Quick Start Guide

VectorStar™ ME7838D/G 2-Port Broadband/Banded mmWave System

High Performance Modular Broadband/Banded mmWave Vector Network Analyzer (VNA) Measurement System, 70 kHz to 145 GHz (150 GHz) or 70 kHz to 220 GHz (226 GHz)

ME7838D, 70 kHz to 145 GHz (150 GHz)
ME7838G, 70 kHz to 220 GHz (226 GHz)

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High Performance Modular Broadband/Banded mmWave Vector Network Analyzer (VNA) Measurement System, 70 kHz to 145 GHz or 220 GHz

This guide provides quick setup instructions for the ME7838D/G Broadband/Banded mmWave VNA System assembly. For additional safety and compliance information, and for more details about the assembly, configuration, setup, and test of the equipment, refer to the *VectorStar™ ME7838 Series Broadband / mmWave System Installation Guide – 10410-00293.*

This and all other documentation that supports the ME7838D/G is available on the ME7838 product web page:

http://www.anritsu.com/test-measurement/products/me7838

On this web page, you can select various tabs for more information about your instrument. Included is a "Library" tab which contains links to all the latest technical documentation related to this instrument.

The ME7838D/G Broadband system consists of the MS4647B VNA with Option 007 (Receiver Offset), Option 08x (Modular Broadband Connection Capability), the 3739C Broadband Test Set, two MA25300A or two MA25400A mmWave Modules, and the necessary front and rear panel cables. A fully configured system is shown below.

The ME7838D/G Banded mmWave system consists of an MS464xA/B VNA with Option 08x, the 3739C Broadband Test Set, and two 3744A-EE, 3744A-EW, or two OML/VDI mmWave Modules.

1. Installing Rear Panel Cables (MS464xA VNA)

The MS4647A VNA can be used in the ME7838D-based systems only.

This section focuses on installing cables when using a MS464xA VNA. Start the ME7838D assembly by placing the 3739C Broadband Test Set so you can access the rear panel for cable connection.

Warning	To avoid injury, use two or more people to lift the MS464xA VNA to the top of the 3739C Test Set.

Caution	To avoid connector damage or inaccurate measurements, before making any connections, review the *10100-00060-Connector Care Instruction Sheet.* Observe connector torque requirements where indicated in this guide.

Note	The MS4647A software does not support the ME7838G system.

At the rear panels connect the cables as shown in Figure 1 and Table 1.

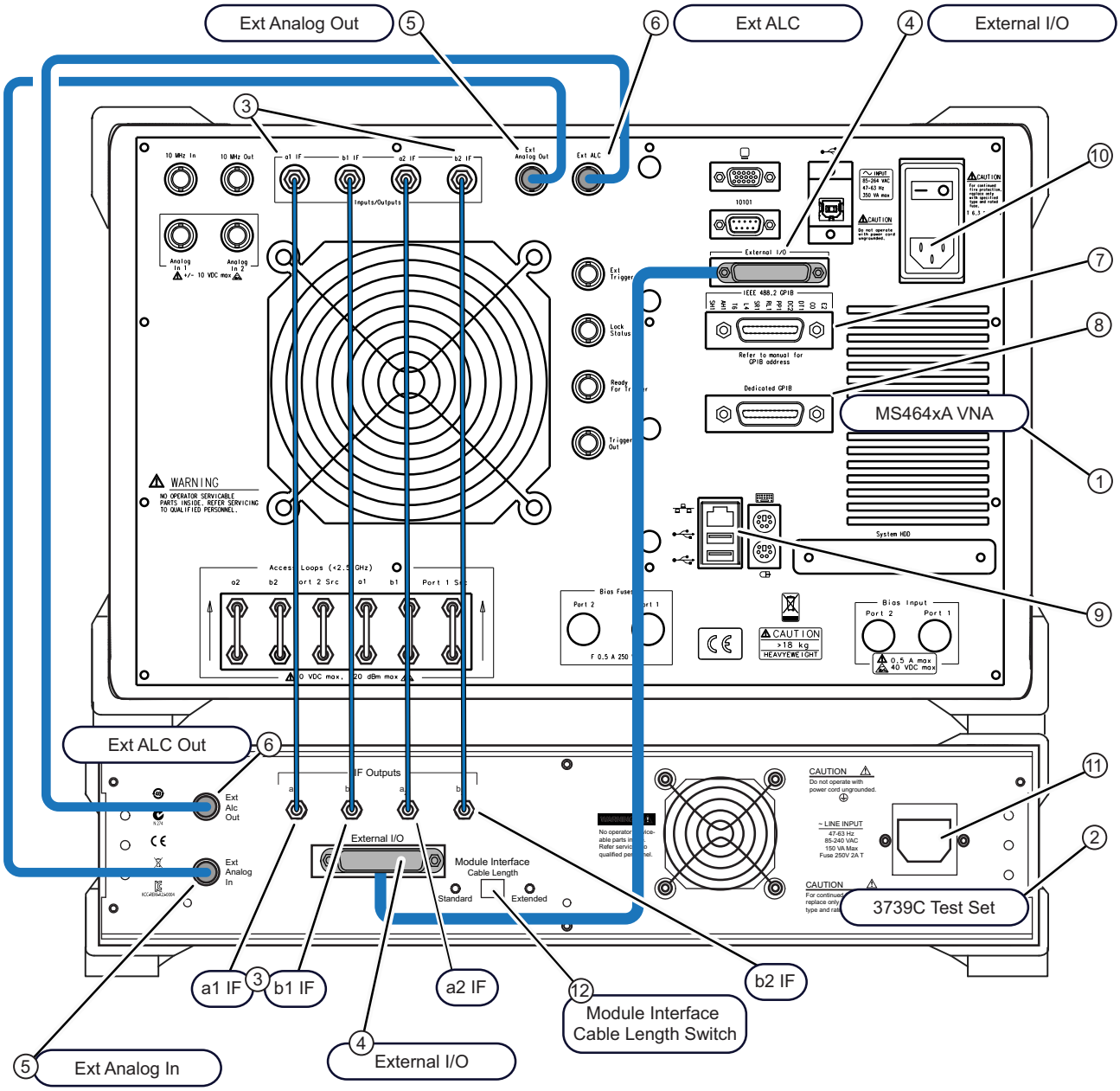


Figure 1. Install Rear Panel Cables between 3739C Test Set and MS464xA VNA

Table 1. ME78383D Cable Rear Panel Connections (MS464xA VNA)

Part Number	Index	Description	From VNA Location	To 3739C Test Set Location
MS464xA VNA	1			
3739C Test Set	2			
3-73598-1 [a] (5 cable bundle)	3	IF Interface Cables	a1 IF b1 IF a2 IF b2 IF	a1 IF b1 IF a2 IF b2 IF
	4	External I/O Cable	External I/O	External I/O
3-806-225	5	BNC (M-M) Cable	VNA Ext Analog Out	Test Set Ext Analog In
3-806-225	6	BNC (M-M) Cable	VNA Ext ALC	Test Set Ext ALC Out
GPIB Cable (Not supplied)	7	Cable for programmatic control	IEEE 488.2 GPIB (For remote controlling ME7838)	NA
GPIB Cable (Not supplied)	8	Cable for programmatic control	Dedicated GPIB (For controlling peripherals such as Power Meter)	NA
Ethernet Cable (Not supplied)	9	Cable for programmatic control	Ethernet Port	NA
USB Type B Cable (Not supplied)		Cable for programmatic control	USB Port (2)	NA
–	10	AC Power Cord	AC Power Input	NA
–	11	AC Power Cord	NA	AC Power Input
–	12	Module Interface Cable Length Switch (Included with 3739C-003 Option)		

a. Tighten each cable in this group using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).

2. Installing Rear Panel Cables (MS464xB VNA)

This section focuses on installing cables when using a MS464xB VNA. Start the ME7838D/G assembly by placing the 3739C Broadband Test Set so you can access the rear panel for cable connection.

Warning	To avoid injury, use two or more people to lift the MS464xB VNA to the top of the 3739C Test Set.

Caution	To avoid connector damage or inaccurate measurements, before making any connections, review the *10100-00060-Connector Care Instruction Sheet,* that was shipped with this system. Observe connector torque requirements where indicated in this guide.

At the rear panels connect the cables as shown in Figure 2 and Table 2.

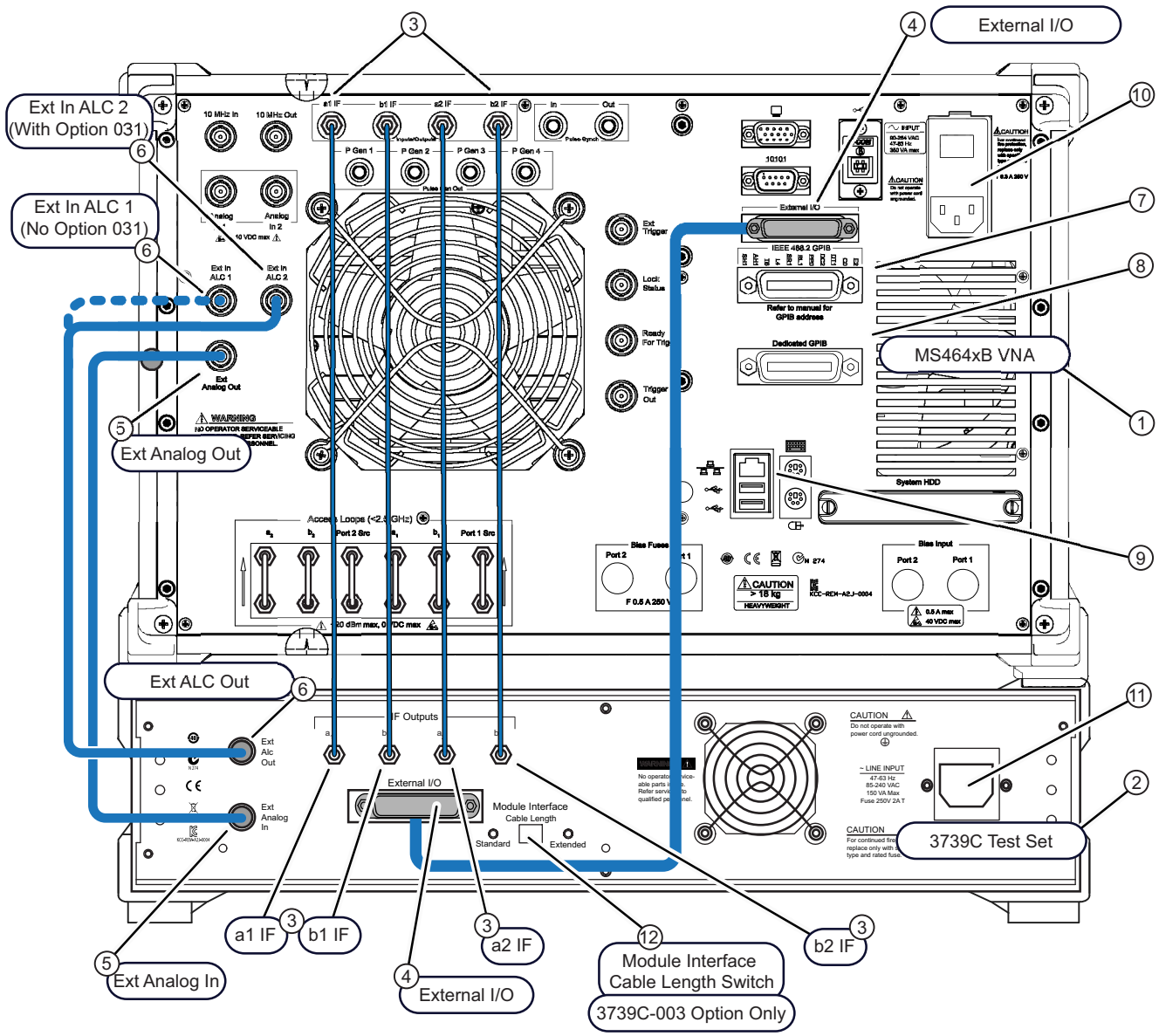


Figure 2. Install Rear Panel Cables between 3739C Test Set and MS464xB VNA

Table 2. ME78383D/G Cable Rear Panel Connections (MS464xB VNA)

Part Number	Index	Description	From VNA Location	To 3739C Test Set Location
MS464xB VNA	1			
3739C Test Set	2			
3-73598-1 [a] (5 cable bundle)	3	IF Interface Cables	a1 IF b1 IF a2 IF b2 IF	a1 IF b1 IF a2 IF b2 IF
	4	External I/O Cable[b]	External I/O	External I/O
3-806-225	5	BNC (M-M) Cable	Ext Analog Out	Test Set Ext Analog In
3-806-225	6	BNC (M-M) Cable	Ext In ALC 1 (without Option 031) Ext In ALC 2 (with Option 031)	Test Set Ext ALC Out
GPIB Cable (Not supplied)	7	Cable for programmatic control	IEEE 488.2 GPIB (for remote controlling ME7838)	NA
GPIB Cable (Not supplied)	8	Cable for programmatic control	Dedicated GPIB (For controlling peripherals such as Power Meter)	NA
Ethernet Cable (Not supplied)	9	Cable for programmatic control	Ethernet Port	NA
USB Type B Cable (Not supplied)		Cable for programmatic control	USB Port (2)	NA
–	10	AC Power Cord[c]	AC Power Input	NA
–	11	AC Power Cord[c]	NA	AC Power Input
–	12	Module Interface Cable Length Switch (Included with 3739C-003 Option)		

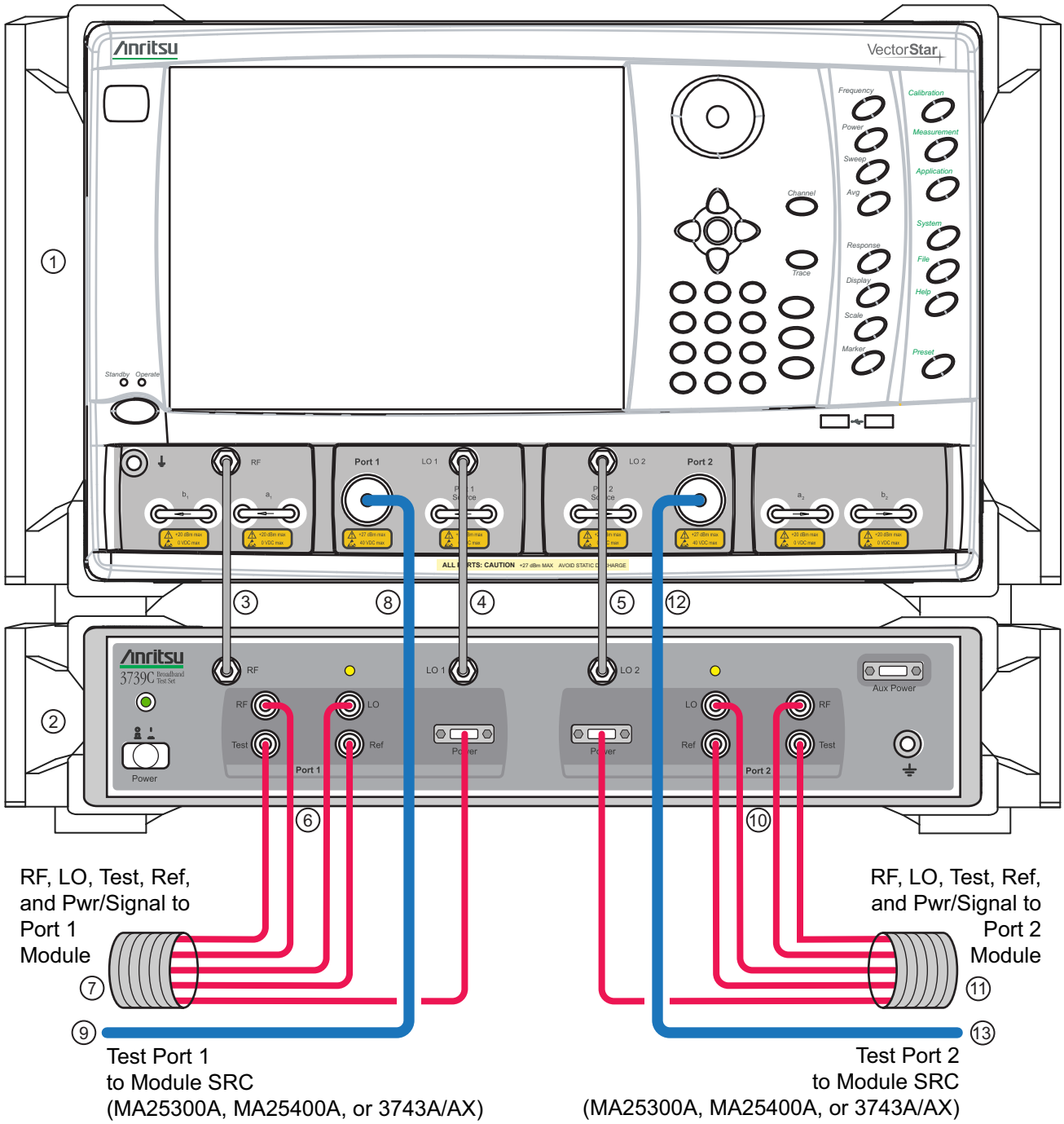
a. Tighten each cable in this group using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).

b. Tighten the connector screws with a flat blade screwdriver.

c. Do not yet connect to AC power cords to the AC source.

3. Installing Front Panel Cables

Connect the front panel cables between the MS464xA/B VNA and the 3739C Test Set, and between the Test Set and the mmWave modules as shown in Figure 3 and as described in Table 3.



Example MS464xA/B VNA equipped with Option 051, 061, or 062 with included Front Panel Loops

Note: The cables for Test Port 1 to Module SRC (key 8 to 9) and Test Port 2 to Module SRC (key 12 to13) are not used with mmWave modules 3744A-EE, 3744A-EW, or 3744A-Rx.

Figure 3. Front Panel Cables between 3739C Test Set, MS464xA/B VNA, and Modules

Table 3. ME78383D/G Cable Interconnect Part Numbers and Locations

Part Number	Index	Description	Connection From	Connection To
MS464xA/B	1	VectorStar VNA	–	–
3739C	2	3739C Broadband Test Set	–	–
3-67357-xx (See Note 1)	3	Semi-Rigid (KM-KM) Cable • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA RF	Test Set RF
3-67357-xx (See Note 1)	4	Semi-Rigid (KM-KM) Cable • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA LO1	Test Set LO1
3-67357-xx (See Note 1)	5	Semi-Rigid (KM-KM) Cable • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA LO2	Test Set LO2
3-75685-1	6-7, 10-11	mmWave Module Interface Cables ***(for MA25300A, MA25400A, 3743A/AX, 3744A-EE, 3744A-EW modules)*** Group of 5 cables for each port	Test Set (Port 1, Port 2) RF, LO, Test, Ref, Power/Signal	Module (Port 1, Port 2) RF, LO, Test, Ref, Power/Signal
3-75685-2		OML Module Interface Cables Group of 4 cables for each port	Test Set (Port 1, Port 2) RF, LO, Test, Ref	Module (Port 1, Port 2) RF, LO, Test IF, Ref IF
		VDI Module Interface Cables Group of 4 cables for each port	Test Set (Port 1, Port 2) RF, LO, Test, Ref	Module (Port 1, Port 2) RF Input, LO Input, Meas. IF, Ref IF
3-75685-3		mmWave Module Interface Cables ***(for 3744A-Rx modules)*** Group of 3 cables	Test Set (Port 1, Port 2) LO, Test, Power/Signal	Module (Port 1, Port 2) LO, Test, Power/Signal
806-xxx-R [a] (See Note 2)	8-9, 12-13	Coaxial Cable ***(MA25300A, MA25400A, or 3743A/AX modules)***	VNA (Port 1, Port 2)	mmWave module (Port 1, Port 2)

Cable Selection Notes

	Cable Selection	Description	
Note 1	3-67357-13	Standard (Non-Rack Mount)	–
	3-67357-67	3739C-001 Rack Mount Option	–

Table 3. ME78383D/G Cable Interconnect Part Numbers and Locations

Part Number	Index	Description	Connection From	Connection To
Note 2	**Cable Selection**		**Description**	
	806-206-R		24 in, 1.85 mm M-F coaxial cable	–
	806-209-R		36 in, 1.85 mm M-F coaxial cable	–
	806-396-R		36 in, 1.85 mm M-F phase stable coaxial cable	–

a. The 806-xxx-R Coaxial Cables are not included or required when using the 3744A-EE, 3744A-EW mmWave modules, or the 3744A-Rx Receiver Module.

4. mmWave Module Connections

Connect the 3739C Broadband Test Set Port-1 and Port-2 cables to the MA25300A, MA25400A, 3743A/AX, 3744A-EE, 3744A-EW, or 3744A-Rx Modules as shown in Figure 4 and Figure 5, observing the correct torque limits for each connector, as specified in Table 4. Route the cable assemblies through the cable restraint.

Note

For ease of connection, the module can be removed from the bracket, then reinstalled after cables are secured. Observe torque instructions where indicated.

Each module (except the 3744A-Rx) is characterized for absolute power for a specific VNA Serial Number and VNA Test Port as designated on the module port assignment label. Ensure the module matches the correct VNA and Test Set port.

If an alternative MA25300A or 3743 series mmWave module is used there will be approximately 1 dB of absolute power inaccuracy, which can be corrected by performing a power calibration.

An alternative MA25400A mmWave module can lead to a 3 dB absolute power accuracy at higher frequencies which can also be corrected by performing a power calibration.

For more detailed information on the modules including DUT Waveguide (WG) connection alignment and custom bracket mounting, refer to *10410-00311-VectorStar® Broadband/Banded mmWave Modules Reference Manual.*

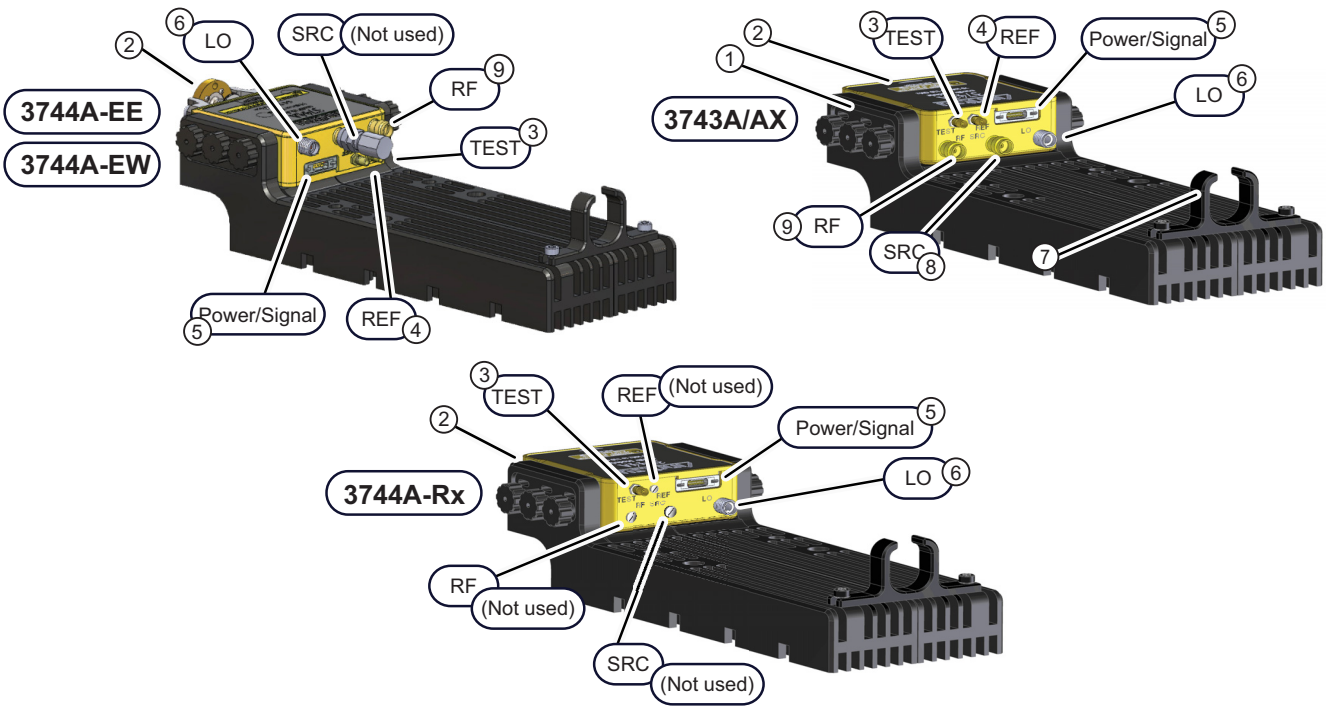


Figure 4. mmWave Module Connections—374x Modules

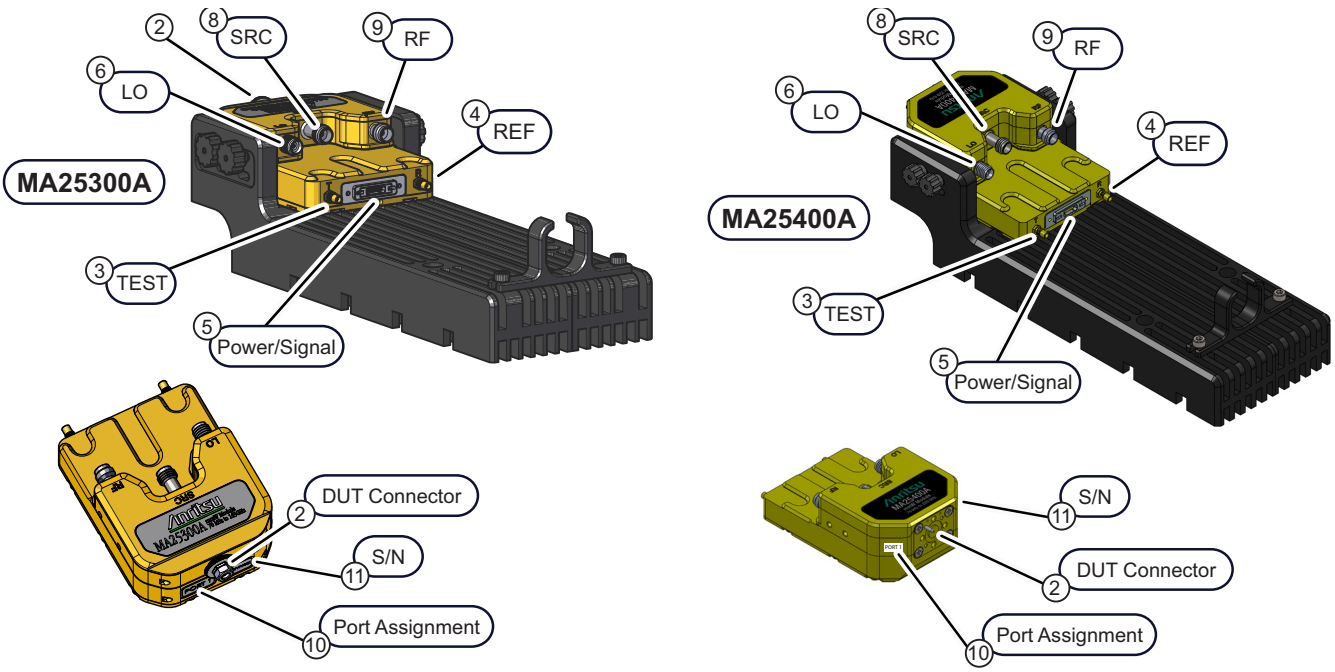


Figure 5. mmWave Module Connections—MA25300A and MA25400A modules

Table 4. mmWave Module Connections (1 of 2)

Cable P/N	Index	Description
N/A	1	mmWave Module in bracket
DUT Connector	2	**0.8 mm Connector (*MA25300A module*)** • Tighten using a torque end wrench and a plain end wrench • 6 mm Torque End Wrench set to 0.45 N·m (4 lbf·in). Recommended is Anritsu 01-524. • 6 mm / 7 mm Open End Wrench. Recommended is Anritsu 01-525. **0.6 mm Flange Connector (*MA25400A module*)** • Tighten using a hex torque wrench set to 6 cN·m (0.5 lbf-in). Recommended is Anritsu 01-530-R. **W1** – 1 mm Connector **(*3743A/AX, 3744A-Rx modules*)** • Tighten using a torque end wrench and a plain end wrench • 6 mm Torque End Wrench set to 0.45 N·m (4 lbf·in). Recommended is Anritsu 01-504. • 6 mm / 7 mm Open End Wrench. Recommended is Anritsu 01-505. **WR-10 or WR-12 to 1 mm connector (*3744A-EE, 3744A-EW modules*)** • Use Waveguide Adapter Toolkits (3-74394-2, 3-74394-3, or 3-74394-4). • Tighten using a torque end wrench and a plain end wrench. • 6 mm Torque End Wrench set to 0.45 N·m (4 lbf·in). Recommended is Anritsu 01-504. • 6 mm / 7 mm Open End Wrench. Recommended is Anritsu 01-505.

Table 4. mmWave Module Connections (2 of 2)

Cable P/N	Index	Description
3-75685-1[a] or 3-75685-3[b,c]	3	**TEST** – SSMC Connector ***(Connected on all Modules)*** • Tighten using a 4 mm (5/32 in) torque end wrench set to less than 0.17 N·m (1.5 lbf·in). • Recommended is Anritsu 01-529-R torque wrench.
	4	**REF –** SSMC Connector ***(Connected on all Modules except 3744A-Rx)*** • Tighten using a 4 mm (5/32 in) torque end wrench set to less than 0.17 N·m (1.5 lbf·in). • Recommended is Anritsu 01-529-R torque wrench.
	5	**Power/Signal** Latching Bi-Lobe™ Connector ***(Connected on all modules)***
	6	**LO** – K Connector ***(Connected on all Modules)*** • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
	7	Module Power and I/O Cable Restraint
806-206-R[d] or 806-209-R[d] or 806-396-R[d]	8	**SRC** – V Connector ***(Connected on MA25300A, MA25400A, and 3743A/AX only)*** • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
3-75685-1[a]	9	**RF –** V Connector ***(Connected on all Modules except 3744A-Rx)*** • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
N/A	10	Factory Calibrated Port Assignment Label
N/A	11	Module Serial Number Label

a. Cable assembly 3-75685-1 is used on MA25300A, MA25400A, 3743A/AX, 3744A-EE, and 3744A-EW modules.

b. The REF cable is not used in the 3-75685-3 cable assembly.

c. Cable assembly 3-75685-3 is used on the 3744A-Rx module.

d. The 806-xxx-R Coaxial Cable is used only with the MA25300A, MA25400A, and 3743A/AX modules.

Inverting a Module

If necessary, a module can be turned over in the bracket to change the height of the DUT connector. To turn the module over:

1. Remove the six Knurled Head Thumbscrews M2 × 8 mm (four M3 x 8 mm on the MA25300A or MA25400A; note that screws with smaller thumbwheels are needed with the MA25400A).
2. Turn the module over.
3. Install the cable assembly then install the module into the bracket.
4. Install the thumbscrews.

mmWave Module Operating Environment

The modules require use of heatsink with adequate air circulation. The following notes should be considered before operating the MA25300A, MA25400A, 3743x, 3744x-xx, and 3744x-Rx mmWave Modules:

- Thermal heat sinking similar to the supplied mounting brackets of the mmWave Module should be considered in custom mounting applications.
- Each MA25300A Module consumes a maximum of 12 watts.
- Each MA25400A Module consumes a maximum of 12 watts.
- Each 3743x Module consumes a maximum of 12 watts.
- Each 3744x-EE and 3744x-EW Module consumes a maximum of 12 watts.
- Each 3744x-Rx Module consumes a maximum of 7 watts.
- The primary heat sinking path for the module is on the two external side surfaces used to mount to the support brackets.
- With the attached cable mounting brackets, the case temperature rise is approximately 15 °C to 20 °C above ambient.

MA25400A Module Installation

Primary use of the MA25400A module is for on-wafer measurements. For typical on-wafer measurements the MA25400A module will be mounted with a dedicated mmWave module bracket on a probe station. Appropriate probes (such as the MPI T220 probe) are connected to the module for on-wafer calibrations and measurements. Refer to the probe manufacturer's operation guide for recommended installation and calibration procedures.

For coaxial measurements a series of adapters are available, such as the 33WG50 W1 (1mm) male to MA25400A interface adapter for measuring 1mm devices (or attachment of 1mm on-wafer probes). 0.8 mm and waveguide adapters are also available. Coaxial/waveguide calibration of the MA25400A module is therefore attainable using the appropriate calibration kit(s) in relevant sub-bands.

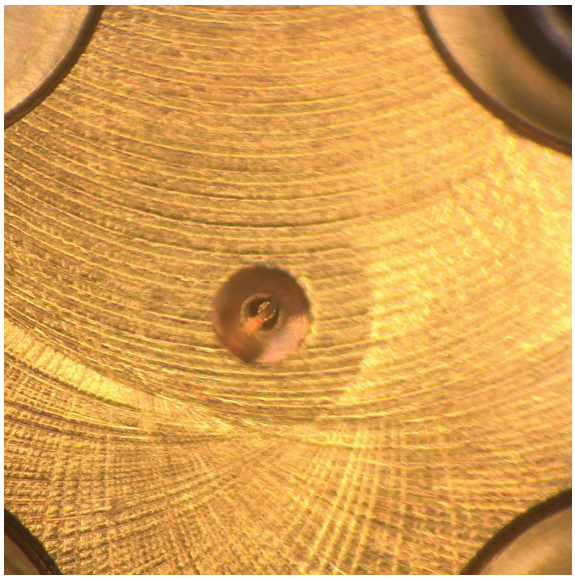
The flange interface is based on a standard UG-387 waveguide flange and one connects to it by first lining up the alignment pins and then mating the flanges.

Standard captive waveguide screws are used with an exposed shank. This is useful since both mating flanges may have threaded holes. Thread the screws all the way into the mating flange (so the shank clears) before mating to the module. This simplifies assembly and avoids cross-threading.

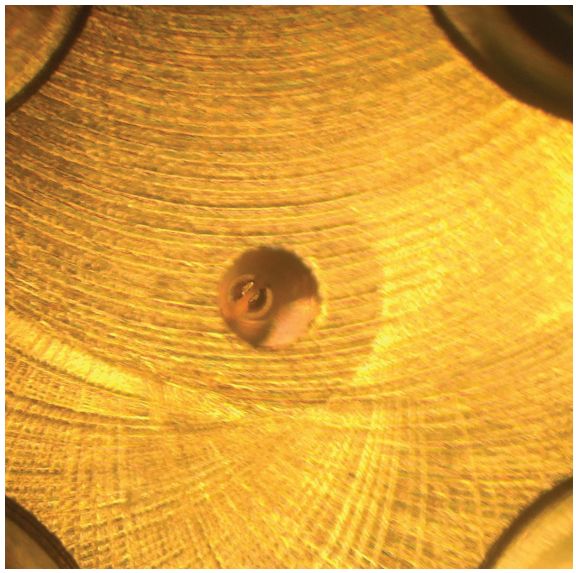
Figure 6. Waveguide Screw Threaded Through the Flange

Use a 6 N-cm torque wrench for these screws (one is in the accessory kit). Tighten in a star pattern (or slowly tighten opposite sides sequentially when using two screws).

Certain mating devices (like the 33GG50 thru and on-wafer probes) have center pins that can move laterally if bumped. Be sure the pins are roughly centered (using the magnifying loupe in the accessory kit or a microscope) before mating.



1. Correctly Centered Pin



2. Incorrectly Centered Pin

Figure 7. Checking Center Pin for Correct Centering

5. OML/VDI Module Connections

Connect the front panel cables between the 3739C Test Set, and the OML or VDI modules as shown in Figure 8, Figure 9, and Figure 10, and as described in Table 5, Table 6, and Table 7.

Caution	To avoid connector damage, observe torque requirements where indicated.

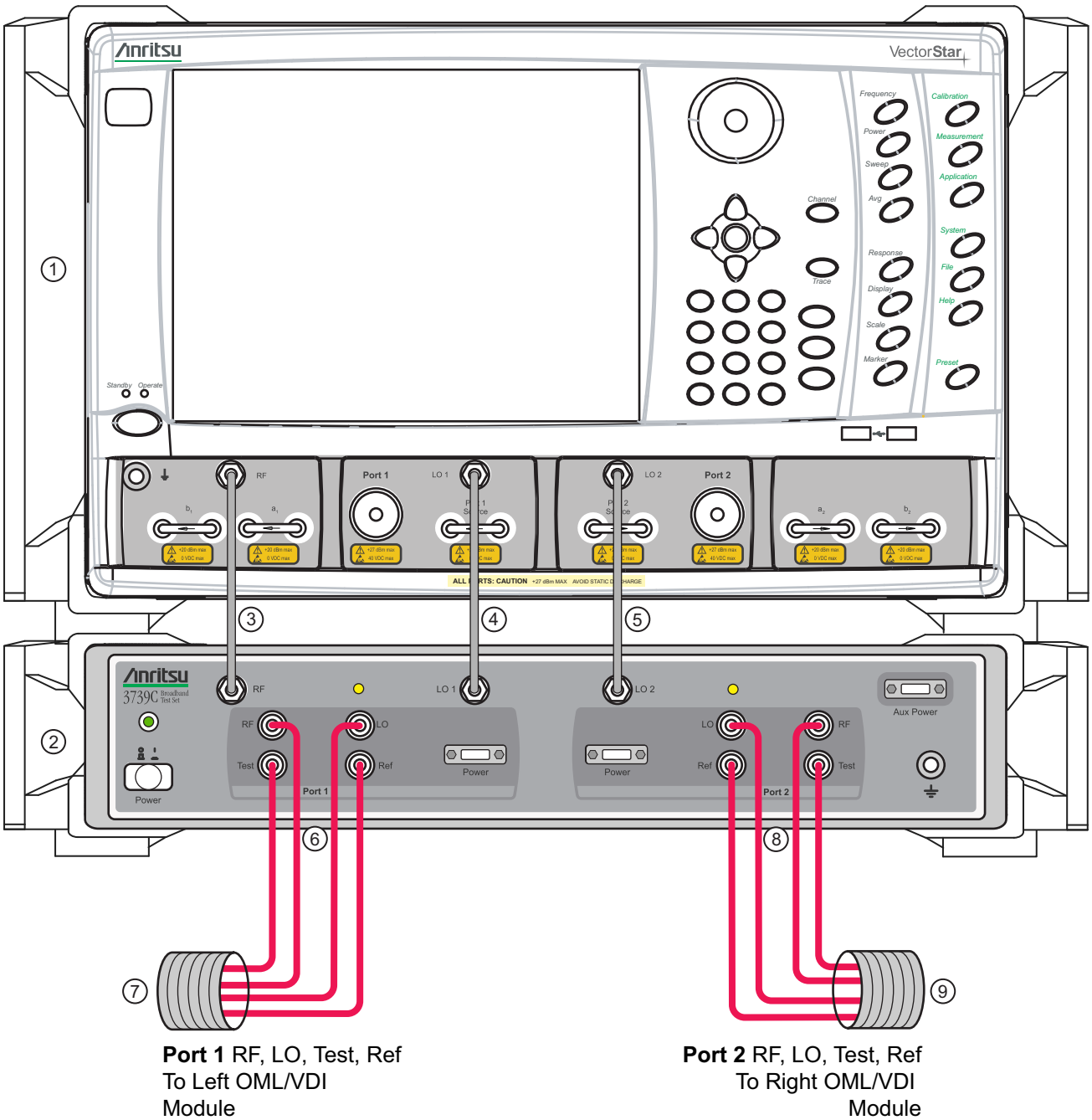


Figure 8. Cable Connections between VNA, 3739C Test Set, and OML or VDI Frequency Extension Modules

Table 5 ME78383D/G Cable Interconnect Part Numbers and Locations

Part Number	Index	Description	Connection From	Connection To
MS464xA/B	1	VectorStar VNA		
3739C	2	3739C Broadband Test Set		
3-67357-xx (See Note 1)	3	Semi-Rigid (KM-KM) Cable • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.	VNA RF	Test Set RF
3-67357-xx (See Note 1)	4	Semi-Rigid (KM-KM) Cable • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.	VNA LO1	Test Set LO1
3-67357-xx (See Note 1)	5	Semi-Rigid (KM-KM) Cable • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.	VNA LO2	Test Set LO2
3-75685-2	6-7, 8-9	OML Module Interface Cables Group of 4 cables for each port	Test Set (Port 1, Port 2) Ref RF LO Test	OML Module (Port 1, Port 2) Ref IF RF Input LO Input Test IF
3-75685-2		VDI Module Interface Cables Group of 4 cables for each port	Test Set (Port 1, Port 2) RF Ref Test LO	VDI Module (Port 1, Port 2) RF Input Ref. IF Meas. IF LO Input
	Cable Selection Notes			
Note 1	**Cable Selection**		**Description**	
	3-67357-13		Standard (Non-Rack Mount)	
	3-67357-67		3739C-001 Rack Mount Option	

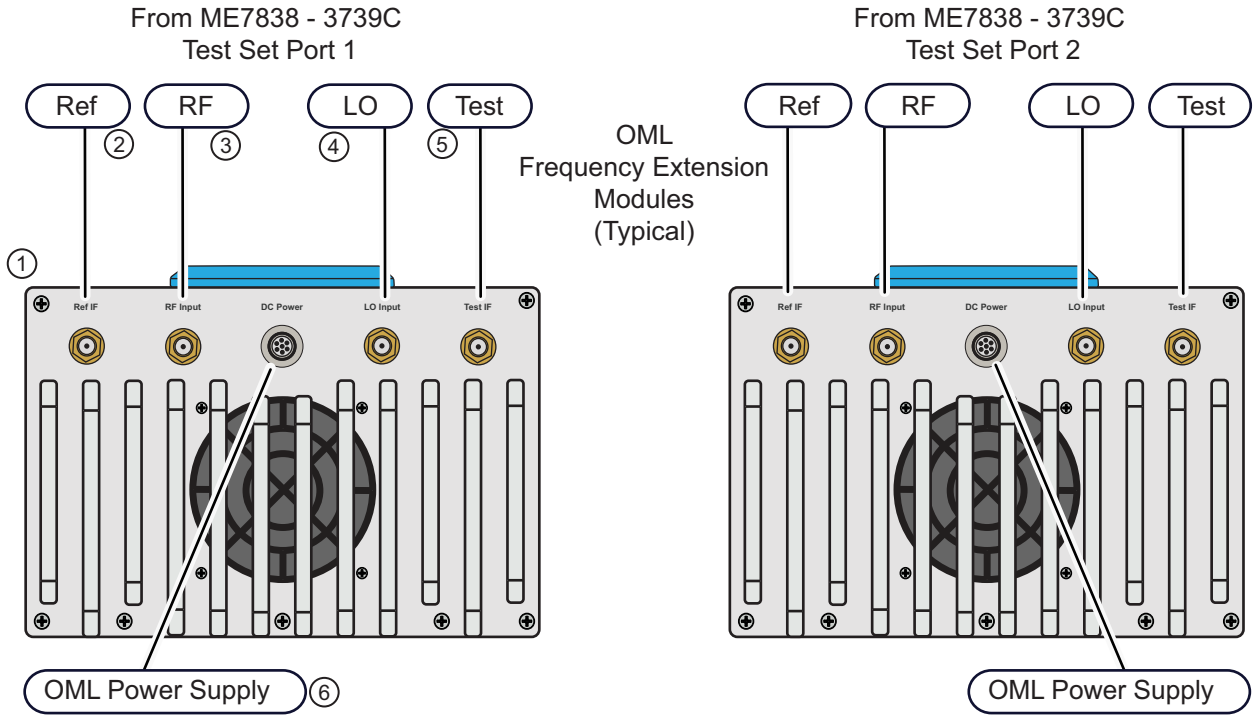


Figure 9. VNA/Test Set Cable Connections to OML Modules

Table 6. OML Module Connections

Cable P/N	Index	Description
N/A	1	OML Module
3-75685-2	2	**Ref IF –** SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
	3	**RF Input –** SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
	4	**LO Input –** SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
	5	**Test IF** – SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
N/A	6	OML Module Power Supply

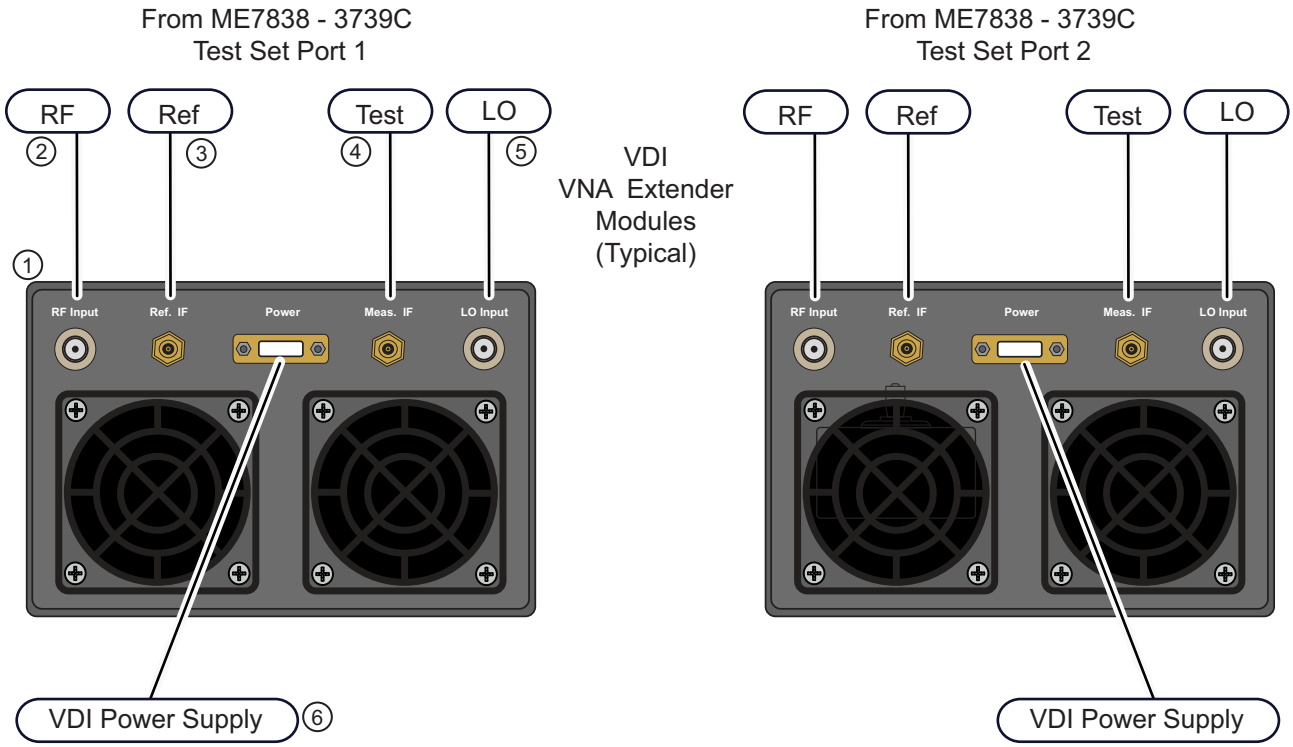


Figure 10. VNA/Test Set Cable Connections to VDI Modules

Table 7. VDI Module Connections

Cable P/N	Index	Description
N/A	1	VDI Module
3-75685-2	2	**RF Input –** K (2.92 mm) Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
	3	**Ref. IF –** SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
	4	**Meas. IF** – SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
	5	**LO Input –** K (2.92 mm) Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
N/A	6[a]	VDI Module Power Supply

a. The VDI module connectors may differ slightly than on the illustration shown above. For example, depending on the model and date built, the power supply connector may be round instead of rectangular.

6. Accessory Kits

All ME7838x systems include a basic accessory kit that has torque wrenches for the IF, 1.85/2.92 and 0.8/1mm connectors among other supplies. The ME7838G system includes an additional accessory kit that contains:

- Two 33WG50 adapters (to allow module use with 1 mm probes and accessories)
- One 33WFWF50 adapter (to facilitate additional 1 mm connections)
- One 33GG50 thru adapter (direct connection of modules with each other)
- Extra flange screws
- Flange screw hex torque wrench
- Eye Loupe, 10X Magnifier

Of particular note is the 33GG50 Thru adapter which has male flange pins on both ends. To support the extreme bandwidth of the device, the thru does not have support beads so, if the pins are knocked accidentally, concentricity can be off. The pins can be re-centered with any small tool and only need to be re-centered within ~ 1/3 of a radius of the outer conductor (the sloped edge of the pin will guide it into the collet). A magnifying loupe is included in the kit to aid in this process.

Anritsu

10410-00732 D

Anritsu utilizes recycled paper and environmentally conscious inks and toner.

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