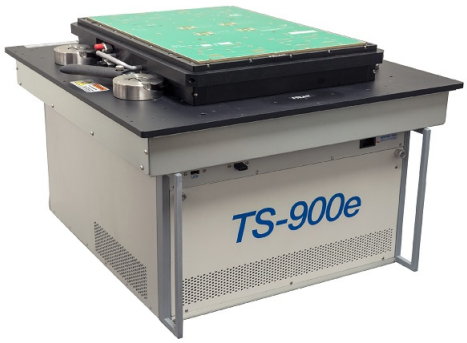
TS-900e-5G SERIES

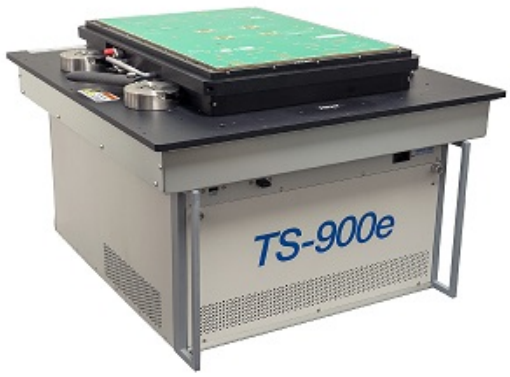
MMWAVE / 5G PXIE PRODUCTION TEST SYSTEMS

- mmWave Device Production Test and Characterization
- DC, Parametric and RF Test Capabilities
- PXIe and LXI RF Instrument Options
- Supports Up to 24 RF Ports for Multi-site Testing
- 50 GHz Signal Delivery to the Device Under Test
- Compatible Receiver for Wafer Probers and Device Handlers
- Comprehensive ICEasy Semiconductor Test Suite
- Intuitive ATEasy® - Integrated Test Executive / Development Environment



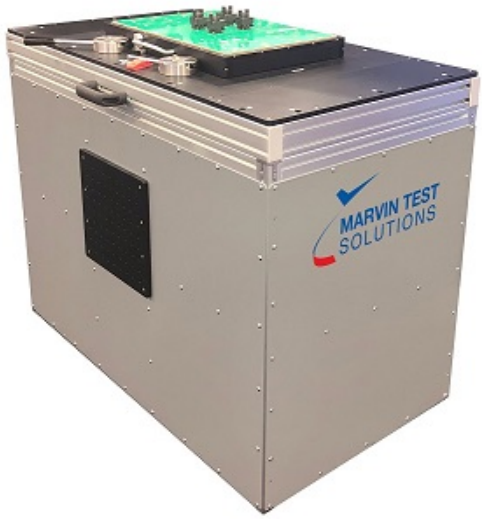
DESCRIPTION

The TS-900e-5G mmWave test systems deliver proven performance up to 50 GHz. Two system configurations are available. The TS-900e-5G incorporates laboratory grade PXIe RF instrumentation with a high performance receiver interface for packaged or wafer test / characterization of mmWave devices and the TS-900eX-5G provides users the option to configure the system with LXI or PXIe RF instrumentation. In addition, MTS offers a full suite of digital and parametric test capabilities as well as SPI/I2C interface support for controlling / monitoring the device under test (DUT). Both systems offer a total of 20 PXI / PXIe peripheral slots which can accommodate additional digital and analog test resources.



TS-900e-5G Test System

The TS-900e-5G's compact footprint is the ideal test solution for semiconductor OEMs, device verification, incoming inspection, wafer probing and packaging / test vendors needing a cost-effective, configurable mmWave test system. For multi-site test applications requiring expanded port and instrumentation needs, the TS-900eX-5G offers an expanded RF port count and the option to incorporate both PXI and LXI instrumentation.



TS900eX-5G Test System

Both systems are compatible with prober and automated device handlers and utilize the same receiver interface, providing device interface board (DIB) compatibility between the two systems. The receiver interface is compatible with the Opus 3 and TEL probe stations as well as the Seiko Epson E8040 & E8080 device handlers. The TS-900e-5G is available with the Reid-Ashman OM-1069 manipulator and the TS-900eX-5G system is available with an inTest manipulator.

The systems include a PXIe chassis with 64 dynamic digital I/O channels, 64 static digital I/O channels, a user programmable power supply, a system self-test and fixture. Additional PXIe slots are available for adding RF instrumentation, more digital and analog test resources as needed.

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MARVIN TEST SOLUTIONS

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TS-900e-5G SERIES

System software includes DIOEasy for digital waveform editing / display, ICEasy for device test development, and Marvin Test Solutions' ATEasy which provides an integrated and complete test executive and test development environment, allowing users to quickly develop and easily maintain test applications.

FEATURES

Both systems can be configured with up to 256 dynamic digital channels. The digital subsystem uses the GX5295 - a 3U PXI, 32 channel, 100 MHz digital I/O card with per channel parametric measurement units (PMUs). A wide range of digital and analog instrument options can easily be incorporated into the TS-900e-5G systems for supporting both functional and DC parametric test capabilities. RF instrumentation options include the Keysight M9807 / M9808 PXIe VNA or the Rohde and Schwarz ZNBT40 LXI instruments.

TS-900E-5G SERIES CORE SYSTEM CONFIGURATION

The core system components include the following test resources and capabilities:

- ICEasy test software development tools
- ATEasy test executive and programming environment
- GX3104 SMU with 4 channels each (expandable to 16)
- DIOEasy digital waveform editing and display tools
- Embedded i7, quad core controller with Windows®10 OS
- (64) 100 MHz digital channels with per pin PMU (expandable to 256)
- (64) static digital channels (expandable to 128), which can be used for fixture ID, UUT static control or DUT board relay control
- 21-slot, high-power PXI Express chassis
- Pogo pin, blind-mate receiver interface with 24, 50 GHz RF ports (TS-900eX-5G)
- Pogo pin, blind-mate receiver interface with 20, 50 GHz RF ports (TS-900e-5G)

The systems are also available with digital vector conversion tools that support ASCII, WGL, STIL, VCD, eVCD and ATP vector formats (DIOEasy-FIT).

SOFTWARE

The test systems are supplied with ATEasy - Test development and executive software. It comes with a pre-configuired software that includes instrument drivers, virtual instrument panels, a system self-test and ICEasy test software tools which facilitates device test development and characterization.

APPLICATIONS

- mmWave packaged and wafer device test / characterization
- Pilot production and focused production test
- Automated failure analysis and test

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TS-900e-5G SERIES

SPECIFICATIONS

MMWAVE TESTS	
Tx / Rx Tests	S-Parameter Measurement (Insertion / Return Loss) S12, S21, S11, S22
TS-900E-5G SERIES PXIE CHASSIS	
Number of Slots	1 controller, 8 PXI-1, 8 Hybrid, 4 PXIe
System CPU (Embedded)	Intel Core i7, 2.4 GHz, single slot controller 4x4 PCIe bus configuration 8 GB of RAM
System Hard Disk	320 GB (min)
Cooling	(4) 100 CFM fans for system cooling. Integrated temperature monitoring via an on-board microcontroller with audible and software notification when preset temperature limits are exceeded. Fan speed control and monitoring is automatic and can be controlled / monitored via the GxChassis software.
PXI Clock	Integrated 10 MHz PXI clock with auto-detect function. Presence of an external 10 MHz PXI clock will disable the internal clock. PXI clock is distributed to all peripheral slots. Optional external clock via slot 2
Temperature Monitoring	Per slot monitoring, 1 reading/sec/slot 4 second moving average value User selectable alarm criteria: • Maximum slot temperature • Average slot temperature Accuracy: ± 2 °C Default warning and shutdown limits: +50 °C & +70 °C Warning and shutdown limits programmable via software driver Status: Query via software driver and audible alarm for a warning limit condition
Power Supply Monitoring	Monitored voltages: 3.3, 5, +12, -12, VIO value Accuracy: ± 2% of reading
PXI Triggers	Slots: 2 – 21 Number: 8 per segment Software controlled segment mapping supports: • Isolate a trigger line within a segment • Map a trigger line left to right • Map a trigger line right to left
PXI Clock and Synch Resources	Integrated 10 and 100 MHz clock with an auto-detect function. Presence of an external 10 MHz PXI clock will synchronize the 100 MHz clock to the external 10 MHz source 100 MHz clock accuracy: ± 30 ppm Synchronization signals: SYNC100 & SYNC_CTRL
External 10 MHz Clock Input	An external 10 MHz clock source (TTL level) can be provided via a rear panel BNC or via a PXI Express System Timing Controller
10 MHz Clock Output	10 MHz output is available via a rear panel BNC connector, TTL compatible level
PXIe System Power	1600 W
PXIe Chassis Input AC Power	120 VAC, ±15%; 20 A max (PFC) 240 VAC, ±10%; 10 A max (PFC) 47 Hz to 440 Hz
DYNAMIC DIGITAL I/O SUBSYSTEM	
Number of Digital I/O and PMU Channels	64 (base configuration)
Maximum Channel Configuration	256 channels
Maximum Clock Rate	100 MHz
Digital Test Modes	Stimulus / response Real-time compare
Vector Memory	64 Mb / channel
Real Time Compare Record Memory	1,024 (records data and program steps)
Drive Voltage Range	-2 V to +7 V, Drive Hi & Drive Lo, maximum swing is 8 V
Sense Voltage Range	-2 V to +7 V, Sense Hi & Sense Lo
Programmable Pull-Up / Pull-Down Current Source / Sink	±24 mA, programmable on a per channel basis, V commutate range: -2 V to +7 V, programmable on a per channel basis
High and Low Commutation Voltage Range	VCLo: -2 V to +5 V VCHi: 0 V to +7 V
Voltage Clamp Accuracy	±100 mV

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Parametric Measurement (PMU)	
Number of Parametric Measurement Units	32, one per channel 4, one per auxiliary channel (for timing /control & static I/O functions)
Configurations	Force Voltage/Measure Current (FVMI) Force Current/Measure Voltage (FIMV) Force Voltage/Measure Voltage (FVMV) Force Current/Measure Current (FIMI)
Force Voltage Range	-1.5 V to +7 V
Force Voltage Accuracy	±20 mV
Force Voltage Resolution	16 bits
Force Current Ranges	±32 mA, ±8 mA, ±2 mA, ±512 uA, ±128 uA, ±32 uA, ±8 uA, ±2 uA FS
Force Current Accuracy: Compliance Range: +1.75 V to +7 V @ 32 mA -1.5 V to +7 V @ no load	±120 uA, 32 mA range ±40 uA, 8 mA range ±5 uA, 2 mA range ±1.2 uA, 512 uA range ±600 nA, 128 uA range ±160 nA, 32 uA range ±80 nA, 8 uA range ±20 nA, 2 uA range
Current Measurement Accuracy (60 Measurements / Sec) Compliance Range: +1.75 V to +7 V @ 32 mA -1.5 V to +7 V @ no load	±120 uA, 32 mA range ±40 uA, 8 mA range ±5 uA, 2 mA range ±1.2 uA, 512 uA range ±600 nA, 128 uA range ±160 nA, 32 uA range ±80 nA, 8 uA range ±20 nA, 2 uA range
Measure Voltage Range	-2 V to +7 V
Measure Voltage Accuracy	±1 mV (measurement rate < 200 measurements / sec)
STATIC DIGITAL INSTRUMENT	
Number of Static Digital I/O Channels	64, expandable to 128 48 Input / Output (programmable I/O in groups of eight) 16 inputs for fixture ID
Logic Levels	LVTTL compatible
Source / Sink Current	24 mA (max)

USER POWER	
Source / Measure Unit (SMU)	4-channel, 4 quadrant operation, isolated outputs, common ground, with remote sense
Programmable Voltage Range	0 to ±20 V
Output Voltage Accuracy	±0.05% of programmed value + 2 mV
Output Noise	<20 mV p-p, 20 MHz BW, full load
Output Current	±2.5 uA to ±250 mA in decade ranges, any one channel can supply up to 1A
Output Current Accuracy	±0.05% of programmed value + 0.05% of FS
Voltage Measurement Accuracy	±0.03% of programmed value + 2 mV
Current Measurement Accuracy	Ranges: 2.5 uA to 250 mA in decades Accuracy: ±0.05% of reading + 0.05% of FS range
Measurement Resolution	Programmable, 18 to 24 bits
TS-900E-5G RF VECTOR NETWORK ANALYZER OPTIONS	
Keysight Technologies	M9807, 2 port VNA, 40 GHz, PXIe M9808A, 2 port VNA, 53 GHz, PXIe
TS-900EX-5G RF VECTOR NETWORK ANALYZER OPTIONS	
Rohde and Schwarz	ZNBT40, 24 port, 40 GHz, LXI
Keysight Technologies	M9807, 2 port, 40 GHz, PXIe M9808A, 2 port, 53 GHz, PXIe
TS-900EX-5G SEREIS RECEIVER INTERFACE	
Type	Modular, pogo-pin and blind-mate RF interface
Interfaces	• (4) 128 pin digital blocks • (2) power blocks (8 DPS) • 20 blind mate RF ports (TS-960e-5G) • 24 blind mate RF ports (TS-960eX-5G) (Weinschel Planar Blind-Mate, 2.92mm (SMK))

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ENVIRONMENTAL / PHYSICAL	
Operating Temperature	0 °C to +50 °C
Storage Temperature	-20 °C to +60 °C
Relative Humidity (Non-Condensing)	90%
Altitude	30,000 ft
TS-900e-5G Weight	125 lbs, core system
TS-900eX-5G Weight	250 lbs, core system
TS-900e-5G Overall Size	24" D x 22" W x 17" H
TS-900eX-5G Overall Size	24" D x 39" W x 35" H
Manipulator Options	TS-900e-5G: Reid-Ashman OM-1069 TS-900eX-5G: inTest 930591 FTM-MVT5900E-5G

Note: Specifications are subject to change without notice

ORDERING INFORMATION

TS-900e-5G	mmWave / 5G PXIe Production Test System
TS-900eX-5G	mmWave / 5G PXIe / LXI Production Test System
OPTION	
TS-900-OPT64	64 Additional Dynamic Channels for use in TS-900

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