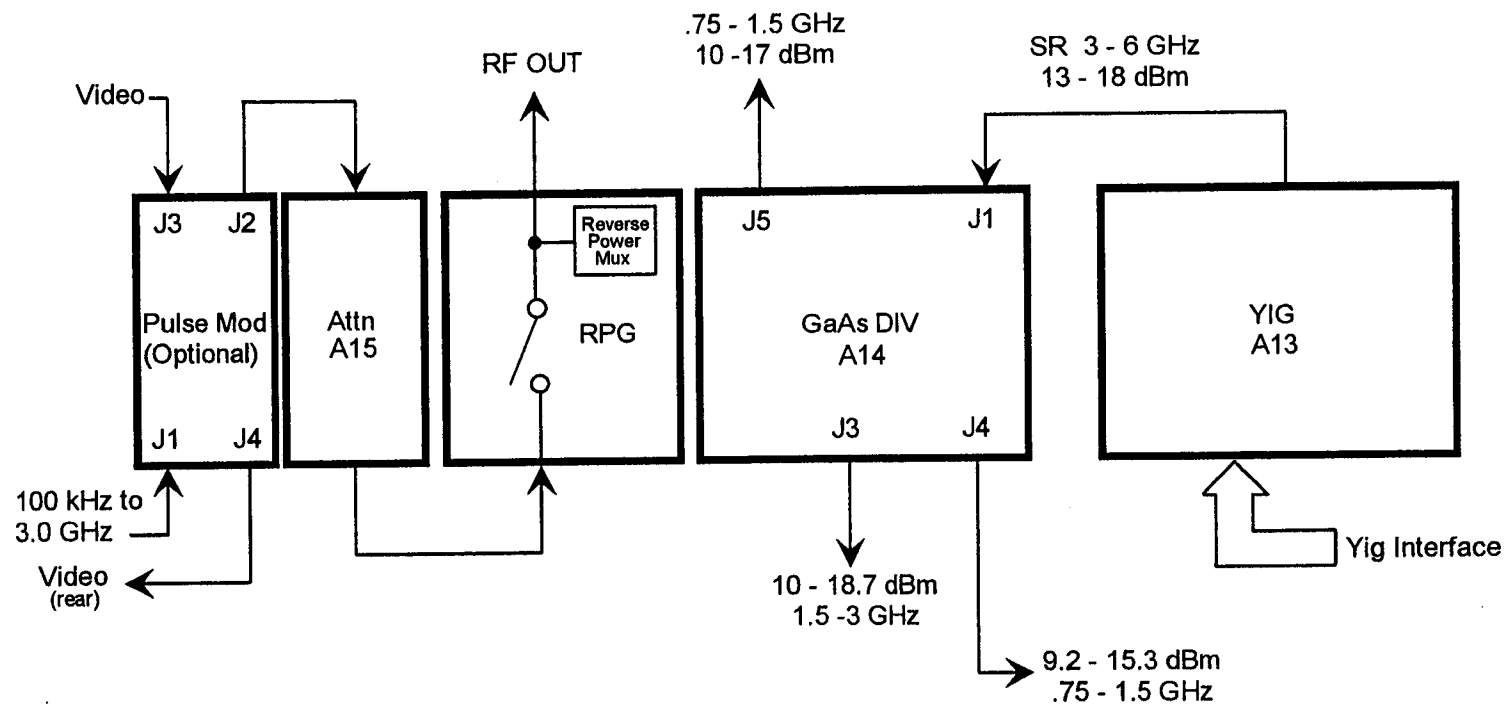
## Instrument Location - A12



Microwave Extender		MUX No.	Typical Value	MUX No.	Typical Value
Module Number	12	0	+ 2.0	4	+ 5.2
Settings: 7.5dBm 6 GHz		1	- 2.0	5	+ 7.3
		2	+ 0.0	6	+ 5.0
		3	+ 4.1	7	+ 7.0

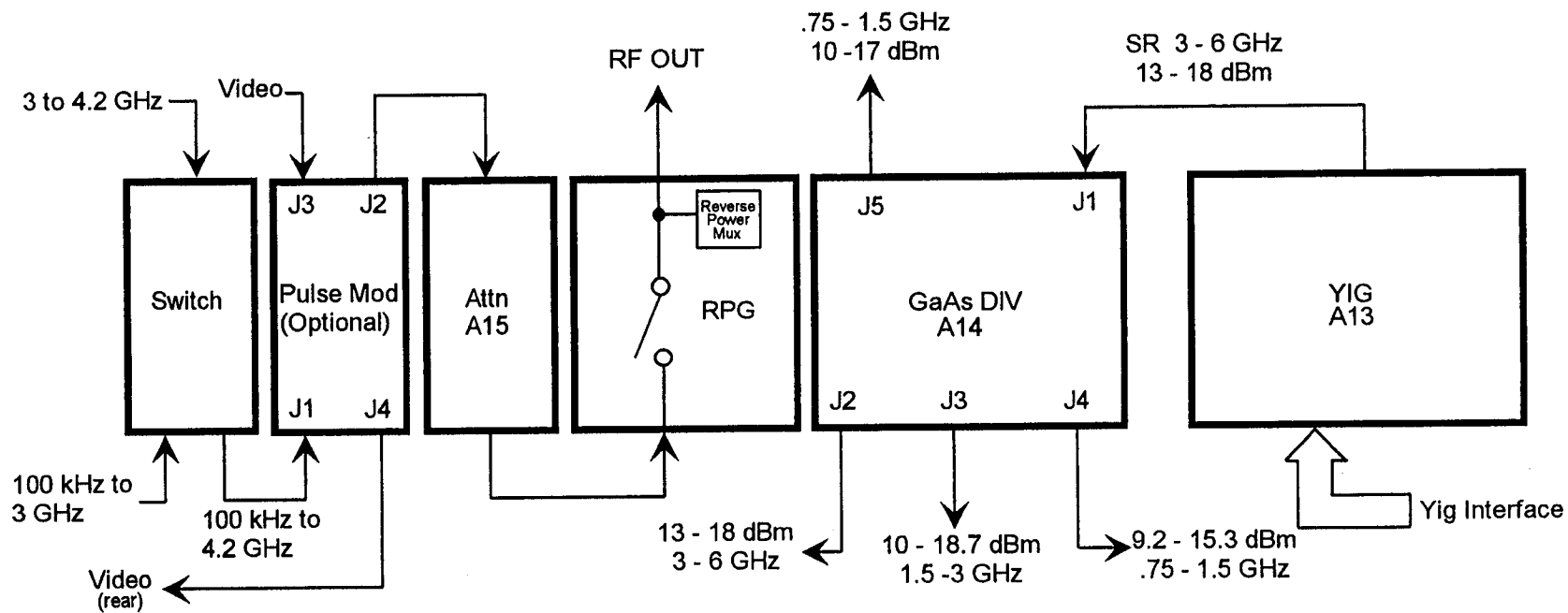
Power Supply Pinout	
Pin No.	Typical Value
J3 (9)	-5 VDC
J3 (10)	-15 VDC
J3 (2)	+15 VDC
J3 (1)	+5 VDC
J3 (3,15)	+10 VDC
J3 (11)	+21 VDC
J3 (7,8)	Gnd

**MW Extender  
Pulse Driver (opt 008)  
8665B  
BD 31**



**Microwave Assembly**  
**8664A**  
**BD 32**

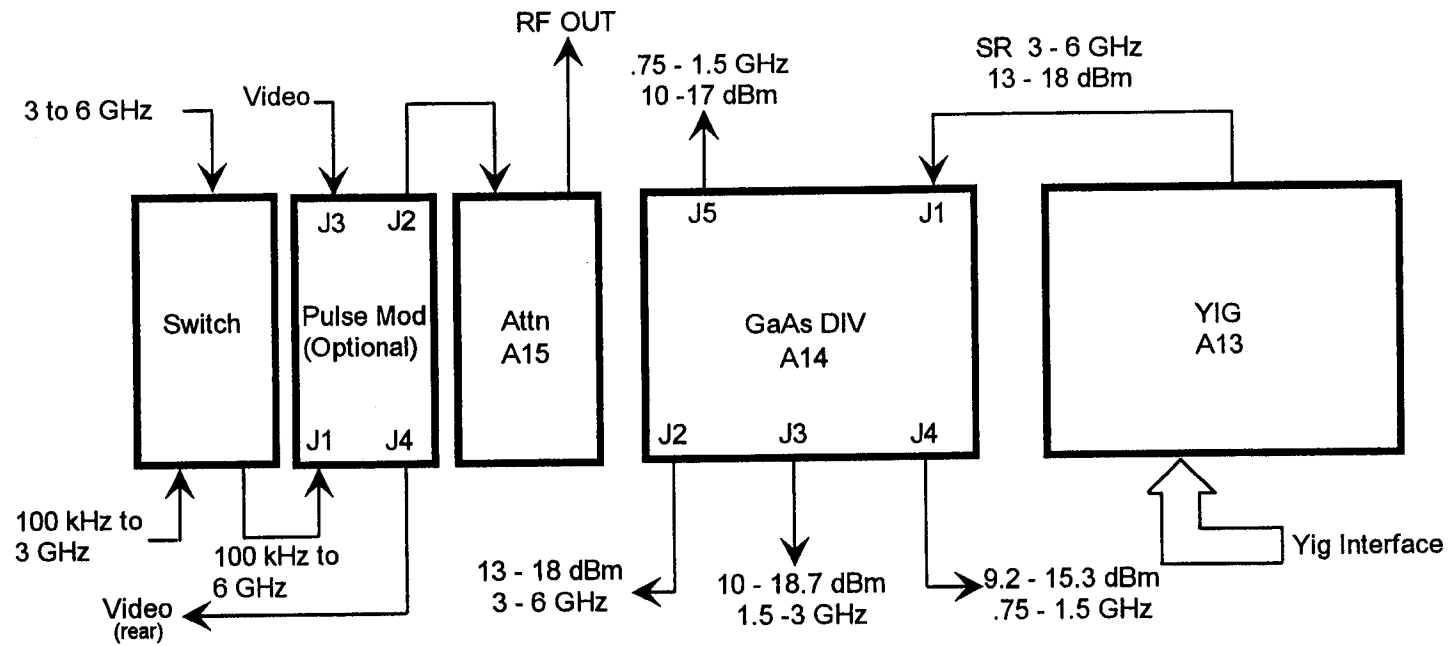




**Microwave Assembly**

**8665A**

**BD 33**



**Microwave Assembly**  
**8665B**  
**BD 34**