OFR 9800A

Measurement Controller

HIGH SPEED SWITCHING CONTROLLER FOR USE IN AUTOMATED MEASUREMENT SYSTEMS

The 9800A is used for high speed switch control, run-time control, and triggering applications and serves as a master controller for synchronizing and sequencing general-purpose data acquisition. Two independent 16 bit ports are capable of controlling solid state microwave switch modules with TTL inputs as well as slower electro-mechanical switches that typically operate from higher voltages. A differential output mode is also available for compatibility with switch control units and other differential devices. Multiple devices can be synchronized via 4 independent sync I/O lines.

Applications

- Multi-channel Antenna and RCS measurements
- T/R module testing
- Polarization switching, band switching
- Mode switching (AUT transmit or receive mode)
- Beam Steering
- Array calibration
- Multi-Probe Array (MPA) measurement systems
- Bench-Top Measurements

Product Highlights

- High-speed switch controller providing 32-bits of output control
- Built in DC power supply
- 2 independent pilot ports: standard TTL, differential output, or electro-mechanical switches (can sink up to 1 A on a single bit)
- LAN communications w/ high-level command language (HLCL)
- Support for third-party application development (API and COM)
- Multiple 9800A devices can be synchronized via 4 independent sync I/O lines
- Arbitrary switching loop control (inside/outside frequency switching) when using 959 Spectrum software in conjunction with Keysight or *Rhode and Schwarz VNAs and Keysight sources (PSG/MXG)
- Software control of external devices with TCP/IP packet transmission suitable replacement

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The 9800A orchestrates data acquisition of high speed, multiple channel measurements by providing sequencing control for the various switch states throughout a system. The 9800A is designed to be configured and controlled by software running on a remote PC using TCP/IP over LAN. Communications using a high-level command language (HLCL) enables MVG-ORBIT/FR 959 Spectrum Antenna/RCS measurement software, or third-party users, to code, load, and run their commands on the 9800 unit(s). The 959 Spectrum software interface allows user-defined switching inside and/or outside the frequency loop. Commands can be executed immediately or from stored memory to allow orchestration of measurements.

Electrical Characteristics	Value	Condition
TTL Switch Outputs		
These are 5 Volts TTL outputs with the following characteristics.		
High Output Voltage (MIN)	3.0 Volts 2.0 Volts	Iout = -3 mA Iout = -32 mA
Low Output Voltage (MAX)	0.55 Volts	Iout = 64 mA
TTL Sync Outputs		
High Output Voltage (MIN)	3.0 Volts 2.0 Volts	Iout = -6 mA Iout = -64 mA
Low Output Voltage (MAX)	0.55 Volts	Iout = 128 mA
TTL Sync AND Outputs		
High Output Voltage (MIN)	3.0 Volts 2.0 Volts	Iout = -7 Iout = -10 mA
Low Output Voltage (MAX)	0.55 Volts	Iout = 6 mA
Electromechanical Switch Outputs		
Off State Leakage Current (MAX)	0.20 µA	Vout = 48 Volts
Low Output Voltage (MAX)	0.35 Volts	Iout = 1 Amp.

Support for the device is built into the 959 Spectrum software such that synchronization of receiver, source(s), switch(es), and data sampling occur in near real-time. Switch-states control program is downloaded to the device prior to an acquisition and then executed with a trigger signal. Handshaking between RF equipment (such as a VNAs, signal sources, and between various DUT and/or RF Subsystem states) is controlled by the master 9800A via sync I/O lines. Open-loop dwell settings can also be used.

Typical Switching Times

TTL Sync AND Outputs

The switching time will vary based on many factors including external equipment response time. These times are average switching times based on a 40 MHz clock and 10 loops running through 200 switch states that are comprised of 8-bit, 16-bit, or 32-bit commands.

Number of bits controlled —Y Operation	8-bit	16-bit	32-bit
Set State	0.9 µs	1.1 µs	1.5 µs
959 Operation (No sync in/out)	4.4 µs	4.5 µs	4.9 µs
959 Operation (with sync in/out)	6.4 µs	6.6 µs	7.0 µs

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