



Model 1313A VXIbus Microwave Downconverter

Operation Manual

1313A: CCN 4602

Manual Assy Part Number: 5585063-01
Manual Text Part Number: 5580100-01
Printed in USA



Warranty

Phase Matrix, Inc. warrants this product to be free from defects in material and workmanship for one year from the date of delivery. Damage due to accident, abuse, or improper signal level is not covered by the warranty. Removal, defacement, or alteration of any serial or inspection label, marking, or seal may void the warranty. Phase Matrix, Inc. will repair or replace, at its option, any components of this product which prove to be defective during the warranty period, provided the entire unit is returned PREPAID to Phase Matrix, Inc or an authorized service facility. In-warranty units will be returned freight prepaid; out-of-warranty units will be returned freight COLLECT. No warranty other than the above is expressed or implied.

Certification

Phase Matrix, Inc. certifies this instrument to be in conformance with the specifications noted herein at time of shipment from the factory. Phase Matrix, Inc. further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology.

Manual Change Information

As Phase Matrix, Inc. continually improves and updates its products, changes to the material covered by the manual will occur. When a part or assembly in a Phase Matrix, Inc. instrument is changed to the extent that it is no longer interchangeable with the earlier part, the configuration control number (CCN) of the instrument, shown on the title page of the manual, will change, and a new edition of the manual will be published.

To maintain the technical accuracy of the manual, it may be necessary to provide new or additional information with the manual. In these cases, the manual is shipped with a Manual Update. Please be sure to incorporate the information as instructed in the Manual Update.

SAFETY

The Phase Matrix, Inc. Model 1313A are designed and tested according to international safety requirements, but as with all electronic equipment, certain precautions must be observed. This manual contains information, cautions, and warnings that must be followed to prevent the possibility of personal injury and/or damage to the instrument.

SAFETY AND HAZARD SYMBOLS

WARNING

A WARNING denotes a hazard to personnel. It calls attention to a procedure or practice, which, if not correctly performed or adhered to, could result in personal injury.

CAUTION

A CAUTION denotes a hazard to the equipment. It calls attention to an operating procedure or practice, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.



This is a general warning that appears whenever care is necessary to prevent damage to the equipment.



Dangerous Voltage



Toxic Substance



Static-Sensitive Component



Fire Hazard

OVERALL SAFETY CONSIDERATIONS**WARNING**

Before this instrument is switched on, its protective earth terminals *must* be connected to the AC power cord's protective conductor. The main plug *must* only be inserted in a socket/outlet that has a protective earth contact. The protective action must not be negated by using an extension cord (power cable) or adapter that does not have a protective earth (grounding) conductor.

**WARNING**

Use only fuses of the type specified with the required current and voltage ratings. Never use repaired fuses or short-circuited fuse holders, as doing so causes shock and/or fire hazard.

**WARNING**

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

**WARNING**

All protective earth terminals, extension cords, autotransformers, and other devices connected to this instrument *must* be connected to a socket/outlet that has a protective earth contact. Any interruption of the protection causes a potential shock hazard that can result in personal injury.

**WARNING**

The power supply is energized whenever AC power is connected to this instrument. Disconnect the AC power cord before removing the covers to prevent electrical shock. Internal adjustments or servicing that must be done with the AC power cord connected must be performed only by qualified personnel.

**WARNING**

Since the power supply filter capacitors may remain charged after the AC power cord is disconnected from the equipment, disconnecting the power cord does not ensure that there is no electrical shock hazard.

**WARNING**

Some of the components used in this instrument contain resins and other chemicals that give off toxic fumes if burned. Be sure to dispose of these items properly.

**WARNING**

Beryllia (beryllium oxide) is used in the construction of the YTF assembly. This material, if handled incorrectly, can pose a health hazard. *NEVER* disassemble the microwave counter assembly.

**CAUTION**

Static sensitive components are used in the YTF Assembly. These components can be damaged if handled incorrectly.

**CAUTION**

Before connecting power to the instrument, ensure that the correct fuse is installed and the voltage-selection switch on the instrument's rear panel is set properly. Refer to **INSTALLATION** Section 2, *Installation*.

**CAUTION**

Excessive signal levels can damage this instrument. To prevent damage, do not exceed the specified damage level. Refer to the instrument specifications in Section 1 of this manual.

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DECLARATION OF CONFORMITY

Application Of Council Directive 89/336/EEC

Standards to which Conformity is Declared:

EMC: EN50011
EN50082-1

Standards to which Compliance is Declared:

Safety: IEC 1010-1 (1990)

Manufacturer's Name: EIP Microwave. Inc.
Manufacturer's Address: 1745 McCandless Drive
Milpitas, CA 95035
Type of Equipment: Microwave Downconverter
Model Name(s): 1313A
Tested By: Rockford Engineering Services, Inc.
9959 Calaveras Road
Sunol, CA 94586 USA
Project Engineer: Mr. Bruce Gordon and Leo Hernandez
Reviewer: Mr. Michael Gbadebo, P.E.

I, the undersigned, hereby declare that the equipment specified above conforms to Directives and Standards listed.

For: **EIP Microwave**

Name: Pete Pragastis
Title: Manager of Engineering

Signature: 

Date: 3-11-96

SECTION 1 GENERAL INFORMATION

DESCRIPTION

The EIP Model 1313A VXIbus Microwave Downconverter is a VXI module specially designed to downconvert microwave signals in the 1 to 20 GHz range to an intermediate frequency (IF) in the 1 to 500 MHz range.

In a common application, a complex-modulated microwave signal can be characterized by a VXIbus system consisting of an EIP 1141A/1142A VXIbus Synthesized Signal Generator (or similar equipment) feeding the LO input of the EIP 1313A. The LO mixes against the complex signal-under-test connected to the RF input and provides an IF signal that is analyzed by a measurement module. A video-detected output of the IF is also provided. Refer to Figure 3-2 for a typical setup.

The 1313A is a "C" size, 1-slot VXIbus module that has no manual controls and requires a VXIbus mainframe for operation. The VXIbus mainframe provides the 1313A with ± 24 Vdc. The 1313A passes the interrupt acknowledge lines and the bus grant lines.

OPERATING CONDITIONS

The EIP 1313A downconverter is designed to operate at temperatures from 0 to 55 °C at a relative humidity not to exceed 95% (75% over 25 °C; 45% over 40 °C). The downconverter will perform to specifications at altitudes not exceeding 10,000 ft (3050 m) and will tolerate vibration not exceeding 2 g. It is fungus resistant. The module housing is not designed to provide protection from severe mechanical shock or liquids and is intended for normal VXIbus use in an environmentally clean area.

The 1313A downconverter meets the requirements of MIL-T-28800D, Type III, Class 7, Style G, Color R with the following modifications and exceptions:

1. The non-operating temperature requirement is limited to the range of -40 to +71 °C.
2. The operating and non-operating altitude requirements are not invoked.
3. The EMI requirement is modified as follows:
 - a) For frequencies ≥ 1 GHz, RE02 of MIL-STD-461C applies.
 - b) For frequencies < 1 GHz, VXIbus System Specifications Revision 1.3/1.4 applies.

STORAGE

To prevent possible damage to the instrument, it must be stored in an antistatic bag or enclosure and in an environment that is protected from moisture, dust, and other contaminants. Do not expose the instrument to temperatures below -40 °C or above 71 °C, nor to altitudes above 40,000 ft (12,000 m).

SPECIFICATIONS

GENERAL

Operating Temperature Range	0 to 55 °C
Non-operating Temperature Range	-40 to 71 °C
Relative Humidity	0 to 95%, non-condensing
EMI	
Below 1 GHz	Complies with VXIbus Revision 1.3/1.4 specifications
Above 1 GHz	Complies with RE02 of MIL-STD-461C
Warm-up Time	None required
Weight	<6 lbs

VXIbus

General	No interface to message backplane. Requires power only.
Module Size	C-size, 1 slot wide
Device Type	Passive
Protocol	Not used
Local Bus	Not used
ECLTRG Utilization	Not used
TTLTRG Utilization	Not used
CLK10 Utilization	Not used
Cooling	1 mm H ₂ O @ 1.6 liters/s
Power Dissipation	7.2 watts

Current Requirements

Voltage (VDC)	+5	+12	+24	-2	-5.2	-12	-24
IPEAK (Amperes)	-	-	0.2	-	-	-	0.1

RF INPUT

Frequency	1 to 20 GHz (usable to 26.5 GHz)
Input Power Level	1 dB compression at +8 dBm typical
Damage Level	+23 dBm
Impedance	50 Ω nominal
VSWR	<2.5:1
Connector	APC-3.5 female

LO INPUT

Frequency	1 to 20 GHz (Usable to 26.5 GHz)
Input Power Level	+10 to +13 dBm
Damage Level	+23 dBm
Impedance	50 Ω nominal
VSWR	<3.5:1 typical
Connector	APC-3.5 female

SPECIFICATIONS (Continued)

IF OUT	
Frequency	IRF-LOI = 1 to 500 MHz, 3 dB bandwidth
Conversion Loss	6 dB max @ 100 MHz, 3 dB typical
IF Flatness	±2 dB typical
Noise Figure	20 dB typical
3rd Order Output Intercept Point	+15 dBm @ 100 MHz typical
LO and RF Rejection	>30 dB
Impedance	50 Ω nominal
Connector	BNC female

DET OUT	
Output Polarity	Positive
3 dB Bandwidth	100 kHz typical
Output Level	0.3 V typical for -10 dBm IF output level
Load	10 kΩ
Connector	BNC female

Note: Specifications subject to change without notice.

ACCESSORIES

011 Extra Operation Manual (one supplied at no charge with each instrument)

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SECTION 2 INSTALLATION

UNPACKING

Before unpacking the instrument, carefully inspect the shipping carton for any signs of damage. If the carton or instrument is damaged, immediately notify shipper's agent. Remove the instrument from the packing carton and make a complete visual inspection—checking for any damage or missing components. Report any problems to EIP immediately. Save the packing material so it can be reused in the event that the instrument needs to be returned to EIP for repair or calibration.

POWER AND COOLING

The EIP 1313A downconverter operates over an ambient temperature range from 0 to 55 °C and consumes up to 7.2 watts (see Specifications in Section 1). When configuring your VXIbus system, make sure that the chassis has sufficient power and cooling capacity for the 1313A along with the other instruments in the chassis. Refer to chassis specifications and cooling capacity curves.

INSTALLATION

CAUTION

Do not plug downconverter into VXIbus mainframe with power applied.

The 1313A is a 1 slot, C-size module that can be installed into any slot of a VXIbus mainframe except slot 0. Slot 0 is reserved for the resource manager. To install the module into the VXIbus mainframe, first turn mainframe power off. Next, place the card edges into the front mainframe guides (top and bottom). Gently slide the module towards the rear of the mainframe until the connectors just mate with the backplane. Firmly seat the module against the backplane connectors making sure the front panel is flush with the front of the card cage. Tighten down the retaining screws to ensure the module remains fully seated.

CAUTION

Do not use retaining screws to seat module.

IN CASE OF PROBLEMS

In the event that a problem does occur, there are a few things to check prior to returning the instrument for repair.

1. If the unit has never worked in the particular system, the problem may be due to the system and not an instrument fault. In this case, call EIP at the phone number listed on the cover page of the manual and ask for Customer Support.
2. Verify that all the VXI specified voltages are present.

SERVICE INFORMATION

PERIODIC MAINTENANCE

No periodic preventive maintenance is required. However, it is recommended that the instrument be checked every 12 months or whenever a problem is suspected.

IDENTIFICATION

This 1313A is identified by three sets of numbers: the model number (EIP 1313A), configuration control number (CCN), and serial number. These numbers are located on a label affixed on the side of the module and must be included in any correspondence.

FACTORY SERVICE

If the instrument is being returned to EIP for service or repair, be sure to include the following information with the shipment.

- Name and address of owner.
- Model, CCN, and serial number.
- A complete description of the problem. Try to provide enough information so that the problem can be verified, i.e., Under what conditions did the problem occur? Did the unit work and then fail? What other equipment was connected to the downconverter?
- Name and telephone number of someone familiar with the problem who may be contacted by EIP if any further information is required.
- Shipping address to which the downconverter is to be returned. Include any special shipping instructions. Pack the downconverter for shipping as detailed in Shipping Instructions.

SHIPPING INSTRUCTIONS

Place the downconverter in an antistatic bag or enclosure, wrap in heavy plastic or kraft paper, and repack in the original container, if available. If the original container cannot be used, pack in a heavy (275 pound test) double-walled carton with approximately two inches of packing material between the downconverter and the inner carton. Seal carton with strong filament tape or strapping. Mark the carton to indicate that it contains a fragile electronic instrument. Ship to the EIP address on the title page of the manual.

SECTION 3 OPERATION

INTRODUCTION

This section describes the front panel connectors and contains a sample setup and block diagram.

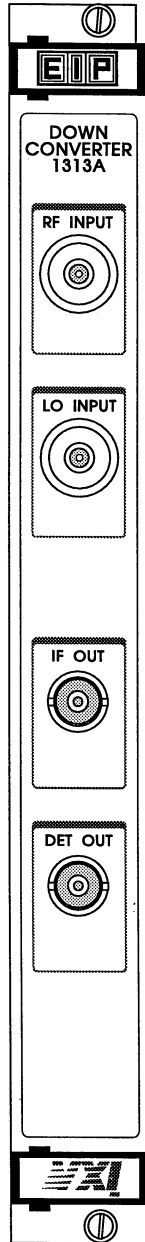


Figure 3-1. Front Panel.

FRONT PANEL CONNECTORS

- RF INPUT

APC-3.5 female connector with a nominal impedance of 50 Ω . This input is specified for input signals from 1 GHz to 20 GHz, but is usable up to 26.5 GHz. The 1 dB compression level for this input is typically +8 dBm. Signal levels of +23 dBm or greater can damage the instrument.

- LO INPUT

APC-3.5 female connector with a nominal impedance of 50 Ω . This input is specified for input signals from 1 GHz to 20 GHz, but is usable up to 26.5 GHz. For optimum performance, the LO input power should be between +10 and +13 dBm. Signal levels of +23 dBm or greater can damage the instrument.

- IF OUT

BNC female connector with a nominal impedance of 50 Ω and provides a 1 to 500 MHz signal output.

- DET OUT

BNC female connector which provides a detected IF output.

TYPICAL SETUP

The 1313A is typically used to downconvert a modulated microwave signal to an IF signal so that the modulation can be analyzed. Shown below is a typical setup. The EIP 1141A (2 to 20 GHz VXIbus Microwave Synthesizer) provides an accurate and spectrally clean LO source for mixing with the modulated microwave signal to be analyzed. The modulated signal to be tested is applied to the RF input. The Racal Dana 4150 Modulation Analyzer is used to analyze the IF output providing information such as: FM deviation, AM depth, and phase deviation.

EQUIPMENT SETUP

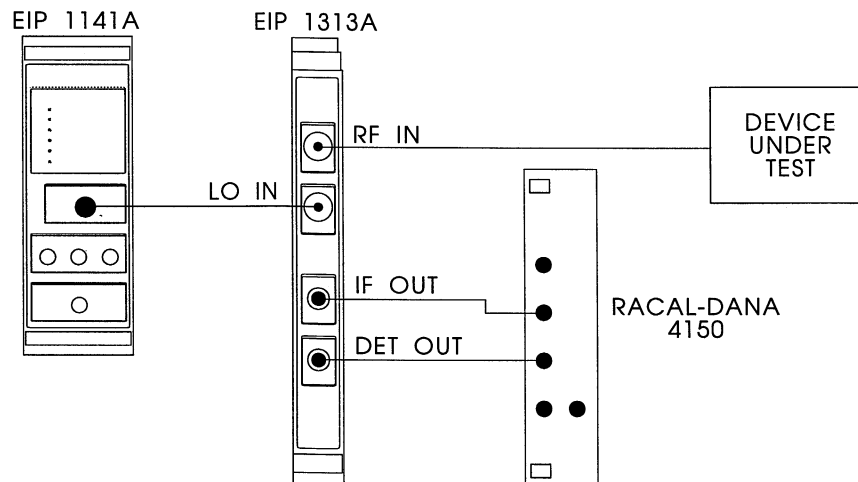


Figure 3-2. Typical Setup.

BLOCK DIAGRAM

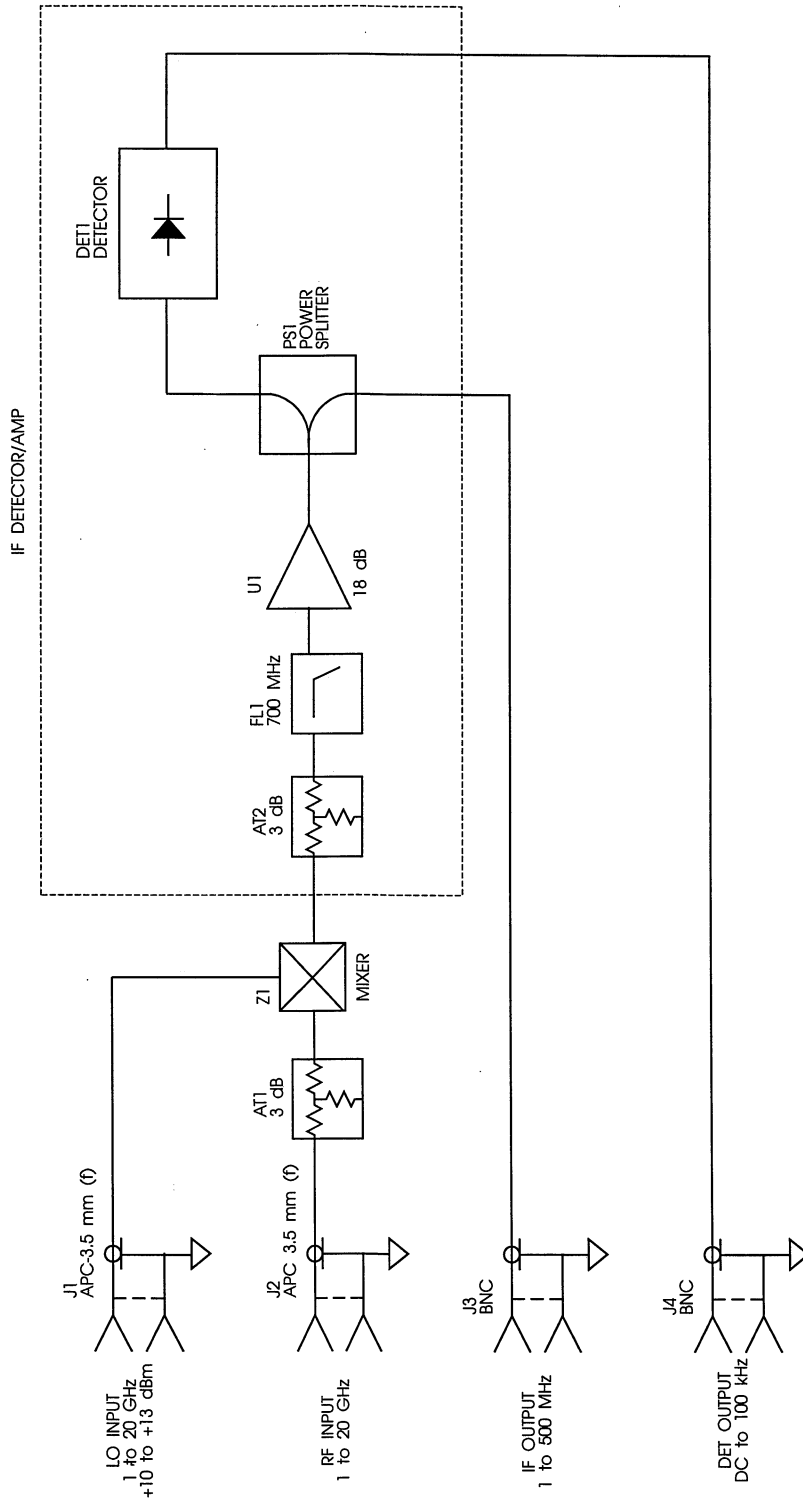


Figure 3-3. 1313A Block Diagram.



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