Talon RTR 2750

250 MS/sec RF/IF rugged rackmount recorder

Scalable multichannel RF/IF signal acquisition

- Phase-coherent recording of 16 independent input channels
- Captures RF signals with bandwidths up to 100 MHz
- Up to 243 TB of front-panel removable solid state storage
- SystemFlow GUI with Signal Viewer analysis tool

The Talon® RTR 2750 is a turnkey recording system that provides phase-coherent recording of 16 independent input channels. Each input channel includes a 250 MHz 16-bit A/D and an FPGA-based digital downconverter with programmable decimations from 2 to 65536, thereby providing the ability to capture RF signals with bandwidths up to 100 MHz.

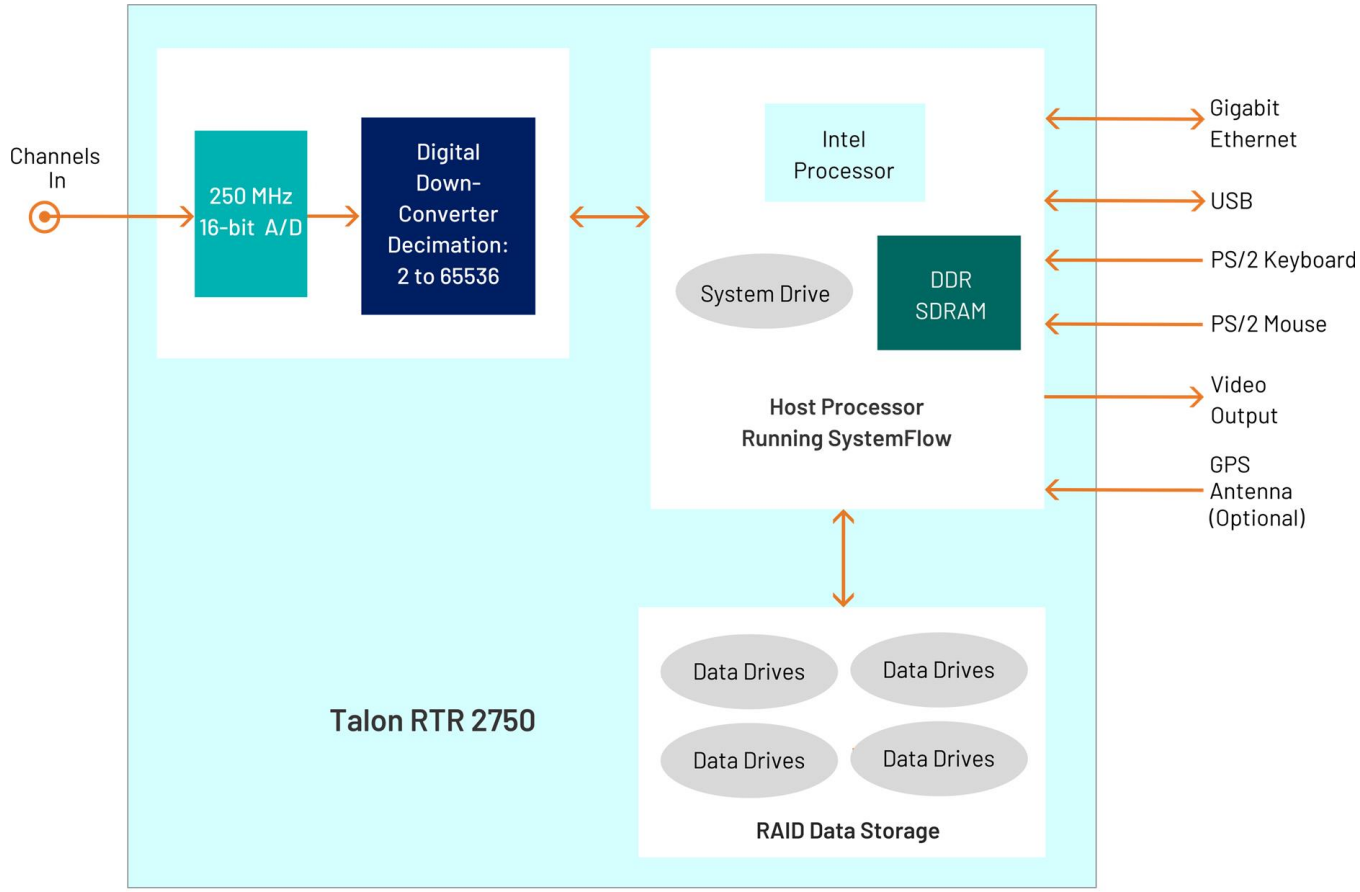
With options for AC- or DC-coupled input channels, RF signals up to 700 MHz in frequency can be sampled and streamed to disk in real-time at sustained aggregate recording rates up to 8 GB/sec in a 4U rackmount solution.

Designed to operate under conditions of vibration and extended operating temperatures, the RTR 2750 is ideal for military, airborne and field applications that require a rugged system. The hot-swappable solid state storage drives provide the highest level of performance under harsh conditions and allow for quick removal of mission-critical data.

A/D sampling rates, DDC decimations and trigger settings are among the selectable system parameters, providing a system that is simple to configure and operate. An optional GPS time and position stamping facility allows the user to timestamp each acquisition as well as track the location of a system in motion.

FEATURES

- Sixteen 250 MHz 16-bit A/Ds
- Sixteen independently-configurable DDC decimations ranging from 2 to 65536
- Sixteen interdependently-configurable DDC tuning frequencies
- Capable of recording RF frequencies to 700 MHz
- Capable of recording signals with bandwidths to 100 MHz
- 8 GB/s real-time aggregate recording rate
- 4U 19-inch rugged rackmount PC server chassis
- Windows® workstation with high-performance Intel® processor
- Front panel removable-SSD drives
- Up to 243 terabytes of storage to NTFS RAID disk array
- Multiple RAID levels of 0, 5 and 6
- SystemFlow® GUI with signal viewer analysis tool
- Optional GPS time and position stamping



RUGGED AND FLEXIBLE ARCHITECTURE

The RTR 2750 is configured in a 4U 19-inch rack-mountable chassis, with hot-swap data drives, front panel USB ports, and I/O connectors on the rear panel. Systems are scalable to accommodate multiple chassis to increase channel counts and aggregate data rates. All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

The RTR 2750 includes as many as 32 hot-swappable SSDs to provide flexible storage capacities up to 243 TB. The 2.5-inch SSDs can be easily removed or exchanged during a mission to retrieve recorded data. Multiple RAID levels, including 0, 5, and 6 provide a choice for the required level of redundancy.

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.

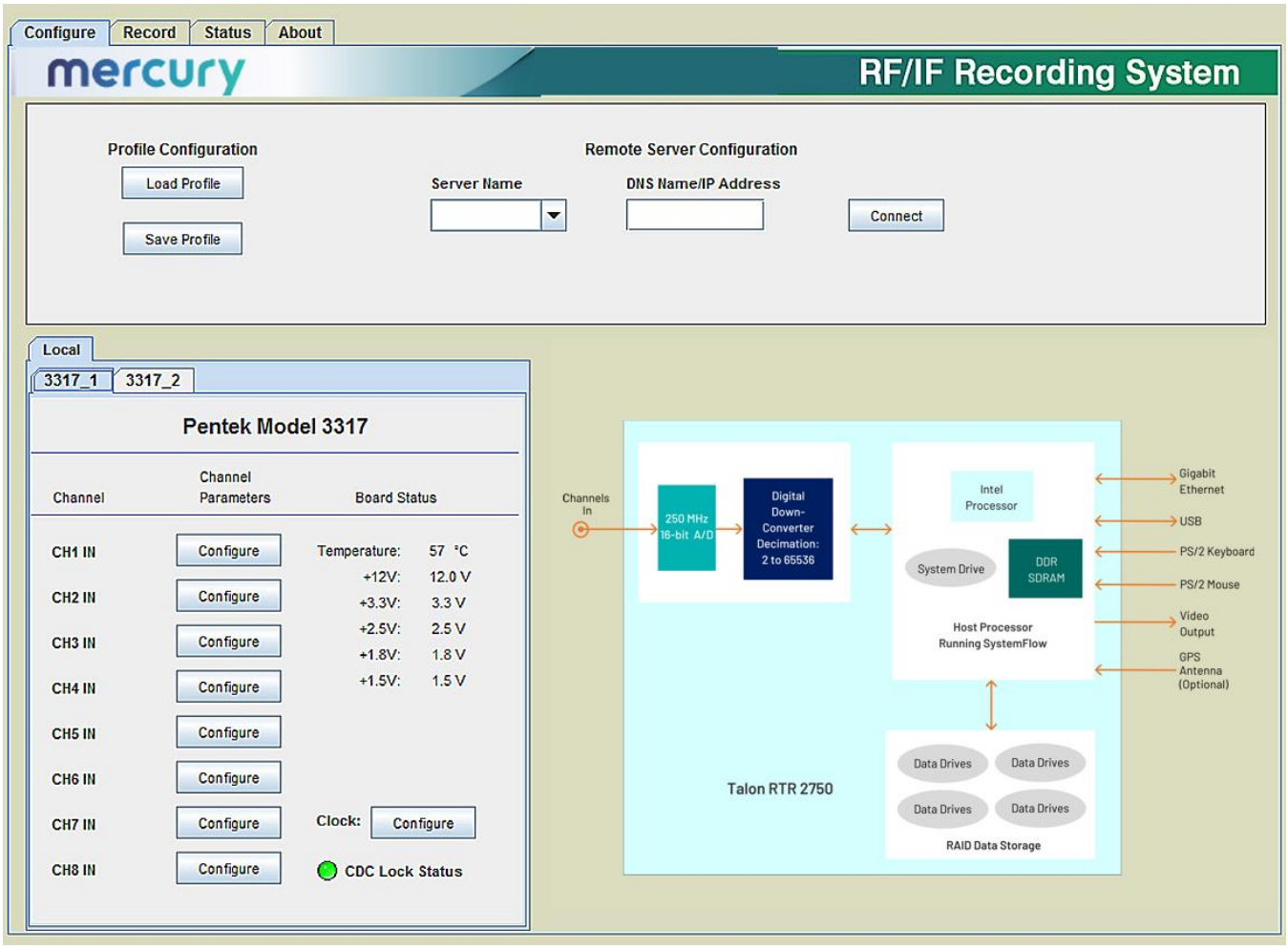
The Simulator can simulate the operating environment of all the different Talon recorder models. The Simulator also demonstrates the SystemFlow Signal Viewer by playing recorded signals to simulate the appearance of live signals being digitized and recorded by a Talon analog signal recorder.

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

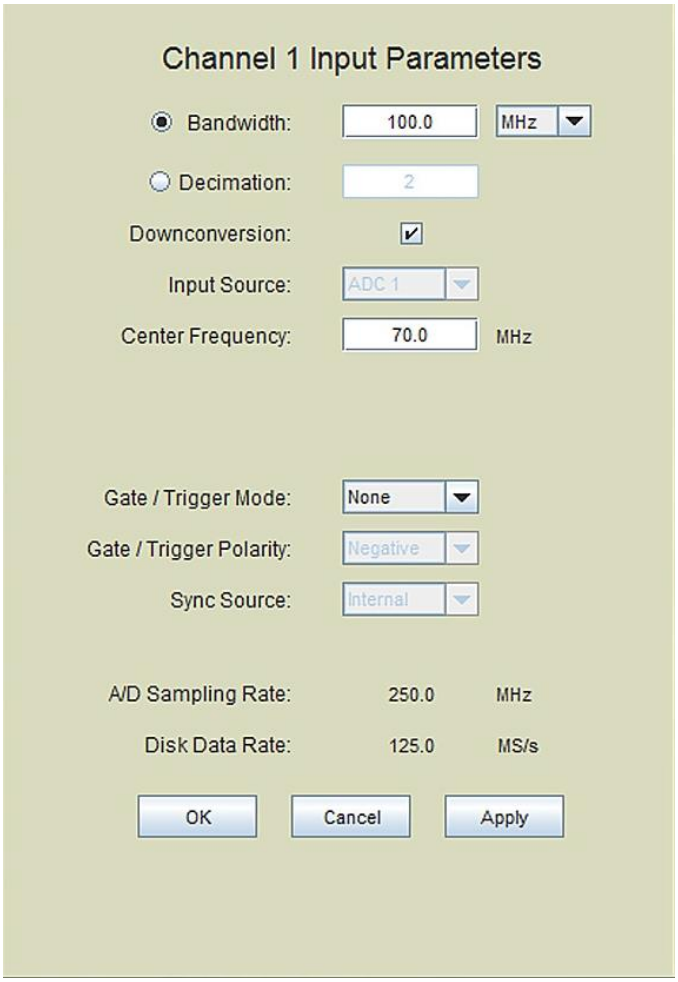
SYSTEMFLOW RECORDER INTERFACE

The RTR 2750 GUI provides the user with a control interface for the recording system. It includes Configuration, Record, Playback and Status screens, each with intuitive controls and indicators. The user can easily move between screens to set configuration parameters, control and monitor a recording, play back a recorded signal and monitor board temperature and voltage levels. The signal viewer, integrated into the recording GUI, allows the user to monitor real-time signals or signals recorded on disk.



SYSTEMFLOW HARDWARE CONFIGURATION INTERFACE

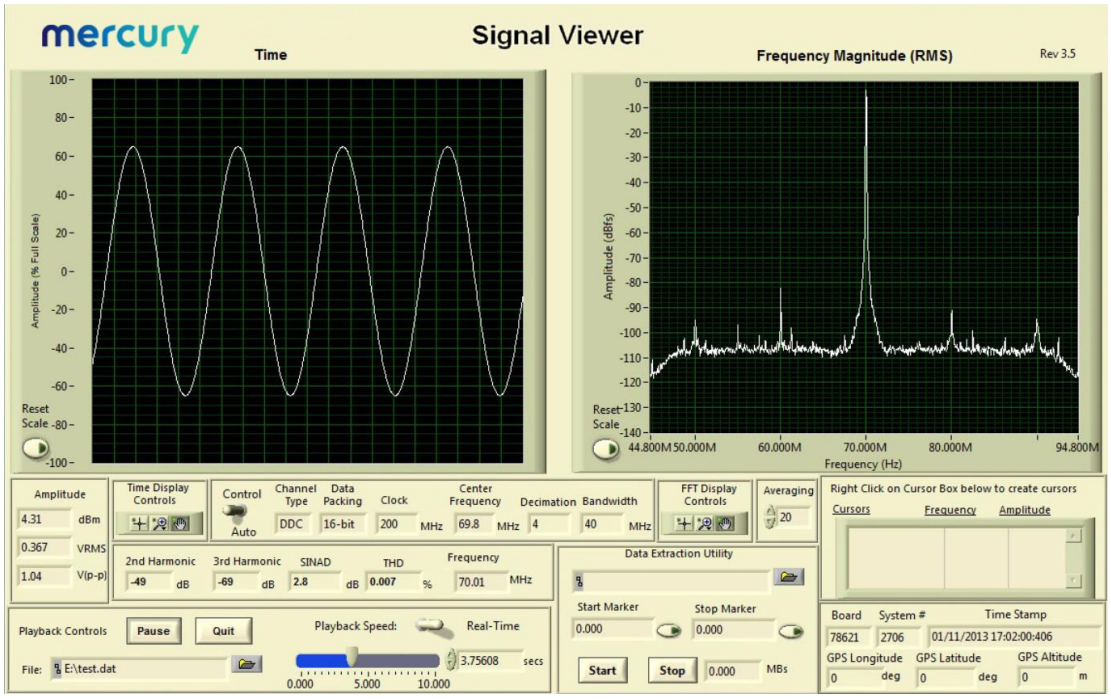
The RTR 2750 Configure screens provide a simple and intuitive means for setting up the system parameters. The DDC configuration screen, shown below, allows user entries for input source, center frequency, and decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help.



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.



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 2750 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)
```

SPECIFICATIONS

PC Workstation

Operating System: Windows®

Processor: Intel Core i7 processor or better

SDRAM: (standard) 8 GB

- Option -309: 16 GB
- Option -310: 32 GB
- Option -311: 64 GB

RAID

- Storage: 15.3, 30.7 or 243 TB
- Supported RAID Levels: (standard) 0
  - Option -285: RAID 5
  - Option -286: RAID 6
- Drive Type: SATA III or NVME SSDs

Analog Signal Inputs

Connector Type: Rear-panel female MMCX connectors

Input Type: Transformer-coupled, optional DC-coupled

Full-Scale Input: +4 dBm into 50 ohms

3 dB Passband: 300 kHz to 700 MHz

Anti-Aliasing Filters: External, user-supplied

A/D Converters

Type: Texas Instruments ADS42LB69

Sampling Rate (f_s): User selectable, 10 MHz to 250 MHz

Resolution: 16 bits

SNR: 73.2 dBFS

SFDR: 87 dBc (HD2 and HD3)

100 dBc (Non HD2 and HD3)

Digital Downconverters

Type: Mercury DDC IP Core

Decimation (D): User selectable 2 to 65536

IF Center Frequency Tuning: User selectable, 32-bit resolution

DDC Usable Bandwidth: 0.8*f_s/D, factory-supplied DDC coefficient tables

A/D Clock

Clock Sources: Selectable from onboard programmable VCXO or external clocks

External Clocks

Connector Type: Rear panel female MMCX connector

Input Type: Transformer-coupled

Full-scale Input: 0 to +10 dBm

Trigger

Connector Type: Rear panel female MMCX connector

Input Type: LVTTL

Physical and Environmental

4U Short Chassis: 19" W x 21" D x 7" H

Weight: 50 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
Option -286	RAID 6 configuration

Memory Options	
Standard	8 GB system memory
Option -309	16 GB system memory
Option -310	32 GB system memory
Option -311	64 GB system memory

Storage Options	
Option -415	7.6 TB SSD storage capacity
Option -420	15.3 TB SSD storage capacity
Option -430	30.7 TB SSD storage capacity
Option -460	61.4 TB SSD storage capacity
Option -485	122.8 TB SSD storage capacity
Option -490	243.3 TB SSD storage capacity

General Options (append to all options)	
Option -261	GPS time and position stamping
Option -264	IRIG-B time stamping

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

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