Optical Power Management and Switching Instrumentation

VERTA enhances capabilities of Defense and Aerospace ATE to test the integrity of optical links and to switch many high-speed, serial digital UUT interfaces to multiple test instruments. VERTA **Optical Power Management** verifies each optical UUT port with inline optical parametric tests. It provides a high-speed, digital switch matrix with concurrent interconnections to optical or copper I/O ports. VERTA ensures reliable, error-free bus communication and interoperability for high-speed, optically networked military weapon assemblies to minimize costly intermittent and No Fault Found test results.



VERTA Overview

A VERTA instrument consists of a central infrastructure of a **Foundation** with **I/O Modules** that interface with ATE instrumentation and the UUT. Multiple foundation models support a large quantity of optical ports in a space-efficient package. Foundations provide switching to interconnect ports of VERTA I/O modules, plus power, cooling, and an LXI interface. The Foundation employs a multi-rate asynchronous crosspoint switch matrix to route electrical signals to optical interface ports. The result is a Physical Layer Switch, with interconnections that are independent of bus protocol and speed, able to connect any port input to any port output.

The **I/O Modules** provide the following: switching to connect UUT ports to bus instruments (one to one), concurrently operating UUT buses (one port to multiple ports), multiple UUTs tested in parallel, and Optical Power Management, consisting of accurate output power control and input measurement.

The basic **Multi-Protocol Switch Module** provides full switching capabilities and I/O provided by standard Small Form-Factor Pluggable (SFP/SFP+) transceivers. I/O is typically optical, but electrical support is also available.

The **Optical Power and Switch Module** provides optical power control and measurement combined with matrix switching. Each input channel measures the optical power and converts light to electrical signals that connect to switching. Each output channel converts electrical signals to an accurate programmable optical transmitter with an inline programmable attenuator and power meter.

The **Wide-Range Power Module** provides an optical-to-optical capability with a 35dB power range for measurement and output control. Typically, the wide-range ports use fiber optic cables to connect to an Optical Power and Switch Module for the full flexibility of VERTA switching control.

Key Features

- *Link Integrity Test* — Fiber-optic link test with protocol transparent bus data switching enables ATE to ensure error-free interoperability of weapon system assemblies
- *Optical Power Management* — Inline parametric validation of each optical link to ensure the UUT will operate within spec on the weapons system bus
- *Concurrent & Parallel Test* — Simultaneous test of multiple UUT ports and multiple UUTs
- *Flexibility* — Configurations for a wide range of optical port counts, independent of bus protocol and speed
- *Comprehensive Support* — Proven technical and logistics support over the program life cycle that avoids expensive obsolescence

VERTA Specification Overview

The VERTA family of instruments include two *Foundations* and three *I/O Module* types that can occupy Foundation slots in any combination.

VERTA Foundation Specifications		
Model Number	Verta-1004	Verta-1007
I/O Module Slots	4	7
Max I/O Ports	64	112
Connectivity	1:1 and 1:Many (Inputs:Outputs)	
Simultaneous Connections	Unlimited	
Rack Mountable	Yes	
Vertical Rack Space	3U	5U
Power Sources	110 VAC, 220 VAC, 210 VDC to 310 VDC	
Communications & Programming	LXI, 10/100/1G Ethernet, IVI-C/IVI.NET drivers for Win7/Win10/Win Server 2016	
Example Low-Level Bus Protocols	Many, such as: 1G/10G Ethernet, Fibre Channel, Serial FPDP, Serial RapidIO, Aurora	
Bit Rate	10 Mb/s to 10.7 Gb/s	
Temperature Range	10°C to 40°C (Operating)	
Relative Humidity	Up to 80% non-condensing	

VERTA Module Specifications			
Model Number	Verta-3010	Verta-3020	Verta-5010
Name	Multi-Protocol Switch Module	Optical Power and Switch Module	Wide-Range Optical Power Module
Ports	16	16	8
I/O Methodology	Standard SFP/SFP+ Transceivers	Custom optical conversion, LC connectors	Optical in, optical out, LC connectors
Channels	1 input channel & 1 output channel per port	1 input channel & 1 output channel per port	1 input channel & 1 output channel per port
Optical Output Power Range	Fixed level, -4.3 dBm min (Note 1)	-9.5 dBm to -1.5 dBm @ 1 Gb/s -4.5 dBm to 0 dBm @ 10 Gb/s	Variable, -30 dBm to -2 dBm
Optical Input Sensitivity	-12.5 dBm @ 1 Gb/s -7.5 dBm @ 10 Gb/s (Note 1)	-18 dBm @ 1 Gb/s -14 dBm @ 10 Gb/s	-35 dBm
Optical Input Range	Fixed (Note 1)	-18 dBm to 0 dBm	-35 dBm to 0 dBm
Center Wavelength	850 nm (Note 1)	850 nm	850 nm
Bit Rate	10 Mb/s to 10.7 Gb/s	1 Gb/s to 10.7 Gb/s	100 Mb/s to 10.7 Gb/s
Connected to VERTA Switch Matrix	Direct	Direct	External optical connection to a VERTA Switching Module

1 Specification is determined by the SFP/SFP+ transceiver, values for default VERTA SFP+ transceiver

Teradyne and the Teradyne logo are trademarks of Teradyne, Inc. All other brand and product names are trademarks or registered trademarks of their respective owners. Information contained in this document is summary in nature and subject to change without notice. © Teradyne 2018. All rights reserved. 8-14-18

TERADYNE