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Talon RTR 2757

100 Gigabit Ethernet
rugged rackmount recorder

Captures data from Quartz® RFSoC products' 100 Gigabit Ethernet ports

- Real-time record rates up to 12.5 GB/s (100 Gigabits/s)
- Front-panel removable solid state storage up to 122 TB
- Records up to 4 A/D channels from Quartz RFSoC
- SystemFlow software GUI with Signal Viewer analysis tool

The Talon RTR 2757 is a turnkey system for recording 100 Gigabit Ethernet UDP streams from Mercury's Quartz® RFSoC products.
Mercury's Quartz products provide 100 Gigabit Ethernet interfaces to stream data from up to eight high-speed A/D converters. The RTR 2757 is designed to capture digitized data from four of these streams in real time at the full 100 Gigabit per second rate. With up to 122 TB of removable solid state storage, the RTR 2757 provides hours of multi-channel wideband signal recording.

Mercury's Quartz RFSoC products provide two 100 Gigabit Ethernet interfaces via MPO optical connections. The Quartz FPGA IP routes four A/D channels to each optical interface. The RTR 2757 provides a single 100 Gigabit Ethernet interface, allowing the user to capture digitized signals from up to four RFSoC A/Ds.

The RTR 2757 provides an interface that matches the Quartz Ethernet UDP protocol and can accept up to four independent UDP data streams. This allows users to stream four A/D channels independently over 100 Gigabit Ethernet and capture them as independent files on the recorder. The recorder captures only the payload, providing data files similar to other Talon recorders. This allows the suite of SystemFlow software tools to be used for signal analysis prior to, during, and after a recording session.

Innovation That Matters®

FEATURES

- Designed for data capture from Mercury Quartz® RFSoC products' 100 Gigabit Ethernet ports

- Single QSFP28 port with MPO transceiver

- Real-time record rates up to 12.5 GB/s (100 Gigabits/s)

- Front-panel removable solid state storage up to 122 TB

- Dual Intel Xeon® Gold processors with up to 4 TB of DDR4 SDRAM

- 4U 19-inch industrial grade server chassis

- Supports up to four independent UDP streams

- SystemFlow software GUI with Signal Viewer analysis tool

- C-callable API for integration

RUGGED AND FLEXIBLE ARCHITECTURE

The RTR 2757 comes in an industrial grade 19-inch 4U rackmountable chassis. It uses high-performance NVMe (Non-Volatile Memory Express) U.2 drives in a RAID 0 configuration to provide extremely high-speed real-time recording. Drives are front-panel removable via eight individual drive trays. The independent operating system drive is also removable via the front panel. Multiple RTR 2757 systems can be combined to provide a scalable high-channel-count system. SystemFlow software provides the ability to control multiple systems from a single user interface. This architecture provides scalable storage as channel counts increase.

The RTR 2757 includes options for GPS time and position stamping, IRIG-B time stamping, and high-speed offload interfaces such as 10, 40, or 100 Gigabit Ethernet. The system is built using a dual Intel Xeon server-class motherboard, includes two Xeon Gold processors, and includes up to 4 TB of DDR4 RAM. The standard configuration includes USB 3.0 ports, Gigabit Ethernet for network communication, and a VGA port for display.

The Talon RTR 2757's single 100 Gigabit Ethernet port can receive up to four UDP streams (four independent UDP socket IDs). Each stream is sent to disk via a dedicated DMA channel. Each UDP stream is written to its own file in the standard Mercury data format on the NTFS file system.

The RTR 2757 provides channelized file recording of the UDP payload. The payload can include VITA49 packet headers if they are enabled on the Quartz RFSoC product.
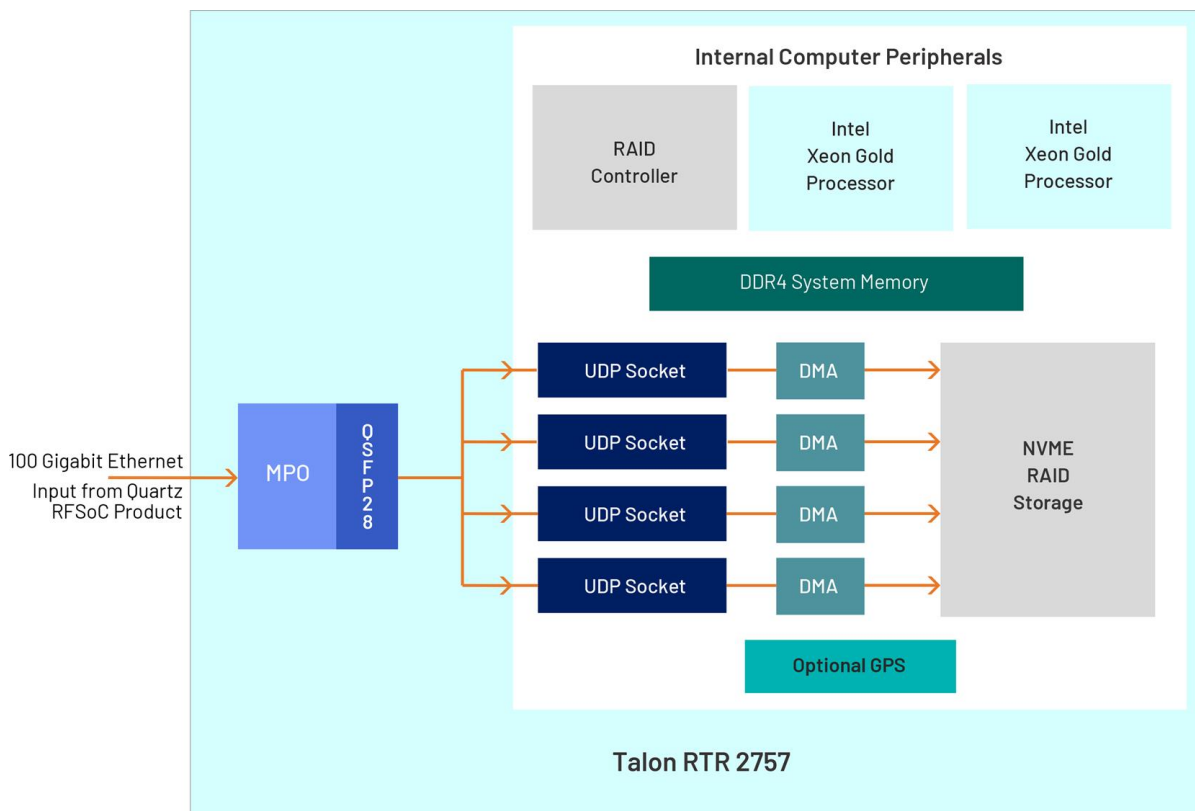

Talon RTR 2757

CAPTURING DATA FROM QUARTZ (RFSOC) PRODUCTS

The RTR 2757 works with any 100 GigE-enabled Quartz product. Each example below shows a complete recording solution using the Quartz Model 6350 Small Form Factor rugged version and Talon RTR 2757 recorders.

4 A/D channels on one optical port
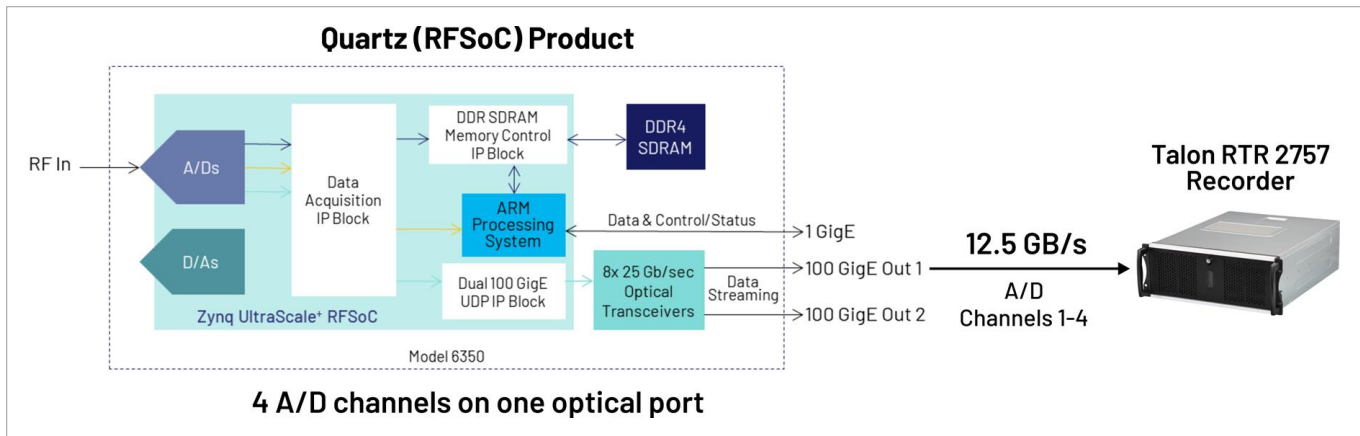
- One 100 Gigabit Ethernet port has a maximum 12.5 GB/s streaming rate.
- One Model 2757 can capture real-time UDP streams at 12.5 GB/s using one QSFP28 optical port.

8 A/D channels on two optical ports
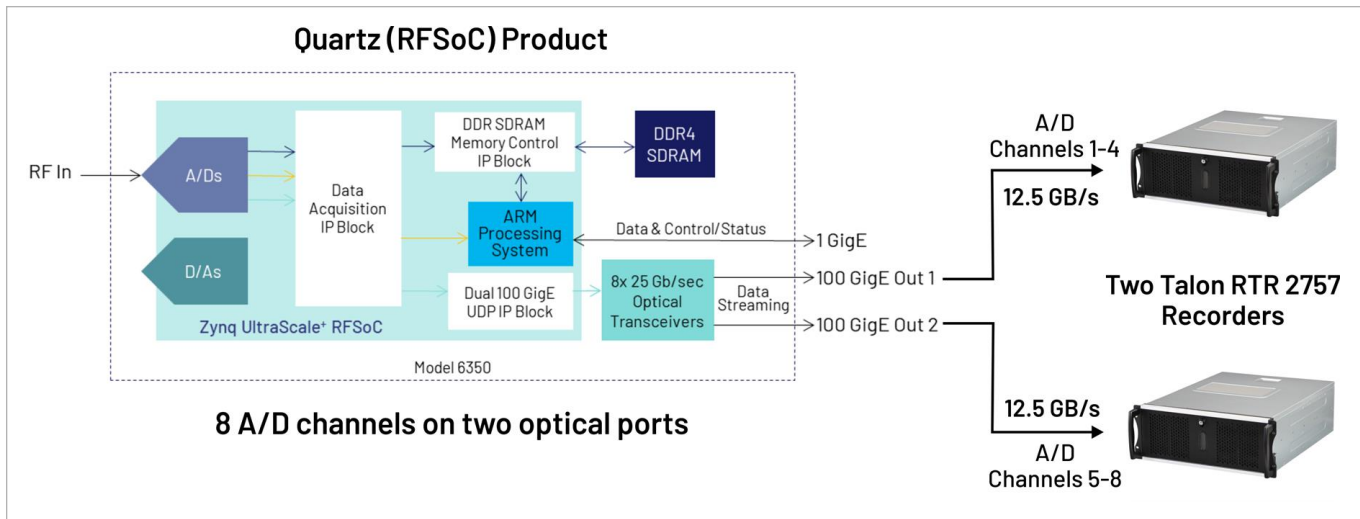
- Two 100 Gigabit Ethernet ports have a maximum 25 GB/s streaming rate.
- Two Model 2757 recorders can capture real-time UDP streams at 25 GB/s using two QSFP28 optical ports.

SYSTEMFLOW SOFTWARE

All Talon recorders include the Mercury SystemFlow® recording software. SystemFlow software enables users to configure and control a Talon recorder:

- The SystemFlow GUI provides a point-and-click user interface. It includes Configure, Record, Playback, and Status screens, each with intuitive controls and indicators. The user can easily move between screens to configure parameters, control and monitor a recording, and play back a recorded stream.

- SystemFlow API provides a set of C-callable libraries that allow engineers to develop their own user interface to configure and control their Talon recorder. Additional high-level libraries, like Python, are available upon request.

The SystemFlow GUI and API can be run from a remote connection over Gigabit Ethernet. Recorders can be set up to run autonomously by implementing scripts using the API interface.

Talon systems record all data to the native NTFS file system, allowing for quick and easy access to the data from any computer. A simple header that holds the recording parameters is added to the beginning of each file. An optional GPS receiver allows the user to precisely timestamp files and optionally track the recorder's position throughout a mission.

SYSTEMFLOW SIMULATOR

To learn more about SystemFlow software, contact Mercury at techsales@mrcy.com. The SystemFlow Simulator allows you to learn how to use a Talon recorder's SystemFlow software interface before you acquire a recorder or while you are waiting for delivery of a recorder.

The Simulator can simulate the operating environment of all the different Talon recorder models. The Simulator also demonstrates the SystemFlow Signal Viewer by playing recorded signals to simulate the appearance of live signals being digitized and recorded by a Talon analog signal recorder.

Features

- Provides real-time recording system simulation
- Allows engineers to write and test their application (built using the SystemFlow API) before receiving the recorder hardware
- Demonstrates SystemFlow signal and file viewer tool
- Capable of simulating all Talon analog and digital recording systems
- Full Talon SystemFlow GUI
- Simulator can be used to develop Talon system profiles for use in the final system

SYSTEMFLOW API

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the Talon recorder from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2757 as a high-performance server front end to a larger system. This is supported using a socket interface through the Ethernet port, either to a local host or through an internet link for remote, standalone acquisition. Recorded NTFS files can be easily retrieved through the same connection. In addition to C, support is also provided for high level languages such as Python and C#. Below is an example of controlling recording via the SystemFlow API.

```
728              }
729              //transfer until end of disk
730              else if (transferType == TRANSFER_END_OF_DISK)
731              {
732                  recordParams->transferTime    = 0;                    // must set to 0
733                  recordParams->transferLength  = 0;                    // must set to 0
734              }
735
736              /////////////////////////// Start the record ///////////////////////////
737              SetConsoleTextAttribute (hConsole, FOREGROUND_GREEN | FOREGROUND_INTENSITY );
738              printf("\nCase 6: RTS_Record\n");
739              SetConsoleTextAttribute (hConsole, wOldColorAttrs);
740
741              //trigger immediately
742              if(recordParams->trigger == RTS_TRIGGER_IMMEDIATELY)
743              {
744                  //send record command
745                  if ((error = RTS_Record(++msgNum,
746                                          serverInfo,
747                                          recordParams,
748                                          recordChanId,
749                                          fileName[0])) != RTS_SUCCESS)
750                  {
751                      printf("Record Error # 0x%lx.\n", error);
752                      exitHandler(error);
753                      goto freeMem;
754                  }
755
756                  Sleep(500);
757              }
758
759              //wait for SW trigger
760              else if(recordParams->trigger == RTS_WAIT_FOR_SW_TRIGGER)
761              {
762                  //send record command which set up record and start DMA
763                  if ((error = RTS_Record(++msgNum,
764                                          serverInfo,
765                                          recordParams,
766                                          recordChanId,
767                                          fileName[0])) != RTS_SUCCESS)
```

SIGNAL VIEWER

The SystemFlow Signal Viewer includes a spectrogram, virtual oscilloscope, and spectrum analyzer for signal monitoring in both the time and frequency domains. It is extremely useful for previewing live inputs prior to recording, and for monitoring signals as they are being recorded to help ensure successful recording sessions. The viewer can also be used to inspect and analyze the recorded files after the recording is complete.

Advanced signal analysis capabilities include automatic calculators for signal amplitude and frequency, second and third harmonic components, THD (total harmonic distortion), and SINAD (signal to noise and distortion). With time and frequency zoom, panning modes, and dual, annotated cursors to mark and measure points of interest, the SystemFlow Signal Viewer can often eliminate the need for a separate oscilloscope or spectrum analyzer in the field.
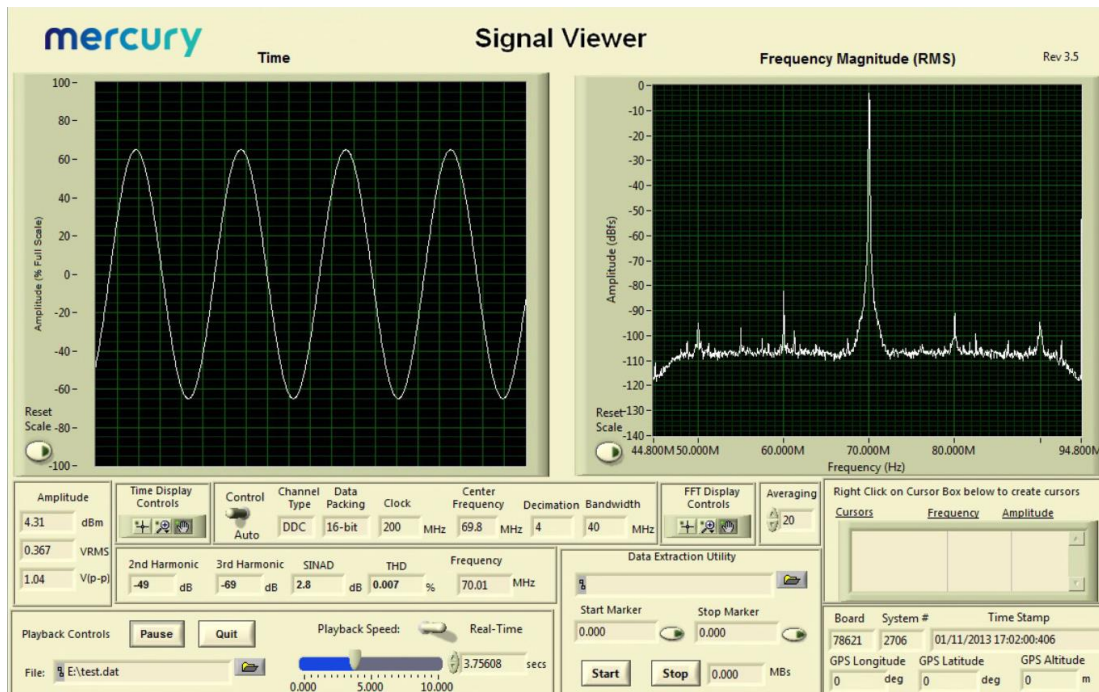
SPECIFICATIONS

PC Workstation

Operating System: Windows®

Processor: Intel Xeon Gold processor

SDRAM: Up to 4 TB of DDR4 SDRAM

RAID

- Drive Type: Front-panel removable MVMe U.2 solid-state drives (SSDs)
- Storage: Up to 122 TB
- Supported RAID Levels: (standard) 0
  - Option -285: RAID 5

Ethernet Interface

Quantity: 1 port

Connector Type: QSFP28 port with MPO transceiver

Physical and Environmental

Dimensions: 16.93" W x 22.19" D x 6.93" H; (430 x 563.7 x 176 mm)

Weight: 51 lb. approx.

Operating Temp: 0° to +50° C

Storage Temp: –40° to +85° C

Relative Humidity: 5 to 95%, non-condensing

Operating Shock: 15 g max. (11 msec, half sine wave)

Operating Vibration: 10 to 20 Hz: 0.02 inch peak, 20 to 500 Hz: 1.4 g peak acceleration

Power Requirements: 100 to 240 VAC, 50 to 60 Hz, 500 W max.

ORDERING INFORMATION

RAID Configurations	
Standard	RAID 0 configuration
Option -285	RAID 5 configuration

Storage Options	
Option -430	30.7 SSD storage capacity
Option -460	61.4 TB SSD storage capacity
Option -485	122.8 TB SSD

Other Options	
Option -261	GPS time and position stamping
Option -264	IRIG-B time stamping
Option -267	Dual 10 GbE offload
Option -268	40 GbE offload
Option -269	100 GbE offload

Contact Mercury for compatible option combinations. Storage and general options may change, so contact Mercury for the latest information.

QUARTZ RFSOC PRODUCTS

Quartz Options	
VPX 3U	
Model 5550	8-Channel A/D and D/A Zynq UltraScale+ RFSoC Processor - SOSA Aligned 3U VPX
Model 5553	8-Channel A/D and D/A Zynq UltraScale+ RFSoC Gen 3 Processor - SOSA Aligned 3U VPX
Model 5950	8-Channel A/D and D/A Zynq UltraScale+ RFSoC Processor - 3U VPX
Model 5953	8-Channel A/D and D/A Zynq UltraScale+ RFSoC Gen 3 Processor - 3U VPX
Small Form Factor	
Model 6350	8-Channel A/D and D/A Zynq UltraScale+ RFSoC Processor - SFF
Model 6350S	8-Channel A/D and D/A Zynq UltraScale+ RFSoC Processor - SFF Subsystem
Model 6353	8-Channel A/D and D/A Zynq UltraScale+ RFSoC Gen 3 Processor - SFF
Model 6353S	8-Channel A/D and D/A Zynq UltraScale+ RFSoC Gen 3 Processor - SFF Subsystem
PCIe	
Model 7050	8-Channel A/D and D/A Zynq UltraScale+ RFSoC Processor - PCIe
Model 7053	8-Channel A/D and D/A Zynq UltraScale+ RFSoC Gen 3 Processor - PCIe

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