

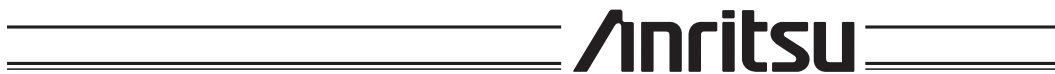
FCN4760

4.7 GHz to 6.0 GHz

Frequency Converter Module



User's Guide



490 JARVIS DRIVE
MORGAN HILL, CA 95037-2809

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UPDATES

Updates to this manual, if any, may be downloaded from the Anritsu internet site at: <http://www.us.anritsu.com>.

Chapter 1

General Information

Introduction

This chapter provides a description, performance specifications, standard and optional accessories, preventive maintenance, and calibration requirements for the Anritsu FCN4760 Frequency Converter Module.

Description

The FCN4760 is a block down converter for the 4.7 GHz to 6.0 GHz frequency range designed to work with an Anritsu Spectrum Master MS2711D or Site Master S332D equipped with a Frequency Converter Interface (Option 6). These models are referenced in this manual as MS2711D/6 and S332D/6

The FCN4760 is primarily intended for field use by wireless engineers responsible for the design, deployment and optimization of 802.11a networks. The FCN4760 can also be used to conduct interference analysis measurements to locate the sources and determine the levels of interfering signals.

The standard measurement capabilities of the Spectrum Master MS2711D and Site Master S332D (in spectrum analyzer mode) can be used with the FCN4760, including such one-button measurements as occupied bandwidth, carrier to interference ratio (C/I), adjacent channel power ratio, field strength, and channel power.

External directional or omni-directional antennas can be attached to the type-N female connector on the FCN4760 for use in interference sniffing.

Standard Equipment

Description	Part Number	Qty
Lanyard	47372	1

Optional Accessories

Description	Part Number
N-male to N-male adapter	34NN50A
Type N male to SMA female adapter	1091-27
Type-N male to SMA male adapter	1091-26
Antenna, 5725 - 5825 MHz, SMA male connector	2000-1361

Performance Specifications

Frequency	
Frequency Range	4.7 GHz to 6.0 GHz
Frequency Resolution*	10 Hz
Frequency Reference	Aging: ± 1 ppm/yr Accuracy: ± 2 ppm
SSB Phase Noise (6 GHz) @ 30 kHz Offset	≤ -65 dBc/Hz
Spurious Responses Input Related	≤ -45 dBc
Spurious Residual Responses*	≤ -90 dBm

Amplitude	
Measurement Range	-40 dBm to -100 dBm
Sensitivity* (displayed average noise level)	≤ -100 dBm
Accuracy	± 1.75 dBm typ. (± 2.25 dBm max.)*
Maximum Input Level without damage	-5 dBm

General	
Input and Output Ports: RF In RF Out	Type N, female, 50Ω Type N, male, 50Ω
Electromagnetic Compatibility	Meets European community requirements for CE marking
Safety	Conforms to EN 61010-1 for Class 1 portable equipment
Temperature: Operating Storage	-10°C to 50°C , 85% humidity or less -50°C to $+80^{\circ}\text{C}$
Power Dissipation	850 mW maximum
Dimensions W x H x D	6.6 cm x 10.9 cm x 3.3 cm (2.6 in x 4.3 in x 1.3 in)
Weight	< 0.45 kg (< 1 lb.)

* Specifications apply when connected to the MS2711D/6 or Site Master S332D/6.

Preventive Maintenance

Preventive Maintenance consists of cleaning the unit and inspecting and cleaning both RF connectors and the attachment cable. Clean the FCN4760 case with a soft cloth dampened with water, or water and a mild cleaning solution. Avoid using solvents or abrasive cleaners.

Clean the RF connectors and the center pins with a cotton swab dampened with denatured alcohol. After cleaning, visually inspect the connectors. The fingers on the N-female connector and the pin of the N-male connector should be unbroken and uniform in appearance. Be sure there is no residue from the cotton swab. To determine if a connector is good, gauge the connector to confirm that the dimensions are correct.

Visually inspect the attachment cable to be sure all connector pins are straight, and that the cable shows no signs of damage.

Calibration

The FCN4760 is calibrated at the factory and the information is stored in the module. When used with the MS2711D/6 or S332D/6, the calibration information is downloaded to the instrument to provide more accurate measurements.

Annual Verification

Anritsu recommends an annual calibration and performance verification of the FCN4760 and associated MS2711D/6 or S332D/6 be performed by local Anritsu service centers. Anritsu service centers are shown in Table 1-1 on page 1-6.

ESD Precautions

The FCN4760, like other high performance instruments, is susceptible to ESD damage. Very often, coaxial cables and antennas build up a static charge, which, if allowed to discharge by connecting to the FCN4760, may damage the FCN4760 circuitry. FCN4760 operators should be aware of the potential for ESD damage and take all necessary precautions. Operators should exercise practices outlined within industry standards such as JEDEC-625 (EIA-625), MIL-HDBK-263, and MIL-STD-1686, which pertain to ESD and ESDS devices, equipment, and practices.

As these apply to the FCN4760 with the Spectrum Master MS2711D or Site Master S332D, we recommend dissipating any static charges that may be present before connecting the coaxial cables or antennas to the FCN4760. This may be as simple as temporarily attaching a short or load device to the cable or antenna prior to attaching it to the FCN4760. It is important to remember that the operator may also carry a static charge that can cause damage. Following the practices outlined in the above standards will insure a safe environment for both personnel and equipment.

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FAX: 015-82-731303

Chapter 2

Installation

Introduction

This chapter provides information on installing the Anritsu FCN4760 Frequency Converter Module on to the MS2711D/6 Spectrum Master or Site Master S332D/6.

The FCN4760 works in conjunction with the Anritsu Spectrum Master MS2711D or Site Master S332D equipped with the Option 6 Frequency Converter Interface. The FCN4760 receives power from the MS2711D/6 or S332D/6.

Installation Procedure

Follow the steps in this procedure to install the FCN4760 Module onto the MS2711D/6 or S332D/6.

1. Connect the FCN4760 type-N male connector to the MS2711D/6 or S332D/6 RF Input connector.
2. Before tightening the type-N connector, turn the FCN4760 so that the interface cable is oriented as shown in Figure 2-1.

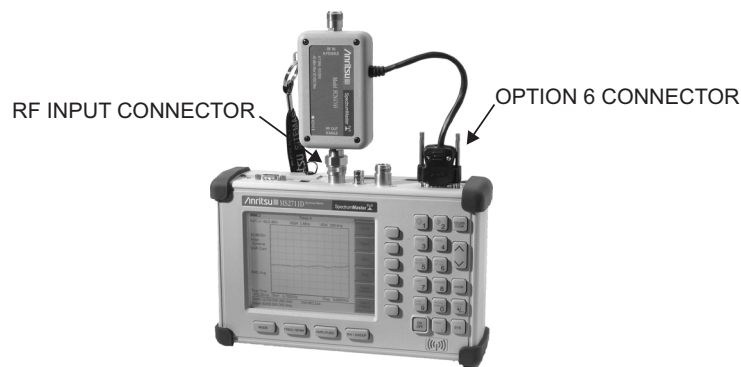


Figure 2-1. FCN4760 Installation

3. Connect the FCN4760 interface cable to the Option 6 connector on the MS2711D/6 or S332D/6. Hand tighten the connector screws.
4. Using the proper torque wrench, tighten the FCN4760 type-N connector to a maximum torque of 14 inch-pounds (1.58 newton-meters).

NOTE: When an FCN4760 is attached to an MS2711D/6 or S332D/6 (in spectrum analyzer mode) that is already powered on, the sweep frequency range will automatically change to sweep 4.7 GHz to 6.0 GHz.

5. If the instrument is off, press the **ON/OFF** key on the MS2711D/6 or S332D/6. The unit will take about five seconds to perform a series of self-diagnostic routines. At completion, the screen displays the Anritsu logo, the model number, and the current version of firmware.

Input Power Limitation

The Anritsu FCN4760 Frequency Converter Module is designed to operate with an input power level between -40 and -100 dBm.

NOTE: Never exceed -5 dBm input power and ± 50 Vdc. Damage will result if more than -5 dBm is applied to the input of the FCN4760.

Disconnecting the FCN4760

1. Disconnect the FCN4760 interface cable from the Option 6 connector on the MS2711D/6 or S332D/6.
2. Disconnect the FCN4760 type-N male connector from the MS2711D/6 or S332D/6 RF Input connector.

NOTE: When the FCN4760 is disconnected from the MS2711D/6 or S332D/6, the sweep frequency range will automatically change to sweep 9 kHz to 3 GHz.

Self Test

When an FCN4760 is attached to a Spectrum Master MS2711D/6 or Site Master S332D/6, the Self Test result will include information about the module, including the serial number of the FCN4760. The self test can be executed by pressing the **SYS** key and selecting the **Self Test** soft key on the MS2711D/6 or S332D/6. See Figure 2-2.

Selftest	
Temperature	24°C
Memory	PASSED
RTC Battery	3.1V
Voltage	External (12.7V)
Battery Cal	PASSED
Battery Charge	99% (I = 0 mA)
VNA PLL	PASSED
VNA Integrator	PASSED
SPA LO	PASSED
Opt. 6: FCN4760 #00000000	
MODULE LOCK	PASSED
Module PLL Fail Counter:	0

Press **ESCAPE** to return.

Figure 2-2. Self Test Display

Chapter 3

Operation

Introduction

This chapter provides information on using the Anritsu FCN4760 Frequency Converter Module with the MS2711D/6 or S332D/6. The FCN4760 functions as a frequency converter to convert signals in the 4.7 GHz to 6.0 GHz band to frequencies that the MS2711D/6 and S332D/6 can process. When the FCN4760 is connected to the MS2711D/6 or S332D/6, the frequency range will fall in the range of 4.7 GHz to 6.0 GHz.

Input Power Limitation

The Anritsu FCN4760 Frequency Converter Module is designed to operate with an input power level between -40 and -100 dBm. Attempts to measure signals greater than -40 dBm could result in inaccurate measurements.

CAUTION

Never exceed -5 dBm input power and ± 50 Vdc. Damage will result if more than -5 dBm is applied to the input of the FCN4760.

Selecting the Frequency

To set the MS2711D/6 or S332D/6 frequency range with a properly connected FCN4760 attached:

1. Press the **FREQ/SPAN** key to display the Frequency menu.
2. Select the **Start** or **Center** soft key and use the keypad to enter the desired start or center frequency. Complete the entry by pressing the **GHz**, **MHz**, **kHz**, or **Hz** soft key to accept the frequency input. Enter a start or center frequency between 4.7 GHz and 6.0 GHz.
3. Select the **Stop** or **Span** soft key and use the keypad to enter the desired stop frequency or frequency span. Complete the entry by pressing the **GHz**, **MHz**, **kHz**, or **Hz** soft key to accept the frequency input. Enter a stop frequency greater than or equal to the start frequency up to 6.0 GHz or a span between zero and 1300 MHz.

Measurements

The MS2711D/6 and S332D/6 are capable of several one-button measurements, all of which work the same with or without the FCN4760 Frequency Converter Module installed.

Refer to Chapter 5, *Field Measurements*, in the MS2711D User's Guide (10580-00097) or Chapter 5, *Spectrum Analyzer Measurements* in the S331D/S332D User's Guide (10580-00079) for instructions on making Occupied Bandwidth, Adjacent Channel Power Ratio, Channel Power, and Field Strength measurements. The preamplifier and dynamic attenuation features can also be used with the FCN4760 Frequency Converter Module.

Recall Trace Display

A trace stored in the MS2711D/6 or S332D/6 can be recalled while using the FCN4760 module, regardless of the frequency range of the stored trace. Whether the FCN4760 module was used when the trace was saved or not, the frequency of the recalled trace will be correctly displayed. After viewing the recalled trace, press the **ESCAPE/CLEAR** key to return to active measurements over the frequency range that was in use before the display was recalled.

Trace Overlay

Traces can be overlaid only if they both cover the same frequency range and frequency converter status. A trace saved while using the frequency converter cannot be overlaid with a trace taken when the frequency converter is not being used.

Saved Setups

Instrument setups are saved with the complete configuration, including information that indicates if the frequency converter was active when the setup was saved.

Attempting to recall a non-FCN4760 setup when an FCN4760 is installed will result in a frequency error message. Follow the on screen prompts to enter an acceptable frequency range for use with the FCN4760, or remove the FCN4760. Attempting to recall an FCN4760 setup when an FCN4760 is not installed will also result in a frequency error message. Again, follow the on screen prompts to enter an acceptable frequency range for use without the FCN4760, or reattach the FCN4760.

Error Messages

The following error messages may appear when using the FCN4760 with the MS2711D/6 or S332D/6. Suggested actions follow each error message listed.

Frequency Mismatch Error - This error can occur when the MS2711D/6 or S332D/6 is powered on using the **ESCAPE-ON** key sequence. It may also occur when attempting to recall a saved FCN4760 setup and an FCN4760 is not installed, or when attempting to recall a setup that does not need an FCN4760 and an FCN4760 is installed.

Suggested Action - Set a valid frequency for the present mode of operation, or attach or remove the FCN4760 module as suggested.

Module Calibration Off - This error can occur if the MS2711D/6 or S332D/6 has difficulty communicating with the module.

Suggested Actions - Verify that the FCN4760 interface cable is properly connected to the Option 6 connector on the MS2711D/6 or S332D/6.

With the FCN4760 module properly connected, turn the MS2711D/6 or S332D/6 power off, then on again. If the error reoccurs, contact your nearest Anritsu Service Center (page 1-6).

Invalid Module Error - This error can occur if the MS2711D/6 or S332D/6 has difficulty communicating with the module.

Suggested Actions - Verify that the FCN4760 interface cable is properly connected to the Option 6 connector on the MS2711D/6 or S332D/6.

With the FCN4760 module properly connected, turn the MS2711D/6 or S332D/6 power off, then on again. If the error reoccurs, contact your nearest Anritsu Service Center (page 1-6).



- PLL failure can occur if there is difficulty in communicating with the module.

Suggested Actions - Verify that the FCN4760 interface cable is properly connected to the Option 6 connector on the MS2711D/6 or S332D/6.

With the FCN4760 module properly connected, turn the MS2711D/6 or S332D/6 power off, then on again. If the error reoccurs, contact your nearest Anritsu Service Center (page 1-6).

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