

TuffServ® 640 Ten Gigabit Recorder / Server



The TuffServ® 640 Recorder / Server (TS 640) Delivers One Gigabyte of Usable Payload Every Second, for hours on end.

Designed with a scalable architecture, the recorder / reproducer supports a range of applications, from vehicle and weapons testing to intelligence gathering.

Designed for Speed

Uncompromising performance, unmatched expandability: the TuffServ 640 delivers well over 1000 Megabytes per second of write throughput for hours, with read performance that saturates a 10 gigabit Ethernet link. That's the performance delivered over NFS, *after* all the network and protocol overhead is accommodated.

Designed for Capacity

Writing data at over 1000MB/s requires huge amounts of storage: nearly 4 terabytes per hour, every hour. The TS 640 has a high capacity Removable Storage Array (RSA-2) that comfortably supports up to 32TB of storage now, with an option for 80TB. Each RSA-2 contains two storage controllers and up to 16 solid-state devices; 256 bit AES encryption is available on request.



Features

- **More than 1000MB/s read or write throughput**
- **Storage of 4 to 32TB and up**
- **Dual 10GigE Optical Interfaces**
- **Multiple Expansion sites for additional I/O**
- **Standards Based: VPX, XMC and commodity SSDs**
- **Maximum Capacity in excess of 80TB**
- **Internal Architecture provides 8GB/s bandwidth throughput**
- **Built for Rugged, MIL-STD-810 environments with MIL-STD power and MIL-STD connectors**

Designed For Use

The TS 640 is a truly open system, running mainstream COTS software, including the Ampex TuffServ recording application; it can also capture raw 10 gigabit Ethernet at line rate. This architecture delivers a solution that is accessible to third-party developers, so that application-specific software can be added to the system by integrators and/or end users.

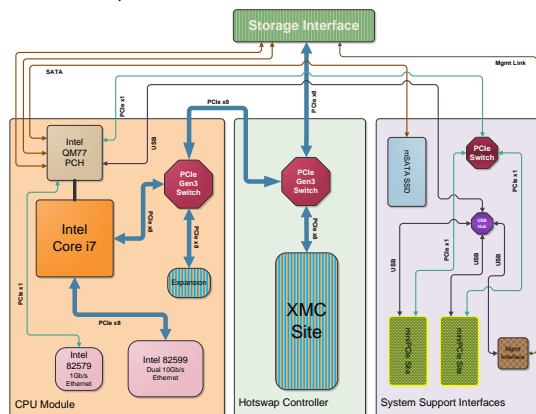
Information assurance and cyber threat prevention strategies are available on the TuffServ platform, facilitating its acceptance in critical or sensitive environments.

Designed For Growth

Everything in the TS 640 has been designed to provide a flexible platform for current and future requirements. The interface between the system components including the RSA-2 storage module runs at a massive 8000MB/s, so as the storage price/performance curve shifts, so can the TS 640's. XMC and two miniPCIe sites provide opportunities to expand and adapt the platform for new or unique requirements, as well as provide options such as MIL-STD-1553 control and GPS time synchronization.

Designed For Control

In addition to the dual standard 10 gigabit/s optical Ethernet interfaces, the TS 640 offers a standard gigabit Ethernet connection for lower bandwidth tasks, and a 100Base-T Ethernet for control and monitoring. Serial ports are also available, as are GPIO signals for embedded applications, such as unmanned vehicles and pods.



TuffServ 640 Block Diagram

Specifications¹

System

CPU Subsystem:	Intel Core i7, 3rd Generation (Ivy Bridge), dual core, 4MB Smart Cache 4GB Dual Channel DDR3 at 1333MHz (PC3-10600), with ECC. 8GB and 16GB variants also available ² Dedicated flash boot device and separate logging device
Network Interfaces:	Two 10GBase-SR 10 gigabit Ethernet and one 1000Base-T Gigabit Ethernet One 10/100Base-T interface for control and status
I/O Expansion:	XMC site for PCI Express-based expansion modules
Other Interfaces:	Serial port (RS-232/RS-422) Discrete signals for power on, erase and application specific functionality Two mini card slots for additional I/O such as MIL-STD-1553, IRIG-B and GPS ³ Service ports (USB and mini-DisplayPort) for diagnostics and maintenance
Removable Storage:	Array of up to 16 solid state drives on 16 dedicated SATA links AES "data at rest" protection feature
Network Protocols:	NFSv4, NFSv3, CIFS/SMB, PCAP, FTP, TCP, UDP, IP
Operating system:	Red Hat Linux

Performance

Internal Data Rate:	1900 MByte/sec (sustained)
Payload Data Rate:	1250 Mbyte/sec (line rate packet capture, "Pcap"), or 1050 MByte/sec (sustained NFS read or write)
Storage Capacity:	32.0 TB (with sixteen 2TB solid state drive modules) or 80.0 TB (with ten 8TB modules)

Power

Power:	28VDC per MIL-STD-704F, 125W
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Mechanical

Dimensions:	7.63" H x 4.88" W x 12.63" D (194mm x 124mm x 321mm)
Mounting:	Vertical ½ ATR Mount or Horizontal/Side Mount
Weight (System):	30lbs (13.6 kg)

Environmental

Temperature:	Operating:	-40° C to +60° C (Vertical Mount on Conduction Cooled Surface) -40° C to +71° C (Horizontal Mount on Conduction Cooled Surface)
	Non-operating:	-50° C to +85° C
Humidity:	0% to 100% RH	
Vibration & Shock:	10 grms, 20 g (half sine, 11ms) – operational.	
EMI Compatibility:	MIL-STD-461F	

The TuffServ 640 Family

The TS 640 is not just a product: it's a product family. There is a complete range of systems tailored to meet different applications and requirements:

- **TuffServ 640:** The flagship airborne recorder, offering dual 10 gigabit/second Ethernet interfaces over optical fiber. A compact, "½ ATR" (4MCU) airborne package.
- **TuffServ 640 options:** additional 10 gig E interfaces, MIL-STD-1553 interfaces, GPS, additional gigabit Ethernet interfaces.
- **TuffServ 640FP:** A Serial Front Panel Data Port (sFPDP, VITA 17.1) recorder, based on the TS 640 with the addition of 2 or 4 interfaces running at up to 2.5 Gbaud each. Contact Ampex for other sFPDP variations (e.g. 4.25 Gbaud)
- **TuffServ 641:** A download station for ingesting data into a ground-based data center. Configured as a 19 inch, 3U rack-mount system, a 40 gigabit/sec Ethernet links the TS 641 unit with processing and data archiving systems, creating a clean separation between the data collection and data processing parts of a mission. Accepts the RSA-2 storage module.
- **Tuffserv 645:** A rack-mounted, lab version of the TS 640, it is a 3U high, 19in rack package like the TS 641, but using the same board design as used by the airborne TS 640 (including the RSA-2), making it an ideal lab support and/or development system.
- **TuffServ 645FP:** The sFPDP version of the TS 640FP, perfect for developing systems that will transfer to an airborne configuration.

¹ Specifications subject to change without notice

² Custom options can be requested through Ampex Contracts Department

³ Contact Ampex for option availability