Features

- Designed to operate under conditions of shock and vibration
- Sample rates up to 3.6 GHz in single-channel mode
- Sample rates up to 1.8 GHz in dual-channel mode
- Capable of recording RF/IF frequencies to 1.75 GHz in single-channel mode
- Capable of recording RF/IF frequencies to 2.8 GHz in dual-channel mode
- 12-bit A/D, with 16- and 8-bit packing modes
- Real-time aggregate recording rates of up to 4.8 GB/sec
- 4U 19-inch rugged rackmount PC server chassis
- Windows® workstation with-high performance Intel® processor
- Up to 122 terabytes of SSD storage to NTFS RAID solid state disk array
- RAID levels of 0, 5, and 6
- SystemFlow® GUI with signal viewer analysis tool
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
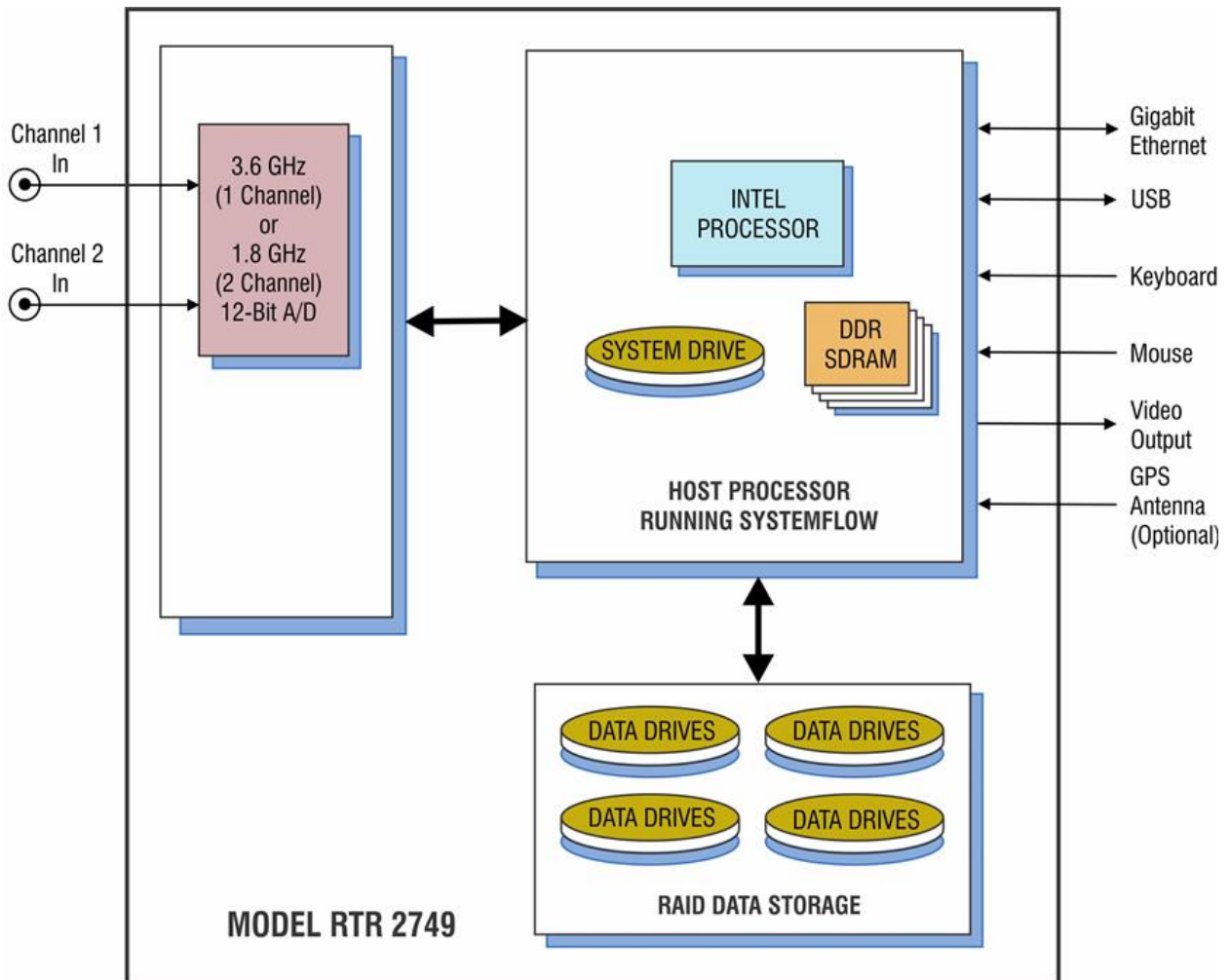- Optional GPS time and position stamping

General Information

The Talon® RTR 2749 is a turnkey system, used for recording high-bandwidth signals. The RTR 2749 uses 12-bit, 3.6 GHz A/D converters. It can be configured as a one- or two-channel system and can record sampled data, packed as 8-bit- or 16-bit-wide consecutive samples (12-bit digitized samples residing in the 12 MSBs of the 16-bit word). A high-speed RAID array provides a maximum streaming recording rate to disk of 4.8 GB/sec.

The RTR 2749 uses Pentek's high-powered Kintex UltraScale-based Jade® boards or Virtex-7-based Onyx® boards, which provide the data streaming engine for the high-speed A/D converters. Channel and packing modes as well as gate and trigger settings are among the GUI-selectable system parameters, providing complete control over this ultra wideband recording system.

Optional GPS time and position stamping allows the user to capture this critical information in the header of each data file.

2749 Block Diagram

Channel 1 In

Channel 2 In

3.6 GHz (1 Channel) or 1.8 GHz (2 Channel) 12-Bit A/D

INTEL PROCESSOR

SYSTEM DRIVE

DDR SDRAM

HOST PROCESSOR RUNNING SYSTEMFLOW

Gigabit Ethernet

USB

Keyboard

Mouse

Video Output

GPS Antenna (Optional)

DATA DRIVES DATA DRIVES
DATA DRIVES DATA DRIVES
RAID DATA STORAGE

MODEL RTR 2749

Rugged and Flexible Architecture

Because SSDs operate reliably under conditions of vibration and shock, the RTR 2749 performs well in ground, shipborne and airborne environments. The hot-swappable SSDs provide storage capacity of up to 122 TB. The drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

The RTR 2749 is configured in a 4U 19" rugged rackmount chassis, with hot-swappable 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.

RAID levels 0, 5, and 6 provide a choice for the required level of redundancy.

SystemFlow Software

All Talon recorders include the Pentek SystemFlow® recording software. SystemFlow software provides three ways for users to configure and control a Talon recorder:

- The SystemFlow GUI provides an easy out-of-the-box experience which allows the operator to open the box and begin recording with a point and click user interface.
- The 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.
- The SystemFlow Telnet interface provides a simple set of commands to configure and control the recorder. This eliminates the need for any software development and is most suitable for unmanned operation.

SystemFlow software allows the recorder to be set up to run autonomously by implementing scripts using the API or telnet interface. All three interfaces can be run from a remote connection over Gigabit Ethernet.

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

Click below to view a video about SystemFlow.

SystemFlow Simulator

To learn more about the SystemFlow Software, you can download and install the free SystemFlow Simulator to your desktop or laptop PC. The SystemFlow Simulator allows you to learn how to use the Talon recording system's SystemFlow software interface before you acquire a recorder or while you are waiting for delivery of a Talon recording system.

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 Pentek analog signal recorder.

Features

- Provides real-time recording system simulation
- Demonstrates SystemFlow signal & file viewer tools
- 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
- Can be used with the SystemFlow API to develop and test custom user interface

SystemFlow Recorder Interface

The RTR 2749 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.

Setting System Parameters

The RTR 2749 configuration GUI provides a simple and intuitive means for setting up the system parameters such as channel mode, clock frequency, downconversion, and gate/trigger mode. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience. Details about each field on the configuration screens are provided in the RTR 2749 user manual.

78741 Board Parameters

Channel Mode:	Dual
Clock Source.	External
Clock Frequency:	800.0 MHz
Downconversion:	☐
⦿ Bandwidth:	640.0 MHz
○ Decimation:	8
CH1 Center Frequency:	190.0 MHz
CH2 Center Frequency:	190.0 MHz
Packing Mode:	16-bits
Gate / Trigger Mode:	None
Gate / Trigger Polarity:	Negative
Trigger Delay:	0 Samples
A/D Sampling Rate:	800.0 MHz
Disk Data Rate:	800.0 MS/s

OK   Cancel   Apply

Signal Viewer

The SystemFlow Signal Viewer includes a 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.
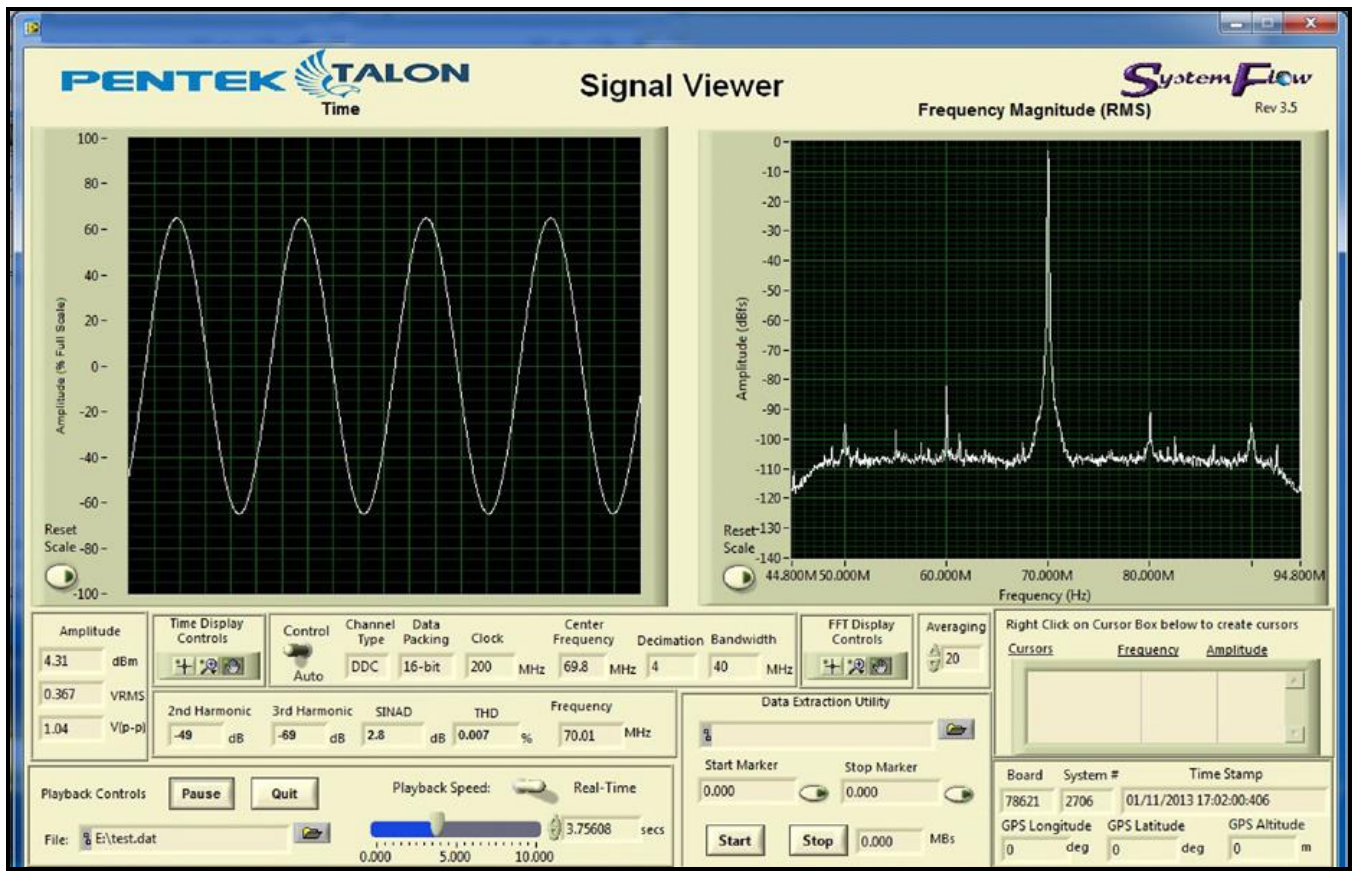
SystemFlow API

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 2749 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.

Below is an example of controlling recording via the SystemFlow API.

```c
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)
```
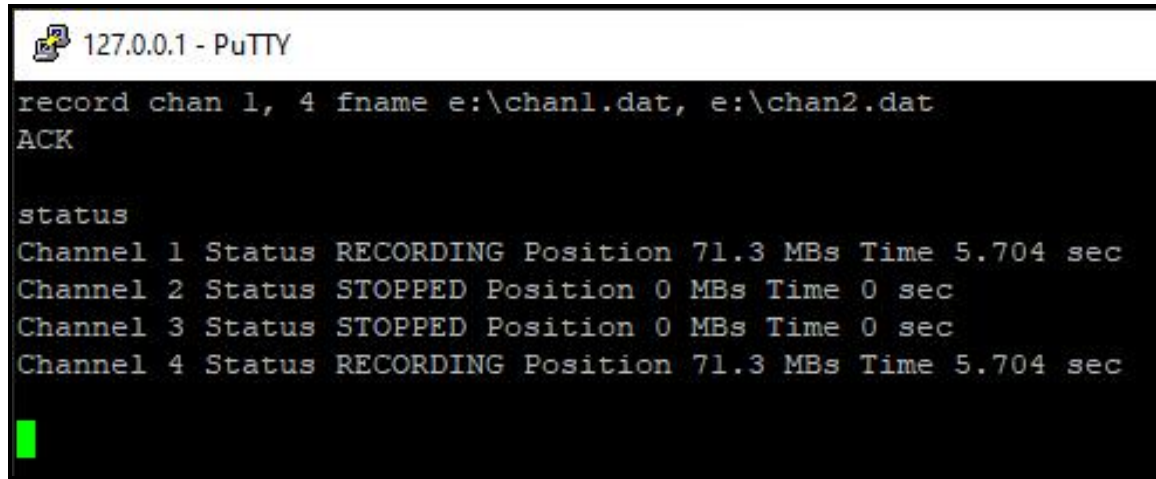
SystemFlow Telnet

The Talon telnet facility is an optional feature that can be requested when ordering one of Pentek's Talon recording systems. The Talon telnet facility allows you to control a Talon recorder from a remote computer. You also can use the Talon recorder's SystemFlow Signal Viewer to remotely monitor real−time data.

Pentek's *Telnet Facility for Talon Recording Systems User's Guide* provides instructions for setting up telnet access and describes all the supported commands.

Below is an example of use of the "record" command:

```
127.0.0.1 - PuTTY

record chan 1, 4 fname e:\chan1.dat, e:\chan2.dat
ACK

status
Channel 1 Status RECORDING Position 71.3 MBs Time 5.704 sec
Channel 2 Status STOPPED Position 0 MBs Time 0 sec
Channel 3 Status STOPPED Position 0 MBs Time 0 sec
Channel 4 Status RECORDING Position 71.3 MBs Time 5.704 sec
```

Specifications

PC Workstation (standard configuration)
Operating System: Windows
Processor: Intel Core i7 processor
SDRAM: 8 GB
RAID
  Storage: 7.6, 15.3, 30.7, 61, or 122.8 TB
  Drive Type: SATA III SSDs
  Supported RAID Levels: 0, 5, and 6

Analog Signal Inputs
Connectors: Two rear panel SSMC connectors, In 1 & In 2
Input Type: Single-ended, non-inverting
Full Scale Input: +4 dBm into 50 ohms
Coupling: Transformer-coupled
Analog Input Transformers
Bandwidth: 4.5 kHz to 3.0 GHz

A/D Converters
Type: Texas Instruments ADC12D1800
Sampling Rate:
  Single-channel mode: 500 MHz to 3.6 GHz
  Dual-channel mode: 150 MHz to 1.8 GHz
  Resolution: 12 bits
Maximum Usable Input Frequency
  Single-channel mode: 1.75 GHz
  Dual-channel mode: 2.8 GHz
Anti-Aliasing Filters: External, user-supplied

Digital Downconverters
Decimation: 8, 16 to 512 in Single-Channel Mode, 4, 8 to 256 in Dual-Channel Mode
IF Center Frequency Tuning: DC to fs, 32 bits
LO SFDR: >120 db
DDC Usable Bandwidth: $0.8*f$s/D

Sampling Clock Source
Internal fixed-frequency or programmable oscillator (selectable by option); in single-channel mode, the sample rate is 2x the clock frequency; in dual- channel mode, the sample rate equals the clock frequency

Frequency Reference
Accepts external 10 MHz reference at 0 to +4 dBm to phase-lock the clock oscillator

Physical and Environmental
4U Long Chassis: 19" W x 26" 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.

Specifications are subject to change without notice.

Ordering Information

Click here for more information.

RAID Options	
Option -285	RAID 5 configuration
Option -286	RAID 6 configuration
Memory Options	
Option -309	16 GB system memory
Option -311	64 GB DDR4 SDRAM
Storage Options	
Option -405	1.9 TB SSD
Option -415	7.6 TB SSD
Option -420	15.3 TB SSD
Option -430	30.7 TB SSD
Option -460	61 TB SSD
Option -485	122.8 TB SSD
Sample Clock Options	
Option -910	**User-Programmable Sample Clock** Dual-channel mode sample clock range 150 MHz – 945 MHz 970 MHz – 1134 MHz 1213 MHz – 1417.5 MHz Single-channel mode sample clock range 500 MHz – 1890 MHz 1940 MHz – 2268 MHz 2426 MHz – 2835 MHz
Option -911	**Fixed-Frequency Clock:** 1.5 / 3.0 GHz sample clock
Option -912	**Fixed-Frequency Clock:** 1.6 / 3.2 GHz sample clock
Option -913	**Fixed-Frequency Clock:** 1.2 / 2.4 GHz sample clock
Option -914	**Fixed-Frequency Clock:** 1.36 / 2.72 GHz sample clock
Option -915	**Fixed-Frequency Clock:** 1.8 / 3.6 GHz sample clock
Custom fixed-frequency sample clocks available upon request.	
Other Options	
Option -202	2-channel recording (2 Model 78741 or 78841 boards)
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 -625	Removable OS drive enclosure
Option -680	28V DC power supply

Pricing and Availability

To learn more about our products or to discuss your specific application please contact your local representative or Pentek directly:

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