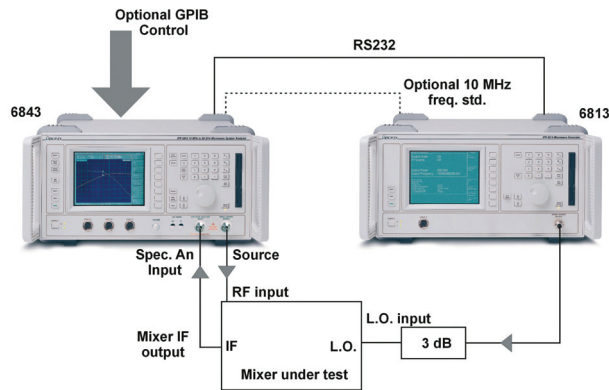


# Microwave Mixer Measurement System

**AEROFLEX**  
A passion for performance.



A fast measurement system that is designed to provide selective measurements of mixers and frequency converters during alignment and testing.

- Wide frequency range 10 MHz - 20 GHz
- Fully synthesized, synchronized, selective system
- Simple interconnection via RS232 and optional 10 MHz reference
- Fast production testing-both standalone or under GPIB control
- Dedicated built in software

The Aeroflex Mixer Measurement System provides both fixed IF, swept local oscillator and swept IF, fixed local oscillator modes for testing most types of mixers and frequency converters. A key feature is the ability to test selectively through the use of a receiver input that operates in both fixed frequency and swept modes regardless of whether the unit under test is an up-converter or down-converter or whether the wanted signal is the upper or lower sideband mixer output.

Typically, this measurement is configured with two sources that are synchronized and a spectrum analyzer. The spectrum analyzer method has the advantage of not requiring additional IF filtering to remove unwanted products, particularly the LO leak signal. Testing of a mixer with a scalar analyzer nearly always requires an IF filter ahead of the broad band detector.

The higher dynamic range of the receiver based measuring system allows measurement of the IF image signal from which image rejection may be calculated.

The Mixer Measurement System achieves fast (< 2 seconds for 400 points) sweeps even with the spectrum analyzer input by utilizing the new frequency list mode within the 6813 that is triggered by the 6840 series unit through the RS232 hardware. Use of the RS232 ports of the two units for control of the mixer system results in fast operation because a hardware trigger is employed rather than a continuous transfer of a sequence of commands. A further benefit is that because the GPIB (IEEE 488) port is not used for control of the 6813 it remains available for control of the 6843 in the Mixer Measurement System through additional GPIB commands within the 6800 series firmware.

An intuitive user interface is provided for each of the two modes of operation: the swept RF, swept IF system and the swept RF, swept local oscillator system. The interface allows the user to set the operating mode and also the required frequency and level setup appropriate to the mixer or converter under test.

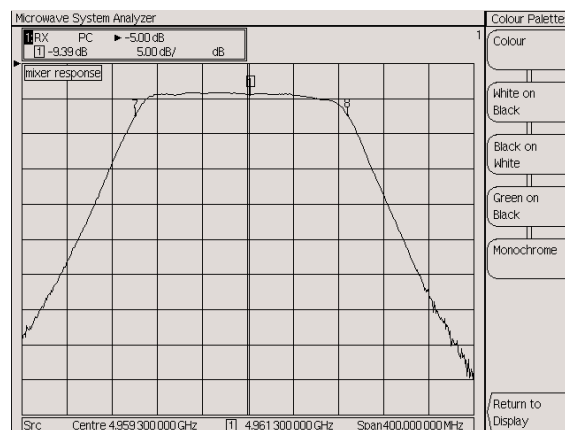


Figure 1 Measured response of a mixer. Frequencies are: input 4.96 GHz, IF 1.2 GHz and LO 3.84 GHz

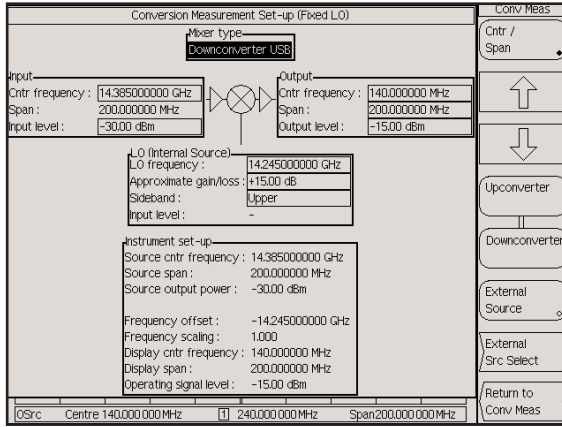


Figure 2 User interface for fixed LO measurement

A major difference in the two modes of operation exists because frequently, a converter will already contain a fixed frequency local oscillator and the requirements of the test system can be fulfilled with the single unit test system contained within the 6840 series unit. When an external fixed frequency source is required this can be provided by many different signal sources without the need for remote control. The 6840 series can be set up to control a CW source in these cases by utilizing the GPIB connection to send the appropriate frequency and level commands.

When an external local oscillator source that sweeps in time with the RF source is required then a control system such as that available in the Aeroflex Mixer Measurements System is required.

It is convenient to use the RS232 interface to act as the hardware trigger for the external source because this frees the GPIB interface for remote control in an automated system or use of a plotting package such as the Aeroflex MiPlot package to download measured data into a PC. A suitable RS232 cable is included with the mixer measurement package.

As with all gain/response, measurements calibration is required to normalize the measured data. A calibration package tailored to conversion measurements exists within the 6840 series that allows for variations in the frequency response of the source and loss in interconnecting cables. In addition, the 6840 series also caters for a relative memory function that allows a mathematical subtraction of a response data file.

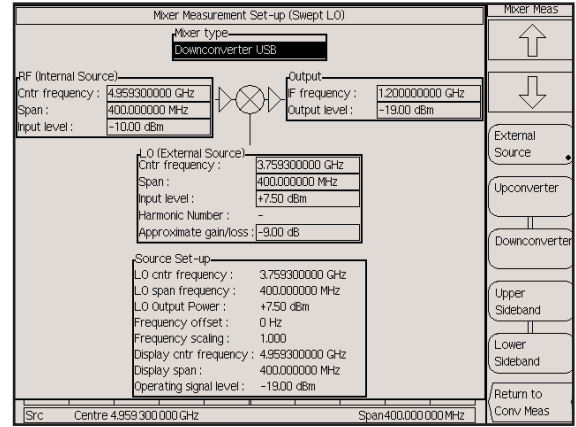


Figure 3 User interface for swept LO measurement

This can be utilized to remove the additional losses incurred in components such as cables connecting the device under test to the receiver input while the mixer calibration mode normalizes the response of the cable at the mixer input.

The mixer mode can also be operated in the conventional scalar mode with a broadband diode scalar detector. In this case a filter will be required between the mixer IF output and the detector input so that unwanted components - mainly the LO leak signal - can be removed.

In scalar mode the units offer the user the choice of DC and AC detection and AC detection is recommended because this mode provides further rejection of unwanted signals.

The present definition of the product for converter testing with a fixed LO includes: Group delay measurement and operation up to 46 GHz. Future enhancements of the swept local oscillator system will include these two features.

## VERSIONS AND OPTIONS

When ordering please quote the full ordering number information.

### Ordering Numbers

Ordering Numbers	Versions
6813	10 MHz to 20 GHz Generator
6815	10 MHz to 46 GHz Generator
6815R	10 MHz to 40 GHz Generator
<b>Supplied Accessories</b>	
46882/662	Operating Manual
43123/076	AC Supply Lead
37591/755	Front Panel Cover
<b>Options</b>	
002	Field Replaceable Precision N (f) or 3.5 mm (f) RF Connectors (6813), 2.92 mm (f) 6815, 6815R
011	20 GHz 70 dB Step Attenuator (only available for 6813)
012	26.5 GHz 90 dB Step Attenuator (only available for 6813)
013	40 GHz 70 dB Step Attenuator (only available for 6815)
023	Internal Modulation
024	Trigger board
<hr/>	
6843	10 MHz to 20 GHz Scalar Analyzer with 20 GHz Spectrum Analyzer
6845	10 MHz to 46 GHz Scalar Analyzer with 46 GHz Spectrum Analyzer
6845R	10 MHz to 40 GHz Scalar Analyzer with 40 GHz Spectrum Analyzer
<b>Supplied Accessories</b>	
46882/350	Operating Manual
46882/354	Getting Started Guide
46882/360	Remote Operating Manual
43123/076	AC Supply Lead
37591/755	Front Panel Cover
<b>Options</b>	
002	Field Replaceable Precision N (f) or 3.5 mm (f) RF Connectors for Source and Spectrum Analyzer for 6843 Field Replaceable Precision N (f) or 2.92 mm (f) RF Connectors for Source and Spectrum Analyzer for 6845 & 6845R
011	20 GHz, 70 dB Step Attenuator (only available for 6843)
012	26.5 GHz 90 dB Step Attenuator (not available for 6845/6845R)
013	40 GHz 70 dB Step Attenuator (only available for 6845 & 6845R)
022	Group Delay
023	Internal Modulation (included in Group Delay option 022)
030	Higher Power Output (not applicable to 6845/6845R)

## ACCESSORIES

### 6230A/L SCALAR DETECTORS

#### Accessories for level calibration

6230A series Standard Detectors (-65 dBm to +20 dBm) typical

### ACCESSORIES

#### Miscellaneous Electrical Cables

43129/189 GPIB Cable  
RS232 Cable  
43139/042 BNC (m) to BNC (m) 1.5 m

#### Standard Microwave Cables

54351/022 0.5 m, 18 GHz, N (m) to N (m)  
54351/025 0.5 m, 26.5 GHz, 3.5 mm (m) to 3.5 mm (m)  
54351/027 0.5 m, 40 GHz, 2.92 mm (m) to 2.92 mm (m)

#### Attenuators

56534/901 Precision Fixed Coaxial Attenuator 3 dB DC to 18 GHz 5 W, N(m) to N(f)  
56534/902 Precision Fixed Coaxial Attenuator 6 dB DC to 18 GHz 5 W, N(m) to N(f)  
56534/903 Precision Fixed Coaxial Attenuator 10 dB DC to 18 GHz 5 W, N(m) to N(f)  
56534/904 Precision Fixed Coaxial Attenuator 20 dB DC to 18 GHz 5 W, N(m) to N(f)

### MISCELLANEOUS

46885/038 Rack Mount Kit for 6800  
46880 Service Manual  
46882/351 Maintenance Manual  
84501 Soft Carrying Case  
46662/695 Flight Case  
54152/001 3.5 mm Torque Wrench  
54211/008 Compact Keyboard

#### Power Splitters/Dividers

54311/123 Power Splitter DC to 18 GHz, Type N  
54311/124 Power Splitter DC to 26.5 GHz, 3.5 mm  
54311/161 Power Splitter DC to 40 GHz, 2.92 mm  
54311/187 Power Divider DC to 18 GHz  
54311/188 Power Divider DC to 26.5 GHz

#### Fixed Loads

54421/021 3.5 mm (f) Fixed Load  
54421/022 3.5 mm (m) Fixed Load  
54421/023 N (m) Fixed Load  
54421/024 N (f) Fixed Load

#### Precision Adapters

54311/175 N (m) to N (m)  
54311/167 N (m) to N (f)  
54311/174 N (f) to N (f)  
54311/176 N (f) to 3.5 mm (f)  
54311/177 N (m) to 3.5 mm (f)  
54311/178 N (m) to 3.5 mm (m)  
54311/185 N (f) to 3.5 mm (m)  
54311/107 3.5 mm (f) to 3.5 mm (f)  
54311/165 3.5 mm (m) to 3.5 mm (f)  
54311/164 3.5 mm (m) to 3.5 mm (m)  
54311/162 2.92 mm (m) to 2.92 mm (m)  
54311/206 2.92 mm (m) to 2.92 mm (f)  
54311/207 2.92 mm (f) to 2.92 mm (f)

#### Standard Adapters

54311/133 N (f) to SMA (f)  
54311/134 N (m) to SMA (f)

**CHINA Beijing**

Tel: [+86] (10) 6467 2761 2716  
Fax: [+86] (10) 6467 2821

**CHINA Shanghai**

Tel: [+86] (21) 6282 8001  
Fax: [+86] (21) 62828 8002

**FINLAND**

Tel: [+358] (9) 2709 5541  
Fax: [+358] (9) 804 2441

**FRANCE**

Tel: [+33] 1 60 79 96 00  
Fax: [+33] 1 60 77 69 22

**GERMANY**

Tel: [+49] 8131 2926-0  
Fax: [+49] 8131 2926-130

**HONG KONG**

Tel: [+852] 2832 7988  
Fax: [+852] 2834 5364

**INDIA**

Tel: [+91] 80 5115 4501  
Fax: [+91] 80 5115 4502

**KOREA**

Tel: [+82] (2) 3424 2719  
Fax: [+82] (2) 3424 8620

**SCANDINAVIA**

Tel: [+45] 9614 0045  
Fax: [+45] 9614 0047

**SPAIN**

Tel: [+34] (91) 640 11 34  
Fax: [+34] (91) 640 06 40

**UK Burnham**

Tel: [+44] (0) 1682 604455  
Fax: [+44] (0) 1682 662017

**UK Stevenage**

Tel: [+44] (0) 1438 742200  
Fax: [+44] (0) 1438 727601  
Freephone: 0800 282388

**USA**

Tel: [+1] (316) 522 4981  
Fax: [+1] (316) 522 1360  
Toll Free: 800 835 2352



As we are always seeking to improve our products, the information in this document gives only a general indication of the product capacity, performance and suitability, none of which shall form part of any contract. We reserve the right to make design changes without notice. All trademarks are acknowledged. Parent company Aeroflex, Inc. ©Aeroflex 2004.

[www.aeroflex.com](http://www.aeroflex.com)  
[info-test@eroflex.com](mailto:info-test@eroflex.com)



Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.