



**PENTEK**  
TALON HIGH-SPEED  
RECORDING SYSTEMS

# HIGH-SPEED RECORDING SYSTEMS

## MODEL

## DESCRIPTION

[Talon](#)

Talon® High-Speed Recording Systems: Flexible and Deployable Solutions

[RTX Rackmount](#)

Talon RTX Extreme Rackmount Recorders - Mechanical Design

## ANALOG RECORDING SYSTEMS

[RTV 2601](#)

200 MS/sec RF/IF Rackmount Value Recorder

[RTS 2706](#)

200 MS/sec RF/IF Rackmount Recorder

[RTR 2726](#)

200 MS/sec RF/IF Rugged Portable Recorder

[RTR 2726A](#)

200 MS/sec RF/IF Rugged Portable Recorder

[RTR 2746](#)

200 MS/sec RF/IF Rugged Rackmount Recorder

[RTX 2766](#)

200 MS/sec RF/IF Extreme Rackmount Recorder

[RTX 2786](#)

200 MS/sec RF/IF Extreme 3U VPX Recorder

[RTR 2750](#)

250 MS/sec RF/IF Rugged Rackmount Recorder

[RTS 2707](#)

500 MS/sec RF/IF Rackmount Recorder

[RTR 2727](#)

500 MS/sec RF/IF Rugged Portable Recorder

[RTR 2727A](#)

500 MS/sec RF/IF Rugged Portable Recorder

[RTR 2747](#)

500 MS/sec RF/IF Rugged Rackmount Recorder

[RTX 2767](#)

500 MS/sec RF/IF Extreme Rackmount Recorder

[RTR 2728](#)

1 GS/sec RF/IF Rugged Portable Recorder

[RTR 2728A](#)

1 GS/sec RF/IF Rugged Portable Recorder

[RTR 2748](#)

1 GS/sec RF/IF Rugged Rackmount Recorder

[RTX 2768](#)

1 GS/sec RF/IF Extreme Rackmount Recorder

[RTR 2729A](#)

3.6 GS/sec Ultra Wideband RF/IF Rugged Portable Recorder

[RTR 2749](#)

3.6 GS/sec Ultra Wideband RF/IF Rugged Rackmount Recorder

[RTX 2769](#)

3.6 GS/sec Ultra Wideband RF/IF Extreme Rackmount Recorder

[RTR 2613](#)

Talon 3 GHz RF/IF Sentinel Intelligent Signal Scanning Portable Recorder

[RTR 2623](#)

Talon 6 GHz RF/IF Sentinel Intelligent Signal Scanning Portable Recorder

[RTR 2546](#)

200 MS/sec RF/IF Rugged SFF Recorder

[RTR 2547](#)

500 MS/sec RF/IF Rugged SFF Recorder

[RTR 2548](#)

1 GS/sec RF/IF Rugged SFF Recorder

[RTR 2549](#)

3.6 GS/sec Ultra Wideband RF/IF Rugged SFF Recorder

[Customer Information](#)



## ANALOG RECORDING SYSTEMS

[Click Here for the PRODUCT SELECTOR](#)

Last updated: April 2018

# HIGH-SPEED RECORDING SYSTEMS

**MODEL**                      **DESCRIPTION**

## DIGITAL RECORDING SYSTEMS

<a href="#">RTS 2715</a>	10-Gigabit Ethernet Rackmount Recorder
<a href="#">RTR 2755</a>	10-Gigabit Ethernet Rugged Rackmount Recorder
<a href="#">RTX 2775</a>	10-Gigabit Ethernet Extreme Rackmount Recorder
<a href="#">RTR 2735A</a>	1, 10, 40-Gigabit Ethernet Rugged Portable Recorder
<a href="#">RTV 2602</a>	Serial FPDP Rackmount Value Recorder
<a href="#">RTS 2716</a>	Serial FPDP Rackmount Recorder
<a href="#">RTR 2736</a>	Serial FPDP Rugged Portable Recorder
<a href="#">RTR 2736A</a>	Serial FPDP Rugged Portable Recorder
<a href="#">RTR 2756</a>	Serial FPDP Rugged Rackmount Recorder
<a href="#">RTX 2776</a>	Serial FPDP Extreme Rackmount Recorder
<a href="#">RTS 2718</a>	LVDS Digital I/O Rackmount Recorder
<a href="#">RTR 2738A</a>	LVDS Digital I/O Rugged Portable Recorder
<a href="#">RTR 2758</a>	LVDS Digital I/O Rugged Rackmount Recorder
<a href="#">RTX 2778</a>	LVDS Digital I/O Extreme Rackmount Recorder
<a href="#">RTR 2555</a>	1, 10, 40-Gigabit Ethernet Rugged SFF Recorder
<a href="#">RTR 2556</a>	Serial FPDP Rugged SFF Recorder
<a href="#">RTR 2558</a>	LVDS Digital I/O Rugged SFF Recorder

[Customer Information](#)

DIGITAL RECORDING SYSTEMS

[Click Here for the PRODUCT SELECTOR](#)



Last updated: April 2018

# Talon High-Speed Recording Systems: Flexible and Deployable Solutions

## Systems Include:

- High-performance Windows® workstation
- High-performance Intel® Processor
- Pentek SystemFlow® recording software with graphical user interface
- SystemFlow analysis tools such as virtual oscilloscope and spectrum analyzer
- Supported RAID levels of up to 0, 1, 5, 6, 10 and 50
- Time and position stamping support
- Detailed technical documentation

## Systems Benefits:

- Complete turnkey systems
- Rack-mountable and portable form factors
- C-callable API for integration of recorder into application
- Aggregate recording rates of up to 5.0 GB/sec
- Recording to non-proprietary NTFS file system for easy and immediate data access
- Ideal for communications, radar, wireless, SIGINT, telecom and satcom
- They are easy to use right out-of-the-box
- Can be controlled over the Ethernet or over the Internet

## High-Speed Recording Systems

Talon® High-Speed Recording Systems eliminate the time and risk associated with new technology system development. With increasing pressure in both the defense and commercial arenas to get to the market first, today's system engineers are looking for more complete off-the-shelf system offerings.

Out of the box, these systems arrive complete with a full-featured virtual operator control panel ready for immediate data recording and/or playback operation.

Because they consist of modular COTS board-level products and the flexible Pentek SystemFlow software, they are easily scalable to larger multichannel data acquisition and recording applications requiring aggregate recording rates of up to 5.0 GB/sec.

## Ready-to-Run Recording Systems

Depending on model, the Pentek offerings are fully integrated systems featuring a range of A/D and D/A resources or digital I/O with high-speed disk arrays.

Since these systems are built on a Windows workstation, users can easily install post-processing and analysis tools to operate on the recorded data.

Pentek systems provide a flexible architecture that can be easily customized to meet user needs. Multiple RAID levels of up to 0, 1, 5, 6, 10 and 50, provide a choice for the required level of redundancy.



*RTV Recording Systems are excellent value for under \$20,000*



*RTS Recording Systems are designed for commercial applications*



*RTR Recording Systems are designed for harsh environments*



*RTX Recording Systems are designed for extreme environments*

## Systems for All Recording Needs

Pentek's High-Speed Recording Systems are available as Lab Systems, Portable Systems, Rugged, and Extreme Systems.

**RTV and RTS Lab Systems** are housed in a 19-in. rack-mountable chassis in a PC server configuration. They are designed for commercial applications in a lab or office environment.



*RTS Lab System*

**RTR Portable Systems** are available in a small briefcase-sized enclosure with an integral LCD display and keyboard. They, too, provide a PC server configuration and are designed for commercial or harsh environment field applications where size and weight is of paramount importance.



*RTR Portable System*

**RTR Rugged Rackmount Systems** are housed in a 19-in. rugged rack-mountable chassis. They are built to survive shock and vibration and they target operation in harsh environments and remote locations that may be unsuitable for humans.



*RTR Rugged Rackmount System*

**RTX Extreme Systems** are available in either a rackmount chassis designed to military specs, or a ½ ATR chassis.

They are designed to operate under extreme environmental conditions using forced-air or conduction-cooling to draw heat from system components.



*RTX Rackmount System.*

*½ ATR System*



## Server/Client Architecture

As shown in the block diagram, the SystemFlow architecture provides for easy communication between the recording system Server on the right and the Client PC on the left.

## SystemFlow GUI

The SystemFlow architecture features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system. Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

## SystemFlow Signal Viewer

SystemFlow also includes signal viewing and analysis tools that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer. More information on the Signal Viewer is provided on the next page.

## Server/Client Communication

Server and Client communicate through a standard socket connection. This arrangement enables the Server to provide real-time recording and playback functions that can be controlled from a local or a remote Client. It also allows Client and Server to run on different operating systems.

## Function Libraries

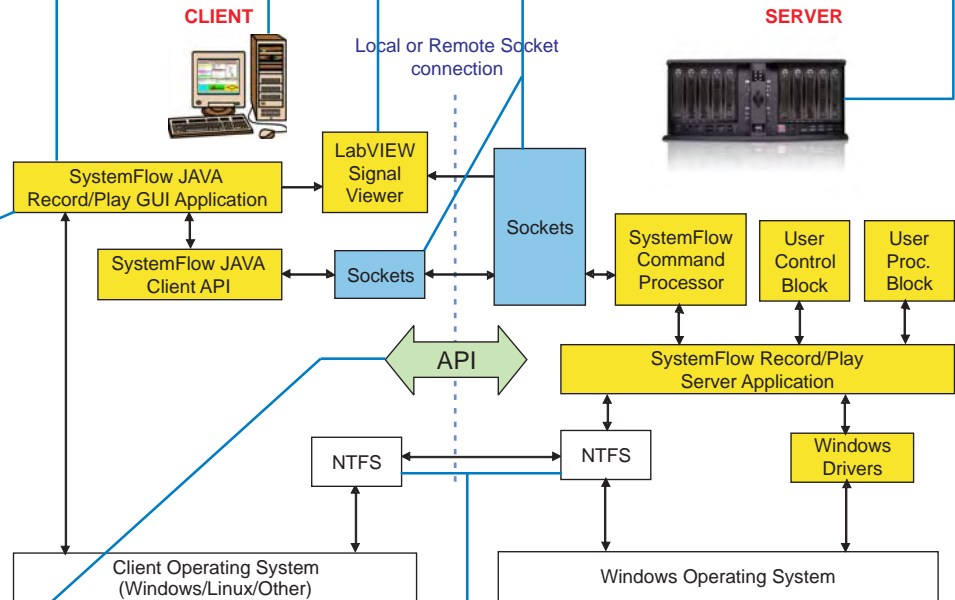
The function libraries and tools for controlling the recording and playback functions include the Application Programming Interface, the Graphical User Interface and the integrated Signal Viewer.

## SystemFlow API

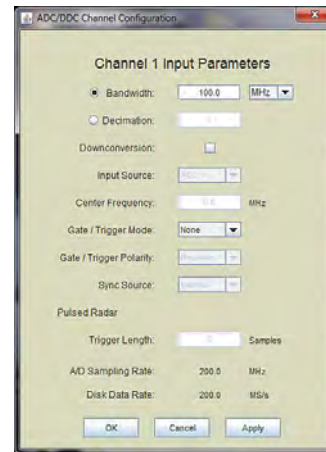
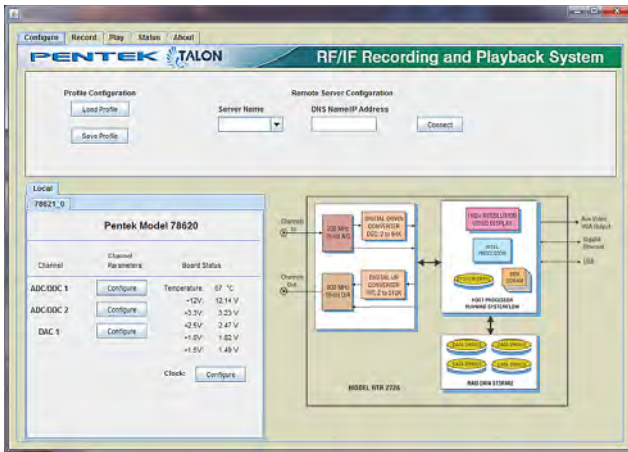
The SystemFlow API allows developers to configure and customize the system interfaces and operation. Source code is supplied for all client API functions. A well-defined set of plugins allows the user to extend server API functions.

## NTFS File System

The NTFS file management system provides immediate access to the recorded data, thereby eliminating time-consuming data conversion processes required with proprietary file management systems. It also eliminates the need for custom hardware and software platforms where the recorded data may need to be physically transported for conversion.



# SystemFlow Graphical User Interface

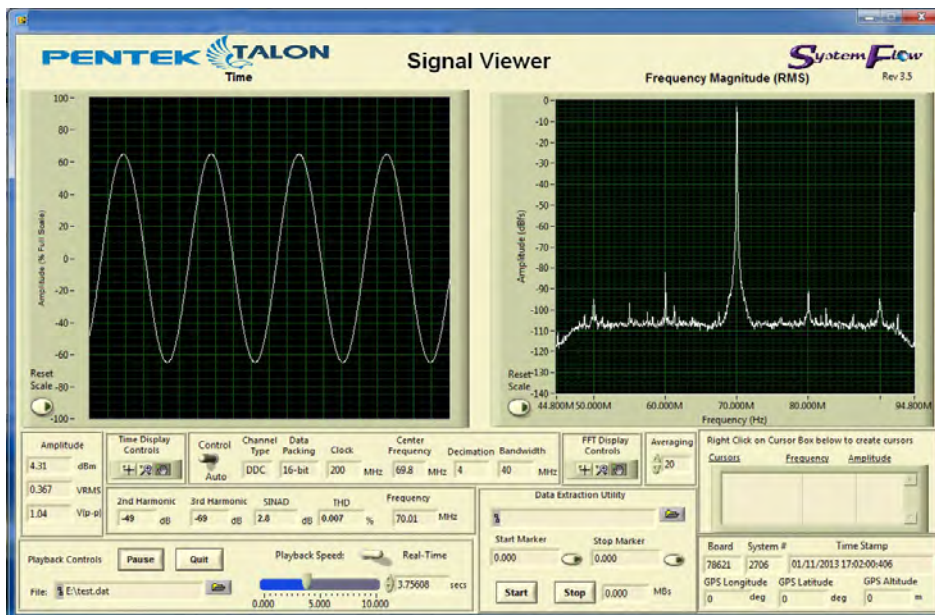


## SystemFlow Recorder Interface

The SystemFlow GUI displays a block diagram of the system and 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.

## SystemFlow Hardware Configuration Interface

The SystemFlow Configure screen provides a simple and intuitive means for setting up the system parameters. The configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



## SystemFlow 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.

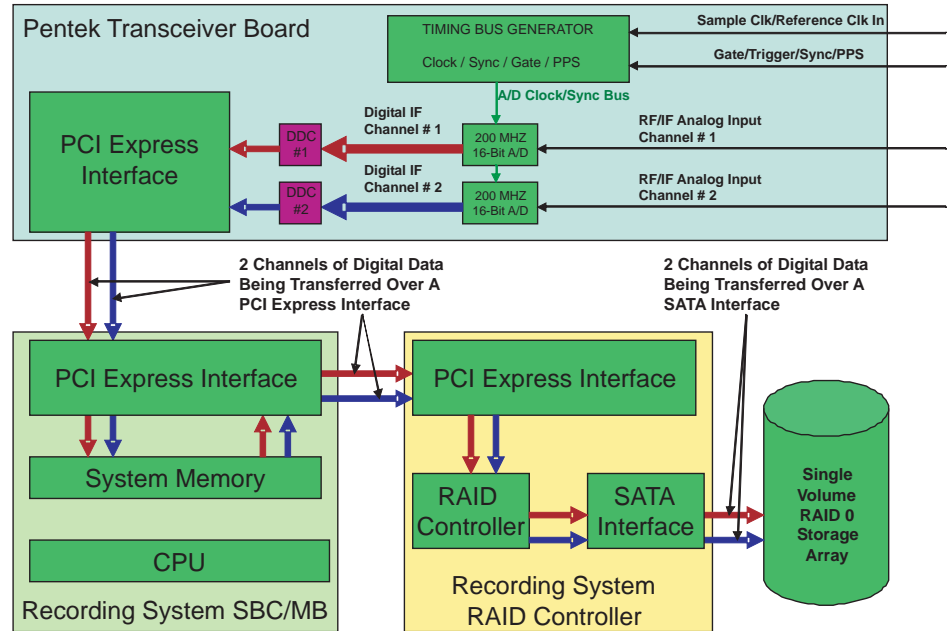
Advanced signal analysis capabilities include automatic calculators for signal amplitude and frequency, second and third harmonic components, THD (total harmonic distortion) and SINAD (signal to noise and distortion). With time and frequency zoom, panning modes and dual, annotated cursors to mark and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

# Recording and Playback Dataflow

## Recording Dataflow

Shown in this diagram is the dataflow during a typical recording session. The Pentek Transceiver Board contains a 2-channel 200 MHz A/D for digitizing two input analog channels. The digitized outputs are downconverted by the two DDCs (Digital Downconverters) and moved on to the PC system memory via the PCI Express inter-

face. Both the DDCs and the PCIe interface are implemented in the board's FPGA. Data then moves from the system memory to the Recording System RAID Controller and is then recorded to disk via the SATA interface. DMA controllers conduct all data transfers, bypassing the CPU for guaranteed real-time operation.



## Playback Dataflow

During a playback session, data stored on disk moves through the SATA interface of the Playback System RAID Controller. From there, data is passed to the PC system memory through the PCIe interface and then to the Pentek Transceiver board through its PCIe interface, all via hardware DMA controllers for real-time operation.

This board also contains DUCs (Digital Upconverters) which upconvert the data to the original IF frequency bands. Two 800 MHz D/As convert the data to analog form and provide signals that are identical to the analog signals that were originally recorded.

These can be further analyzed with any Windows-compatible analysis software.

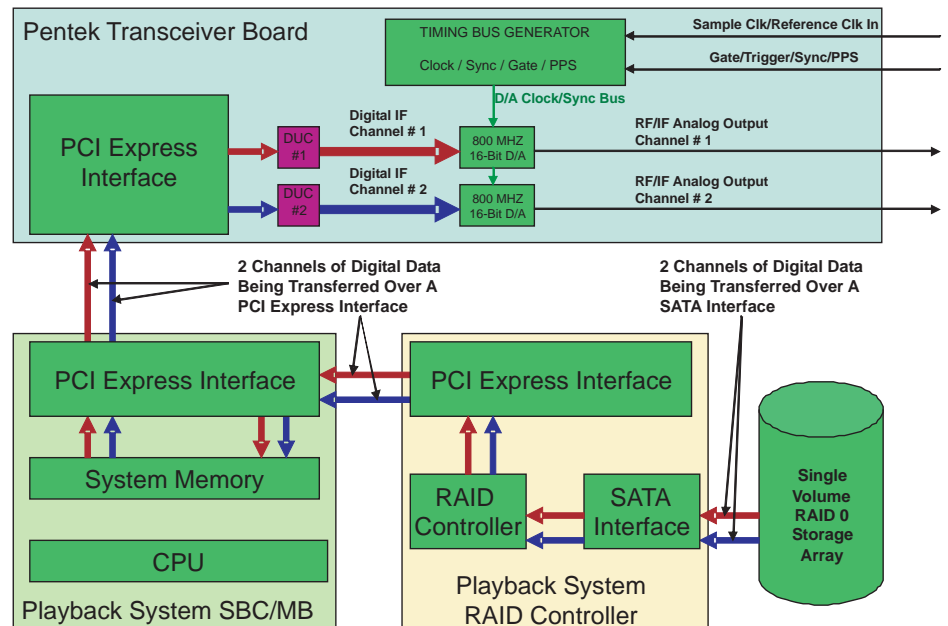






Figure 1. Rackmount RTX chassis is designed to meet or exceed Mil Specs.



Figure 2. Chassis View showing one QuickPac canister partially withdrawn.

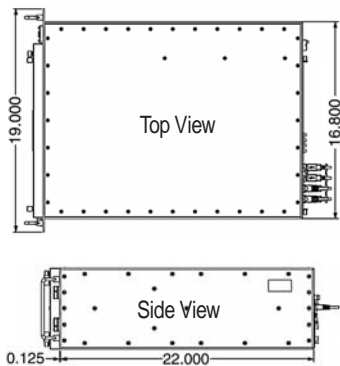


Figure 3. Dimensional drawings of the rackmount enclosure.

## Extreme Rackmount Recorders

Pentek's Talon® RTX Rackmount series recorders are designed to provide a combination of high performance and large storage capacity in a military-specified rackmount chassis. Designed for field operation, the RTX Rackmount series provides up to 30 TB of SSD storage with aggregate recording rates up to 5 GB/sec.

## Military Specifications

All Talon RTX rackmount recorders are designed to meet military specifications for temperature, altitude, shock, vibration, radiated emissions, conducted emissions, ESD, sand and dust.

The following list contains these military specifications.

- **Vibration:** MIL-STD-810F, method 514.5
- **Shock:** MIL-STD-810F, method 516.5
- **EMI/EMC:** MIL-STD-461E, CE101, CE102, CS101 CS114, RE101, RE102, RS101, RS103
- **ESD:** MIL-STD-1686A
- **Sand & Dust:** MIL-STD-810F, method 510

## Chassis Design

All Talon RTX rackmount chassis are specially designed using heavy-duty wrought aluminum extrusions to provide superior torsional strength. Extrusions are partially overlapped for superior EMC. The chassis is 4U in height, with a depth of only 22". A fully-loaded chassis weighs as little as 45 lb.

Rear-panel I/O includes bulk-head mounted SMA connectors, a 4-pin 38999 power connector as well as motherboard I/O. Rear-panels are modular and customizable allowing the end-user to specify the desired connectors.

The Operating System drive can be internally hard-mounted or can be made removable. Additionally an internally-mounted optical DVD writer is optional. All drives, OS, DVD and data drives are protected from dust with EMI filters.



Figure 4. The rear panel includes all analog signal connections and can be customized to suit the application requirements.

## QuickPac Canisters

In order to provide field engineers the ability to quickly remove and replace storage drives in the field, Pentek has developed the QuickPac™ canisters for use in the Talon RTX rackmount chassis. These canisters hold eight SSDs, providing up to 7.68 TB of storage capacity in each canister. Up to four QuickPac canisters can be installed in a Talon RTX rackmount chassis, providing a total storage capacity of 30 TB.

Fastened by four thumbscrews, QuickPac canisters can easily be swapped in the field, allowing users to replace those filled with data with new, empty ones with very little down time. QuickPac canisters can be transported to the lab for offload or analysis, using one of Pentek's Talon offload or playback systems.

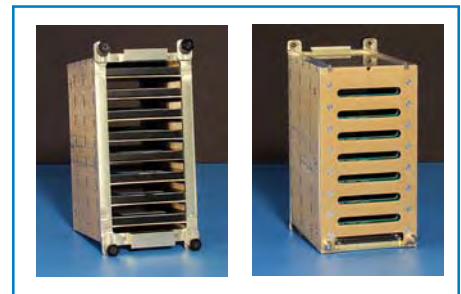


Figure 5. Front and rear view of the QuickPac canister showing the eight SSDs inside.

## Floating Inner Chassis

In order to withstand conditions of high vibration and shock, the RTX rackmount chassis is designed to isolate all critical system components by placing them on a floating inner chassis.

This inner chassis is suspended using multiaxis mounts that attenuate externally-transmitted shock and vibration energy. This allows the system to perform flawlessly in aircraft, ships, ground vehicles, UAVs or any other areas of high shock or vibration.

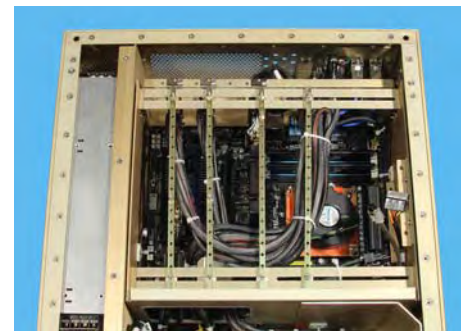


Figure 6. The inner chassis floats with respect to the outer enclosure to improve isolation from shock and vibration.



**Cooling and Filtering**

Every RTX recorder includes a high-powered forced air-cooling system, to allow the proper transfer of heat from hot system components out the back of the chassis. Cool air is pulled from the front of the system through the QuickPac drive packs and forced over the hottest system components to ensure optimal cooling.

High-powered fans can be controlled via system software to allow the system to

run quietly with lower cooling levels or at maximum air flow levels. This can be adjusted to match the user’s application.

Every RTX recorder includes filtering necessary to protect the system as well as the surrounding operating environment. EMI filters are placed on the front and rear of the chassis, to protect the surrounding environment from radiated emissions. A removable front panel filter protects the system against dust and sand.

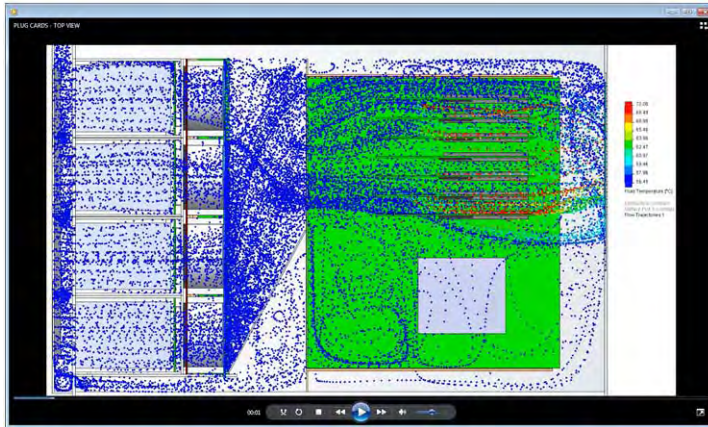


Figure 7. Airflow map shows the extensive ventilation provided to all components inside the RTX rackmount recorder.

**Modular Power Supply**

Every Talon RTX rackmount Recorder includes a 600 Watt, 85 – 264 V, 47– 400 Hz AC power supply. The power supply has an inline EMI filter to protect against conducted emissions and is isolated from the other electronics in the system, via an isolated chassis compartment. The 400 Hz rating allows every RTX rackmount recorder to operate in aircraft and other environments where smaller, 400 Hz generators are used. For applications that require DC power, 24 V and 28 V DC power supplies are available to replace the AC power supply.

**Talon Solutions Chart**

The chart below compares Pentek’s different Talon Recording System solutions. As seen here, the RTX Rackmount series

provide high performance and large storage capacity in a rugged package that meets high-level military specifications.

Talon Chassis Type	RTS-COTS Rackmount	RTR Portable	RTR Rackmount	RTX Rackmount	RTX 1/2 ATR
Dimensions (H"xW"xL")	7x19x26	13.4x16.9x9.5	7x19x21/26	7x19x22	8.1x7.1x16.5
Weight (lb)	60–85	30–35	45–85	45–60	30–35
Cooling	Forced-air	Forced-air	Forced-air	Forced-air	Conduction
Storage Drive Type	HDD	SSD	SSD	SSD	SSD
Max. Storage Capacity (TB)	60	7.6	38.4	30.7	3.8
Max. Record Rate (MB/sec)	1600	1600	5000	5000	500
Drive Removal	Individual (with trays)	Individual (no trays)	Individual (with trays)	QuickPac Canisters	Internal (needs disassembly)
Operating Temperature (deg C)	5 to 45	0 to 50	-10 to 55	-20 to 55	-40 to 71
Operating Altitude (ft)	10,000	10,000	10,000	15,000	65,000
Shock	–	15 g	15 g	MIL-STD-810F Method 516.5	MIL-STD-810F Method 516.5
Vibration	–	1.4 g 20–500 Hz	1.4 g 20–500 Hz	MIL-STD-810F Method 514.5	MIL-STD-810F Method 514.5
EMI/EMC	–	–	–	MIL-STD-461E CE101, CE102, CS101 CS114, RE101, RE102 RS101, RS103	MIL-STD-461E CE101, CE102, CS101 RE101, RE102, RS101
ESD	–	–	–	MIL-STD-1686A	–
Sand and Dust	–	–	–	MIL-STD-810F Method 510	MIL-STD-810F Method 510

Appendix A - System Specifications Summary

Parameter	Condition	Specification
Temperature	Operating	-20 <sup>0</sup> C to +55 <sup>0</sup> C
	Non-operating	-40 <sup>0</sup> C to +70 <sup>0</sup> C
Altitude	Operating	0 to 15,000 ft
	Non-operating	0 to 40,000 ft
Humidity	Operating	0-95%, non-condensing
Fungus	Operating	No fungus nutrient material shall be used
Shock	Operating	MIL-STD-810F, Method 516.5, Procedure I (functional shock), 20 g half sine, 12 msec in each axis
Vibration	Operating	MIL-STD-810F, Method 514.5, Procedure I
Airborne Noise	Operating	60 dBA max at 1 meter from the equipment
Structure-borne Noise	Operating	Maximum structure-borne noise per MIL-STD-704-2 is no greater than 60 dB one-third octave L <sub>a</sub> , (Type III)
Blowing Dust	Operating	The unit shall resume specified performance after exposed to settling-dust conditions defined in MIL-STD-810F, Method 510, Procedure II - See Note 1
Inclination Angles	Operating	The unit shall maintain specified performance when subjected to: <ul style="list-style-type: none"> <li>● A static pitch angle of ±5<sup>0</sup></li> <li>● A list angle of 15<sup>0</sup></li> <li>● A roll angle of 45<sup>0</sup></li> </ul>

Note 1: Standard maintenance includes cleaning of the dust filter(s) as required.

Appendix B - Emissions Specifications Summary

- CE101: Conducted Emissions, Power Leads, 30 Hz to 10 kHz
- CE102: Conducted Emissions, Power Leads, 10 kHz to 10 MHz
- CS101: Conducted Susceptibility, Power Leads, 30 Hz to 50 kHz
- CS114: Conducted Susceptibility, Bulk Cable Injection, 10 kHz to 400 MHz
- CS116: Conducted Susceptibility, Damped Sinusoidal Transients, Cable and Power Leads, 10 kHz to 100 MHz
- RE101: Radiated Emissions, Magnetic Field, 30 Hz to 100 kHz
- RE102: Radiated Emissions, Electric Field, 10 kHz to 18 GHz
- RS101: Radiated Susceptibility, Magnetic Field, 30 Hz to 100 kHz
- RS103: Radiated Susceptibility, Electric Field, 10 kHz to 40 GHz

*Specifications are subject to change without notice*



**Features**

- Single-channel multiband recording and playback system.
- 4U 19-inch industrial rackmount PC server chassis
- Windows® 7 Professional workstation with high-performance Intel® Core™ i3 processor
- 200 MHz max. 16-bit A/D sampling for recording
- 800 MHz max. 16-bit D/A sampling for playback
- 80 MHz recording and playback signal bandwidths
- Capable of record/playback of IF frequencies to 700 MHz
- Real-time aggregate recording rates up to 400 MB/sec
- 4 TB of data storage to NTFS RAID disk array
- SystemFlow® recording software with signal viewer analysis tool
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- DDC decimation and DUC interpolation range from 2 to 65,536
- Optional GPS time and position stamping

**General Information**

The Talon® RTV 2601 is a turnkey multi-band recording and playback system used for recording and reproducing signals with bandwidths up to 80 MHz. The RTV 2601 uses a 16-bit, 200 MHz A/D converter to provide real-time sustained recording rates to disk of up to 400 MB/sec. The A/D is complemented with a 16-bit 800 MHz D/A that provides the ability to reproduce signals captured in the field.

The RTV 2601 comes in a 4U 19 in. rackmount package that is 22.75 in. deep. Signal I/O is provided in the rear of the unit, while the hot-swappable data drives are available at the front. Air is pulled through the system from front to back allowing it to operate at ambient temperatures from 5 to 35 deg C.

The RTV 2601 includes a programmable digital downconverter so users can configure the system to capture signals with frequencies as low as 300 kHz and as high as 700 MHz. Corresponding signal bandwidths range from a few kilohertz to 80 MHz. A digital upconverter and D/A produce an analog output matching the recorded IF signal frequency.

The system includes a built-in sample clock synthesizer programmable to any desired frequency from 10 MHz to 200 MHz. This clock synthesizer can be locked to an external 10 MHz reference clock and has excellent phase noise characteristics. Alternately, the user can supply an external sample

clock to drive the A/D and D/A converters. The RTV 2601 also supports external triggering, allowing users to trigger a recording or playback on an external signal.

As an option, a GPS or IRIG receiver card can be supplied with the system providing accurate time stamping of recorded data. Additionally, the GPS receiver delivers GPS position information that can be recorded along with the analog input signal.

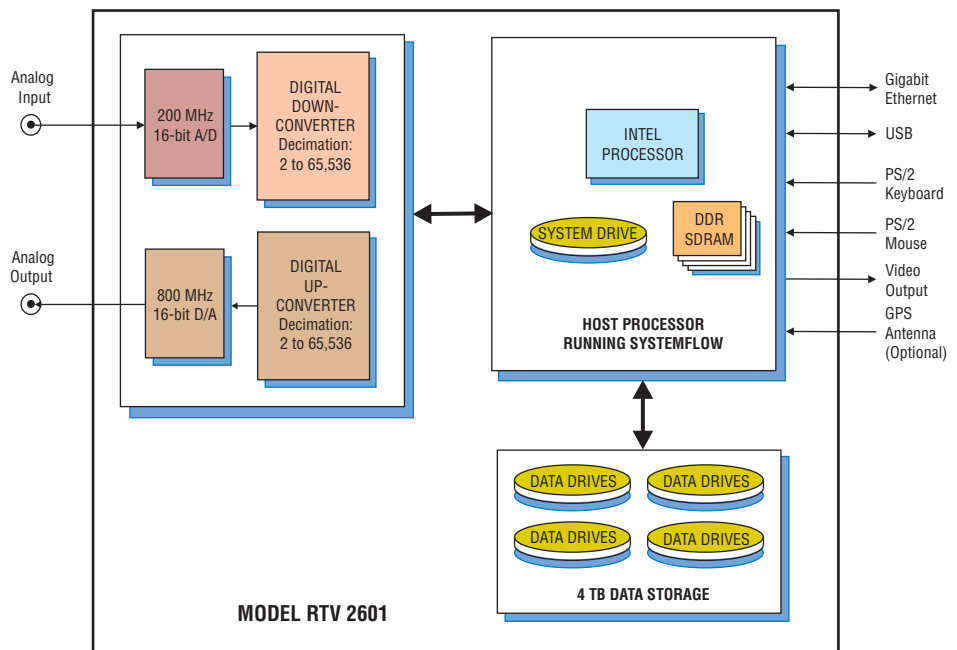
**SystemFlow Software and API**

The RTV 2601 includes the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the recorder.

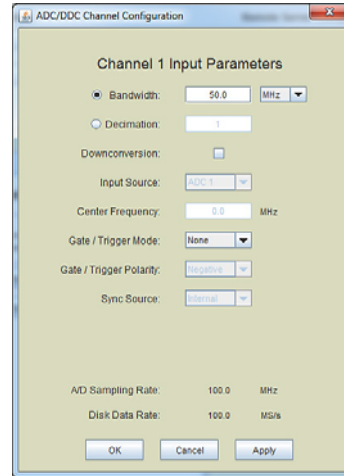
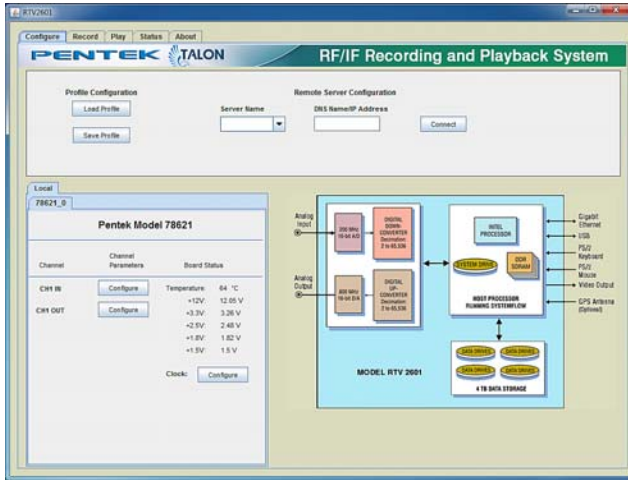
Custom configurations can be stored as profiles and later loaded when needed, so users can select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, for monitoring the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

In addition to the GUI, the RTV 2601 provides a C-callable API, which allows the user to integrate the recorder control into any application. A simple set of commands that provide configuration and control come with source code and examples to allow for an exceptionally fast integration. ➤



► SystemFlow Graphical User Interface

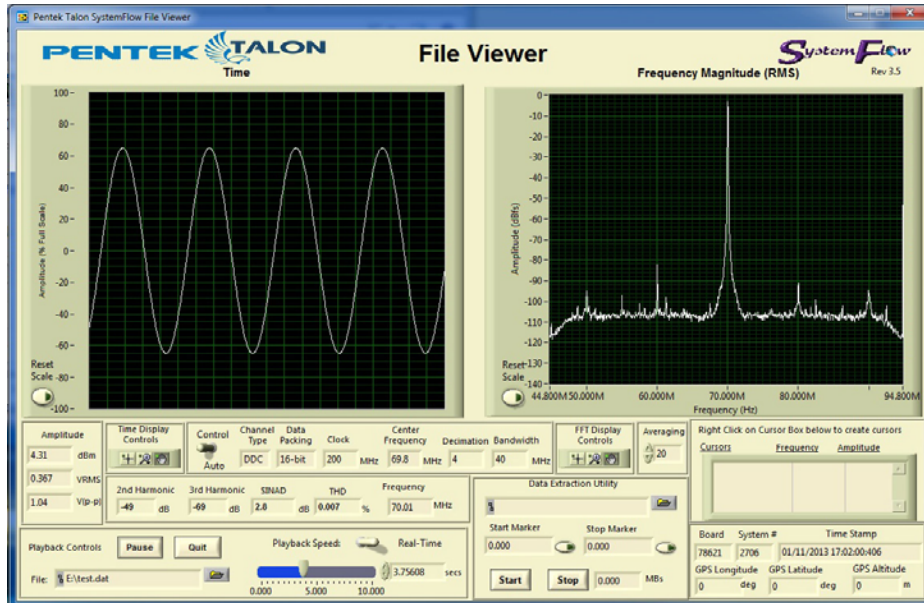


SystemFlow Recorder Interface

The RTV 2601 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 RTV 2601 Configure screens provide a simple and intuitive means for setting up the system parameters. The configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Signal Viewer

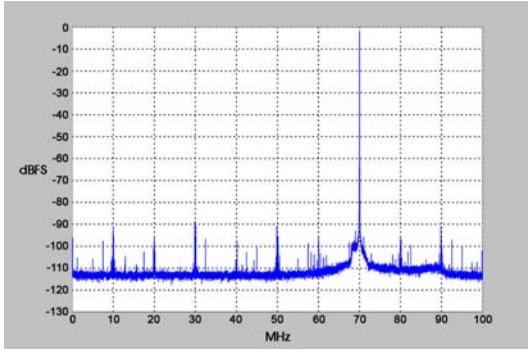
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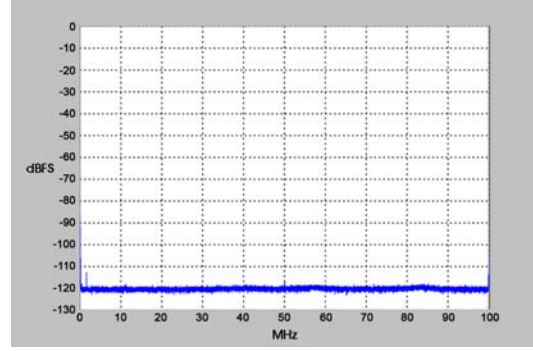
► A/D Performance

Spurious Free Dynamic Range



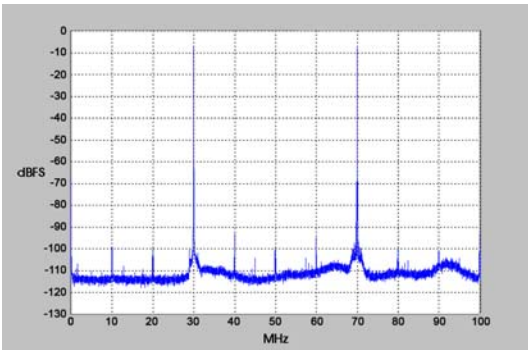
$f_{in} = 70 \text{ MHz}, f_s = 200 \text{ MHz}, \text{Internal Clock}$

Spurious Pick-up



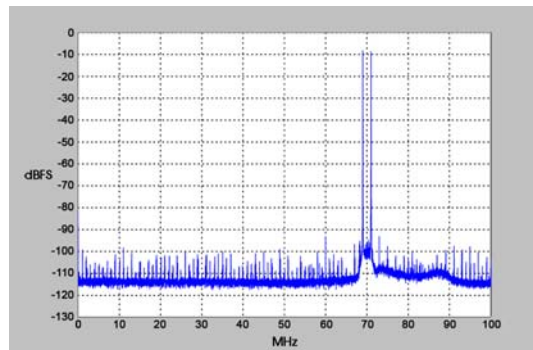
$f_s = 200 \text{ MHz}, \text{Internal Clock}$

Two-Tone SFDR



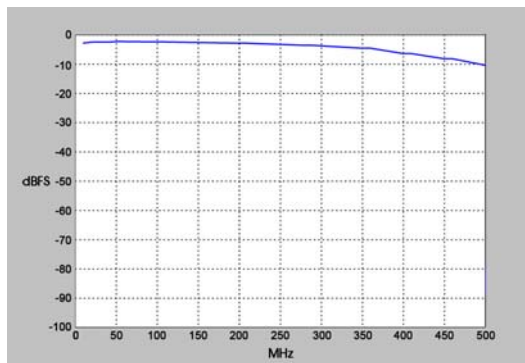
$f_1 = 30 \text{ MHz}, f_2 = 70 \text{ MHz}, f_s = 200 \text{ MHz}$

Two-Tone SFDR



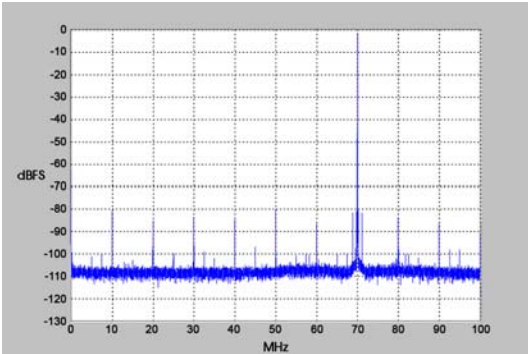
$f_1 = 69 \text{ MHz}, f_2 = 71 \text{ MHz}, f_s = 200 \text{ MHz}$

Input Frequency Response



$f_s = 200 \text{ MHz}, \text{Internal Clock}$

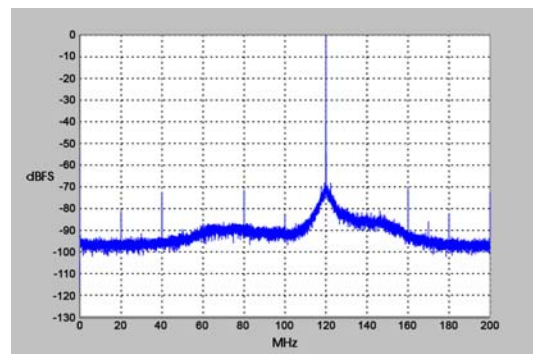
Spurious Free Dynamic Range



$f_{out} = 70 \text{ MHz}, f_s = 200 \text{ MHz}, \text{Internal Clock}$

D/A Performance

Spurious Free Dynamic Range



$f_{out} = 120 \text{ MHz}, f_s = 400 \text{ MHz}, \text{External Clock}$  ►

## ► System Architecture

Built on a Windows 7 Professional workstation, the RTV 2601 allows the user to install post-processing and analysis tools to operate on the recorded data. The recorder stores data in the native NTFS file system, providing immediate access to any installed Windows application. Alternately, the NTFS drive can be accessed remotely over the built-in gigabit Ethernet link from a remote Windows or Linux machine.

Recorded data can be off-loaded via the rear-panel gigabit Ethernet port, two front-panel USB 3.0 ports, two rear-panel USB 3.0 ports or four rear-panel USB 2.0 ports. A built-in DVD +/- R/RW drive allows the user to burn recorded data to disk. Hot-swappable front-panel drives can be easily removed and replaced with empty drives to provide additional data storage.

## Specifications

### PC Workstation (standard configuration)

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i3 processor

**Clock Speed:** 2.0 GHz or higher

**SDRAM:** 8 GB

### RAID

**Storage:** 4 TB

**Number of Drives:** Six, removable, front panel access

**Optical Drive:** DVD +/- R/RW, front panel access

**USB Ports:** Front panel: 2x USB 3.0; rear panel: 2x USB 3.0, 4x USB 2.0

**Ethernet:** Single 1GbE, rear panel

**Supported RAID Levels:** 0

### Analog Recording Input

#### Analog Signal Inputs

**Input Type:** Transformer-coupled, rear-panel female SSMC connectors

**Transformer Type:** Coil Craft WBC4-6TLB

**Full Scale Input:** +8 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### A/D Converters

**Type:** Texas Instruments ADS5485

**Sampling Rate ( $f_s$ ):** 10 MHz to 200 MHz

**Resolution:** 16 bits

**A/D Record Bandwidth:**  $f_s/2 =$  Nyquist bandwidth

**Anti-Aliasing Filter:** External, user-supplied

### Digital Downconverter

**Type:** Virtex-6 FPGA, Pentek DDC IP Core

**Decimation(D):** 2 to 65,536

**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits

**DDC Usable Bandwidth:**  $0.8 * f_s / D$

### Analog Recording Output

**Output Type:** Transformer-coupled, rear-panel female SSMC connector

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

### Digital Upconverter and D/As

**Interpolation:** 2 to 65,536

**Input Data Rate:** 250 MHz max.

**Bandwidth:** matches digital downconverter

**Output IF:** DC to 400 MHz

**Output Signal:** Analog, real or quadrature

**Output Sampling Rate:** 800 MHz max. with 2, 4 or 8 interpolation

**Resolution:** 16 bits

**Clock Sources:** Selectable from onboard programmable VCXO or external

### External Clocks

**Function:** Synthesizer reference clock (10 MHz typical) or A/D or D/A sample clock

**Type:** Rear-panel female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, 10 to 800 MHz

### Physical and Environmental

**Size:** 19" W x 22.75" D x 7" H

**Weight:** 50 lbs

**Operating Temp:** +5° to +35° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 5 to 95%, non-condensing

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

## Model RTV 2601 Options Information

### General Options

**Option -261** GPS time & position stamping

**Option -264** IRIG-B time stamping

*Specifications are subject to change without notice*



### Features

- Complete multiband recording and playback system
- 4U 19-inch industrial rack-mount PC server chassis
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- 200 MHz max. 16-bit A/D sampling for recording, up to eight channels
- 800 MHz 16-bit D/A sampling for playback, up to eight channels
- 80 MHz recording and playback signal bandwidths
- Capable of record/playback of IF frequencies to 700 MHz
- Real-time aggregate recording rates of up to 1.6 GB/sec
- Up to 100 terabytes storage to NTFS RAID disk array
- RAID levels of 0, 1, 5, 6, 10 and 50
- SystemFlow® GUI with signal viewer analysis tool
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- DDC decimation and DUC interpolation range from 2 to 65,536
- Optional GPS time and position stamping

Contact factory for options, number and type of analog channels, recording rates, and disk capacity.

### General Information

The Talon® RTS 2706 is a turnkey, multi-band recording and playback system for recording and reproducing high-bandwidth signals. The RTS 2706 uses 16-bit, 200 MHz A/D converters and provides sustained recording rates up to 1.6 GB/sec in four-channel configuration.

The RTS 2706 uses Pentek's high-powered Virtex-6-based Cobalt® modules, that provide flexibility in channel count, with optional digital downconversion capabilities. Optional 16-bit, 1.25 GHz D/A converters with digital upconversion allow real-time reproduction of recorded signals.

A/D sampling rates, DDC decimations and bandwidths, D/A sampling rates and DUC interpolations are among the GUI-selectable system parameters, providing a fully-programmable system capable of recording and reproducing a wide range of signals.

Optional GPS time and position stamping allows the user to record this critical signal information.

### SystemFlow Software

The RTS 2706 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

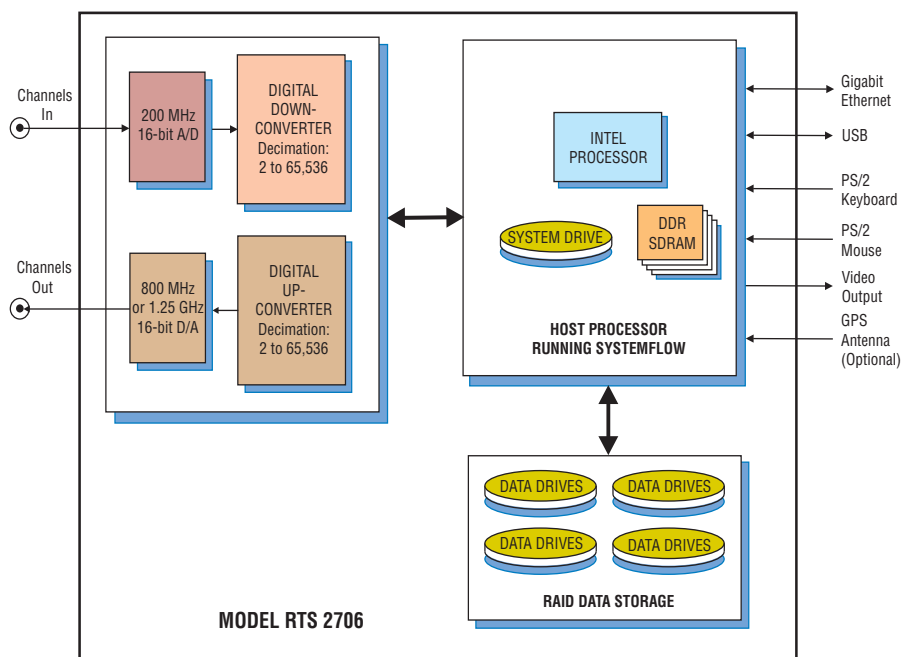
Built on a Windows 7 Professional workstation, the RTS 2706 allows the user to install post processing and analysis tools to operate on the recorded data. The RTS 2706 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports, six USB 2.0 ports or two eSATA ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

### Flexible Architecture

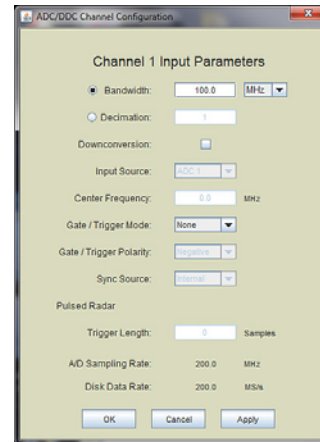
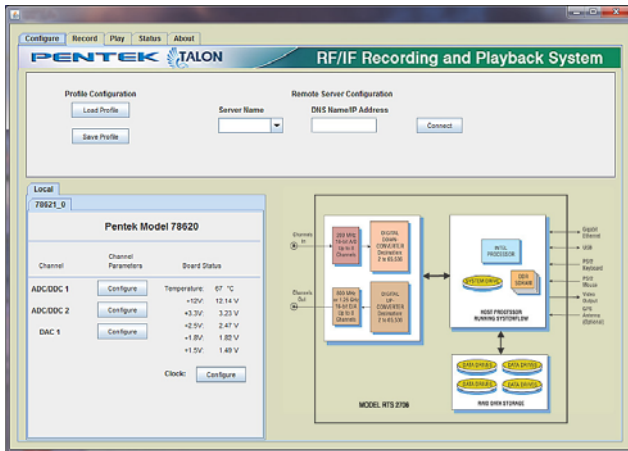
The RTS 2706 is configured in a 4U 19" rack-mountable chassis, with hot-swappable data drives, front panel USB ports and I/O connectors on the rear panel. Systems are scalable to accommodate multiple chassis to increase channel counts and aggregate data rates. All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50, provide a choice for the required level of redundancy. The hot-swappable HDDs provide storage capacities of up to 100 TB in a single 6U chassis. ➤





► SystemFlow Graphical User Interface

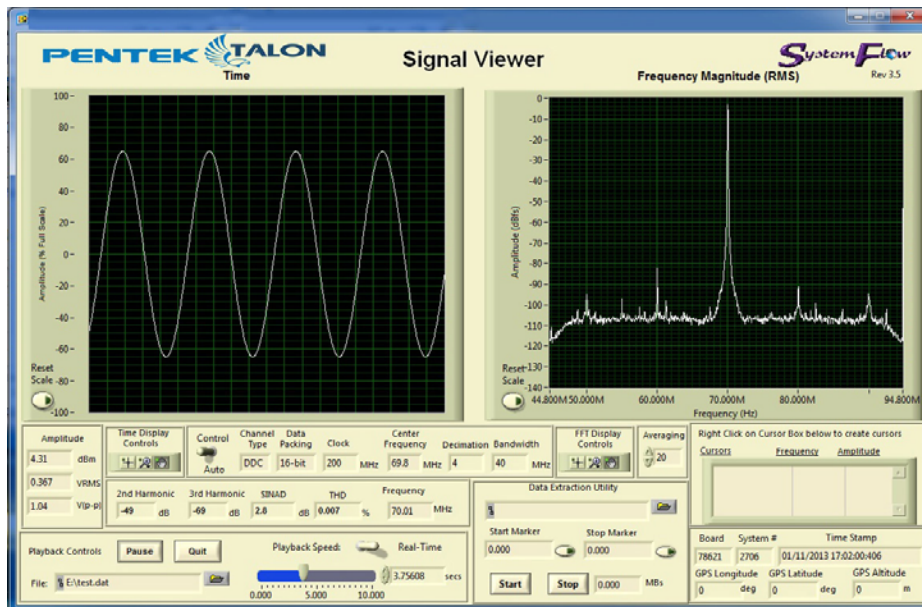


SystemFlow Recorder Interface

The RTS 2706 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 RTS 2706 Configure screens provide a simple and intuitive means for setting up the system parameters. The configuration screen shown here, provides entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Signal Viewer

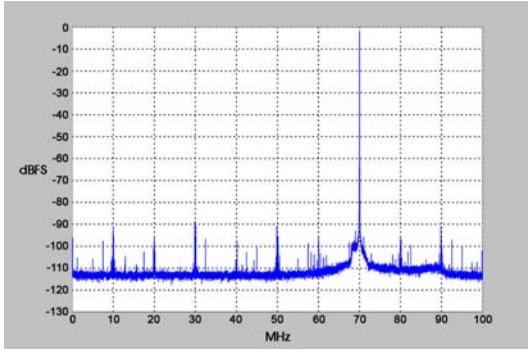
The SystemFlow Signal Viewer includes a virtual oscilloscope and spectrum analyzer for signal monitoring in both the time and frequency domains. It is extremely useful for previewing live inputs prior to recording, and for monitoring signals as they are being recorded to help ensure successful recording 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. ►



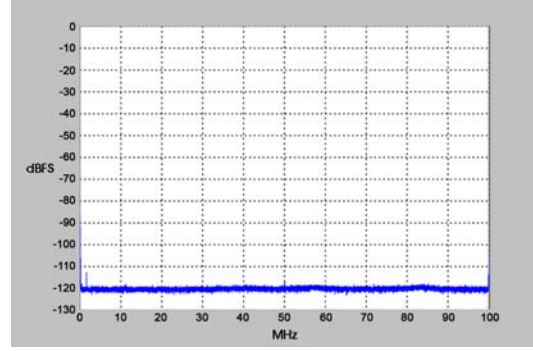
► A/D Performance

Spurious Free Dynamic Range



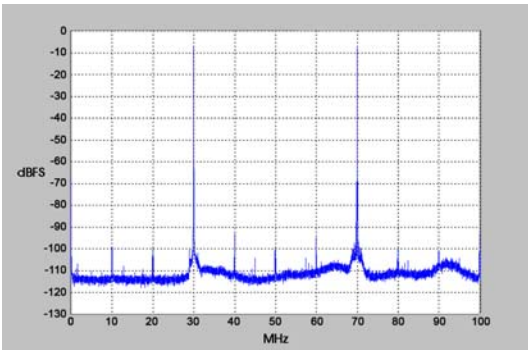
$f_{in} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Internal Clock

Spurious Pick-up



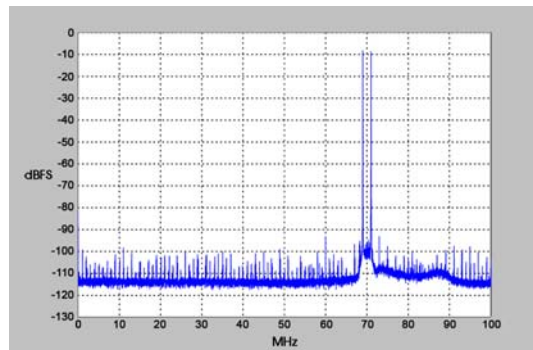
$f_s = 200 \text{ MHz}$ , Internal Clock

Two-Tone SFDR



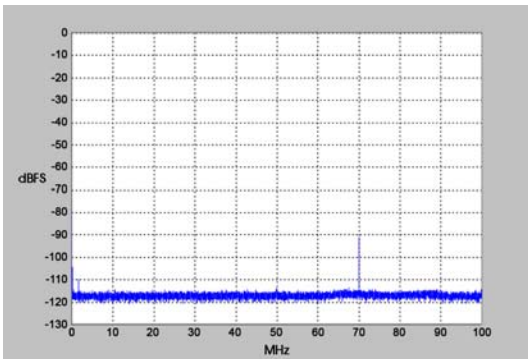
$f_1 = 30 \text{ MHz}$ ,  $f_2 = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$

Two-Tone SFDR



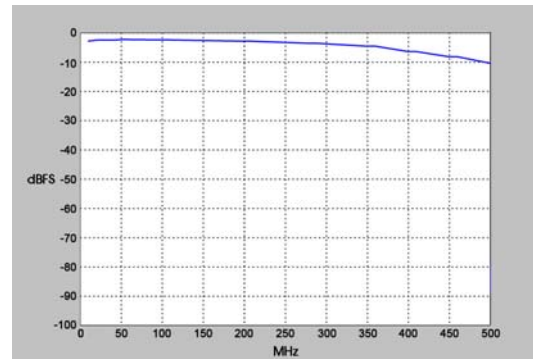
$f_1 = 69 \text{ MHz}$ ,  $f_2 = 71 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$

Adjacent Channel Crosstalk



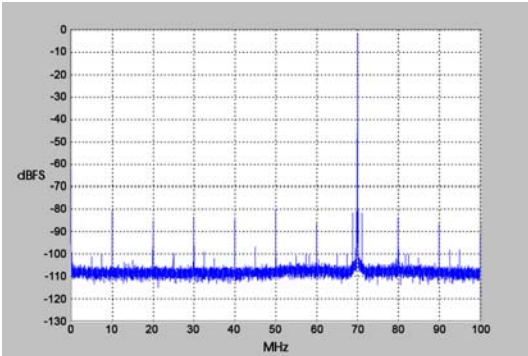
$f_{in \text{ Ch2}} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Ch 1 shown

Input Frequency Response



$f_s = 200 \text{ MHz}$ , Internal Clock

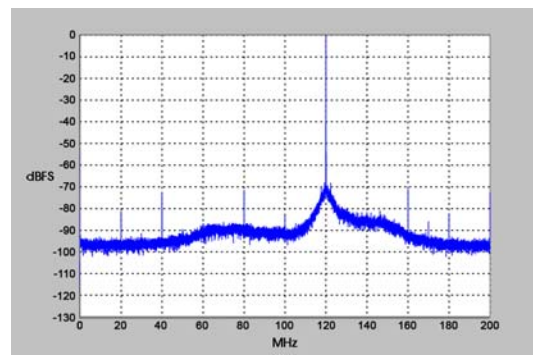
Spurious Free Dynamic Range



$f_{out} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Internal Clock

D/A Performance

Spurious Free Dynamic Range



$f_{out} = 120 \text{ MHz}$ ,  $f_s = 400 \text{ MHz}$ , External Clock

## ► Specifications

### PC Workstation (standard configuration)

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 2.0 GHz or higher

**SDRAM:** 6 GB

### RAID

**Storage:** 2–100 TB

**Supported RAID Levels:** 0, 1, 5, 6, 10 and 50

### Analog Recording Inputs/ Outputs

#### Analog Signal Inputs

**Input Type:** Transformer-coupled, front panel female SSMC connectors

**Transformer Type:** Coil Craft WBC4-6TLB

**Full Scale Input:** +8 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### A/D Converters

**Type:** Texas Instruments ADS5485

**Sampling Rate ( $f_s$ ):** 10 MHz to 200 MHz

**Resolution:** 16 bits

**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

#### Digital Downconverter

**Type:** Virtex-6 FPGA, Pentek DDC IP Core

**Decimation Range (D):** 2 to 65,536

**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits

**DDC Usable Bandwidth:**  $0.8 \cdot f_s / D$  (80 MHz max)

#### Analog Signal Outputs

**Output Type:** Transformer-coupled, front panel female SSMC connectors

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### Digital Upconverter and D/As

**Type:** TI DAC5688 and Pentek-installed interpolation IP core

**Interpolation:** 2 to 65,536

**Input Data Rate:** 250 MHz max.

**Output IF:** DC to 400 MHz

**Output Signal:** Analog, real or quadrature

**Output Sampling Rate:** 800 MHz max. with 2, 4 or 8 interpolation

**Resolution:** 16 bits

**Clock Sources:** Selectable from onboard programmable VCXO, external or LVDS clocks

#### External Clocks

**Type:** Front panel female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, 10 to 200 MHz

**Multi-Recorder Sync/Gate Bus:** 26-pin connector, dual clock/sync/gate input/output LVDS buses; one sync/gate input TTL signal

#### Physical and Environmental

**Size:** 19" W x 26" D x 7" H

**Weight:** 60-85 lb

**Operating Temp:** +5° to +45° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 5 to 95%, non-condensing

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

## Model RTS 2706 Ordering Information and Options

### Channel Configurations

<b>Option -201</b>	1-channel recording
<b>Option -202</b>	2-channel recording
<b>Option -203</b>	3-channel recording
<b>Option -204</b>	4-channel recording
<b>Option -208</b>	8-channel recording
<b>Option -221</b>	1-channel playback
<b>Option -222</b>	2-channel playback
<b>Option -224</b>	4-Channel playback
<b>Option -228</b>	8-Channel playback

### Storage Options

<b>Option -406</b>	2.0 TB HDD storage capacity
<b>Option -411</b>	4.0 TB HDD storage capacity
<b>Option -416</b>	8.0 TB HDD storage capacity
<b>Option -421</b>	16.0 TB HDD storage capacity
<b>Option -423</b>	20.0 TB HDD storage capacity
<b>Option -439</b>	30.0 TB HDD storage capacity
<b>Option -450</b>	45.0 TB HDD storage capacity
<b>Option -460</b>	60.0 TB HDD storage capacity
<b>Option -480</b>	100.0 TB HDD storage capacity

**Note:** Options -450 and -460 require a 5U Chassis; Option -480 requires a 6U chassis

### General Options (append to all options)

<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications subject to change without notice



## Features

- Designed to operate under conditions of shock and vibration
- Portable system measuring 16.9" W x 9.5" D x 13.4" H
- Lightweight: approximately 30 pounds
- Rugged aluminum alloy chassis
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- Recording and playback of IF signals up to 700 MHz
- 80 MHz record and playback signal bandwidths
- 200 MHz 16-bit A/Ds
- 800 MHz 16-bit D/As
- SFDR > 80 dBFS
- Real-time aggregate recording rates up to 2.4 GB/sec
- Up to of 7.6 TB storage with hot-swappable SSD drives
- NTFS file format
- SystemFlow® GUI with Signal Viewer analysis tool
- File headers include time stamping and recording parameters
- Ideal for communications, radar, wireless, SIGINT, telecom and satcom
- Optional GPS time and position stamping
- Complete high-performance Windows® workstation

Contact the factory for options, for number and type of analog channels, recording rates, and disk capacity.

## General Information

The Talon® RTR 2726 is a turnkey, multi-band recording and playback system that allows the user to record and reproduce high-bandwidth signals with a lightweight, portable and rugged package. The RTR 2726 provides aggregate recording rates of up to 2.4 GB/sec and is ideal for the user who requires both portability and solid performance in a compact recording system.

The RTR 2726 is supplied in a small footprint portable package measuring only 16.9" W x 9.5" D x 13.4" H and weighing just 30 pounds. With measurements similar to a small briefcase, this portable workstation includes an Intel® Core™ i7 processor a high-resolution 17" LCD monitor, and a high-performance SATA RAID controller.

At the heart of the RTR 2726 are Pentek Cobalt® Series Virtex-6 software radio boards featuring A/D and D/A converters, DDCs (Digital Downconverters), DUCs (Digital Upconverters), and complementary FPGA IP cores. This architecture allows the system engineer to take full advantage of the latest technology in a turnkey system.

Optional GPS time and position stamping allows the user to record this critical signal information.

## SystemFlow Software

Included in this system is the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed,

allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

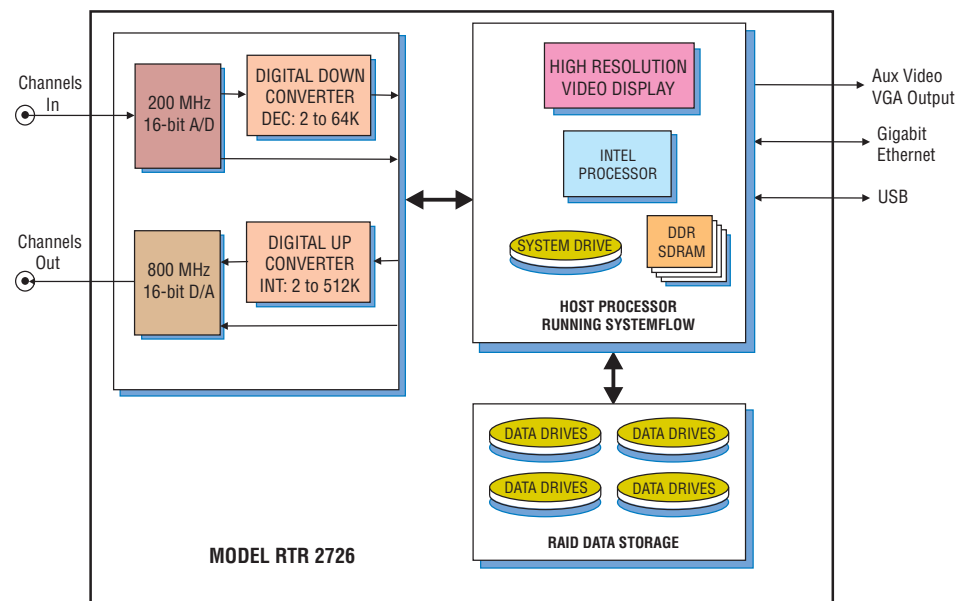
Built on a Windows 7 Professional workstation, the RTR 2726 allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2726 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded through two 1 Gb Ethernet ports, eight USB 2.0 ports or two eSATA ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

## Rugged & Flexible Architecture

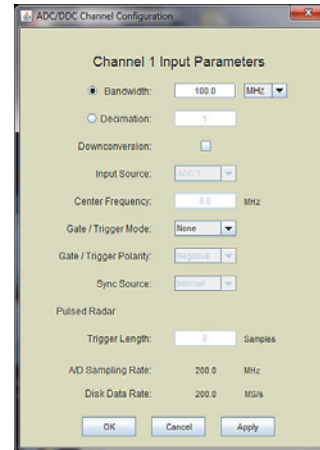
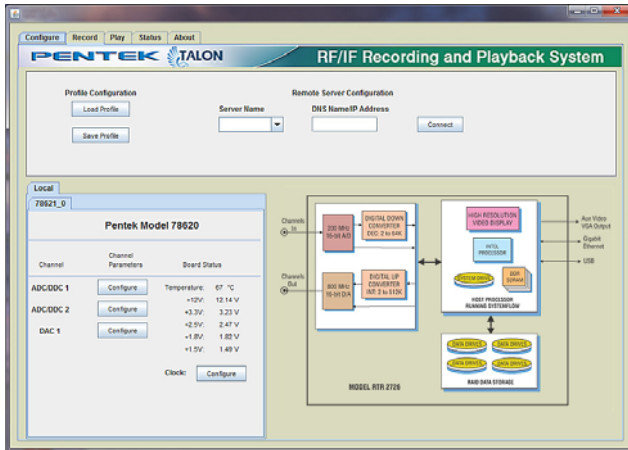
The RTR 2726 is configured in a portable, lightweight chassis with hot-swap SSDs, front panel USB ports and I/O connections on the side panel. It is built on an extremely rugged, 100% aluminum alloy unit, reinforced with shock absorbing rubber corners and an impact-resistant protective glass. Using shock- and vibration-resistant SSDs, the RTR 2726 is designed to reliably operate as a portable field instrument.

The hot-swappable SSDs provide storage capacities of up to 7.6 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0,1,5 and 6, provide a choice for the required level of redundancy. ▶





► SystemView Graphical User Interface

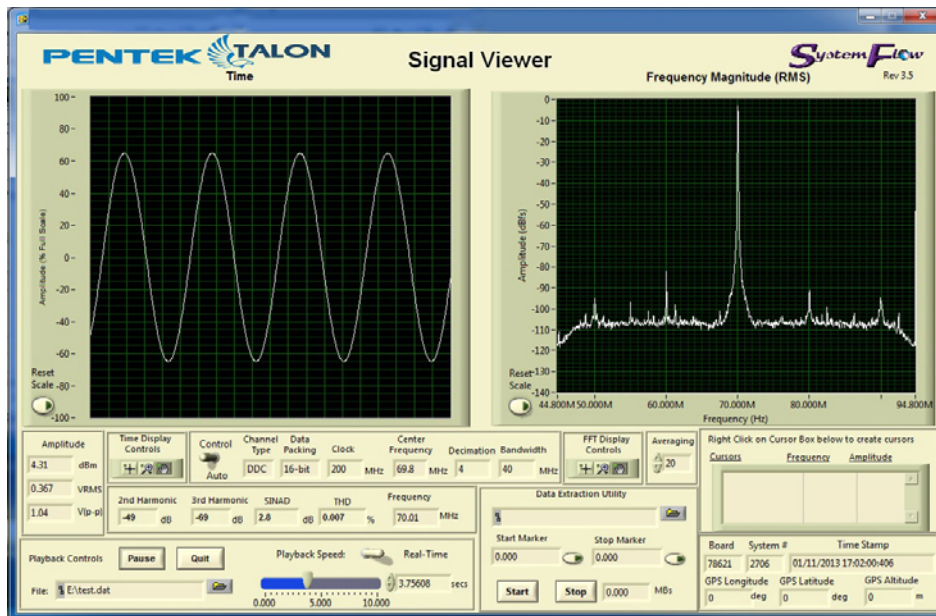


SystemFlow Recorder Interface

The RTR 2726 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 recorded signals on disk.

SystemFlow Hardware Configuration Interface

The RTR 2726's Configure screens provide a simple and intuitive means for setting up the system parameters. The DDC configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Signal Viewer

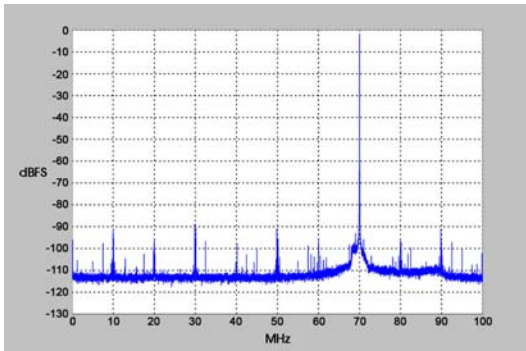
The SystemFlow Signal Viewer includes a virtual oscilloscope and spectrum analyzer for signal monitoring in both the time and frequency domains. It is extremely useful for previewing live inputs prior to recording, and for monitoring signals as they are being recorded to help ensure successful recording 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. ►



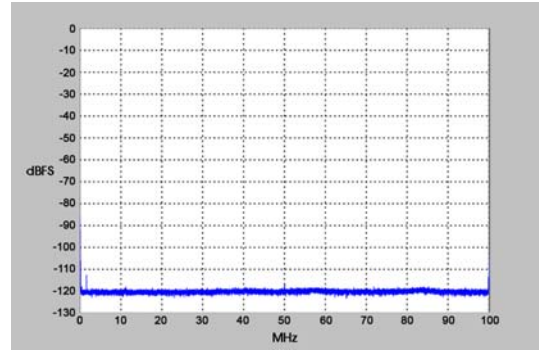
► A/D Performance

Spurious Free Dynamic Range



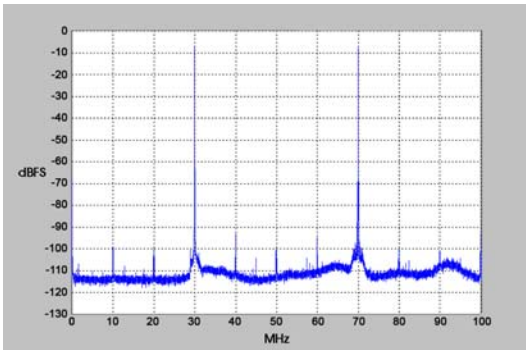
$f_{in} = 70 \text{ MHz}, f_s = 200 \text{ MHz}, \text{Internal Clock}$

Spurious Pick-up



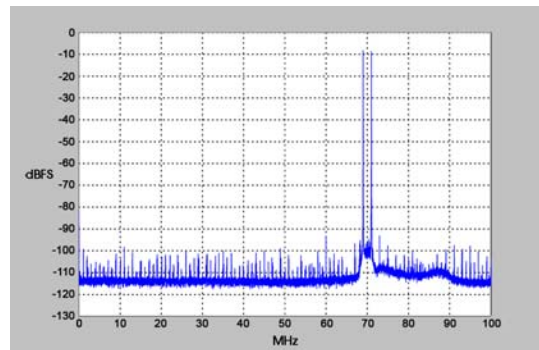
$f_s = 200 \text{ MHz}, \text{Internal Clock}$

Two-Tone SFDR



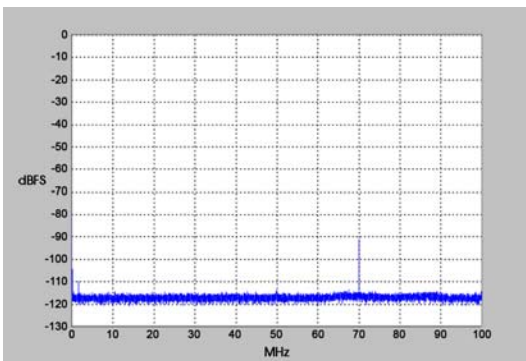
$f_1 = 30 \text{ MHz}, f_2 = 70 \text{ MHz}, f_s = 200 \text{ MHz}$

Two-Tone SFDR



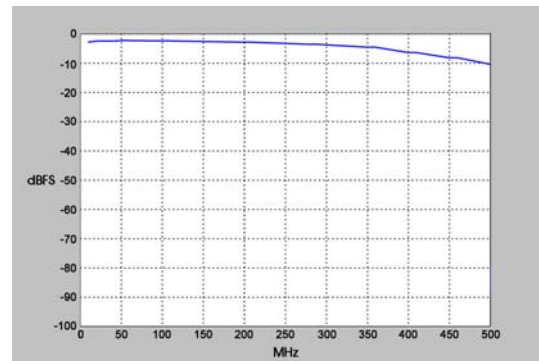
$f_1 = 69 \text{ MHz}, f_2 = 71 \text{ MHz}, f_s = 200 \text{ MHz}$

Adjacent Channel Crosstalk



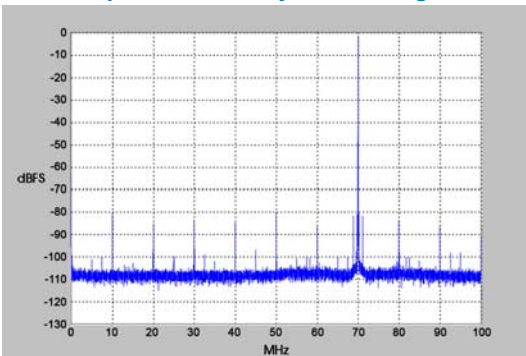
$f_{in \text{ Ch2}} = 70 \text{ MHz}, f_s = 200 \text{ MHz}, \text{Ch 1 shown}$

Input Frequency Response



$f_s = 200 \text{ MHz}, \text{Internal Clock}$

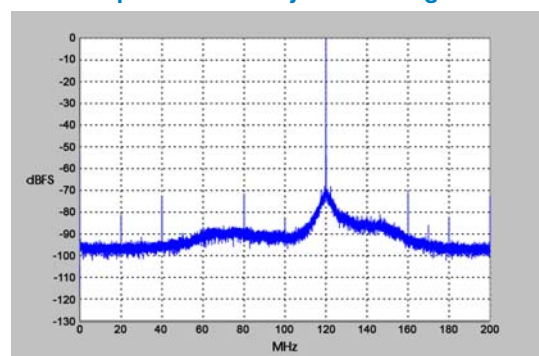
Spurious Free Dynamic Range



$f_{out} = 70 \text{ MHz}, f_s = 200 \text{ MHz}, \text{Internal Clock}$

► D/A Performance

Spurious Free Dynamic Range



$f_{out} = 120 \text{ MHz}, f_s = 400 \text{ MHz}, \text{External Clock}$

## Specifications

### PC Workstation (standard configuration)

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 2.0 GHz or higher

**Operating System Drive:** 128 GB SSD

**SDRAM:** 6 GB

**Monitor:** Built-in 17" high-resolution LCD  
1440 x 900 pixels, 200 nits

### RAID

**Total Storage:** 1.9, 3.8 or 7.6 TB

**Supported RAID Levels:** 0, 1, 5 and 6

**Drive Bays:** Hot-swap, removable, rear panel

**USB 2.0 Ports:** Eight (8) left side, two (2) front panel

**USB 3.0 Ports:** Two (2) left side

**1 Gb Ethernet Port:** One (1) left side

**eSATA 3 Ports:** Two (2) left side

**Aux Video Output:** 15-pin VGA left side

### Analog Recording Inputs

#### Analog Signal Inputs

**Quantity:** 1, 2, 3, or 4

**Input Type:** Transformer-coupled, female SSMC connectors

**Transformer Type:** Coil Craft WBC4-6TLB

**Full Scale Input:** +8 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### A/D Converters

**Type:** Texas Instruments ADS5485

**Sampling Rate ( $f_s$ ):** 10 MHz to 200 MHz

**Resolution:** 16 bits

**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

#### Digital Downconverter

**Type:** Virtex-6 FPGA, Pentek DDC IP Core

**Decimation (D):** 2 to 65,536

**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits

**DDC Usable Bandwidth:**  $0.8 * f_s / D$

**Bandwidth Range:** 2.5 kHz to 80 MHz at  $f_s = 200$  MHz

### Analog Playback Outputs

#### Analog Signal Outputs

**Quantity:** 1 or 2

**Output Type:** Transformer-coupled, female SSMC connectors

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### Digital Upconverter, Interpolator and D/As

**D/A Resolution:** 16 bits

**Output Signal:** Analog, real or quadrature

**Type:** TI DAC5688 and Pentek-installed IP core interpolator

**IP Core Interpolation:** 2 to 65,536

**DAC5688 Interpolation:** 2, 4 or 8

**Overall Interpolation:** 2 to 524,288

**Input Data Rate to DAC5688:** 250 MS/sec max.

**Output Sampling Rate:** 800 MHz max

**Output IF:** DC to 400 MHz

**Bandwidth Range:** Matches recording bandwidths

**Clock Sources:** Selectable from onboard programmable VCXO, external or LVDS clocks

#### External Clocks

**Type:** Female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, 10 to 200 MHz

### Physical and Environmental

**Dimensions:** 16.9" W x 9.5" D x 13.4" H

**Weight:** 30 lb, approximately

**Power:** 90 to 265 VAC, 50 - 60 Hz

**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.

## Model RTR 2726 Ordering Information and Options

### Channel Configurations

<b>Option -201</b>	1-channel recording
<b>Option -202</b>	2-channel recording
<b>Option -203</b>	3-channel recording
<b>Option -204</b>	4-channel recording
<b>Option -208</b>	8-channel recording
<b>Option -221</b>	1-channel playback
<b>Option -222</b>	2-channel playback
<b>Option -224</b>	4-Channel playback
<b>Option -228</b>	8-Channel playback

### Storage Options

<b>Option -405</b>	1.9 TB SSD storage capacity
<b>Option -410</b>	3.8 TB SSD storage capacity
<b>Option -415</b>	7.6 TB SSD storage capacity

### General Options (append to all options)

<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications subject to change without notice

New!

# Model RTR 2726A

# 200 MS/sec RF/IF Rugged Portable Recorder



### Features

- Designed to operate under conditions of shock and vibration
- Portable system measuring 16.0" W x 6.9" D x 13.0" H
- Lightweight, just less than 30 pounds
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 200 MHz 16-bit A/Ds
- 800 MHz 16-bit D/As
- 80 MHz record and playback signal bandwidths
- Recording and playback of IF signals up to 700 MHz
- Real-time sustained recording rates up to 3.2 GB/sec
- Windows® workstation with high performance Intel® Core™ i7 processor
- Up to 61 terabytes of SSD storage to NTFS RAID solid state disk array
- SystemFlow® GUI with Signal Viewer analysis tool
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Optional 10–36 VDC power supply

Contact the factory for options, for number and type of analog channels, recording rates, and disk capacity.

### General Information

The Talon® RTR 2726A is a turnkey, multiband recording and playback system that allows the user to record and reproduce high-bandwidth signals with a lightweight, portable and rugged package. The RTR 2726A provides sustained recording rates of up to 3.2 GB/sec in a four-channel system and is ideal for the user who requires both portability and solid performance in a compact recording system.

The RTR 2726A is supplied in a small footprint portable package measuring only 16.0" W x 6.9" D x 13.0" H and weighing just less than 30 pounds. With measurements similar to a small briefcase, this portable workstation includes an Intel Core i7 processor a high-resolution 17" LCD monitor, and up to 30.7 TB of SSD storage.

At the heart of the RTR 2726A are Pentek Cobalt® Series Virtex-6 software radio boards featuring A/D and D/A converters, DDCs (Digital Downconverters), DUCs (Digital Upconverters), and complementary FPGA IP cores. This architecture allows the system engineer to take full advantage of the latest technology in a turnkey system.

Optional GPS time and position stamping allows the user to record this critical signal information.

### SystemFlow Software

Included in this system is the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system. It also includes a C-callable API that allows users to easily integrate the Talon recorder into a larger system.

The GUI provides a very simple interface for system setup. This includes pull-down selections for a handful of parameters, a checkbox to enable/disable the DDC and a data-entry field for the sample rate. Once set up, the GUI provides the ability to save profiles that can be reloaded at the click of a button.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and spectrum analyzer.

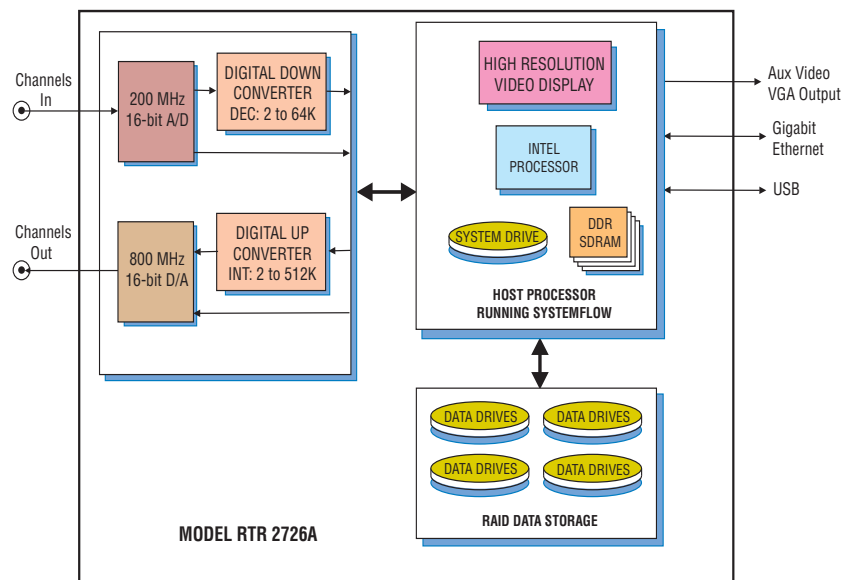
Built on a Windows 7 Professional workstation, the RTR 2726A allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2726A records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via gigabit Ethernet, USB 2.0 and USB 3.0 ports. Additionally, data can be copied to optical disk using the 8X double-layer DVD±R/RW drive.

Option -625 replaces the DVD±R/RW drive with a removable operating system drive; an external DVD drive can be used.

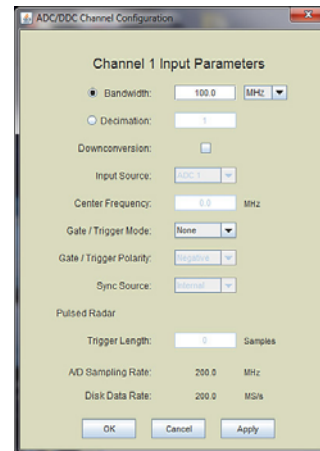
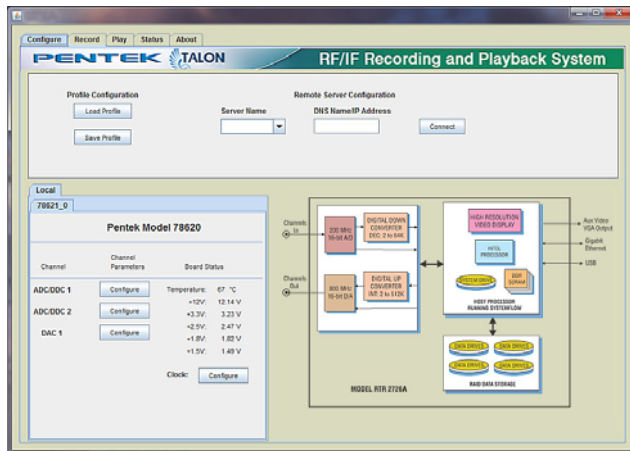
### Rugged Chassis with SSD Storage

The RTR 2726A is configured with hot-swappable SSDs, front panel USB ports, and I/O connectors on the side panel. It is built in an extremely rugged steel and aluminum chassis and is tested for shock and vibration. The SSDs provide storage capacities of up to 61.4 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0, 5, and 6, provide a choice for the required level of redundancy. ➤





► SystemView Graphical User Interface

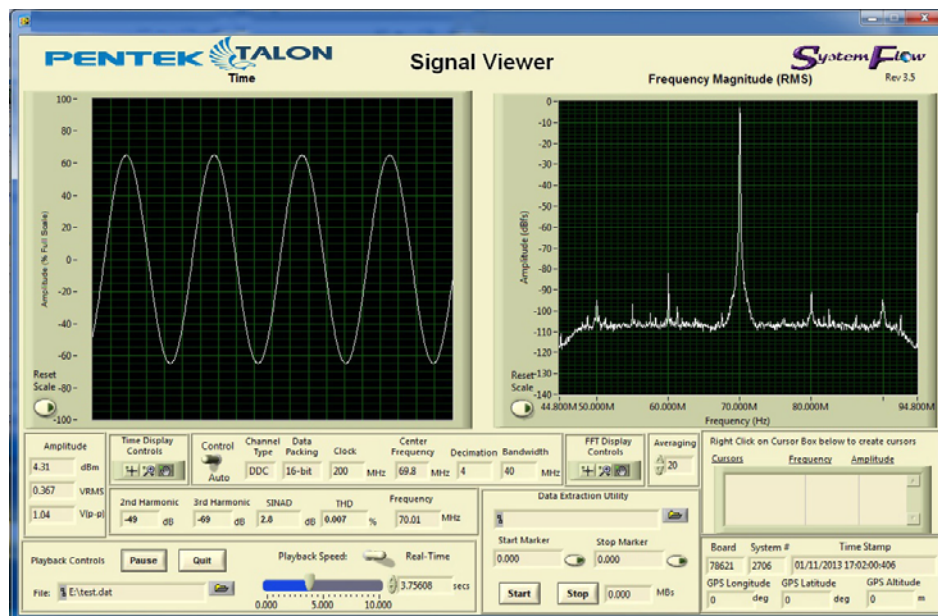


SystemFlow Recorder Interface

The RTR 2726A 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, playback 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 recorded signals on disk.

SystemFlow Hardware Configuration Interface

The RTR 2726A's Configure screens provide a simple and intuitive means for setting up the system parameters. The DDC configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Signal Viewer

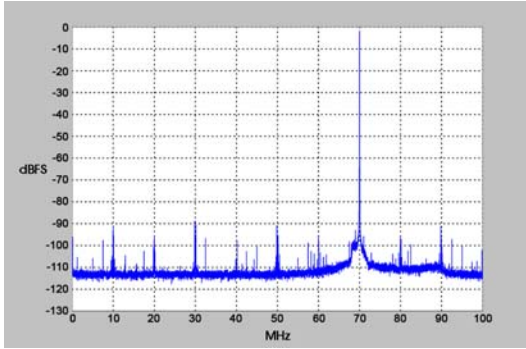
The SystemFlow Signal Viewer includes a virtual oscilloscope and spectrum analyzer for signal monitoring in both the time and frequency domains. It is extremely useful for previewing live inputs prior to recording, and for monitoring signals as they are being recorded to help ensure successful recording 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. ►



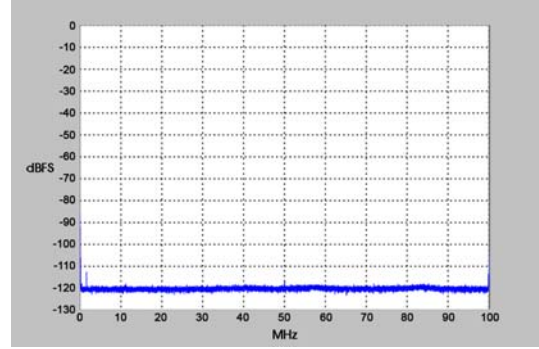
► A/D Performance

Spurious Free Dynamic Range



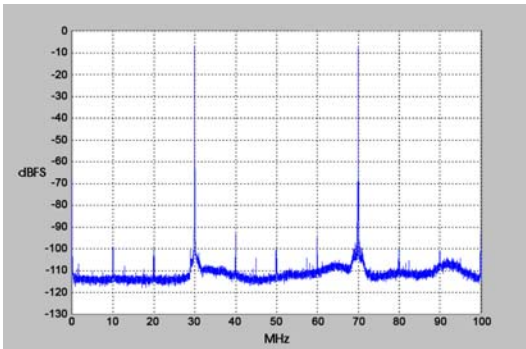
$f_{in} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Internal Clock

Spurious Pick-up



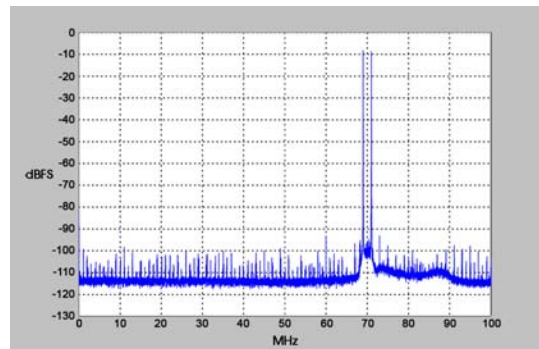
$f_s = 200 \text{ MHz}$ , Internal Clock

Two-Tone SFDR



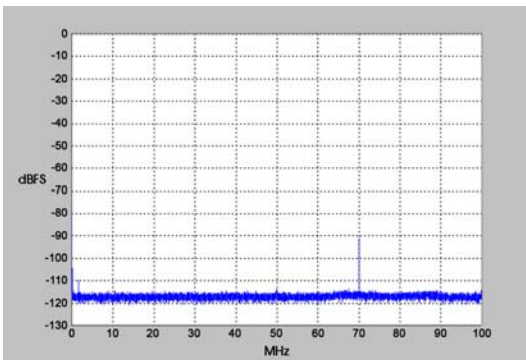
$f_1 = 30 \text{ MHz}$ ,  $f_2 = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$

Two-Tone SFDR



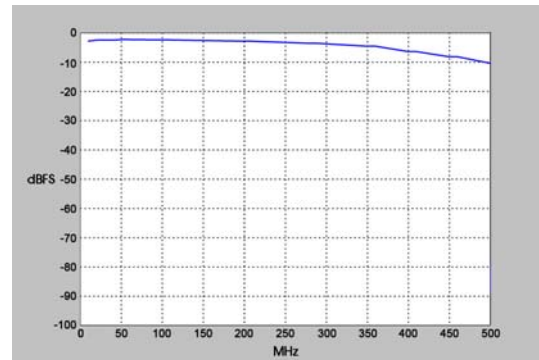
$f_1 = 69 \text{ MHz}$ ,  $f_2 = 71 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$

Adjacent Channel Crosstalk



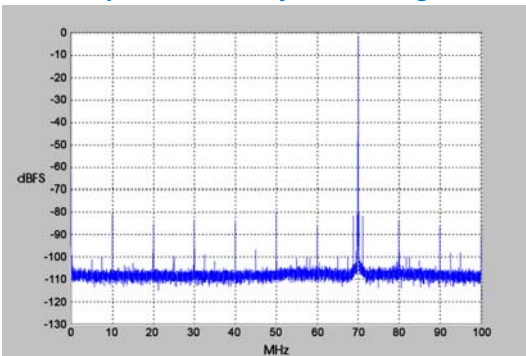
$f_{in Ch2} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Ch 1 shown

Input Frequency Response



$f_s = 200 \text{ MHz}$ , Internal Clock

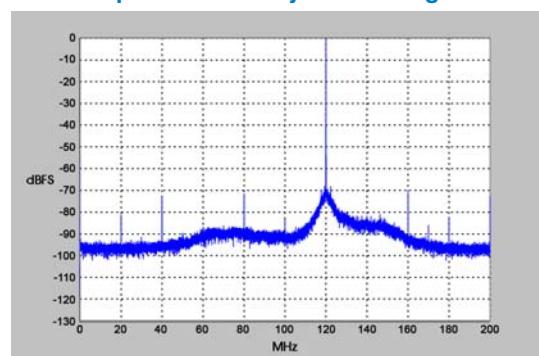
Spurious Free Dynamic Range



$f_{out} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Internal Clock

D/A Performance

Spurious Free Dynamic Range



$f_{out} = 120 \text{ MHz}$ ,  $f_s = 400 \text{ MHz}$ , External Clock

**Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows workstation  
**Processor:** Intel Core i7 processor  
**Clock Speed:** 3.0 GHz or higher  
**Operating System Drive:** 128 GB SSD  
**SDRAM:** 8 GB  
**Monitor:** Built-in 17.3" high-resolution LCD,  
 1920 x 1080 pixels, 16:9 aspect ratio, anti-glare surface  
 Brightness: 300 cd/m<sup>2</sup>; Contrast ratio: 400:1 typical

**RAID**

**Total Storage:** 3.8 TB – 61.4 TB  
**Supported RAID Levels:** 0, 5 and 6  
**Drive Bays:** Hot-swap, removable, side panel

**USB 2.0 Ports:** Four on left side, two on front panel  
**USB 3.0 Ports:** Two on left side  
**1 Gb Ethernet Ports:** Two on left side  
**Aux Video Output:** 15-pin VGA on left side

**Analog Signal Inputs**

**Connectors** 1, 2, 3, or 4 transformer-coupled, female SSMC  
**Transformer Type:** Coil Craft WBC4-6TLB  
**Full Scale Input:** +8 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**A/D Converters**

**Type:** Texas Instruments ADS5485  
**Sampling Rate ( $f_s$ ):** 10 MHz to 200 MHz  
**Resolution:** 16 bits  
**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth  
**Anti-Aliasing Filters:** External, user-supplied

**Digital Downconverter**

**Type:** Virtex-6 FPGA, Pentek DDC IP Core  
**Decimation (D):** 2 to 65,536  
**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits  
**DDC Usable Bandwidth:**  $0.8*f_s/D$

**Analog Signal Outputs**

**Connectors:** 1 or 2, transformer-coupled, female SSMC  
**Full Scale Output:** +4 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**Digital Upconverter, Interpolator and D/As**

**D/A Resolution:** 16 bits  
**Output Signal:** Analog, real or quadrature  
**Type:** TI DAC5688 and Pentek-installed IP core interpolator  
**IP Core Interpolation:** 2 to 65,536  
**DAC5688 Interpolation:** 2, 4 or 8  
**Overall Interpolation:** 2 to 524,288  
**Input Data Rate to DAC5688:** 250 MS/sec max.  
**Output Sampling Rate:** 800 MHz max  
**Output IF:** DC to 400 MHz  
**Bandwidth Range:** Matches recording bandwidths  
**Clock Sources:** Selectable from onboard programmable VCXO, external or LVDS clocks

**External Clocks**

**Type:** Female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, 10 to 200 MHz

**Optional DC Power supply**

**Voltage:** 10 to 36 VDC  
**Input Current:** 42 to 26 A (39 A at 24 VDC)  
**Inrush Current:** 100 A at 24 VDC  
**Temperature Range:** Oper.: 0° to 50° C, Store: -0° to 80° C  
**Efficiency:** >80% typical at 24 V full load  
**Power Good Signal:** On delay 100 to 500 msec  
**OverPower Protection:** 110% to 160%  
**Remote Control:** On/Off  
**Safety:** Meets UL, TUV, CB specifications

**Physical and Environmental**

**Size:** 16.0" W x 6.9" D x 13.0" H  
**Weight:** 30 lb max.  
**Operating Temp:** 0° to +50° C  
**Storage Temp:** -40° to +85° C  
**Relative Humidity:** 5 to 95%, non-condensing  
**Operating Shock:** 30 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  
**Non-operating Vibration:** 5 to 500 Hz: 2.06 g RMS  
**Power Requirements:** 100 to 240 VAC, 50 to 60 Hz, 500 W max.

**Model RTR 2726A Ordering Information and Options**

**Channel Configurations**

**Option -201** 1-Channel Recording  
**Option -202** 2-Channel Recording  
**Option -203** 3-Channel Recording  
**Option -204** 4-Channel Recording  
**Option -208** 8-Channel Recording  
**Option -221** 1-Channel Playback  
**Option -222** 2-Channel Playback  
**Option -224** 4-Channel playback  
**Option -228** 8-Channel playback

**Storage Options**

**Option -410** 3.8 TB SSD Storage  
**Option -415** 7.6 TB SSD Storage  
**Option -420** 15.3 TB SSD Storage  
**Option -430** 30.7 TB SSD Storage  
**Option -460** 61.4 TB SSD Storage  
**Option -681** 18 to 36 VDC Power Supply

**Additional Options**

**Option -261** GPS Time and Position stamping  
**Option -264** IRIG-B Time stamping  
**Option -285** Raid 5 Configuration  
**Option -286** Raid 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -311** 64 GB System Memory  
**Option -625** Removable Operating System Drive  
**Option -681** 10 to 36 VDC Power Supply

**Contact Pentek for compatible Option combinations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*



**Features**

- Designed to operate under conditions of shock and vibration
- 4U 19-inch rugged rackmount PC server chassis
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- 200 MHz max. 16-bit A/D sampling for recording, up to eight channels
- 80 MHz recording and playback signal bandwidths
- Capable of record/playback of IF frequencies to 700 MHz
- Real-time aggregate recording rates of up to 3.2 GB/sec
- Removable SSD drives
- Up to 46 terabytes of storage to NTFS RAID disk array
- RAID levels of 0 , 1 , 5 , 6 , 10 and 50
- SystemFlow® GUI with signal viewer analysis tool
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- DDC decimation and DUC interpolation range from 2 to 65,536
- Optional GPS time and position stamping

Contact factory for options, number and type of analog channels, recording rates, and disk capacity.

**General Information**

The Talon® RTR 2746 is a turnkey, multi-band record and playback system that is built to operate under harsh conditions. Designed to withstand high vibration and operating temperatures, the RTR 2746 is intended for military, airborne and UAV applications requiring a rugged system. With scalable A/Ds, D/As and SSD (Solid-State Drive) storage, the RTR 2746 can be configured to stream data to and from disk at rates as high as 3.2 GB/sec.

The RTR 2746 uses Pentek's high-powered Virtex-6-based Cobalt® boards, that provide flexibility in channel count with optional digital downconversion capabilities. Optional 16-bit, 1.25 GHz D/A converters with digital upconversion allow real-time reproduction of recorded signals.

A/D sampling rates, DDC decimations and bandwidths, D/A sampling rates, and DUC interpolations are among the GUI-selectable system parameters, providing a fully programmable system capable of recording and reproducing a wide range of signals.

Optional GPS time and position stamping allows the user to record this critical signal information.

**SystemFlow Software**

The RTR 2746 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system. Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

Built on a Windows 7 Professional workstation, the RTR 2746 allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2746 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded through two rear-access gigabit Ethernet ports or two USB 2.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

**Rugged and Flexible Architecture**

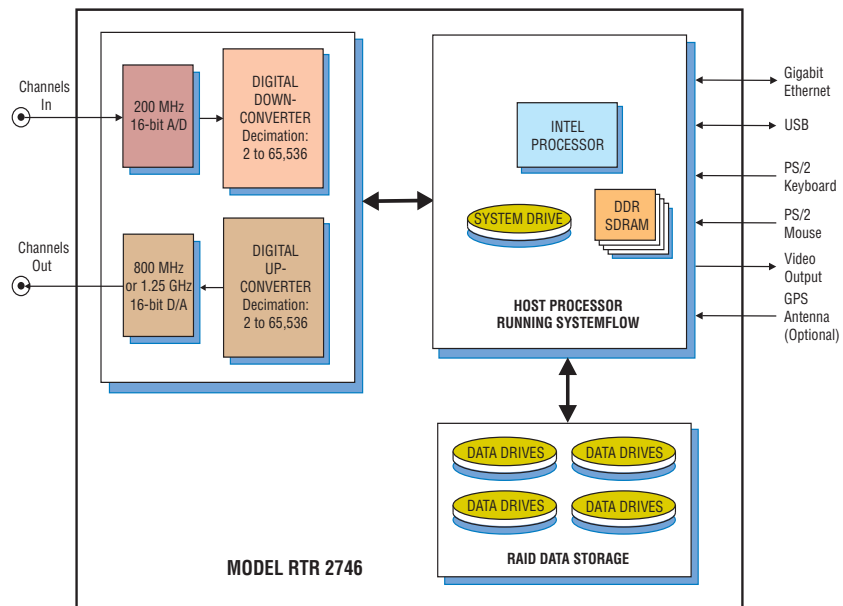
Because SSDs operate reliably under conditions of shock and vibration, the RTR 2746 performs well in ground, shipborne and airborne environments. The hot-swappable SSDs provide storage capacity of up to 46 TB. The drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

The RTR 2746 is configured in a 4U 19" 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.

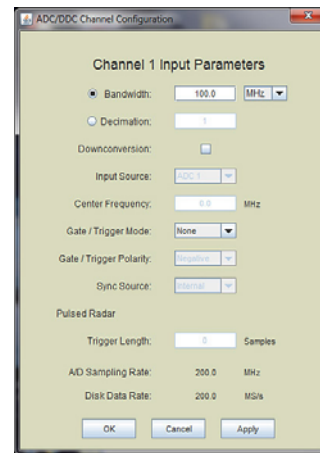
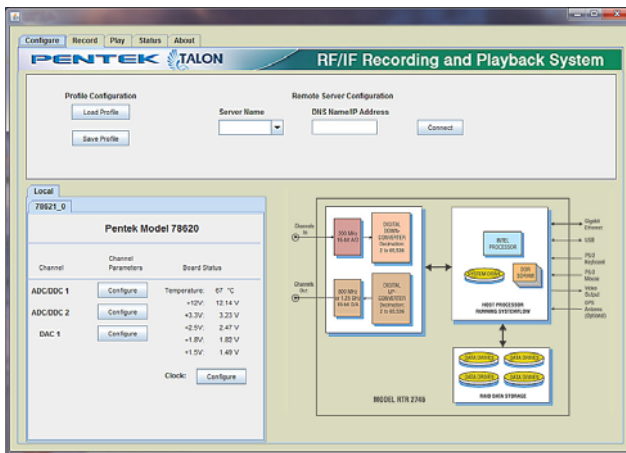
All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50, provide a choice for the required level of redundancy. ➤





► SystemFlow Graphical User Interface

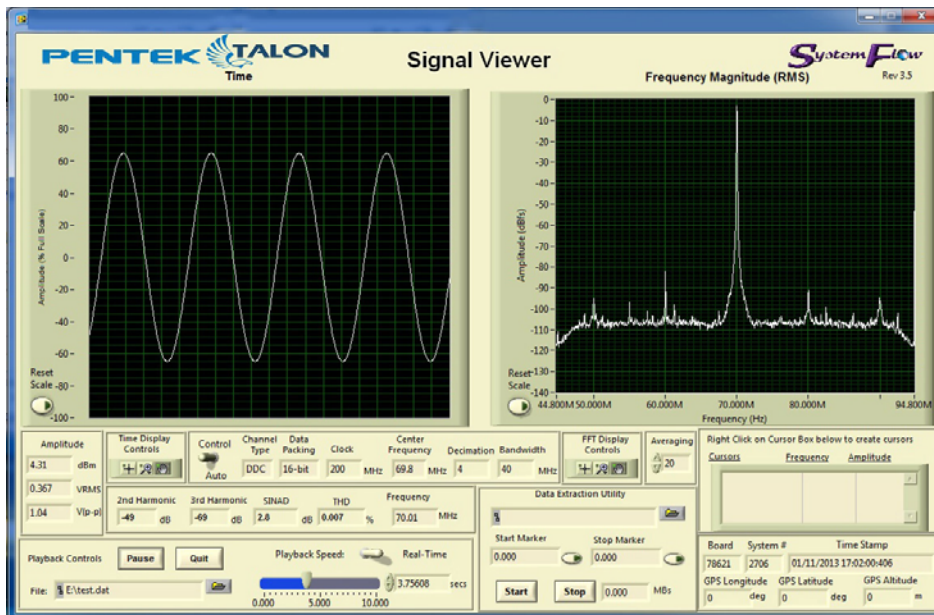


SystemFlow Recorder Interface

The RTR 2746 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 2746 Configure screens provide a simple and intuitive means for setting up the system parameters. The DDC configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Signal Viewer

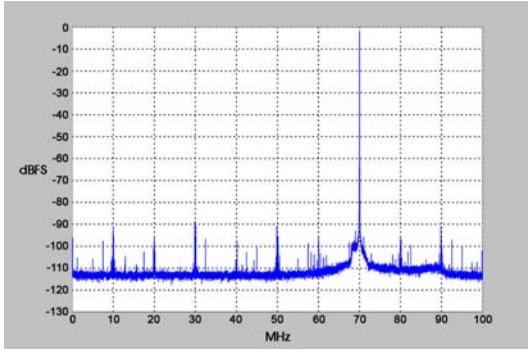
The SystemFlow Signal Viewer includes a virtual oscilloscope and spectrum analyzer for signal monitoring in both the time and frequency domains. It is extremely useful for previewing live inputs prior to recording, and for monitoring signals as they are being recorded to help ensure successful recording 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. ►



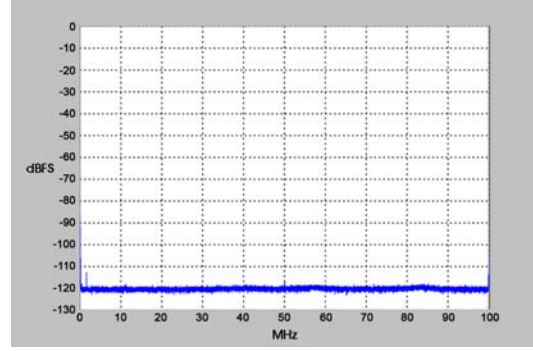
► A/D Performance

Spurious Free Dynamic Range



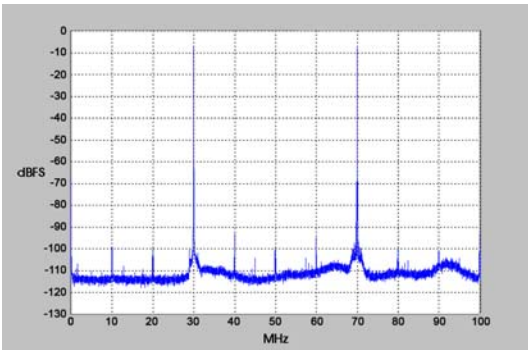
$f_{in} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Internal Clock

Spurious Pick-up



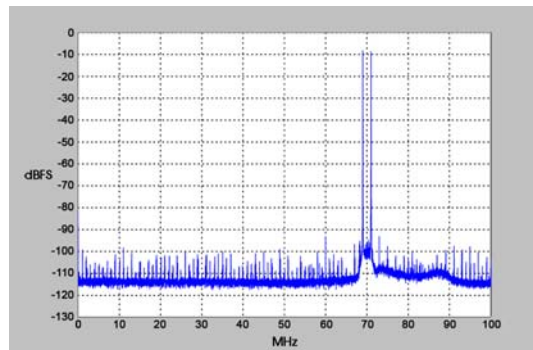
$f_s = 200 \text{ MHz}$ , Internal Clock

Two-Tone SFDR



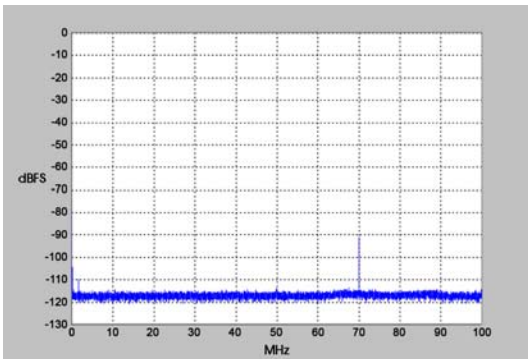
$f_1 = 30 \text{ MHz}$ ,  $f_2 = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$

Two-Tone SFDR



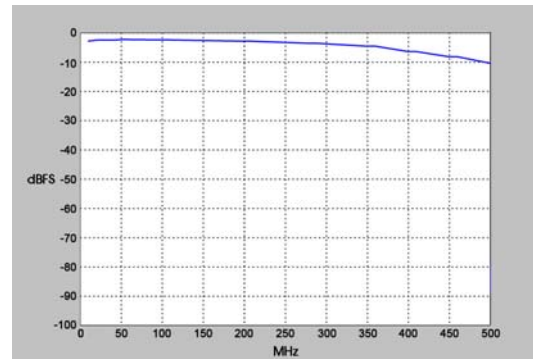
$f_1 = 69 \text{ MHz}$ ,  $f_2 = 71 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$

Adjacent Channel Crosstalk



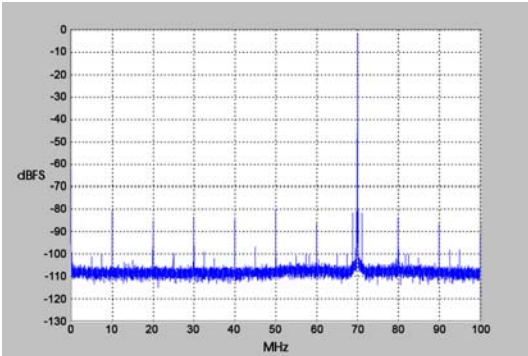
$f_{in \text{ Ch2}} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Ch 1 shown

Input Frequency Response



$f_s = 200 \text{ MHz}$ , Internal Clock

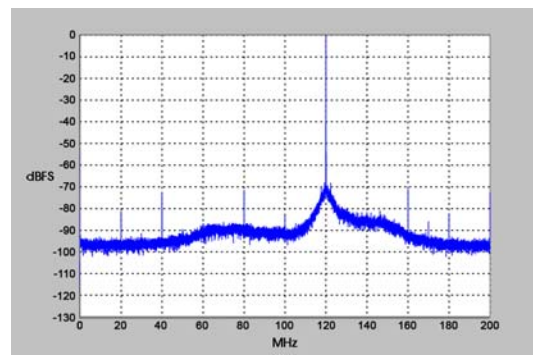
Spurious Free Dynamic Range



$f_{out} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Internal Clock

D/A Performance

Spurious Free Dynamic Range



$f_{out} = 120 \text{ MHz}$ ,  $f_s = 400 \text{ MHz}$ , External Clock

## ► Specifications

### PC Workstation (standard configuration)

**Operating System:** Windows7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 2.0 GHz or higher

**SDRAM:** 6 GB

#### RAID

**Storage:** 3.8, 7.6, 15.3, 30.7 or 46.0 TB

**Supported Levels:** 0, 1, 5, 6, 10 and 50

### Analog Recording Inputs

#### Analog Signal Inputs

**Input Type:** Transformer-coupled, front panel female SSMC connectors

**Transformer Type:** Coil Craft WBC4-6TLB

**Full Scale Input:** +8 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### A/D Converters

**Type:** Texas Instruments ADS5485

**Sampling Rate:** 10 MHz to 200 MHz

**Resolution:** 16 bits

**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

#### Digital Downconverter

**Type:** Virtex-6 FPGA Pentek DDC IP Core

**Decimation (D):** 2 to 65,536

**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits

**DDC Usable Bandwidth:**  $0.8*f_s/D$

### Analog Signal Outputs

**Output Type:** Transformer-coupled, front panel female SSMC connectors

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### Digital Upconverter and D/As

**Type:** TI DAC5688 and Pentek-installed interpolation IP core

**Interpolation:** 2 to 65,536

**Input Data Rate:** 250 MHz max.

**Output IF:** DC to 400 MHz

**Output Signal:** Analog, real or quadrature

**Output Sampling Rate:** 800 MHz max. with 2, 4 or 8 interpolation

**Resolution:** 16 bits

**Clock Sources:** Selectable from onboard programmable VCXO, external or LVDS clocks

#### External Clocks

**Type:** Front panel female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, 10 to 200 MHz

**Multi-Recorder Sync/Gate Bus:** 26-pin connector, dual clock/sync/gate input/output LVDS buses; one sync/gate input TTL signal

### Physical and Environmental

#### Dimensions

**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.

## Model RTR 2746 Ordering Information and Options

### Channel Configurations

<b>Option -201</b>	1-channel recording
<b>Option -202</b>	2-channel recording
<b>Option -203</b>	3-channel recording
<b>Option -204</b>	4-channel recording
<b>Option -208</b>	8-channel recording
<b>Option -221</b>	1-channel playback
<b>Option -222</b>	2-channel playback
<b>Option -224</b>	4-Channel playback
<b>Option -228</b>	8-Channel playback

### Storage Options

<b>Option -410</b>	3.8 TB SSD storage capacity
<b>Option -415</b>	7.6 TB SSD storage capacity
<b>Option -420</b>	15.3 TB SSD storage capacity
<b>Option -430</b>	30.7 TB SSD storage capacity
<b>Option -440</b>	46.0 TB SSD storage capacity

**Note:** Options -430 and -440 require a 26-inch deep chassis

### General Options (append to all options)

<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

*Specifications subject to change without notice*



## Features

- Designed to meet MIL-STD-810 shock and vibration
- Designed to meet EMC/EMI per MIL-STD-461 EMC
- 4U 19-inch rugged rackmount PC server chassis, 22" deep
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- 200 MHz max. 16-bit A/D sampling for recording, up to eight channels
- 800 MHz max. 16-bit D/A sampling for playback, up to eight channels
- 80 MHz record and playback signal bandwidths
- Capable of record/playback of IF frequencies to 700 MHz
- Real-time aggregate recording rates up to 3.2 GB/sec
- Up to four front-panel removable QuickPac SSD drive canisters with eight drives each
- Up to 30 terabytes of storage to NTFS RAID disk array
- 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® RTX 2766 is a turnkey, multi-band record and playback system that is built to operate under harsh conditions. Designed to withstand high vibration and operating temperatures, the RTX 2766 is intended for military, airborne and UAV applications requiring a rugged system. With scalable A/Ds, D/As and SSD (Solid-State Drive) storage, the RTX 2766 can be configured to stream data to and from disk at rates as high as 3.2 GB/sec

The RTX 2766 uses Pentek's high-powered Virtex-6-based Cobalt® boards that provide flexibility in channel count, with optional digital downconversion capabilities. Optional 16-bit, 800 MHz D/A converters with digital upconversion allow real-time reproduction of recorded signals.

A/D sampling rates, DDC decimations and bandwidths, D/A sampling rates and DUC interpolations are among the GUI-selectable system parameters, providing a fully-programmable system capable of recording and reproducing a wide range of signals.

Optional GPS time and position stamping allows the user to record this critical signal information.

## SystemFlow Software

The RTX 2766 includes the SystemFlow® Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed,

allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

Built on a Windows 7 Professional workstation, the RTX 2766 allows the user to install post-processing and analysis tools to operate on the recorded data. The RTX 2766 records data to the native NTFS file system, providing immediate access to the recorded data.

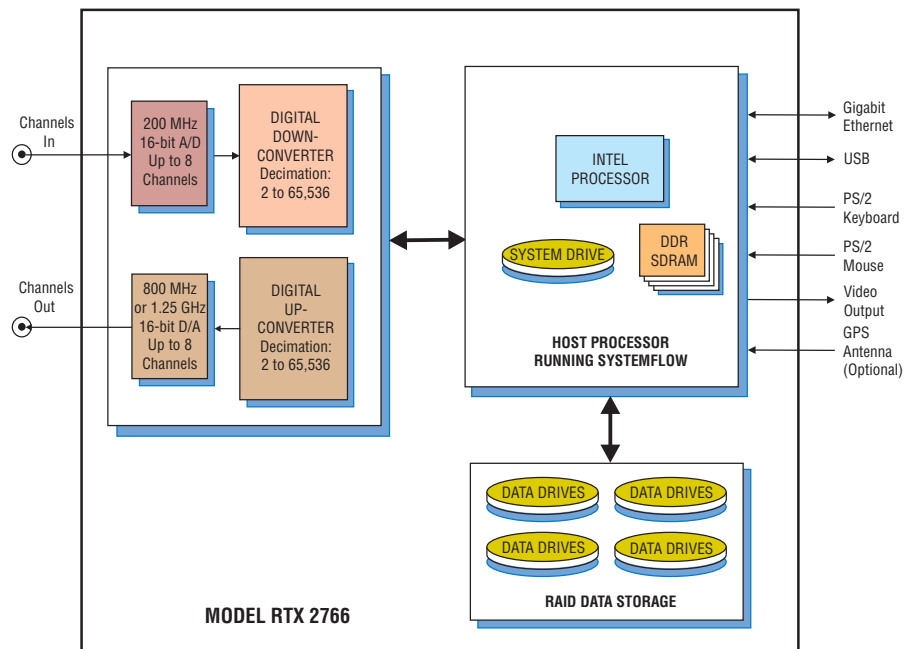
Data can be off-loaded via two rear-access gigabit Ethernet ports, two USB 3.0 ports or up to four USB 2.0 ports.

## Rugged Mil-Spec Chassis

The Talon RTX 2766 uses a shock- and vibration-isolated inner chassis and solid-state drives to assure reliability under harsh conditions. The chassis uses an in-line EMI filter along with rear-panel MIL-style connectors to meet MIL-STD-461 emissions specifications.

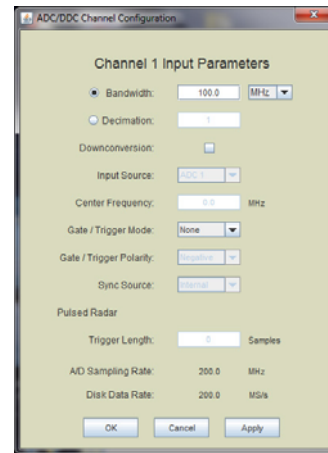
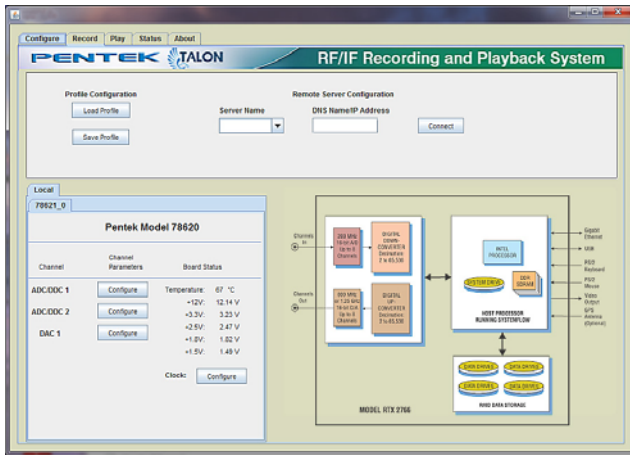
Up to four front-panel removable QuickPac drive canisters are provided, each containing up to eight SSDs. Each drive canister can hold up to 7.6 TB of data storage and allows for quick and easy removal of mission-critical data.

Forced-air cooling draws air from the front of the chassis and pushes it out the back via exhaust fans. A hinged front door with a serviceable air filter provides protection against dust and sand. ➤





► SystemFlow Graphical User Interface

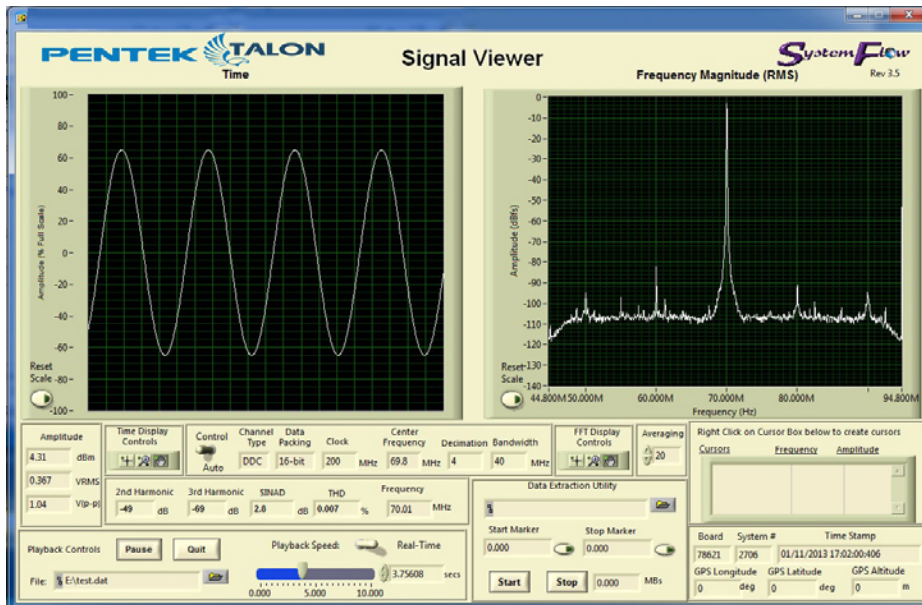


SystemFlow Recorder Interface

The RTX 2766 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 RTX 2766 Configure screens provide a simple and intuitive means for setting up the system parameters. The configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Signal Viewer

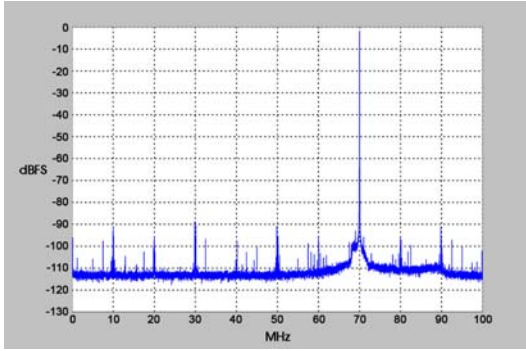
The SystemFlow Signal Viewer includes a virtual oscilloscope and spectrum analyzer for signal monitoring in both the time and frequency domains. It is extremely useful for previewing live inputs prior to recording, and for monitoring signals as they are being recorded to help ensure successful recording 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. ►



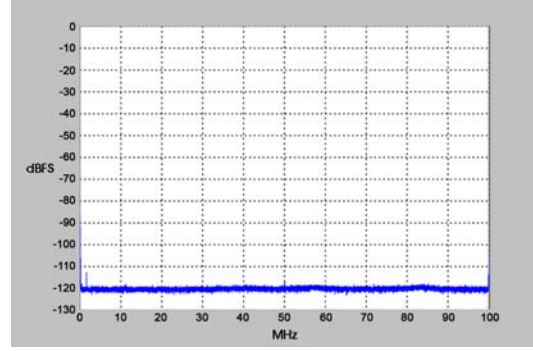
► A/D Performance

Spurious Free Dynamic Range



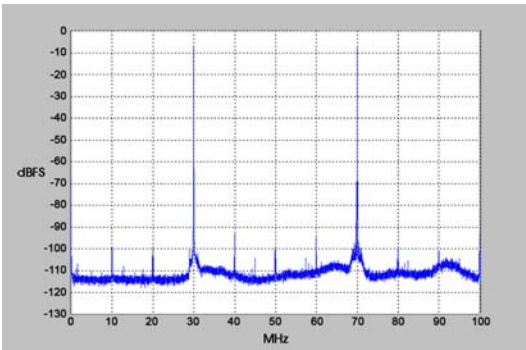
$f_{in} = 70 \text{ MHz}, f_s = 200 \text{ MHz}, \text{Internal Clock}$

Spurious Pick-up



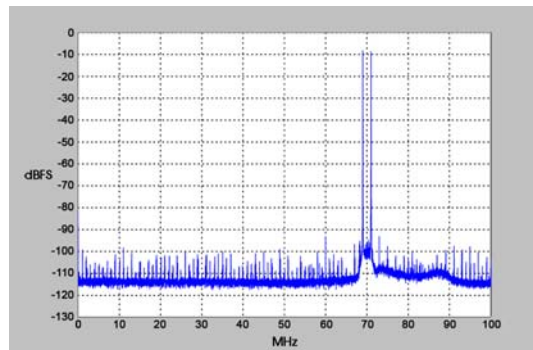
$f_s = 200 \text{ MHz}, \text{Internal Clock}$

Two-Tone SFDR



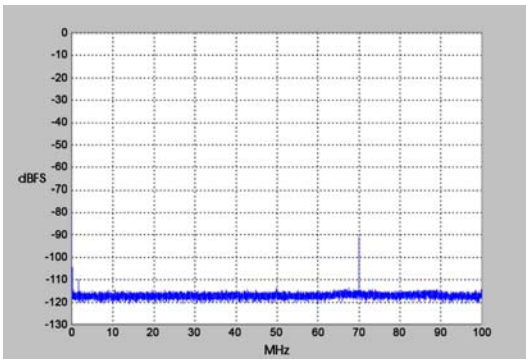
$f_1 = 30 \text{ MHz}, f_2 = 70 \text{ MHz}, f_s = 200 \text{ MHz}$

Two-Tone SFDR



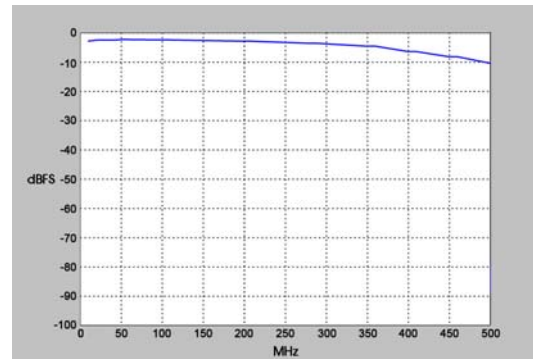
$f_1 = 69 \text{ MHz}, f_2 = 71 \text{ MHz}, f_s = 200 \text{ MHz}$

Adjacent Channel Crosstalk



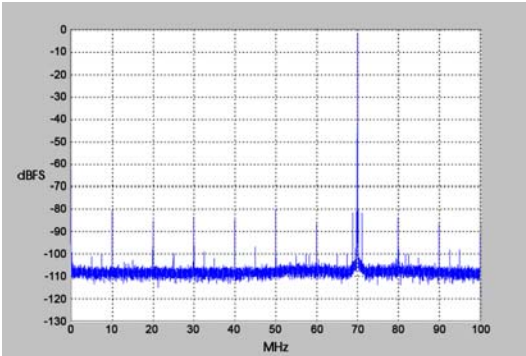
$f_{in \text{ Ch2}} = 70 \text{ MHz}, f_s = 200 \text{ MHz}, \text{Ch 1 shown}$

Input Frequency Response



$f_s = 200 \text{ MHz}, \text{Internal Clock}$

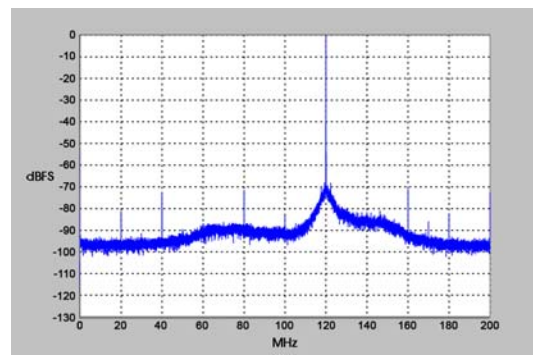
Spurious Free Dynamic Range



$f_{out} = 70 \text{ MHz}, f_s = 200 \text{ MHz}, \text{Internal Clock}$

D/A Performance

Spurious Free Dynamic Range



$f_{out} = 120 \text{ MHz}, f_s = 400 \text{ MHz}, \text{External Clock}$  ►

## ► Specifications

### PC Workstation (standard configuration)

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

### Data Storage

**Style:** Up to four front-panel removable QuickPac drive canisters; up to eight SSDs contained in each canister

**Location:** Front panel

**Capacity:** Up to 30.7 TB

**Number of Drives:** Up to 32 total

**Supported RAID Levels:** 0, 1, 5 and 6

### Analog Recording Input Channels

#### Analog Signal Inputs

**Connector Type:** Rear-panel female SMA connectors

**Input Type:** Transformer-coupled

**Full Scale Input:** +8 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### A/D Converters

**Type:** Texas Instruments ADS5485

**Sample Rate ( $f_s$ ):** 10 MHz to 200 MHz

**Resolution:** 16 bits

**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

#### Digital Downconverter

**Type:** Virtex-6 FPGA, Pentek DDC IP Core

**Decimation(D):** 2 to 65,536

**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits

**DDC Usable Bandwidth:**  $0.8 \cdot f_s / D$

#### Sample and Reference Clocks

**External Sample Clock:** Sine wave, 0 to +10 dBm, AC-coupled, 50 ohms 10 to 200 MHz, common to all A/Ds

**VCXO Sample Clock:** Programmable, 10 to 200 MHz, phase-locked to 10MHz reference, common to all A/Ds

**Reference Clock:** Sine wave, 0 to +10 dBm, A-C coupled, 50 ohms, 10 MHz, used for phase-locking the VCXO

**Connector Type:** Rear panel female SMA connector for external sample or reference clock input

#### External Trigger

**Number:** One common trigger for all input channels

**Input Level:** LVTTTL with selectable rising or falling edge ►

► **Connector Type:** Rear panel female SMA connector

### Analog Playback Output Channels

#### Analog Signal Outputs

**Output Type:** Rear-panel female SSMC connectors

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### D/A Converters

**Type:** Texas Instruments DAC5688 or DAC3484, depending on option set

**Output Sampling Rate:** Up to 800 MHz or 1.25 GHz

**Resolution:** 16 bits

**Input Sample Data Rate:** 250 or 312.5 MHz

**Output IF:** Up to 400 MHz or 625 MHz

#### Digital Upconverters

**Type:** Virtex-6 FPGA, Pentek interpolation IP core

**Overall Interpolation:** 2 to 65,536 including D/A

#### Sample and Reference Clocks

**External Sample Clock:** Sine wave, 0 to +10 dBm, AC-coupled, 50 ohms 800 MHz or 1.25 GHz, common to all D/As

**VCXO Sample Clock:** Programmable, up to 1.25 GHz, phase-locked to 10MHz reference, common to all D/As

**Reference Clock:** Sine wave, 0 to +10 dBm, A-C coupled, 50 ohms, 10 MHz, used for phase-locking the VCXO

**Connector Type:** Rear panel female SMA connector for external sample or reference clock input

#### External Trigger

**Number:** One common trigger for all output channels

**Input Level:** LVTTTL with selectable rising or falling edge

**Connector Type:** Rear panel female SMA connector

### Physical and Environmental

**Dimensions:** 19" W x 22" D x 7" H

**Weight:** 50 lb, approx.

**Operating Temp:** -20° to +50° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 10% to 95%, non-condensing

**Operating Shock:** Designed to MIL-STD 810F, method 514.5, procedures I and VI

**Operating Vibration:** Designed to MIL-STD 810F, method 514.5, procedure I

**EMI/EMC:** Designed to MIL-STD 461E, CE101, CE102, CS101, CS113, RE101, RE102, RS101, RS103

**Input Power:** 85 to 264 VAC, 47– 400 Hz, 600 W max.

## Model RTX 2766 Order Information and Options

### Channel Configurations

<b>Option -201</b>	1-channel recording
<b>Option -202</b>	2-channel recording
<b>Option -203</b>	3-channel recording
<b>Option -204</b>	4-channel recording
<b>Option -208</b>	8-channel recording
<b>Option -221</b>	1-channel playback
<b>Option -222</b>	2-channel playback
<b>Option -224</b>	4-Channel playback
<b>Option -228</b>	8-Channel playback

### Storage Options

<b>Option -410</b>	3.8 TB SSD storage capacity
<b>Option -415</b>	7.6 TB SSD storage capacity
<b>Option -418</b>	11.5 TB SSD storage capacity
<b>Option -420</b>	15.3 TB SSD storage capacity
<b>Option -425</b>	23.0 TB SSD storage capacity
<b>Option -430</b>	30.7 TB SSD storage capacity

### General Options (append to all options)

<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping
<b>Option -680</b>	28 VDC power supply
<b>Option -625</b>	Front-panel removable OS drive

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

*Specifications are subject to change without notice*



**Features**

- Multiband recording and playback system
- ½ ATR 3U VPX chassis
- Designed to MIL-STD-704F, 810F and 461F
- Windows® 7 Professional workstation with high performance Intel® Core™ i7 processor
- 200 MHz 16-bit A/Ds for recording up to four channels
- 800 MHz 16-bit D/A for playback of one channel
- 80 MHz recording and playback signal bandwidths
- Capable of record/playback of IF frequencies to 700 MHz
- Real-time sustained recording rates of up to 500 MB/sec
- 1.92 TB of storage to NTFS RAID disk array
- RAID levels of 0, 1, 5 and 6
- SystemFlow® GUI with signal viewer analysis tool which includes a virtual oscilloscope and spectrum analyzer
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters

Contact factory for options, for number and type of analog channels, recording rates, and disk capacity.

**General Information**

The Talon® RTX 2786 is a turnkey, RF/IF signal recorder designed to operate under extreme environmental conditions. Housed in a ½ ATR chassis, the RTX 2786 leverages Pentek’s 3U VPX SDR modules to provide a rugged recording system with up to four 16-bit, 200 MHz A/D converters with built-in digital downconversion capabilities.

Optionally, the RTX 2786 provides one 800 MHz, 16-bit D/A converter with a digital upconverter for signal playback or waveform generation. As shown in the block diagram below, the maximum number of record channels with this option is three.

The RTX2786 can record and play back analog signals with bandwidths ranging from a few kHz up to 80 MHz, either as baseband signals or as IF signals with center frequencies tunable across a 700 MHz range.

The RTX 2786 uses conduction cooling to draw heat from the system components allowing it to operate in reduced air environments. It includes 1.92 TB of solid-state data storage, that allows it to operate with no degradation under conditions of extreme shock and vibration. The system is hermetically sealed and provides five D38999 connectors for power and I/O. Four SMA connectors are used for analog I/O.

The recorder includes a graphical user interface for quick and simple out-of-the-box operation. It also includes a user API (Application Programming Interface) to easily integrate the system into the user’s application.

**SystemFlow Software**

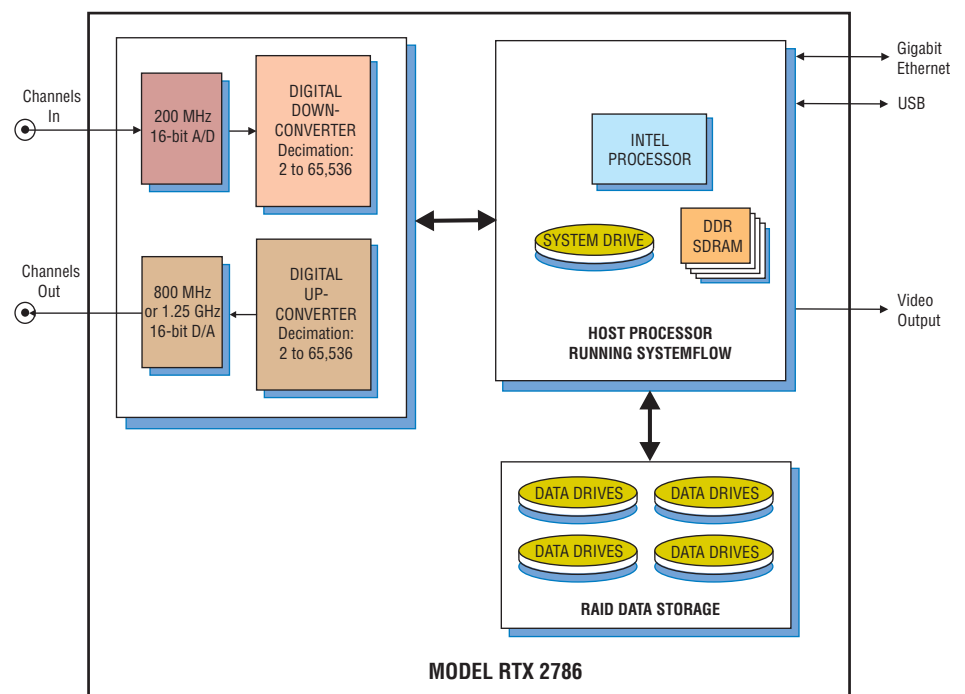
The RTX 2786 includes Pentek’s SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system. Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

The user API allows users to integrate the recorder as a subsystem of a larger system. The API is provided as a C-callable library and allows for the recorder to be controlled over Ethernet, thus providing the ability to remotely control the recorder from a custom interface.

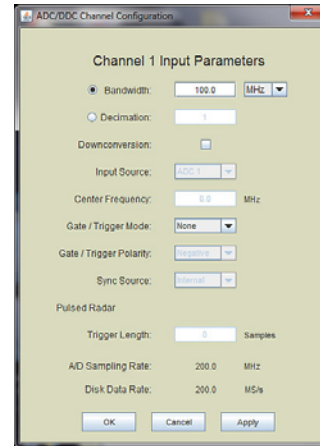
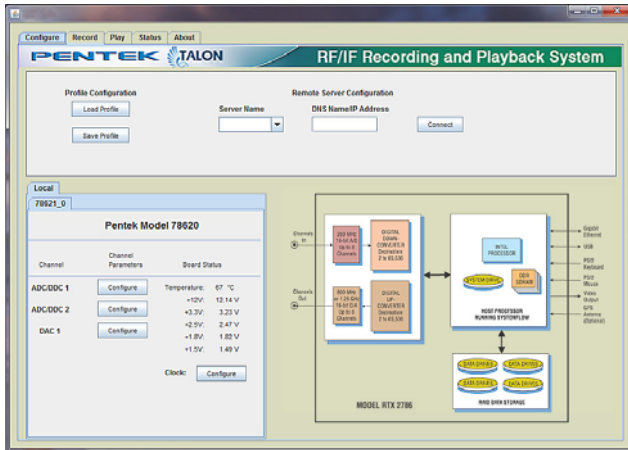
Built on a Windows 7 Professional workstation, the RTX 2786 allows the user to install post-processing and analysis tools on the system itself to operate on the recorded data. The RTX 2786 records data to the Windows’ native NTFS file system, providing immediate access to all recorded data. Data can be off-loaded via dual gigabit Ethernet ports or four USB 2.0 ports.

Four built-in solid-state drives provide reliable, high-speed storage with a total capacity of 1.92 TB. ➤





► SystemFlow Graphical User Interface

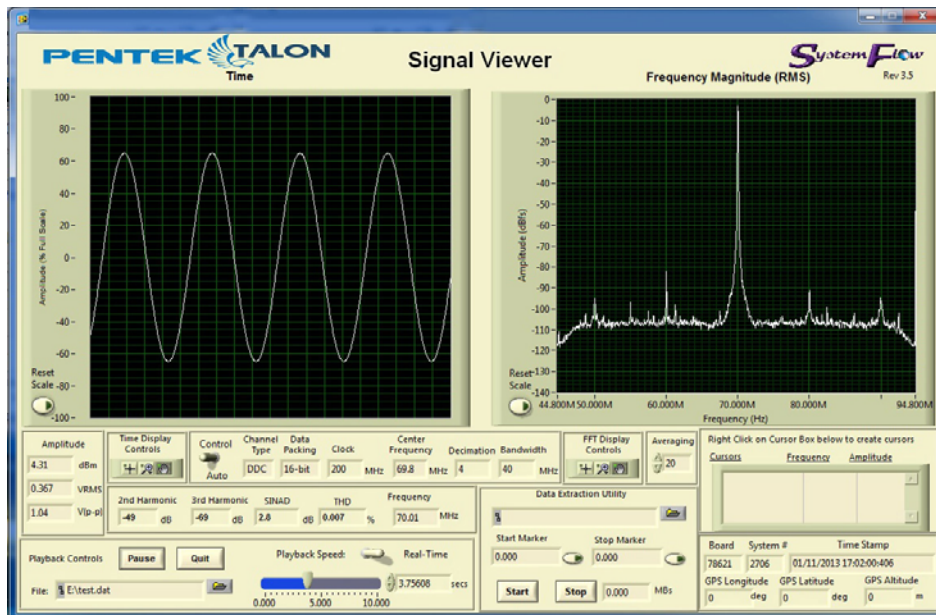


SystemFlow Recorder Interface

The RTX 2786 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 RTX 2786 Configure screens provide a simple and intuitive means for setting up the system parameters. The DDC configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Signal Viewer

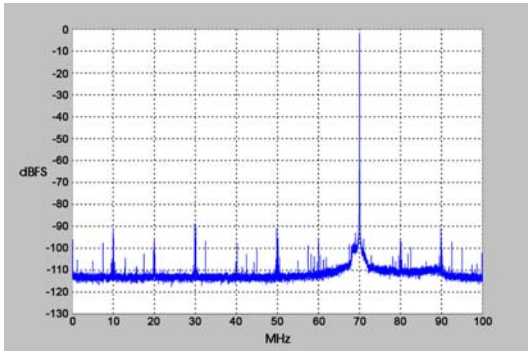
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Advanced signal analysis capabilities include automatic calculators for signal amplitude and frequency, second and third harmonic components, THD (total harmonic distortion) and SINAD (signal to noise and distortion). With time and frequency zoom, 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. ►



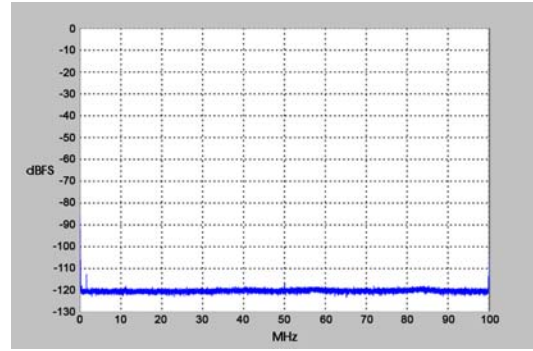
► A/D Performance

Spurious Free Dynamic Range



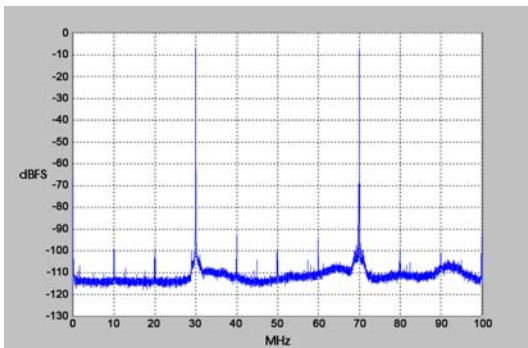
$f_{in} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Internal Clock

Spurious Pick-up



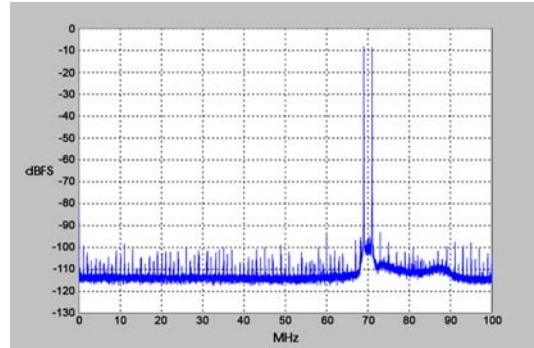
$f_s = 200 \text{ MHz}$ , Internal Clock

Two-Tone SFDR



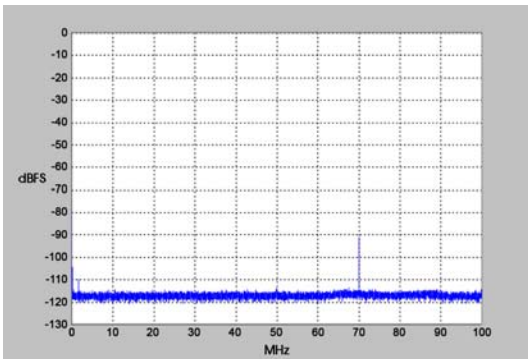
$f_1 = 30 \text{ MHz}$ ,  $f_2 = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$

Two-Tone SFDR



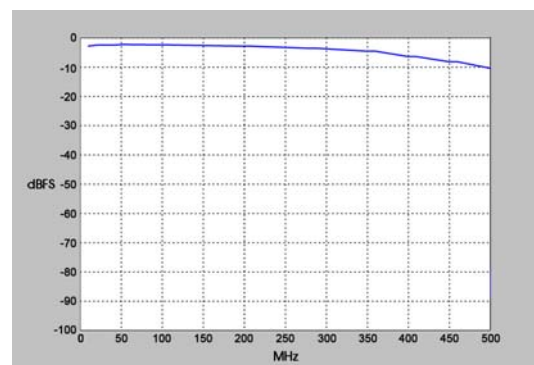
$f_1 = 69 \text{ MHz}$ ,  $f_2 = 71 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$

Adjacent Channel Crosstalk



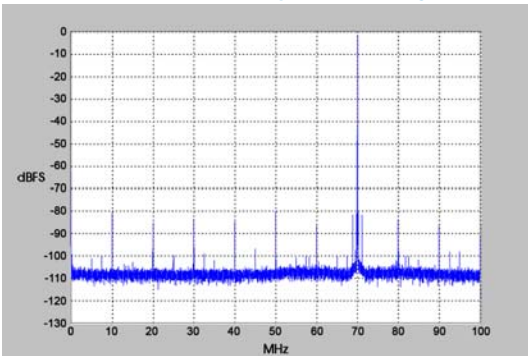
$f_{in \text{ Ch2}} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Ch 1 shown

Input Frequency Response



$f_s = 200 \text{ MHz}$ , Internal Clock

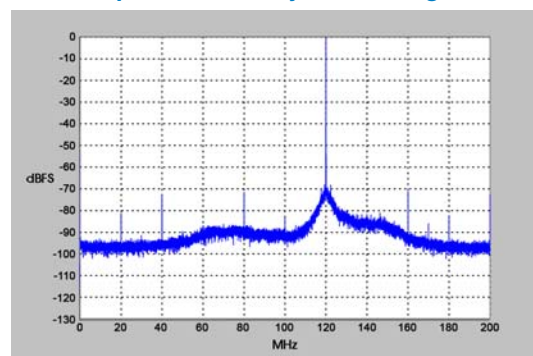
Spurious Free Dynamic Range



$f_{out} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Internal Clock

D/A Performance

Spurious Free Dynamic Range



$f_{out} = 120 \text{ MHz}$ ,  $f_s = 400 \text{ MHz}$ , External Clock

## ► Specifications

### Ruggedized Computer

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**SDRAM:** 4 GB

### I/O Connections

**Connectors:** D38999 circular

**Ethernet:** Dual 1 GbE

**Serial:** Dual RS-232/422/485

**USB:** Four USB 2.0

**Video:** Hi-Res VGA

**Audio:** In/Out Stereo

**Switch:** Reboot

### RAID

**Storage:** 1.92 TB

**Storage Type:** Internal SSDs

### Analog Signal Input

**Input Type:** Transformer-coupled

**Connectors:** Bulkhead SMA female

**Full Scale Input:** +8 dBm into 50 ohms

**Transformer Type:** Coil Craft WBC4-6TLB

**3 dB Passband:** 300 kHz to 700 MHz

### A/D Converters

**Type:** Texas Instruments ADS5485

**Sample Rate ( $f_s$ ):** 10 MHz to 200 MHz

**Resolution:** 16 bits

**A/D Record Bandwidth:**  $f_s/2 =$  Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

### Digital Downconverter

**Type:** Virtex-6 FPGA, Pentek DDC IP Core

**Decimation(D):** 2 to 65,536

**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits

**DDC Usable Bandwidth:**  $0.8 * f_s / D$

### Analog Signal Output

**Output Type:** Transformer-coupled

**Connectors:** Bulkhead SMA female

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

### Digital Upconverter and D/As

**Type:** TI DAC5688 and FPGA interpolation IP core

**Overall Interpolation:** 2x to 524,288x in two stages of 2x to 256x and one stage of 2x, 4x, or 8x

**Output Bandwidth:** 200 MHz maximum

**Output IF Center Frequency:** Up to 400 MHz

**Output Sampling Rate:** 800 MHz maximum

**Resolution:** 16 bits

### Sample Clock Selections:

On-board programmable VCXO

External 10 MHz reference for phase-locking VCXO

External direct sample clock

### External Clock Input

**Connector:** Bulkhead female SMA connector

**Clock Input Type:** 10 MHz reference to lock VCXO or direct input sample clock

**Clock Signal:** Sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, 10 to 200 MHz

### Physical and Environmental

**Size:** 7.1" W x 16.5" D x 8.1" H

**Weight:** 40 lb

**Environmentals:** MIL-STD-810F

**EMC:** MIL-STD-461F - CE101, CE102, CS101, RE101, RE102, and RS101

**Operating Temperature:** -40°C to +55°C

**Cooling Options:** Conduction, to cold plate

Conduction, to forced air side wall heat exchangers, four variable-speed rear fans

**Power Requirements:** 24 to 32 VDC, per MIL-STD-704F with 50 msec transient holdup

## Model RTX 2786 Order Information and Options

### Recording/Playback Options

<b>Option -201</b>	One-channel recording and one-channel playback
<b>Option -202</b>	Two-channel recording and one-channel playback
<b>Option -203</b>	Three-channel recording and one channel playback
<b>Option -204</b>	Four-channel recording and no playback

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications are subject to change without notice

New!

## Model RTR 2750

## 250 MS/sec RF/IF Rugged Rackmount Recorder



### Features

- Sixteen 250 MHz 16-bit A/Ds
- Sixteen independently-configurable DDC decimations ranging from 2 to 32768
- Sixteen independently-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® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- Front panel removable-SSD drives
- Up to 61 terabytes of storage to NTFS RAID disk array
- Multiple RAID levels of 0, 1, 5 and 6
- SystemFlow® GUI with signal viewer analysis tool
- Optional GPS time and position stamping

Contact factory for options, number and type of analog channels, recording rates, and disk capacity.

### General Information

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 down-converter with programmable decimations from 2-32768, 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 time-stamp each acquisition as well as track the location of a system in motion.

### SystemFlow Software

The Talon RTR 2750 includes Pentek's SystemFlow® Recording Software. SystemFlow features a Windows-based GUI that provides a simple means to configure and control the system. User configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured setups with a single click.

SystemFlow also includes signal viewing and analysis tools that allow the user to

monitor signals prior to, during, and after a recording session. These tools include a virtual oscilloscope, a virtual spectrum analyzer and a spectrogram display.

For users who wish to create a custom user interface or to integrate the Talon recording system into a larger application, a C-callable API is also provided as part of SystemFlow. Source code and examples are supplied to allow for a quick and simple integration effort.

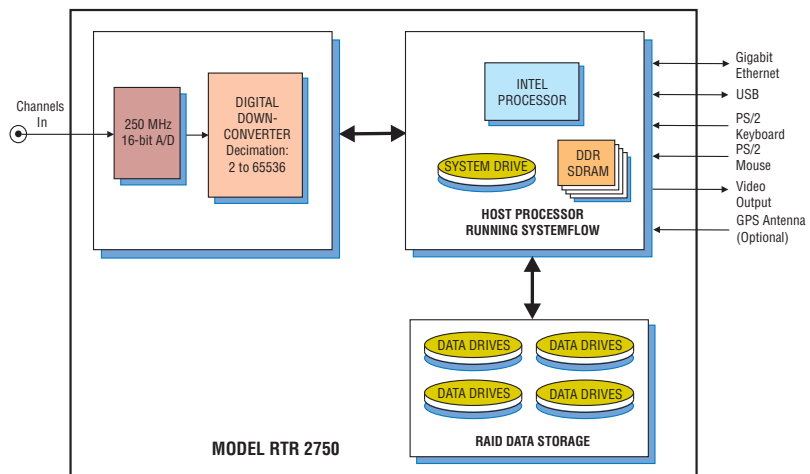
Built on a Windows 7 Professional workstation, the RTR 2750 allows the user to install post-processing and analysis tools directly onto the recording system. The RTR 2750 records data to the native NTFS file system, providing immediate access to the recorded data; no file conversion is required.

Data can be off-loaded through rear-access gigabit Ethernet ports or USB 3.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive. Dual 10 or 40 gigabit Ethernet cards can be added to the system to provide an even faster offload facility.

### Rugged and Flexible Architecture

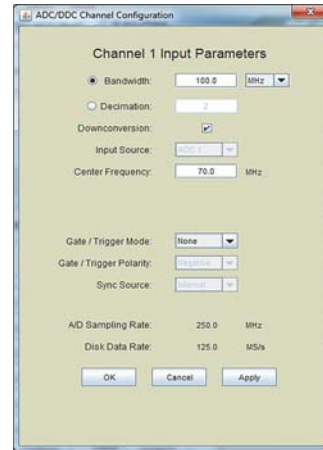
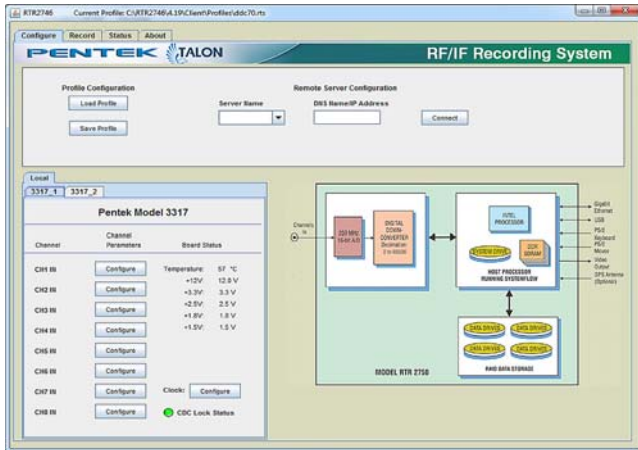
The RTR 2750 is configured in a 4U 19" rack-mountable chassis, with hot-swap data drives, front panel USB ports and I/O connectors on the rear panel. Systems are scalable to accommodate multiple chassis to increase channel counts and aggregate data rates. All recorder chassis are connected via Ethernet 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 61 TB. The 2.5-inch SSDs can be easily removed or exchanged during a mission to retrieve recorded data. Multiple RAID levels, including 0, 1, 5, and 6 provide a choice for the required level of redundancy. ▶





➤ SystemFlow Graphical User Interface

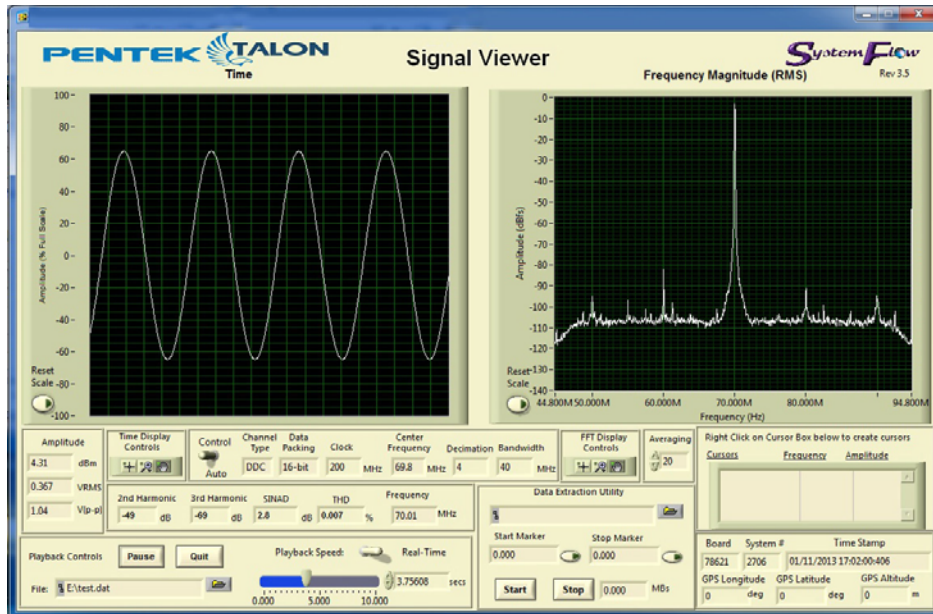


SystemFlow Recorder Interface

The RTR 2750 GUI provides the user with a control interface for the recording system. It includes Configuration, Record, 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, 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 here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ➤

## ► Specifications

### PC Workstation (standard configuration)

**Operating System:** Windows7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 16 GB

#### RAID

**Storage:** 15.3, 30.7 or 61.4 TB

**Supported Levels:** 0, 1, 5 and 6

### Analog Recording Inputs

#### 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:** Virtex-7 FPGA Pentek DDC IP Core

**Decimation (D):** User selectable 2 to 32768

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

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

### Clock and Trigger

#### 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:** LVTTTL

### Physical and Environmental

#### Dimensions

**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.

## Model RTR 2750 Ordering Information and Options

### Storage Options

**Option -420** 15.3 TB SSD total storage, 960 GB per channel

**Option -430** 30.7 TB SSD total storage, 1.92 TB per channel

**Option -461** 61.4 TB SSD total storage, 3.84 TB per channel

### General Options (append to all options)

**Option -261** GPS time & position stamping

**Option -264** IRIG-B time stamping

**Option -004** D-C coupled inputs

**Contact Pentek for compatible Option combinations**  
**Storage Options may change, contact Pentek for the latest information**

*Specifications are subject to change without notice*



## Features

- Complete multiband recording and playback system
- 4U 19-inch industrial rack-mount PC server chassis
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- 500 MHz 12-bit A/Ds or 400 MHz 14-bit A/Ds
- 800 MHz 16-bit D/As
- 80 MHz record and playback signal bandwidths
- Capable of record/playback of IF frequencies to 700 MHz
- Real-time aggregate recording rates of up to 1.6 GB/sec
- Up to 100 terabytes storage to NTFS RAID disk array
- RAID levels of 0, 1, 5, 6, 10 and 50
- SystemFlow® GUI with signal viewer analysis tool
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- DDC decimation and DUC interpolation range from 2 to 65,536
- Optional GPS time and position stamping

Contact factory for options, number and type of analog channels, recording rates, and disk capacity.

## General Information

The Talon® RTS 2707 is a turnkey, multi-band recording and playback system for recording and reproducing high-bandwidth signals. The RTS 2707 uses 12-bit, 500 MHz A/D converters and provides aggregate recording rates up to 1.6 GB/sec.

The RTS 2707 uses Pentek's high-powered Virtex-6-based Cobalt® modules, that provide flexibility in channel count, with optional digital downconversion capabilities. Optional 16-bit, 800 MHz D/A converters with digital upconversion allow real-time reproduction of recorded signals.

A/D sampling rates, DDC decimations and bandwidths, D/A sampling rates and DUC interpolations are among the GUI-selectable system parameters, providing a fully-programmable system capable of recording and reproducing a wide range of signals.

Optional GPS time and position stamping allows the user to record this critical signal information.

## SystemFlow Software

The RTS 2707 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the recorder.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

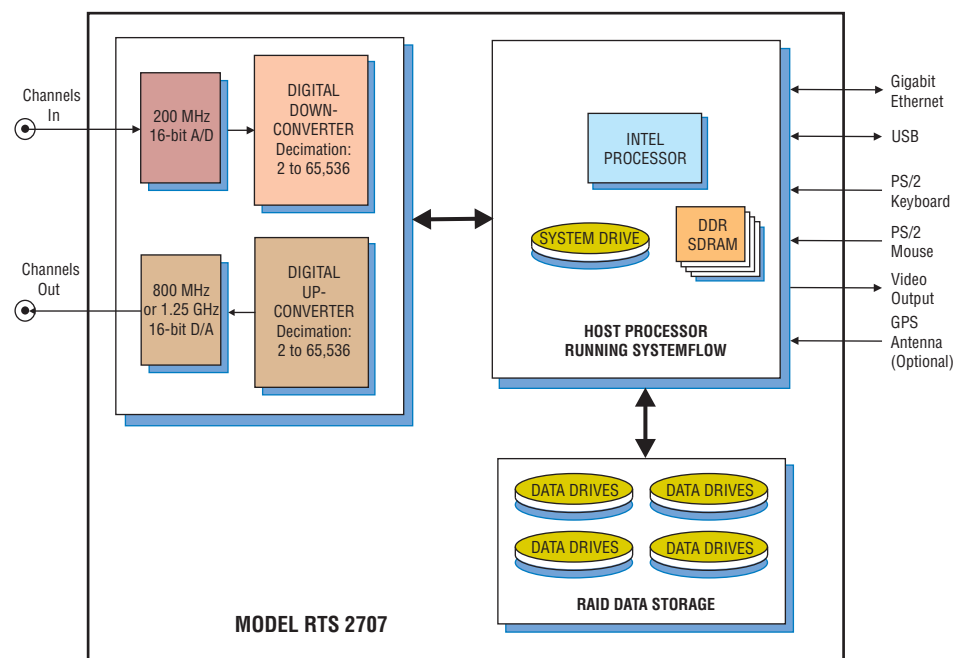
Built on a Windows 7 Professional workstation, the RTS 2706 allows the user to install post processing and analysis tools to operate on the recorded data. The RTS 2706 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via gigabit Ethernet ports or USB 2.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

## Flexible Architecture

The RTS 2707 is configured in a 4U 19" rack-mountable 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.

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50, provide a choice for the required level of redundancy. The hot-swappable HDDs provide storage capacities of up to 100 TB in a single 6U chassis. ➤







## ► Specifications

### PC Workstation (standard configuration)

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

### RAID

**Storage:** 8–100 TB

**Supported RAID Levels:** 0, 1, 5, 6, 10 and 50

### Analog Recording Inputs

#### Analog Signal Inputs

**Input Type:** Transformer-coupled, rear panel female SSMC connectors

**Transformer Type:** Coil Craft WBC4-6TLB

**Full Scale Input:** +5 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### A/D Converters

**Type:** Texas Instruments ADS5463 or ADS5474 (Option -014)

**Sampling Rate ( $f_s$ ):** 20 MHz to 500 MHz or 20 MHz to 400 MHz (Option -014)

**Resolution:** 12 bits or 14 bits (Option -014)

**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

#### Digital Downconverter

**Type:** Virtex-6 FPGA, Pentek DDC IP Core

**Decimation(D):** 2 to 65,536

**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits

**DDC Usable Bandwidth:**  $0.8 * f_s / D$

### Analog Playback Outputs

**Output Type:** Transformer-coupled, rear panel female SSMC connectors

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

### Digital Upconverter and D/A

**Type:** TI DAC5688 and Pentek-installed interpolation IP core

**Interpolation:** 2 to 65,536

**Input Data Rate to DAC5688:** 250 MS/sec max.

**Output IF:** 250 MHz max.

**Output Sampling Rate:** 800 MHz max.

**Resolution:** 16 bits

**Bandwidth Range:** Matches recording bandwidths

**Clock Sources:** Selectable from onboard programmable or external clocks

#### External Clock

**Type:** Female SSMC connector, sine wave, 0 to +12 dBm, AC-coupled, 50 ohms, accepts 10 to 500 MHz divider input clock or PLL system reference

#### Internal Clock

**Type:** Programmable VCXO from 10 to 810 MHz

### Physical and Environmental

**Size:** 19" W x 26" D x 7" H

**Weight:** 60-85 lb

**Operating Temp:** +5° to +45° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 5 to 95%, non-condensing

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

## Model RTS 2707 Ordering Information and Options

### Channel Configurations

<b>Option -201</b>	1-channel recording
<b>Option -202</b>	2-channel recording
<b>Option -204</b>	4-channel recording
<b>Option -221</b>	1-channel playback
<b>Option -222</b>	2-channel playback

### Storage Options

<b>Option -416</b>	8.0 TB HDD storage capacity
<b>Option -421</b>	16.0 TB HDD storage capacity
<b>Option -423</b>	20.0 TB HDD storage capacity
<b>Option -439</b>	30.0 TB HDD storage capacity
<b>Option -450</b>	45.0 TB HDD storage capacity
<b>Option -460</b>	60.0 TB HDD storage capacity
<b>Option -480</b>	100.0 TB HDD storage capacity
<b>Note:</b> Options -450 and -460 require a 5U Chassis; Option -480 requires a 6U chassis	

### General Options (append to all options)

<b>Option -014</b>	400 MHz, 14-bit A/Ds
<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications subject to change without notice



**Features**

- Designed to operate under conditions of shock and vibration
- Portable system measuring 16.9" W x 9.5" D x 13.4" H
- Lightweight: approximately 30 pounds
- Rugged aluminum alloy chassis
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 500 MHz 12-bit A/Ds or 400 MHz 14-bit A/Ds
- 800 MHz 16-bit D/A
- 200 MHz recording and playback signal bandwidths
- Recording and playback of IF signals up to 700 MHz
- SFDR > 70 dBFS
- Real-time aggregate recording rates up to 2.4 GB/sec
- Up to of 7.6 TB storage with hot-swappable SSD drives
- NTFS file format
- SystemFlow® GUI with Signal Viewer analysis tool
- File headers include time stamping and recording parameters
- Ideal for communications, radar, wireless, SIGINT, telecom and satcom
- Optional GPS time and position stamping
- Complete high-performance Windows® workstation

Contact the factory for options, for number and type of analog channels, recording rates, and disk capacity.

**General Information**

The Talon® RTR 2727 is a turnkey, multi-band recording and playback system that allows the user to record and reproduce high-bandwidth signals with a lightweight, portable and rugged package. The RTR 2727 provides aggregate recording rates of up to 2.4 GB/sec in a two-channel system and is ideal for the user who requires both portability and solid performance in a compact recording system.

The RTR 2727 is supplied in a small footprint portable package measuring only 16.9" W x 9.5" D x 13.4" H and weighing just 30 pounds. With measurements similar to a small briefcase, this portable workstation includes an Intel® Core™ i7 processor a high-resolution 17" LCD monitor, and a high-performance SATA RAID controller.

At the heart of the RTR 2727 are Pentek Cobalt® Series Virtex-6 software radio boards featuring A/D and D/A converters, DDCs (Digital Downconverters), DUCs (Digital Upconverters), and complementary FPGA IP cores. This architecture allows the system engineer to take full advantage of the latest technology in a turnkey system.

Optional GPS time and position stamping allows the user to record this critical signal information.

**SystemFlow Software**

Included in this system is the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed,

allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

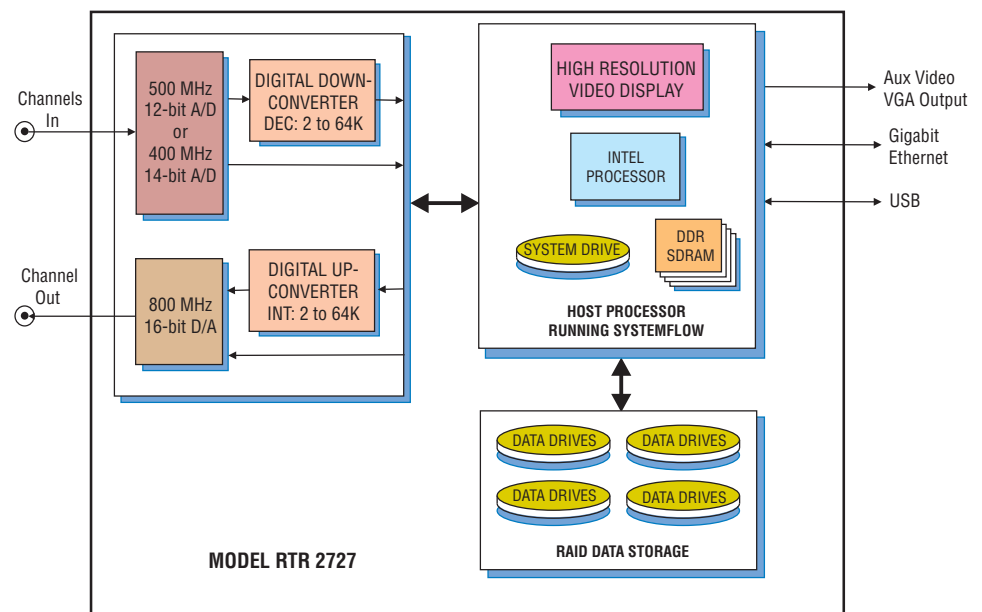
Built on a Windows 7 Professional workstation, the RTR 2727 allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2727 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded through two 1 Gb Ethernet ports, eight USB 2.0 ports or two eSATA ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

**Rugged & Flexible Architecture**

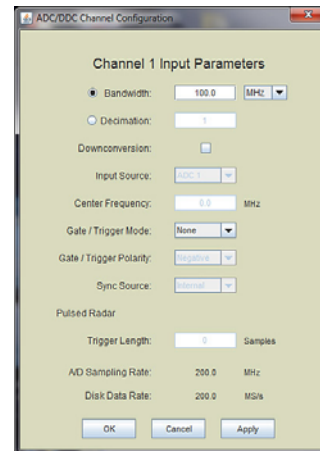
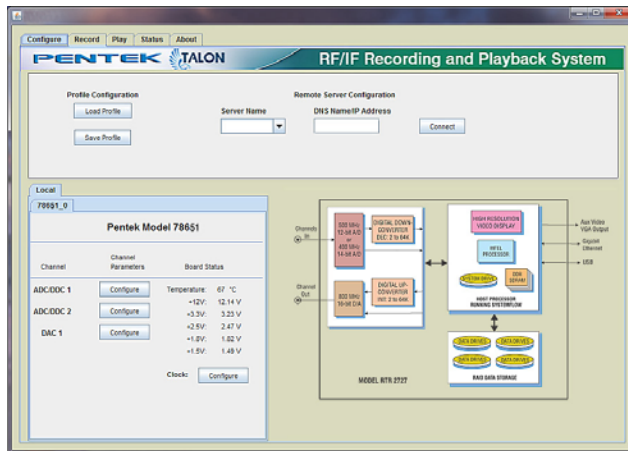
The RTR 2727 is configured in a portable, lightweight chassis with hot-swap SSDs, front panel USB ports and I/O connections on the side panel. It is built on an extremely rugged, 100% aluminum alloy unit, reinforced with shock absorbing rubber corners and an impact-resistant protective glass. Using shock- and vibration-resistant SSDs, the RTR 2727 is designed to operate reliably as a portable field instrument.

The hot-swappable SSDs provide storage capacities of up to 7.6 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0,1,5, and 6 provide a choice for the required level of redundancy. ➤





► SystemView Graphical User Interface

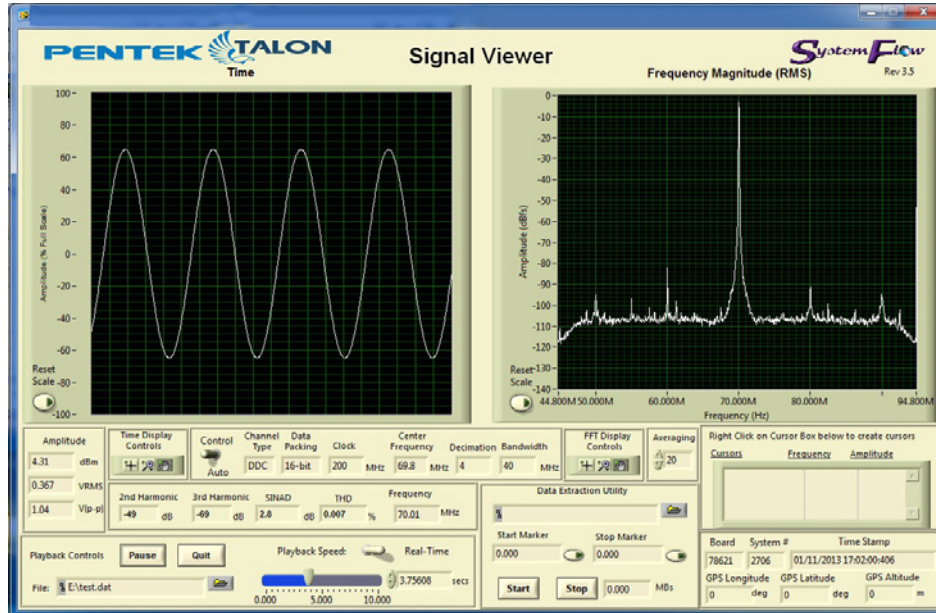


SystemFlow Recorder Interface

The RTR 2727 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, playback 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 recorded signals on disk.

SystemFlow Hardware Configuration Interface

The RTR 2727's Configure screens provide a simple and intuitive means for setting up the system parameters. The DDC configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ►

## Specifications

### PC Workstation (standard configuration)

**Operating System:** 64-bit Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 2.0 GHz or higher

**Operating System Drive:** 128 GB SSD

**SDRAM:** 8 GB

**Monitor:** Built-in 17" high-resolution LCD  
1440 x 900 pixels, 200 nits

### RAID

**Total Storage:** 1.9, 3.8 or 7.6 TB

**Supported RAID Levels:** 0, 1, 5, and 6

**Drive Bays:** Hot-swap, removable, rear panel

**USB 2.0 Ports:** Eight on left side, two on front panel

**USB 3.0 Ports:** Two on left side

**1 Gb Ethernet Port:** Two on left side

**eSATA 3 Ports:** Two on left side

**Aux Video Output:** 15-pin VGA on left side

### Analog Recording Inputs

#### Analog Signal Inputs

**Quantity:** 1 or 2

**Input Type:** Transformer-coupled, female SSMC connectors

**Transformer Type:** Coil Craft WBC4-6TLB

**Full Scale Input:** +5 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### A/D Converters

**Type:** Texas Instruments ADS5463 or ADS5474 (Option -014)

**Sampling Rate ( $f_s$ ):** 20 MHz to 500 MHz or 20 MHz to 400 MHz (Option -014)

**Resolution:** 12 bits or 14 bits (Option -014)

**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

#### Digital Downconverter

**Type:** Virtex-6 FPGA Pentek DDC IP Core

**Decimation (D):** 2 to 65,536

**DDC Usable Bandwidth:**  $0.8 \cdot f_s / D$

**Bandwidth Range:** 5 kHz to 160 MHz at  $f_s = 400$  MHz

### Analog Playback Output

#### Analog Signal Outputs

**Quantity:** 1

**Output Type:** Transformer-coupled, female SSMC connectors

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### Digital Upconverter and D/A

**Output Signal:** Analog, real or quadrature

**Type:** TI DAC5688 and Pentek-installed interpolation IP core

**Interpolation:** 2 to 65,536

**Input Data Rate to DAC5688:** 250 MS/sec max.

**Output Sampling Rate:** 800 MHz, max.

**Output IF:** 250 MHz, max.

**D/A Resolution:** 16 bits

**Bandwidth Range:** Matches recording bandwidths

**Clock Sources:** Selectable from onboard programmable VCXO, external or LVDS clocks

#### External Clock

**Type:** Female SSMC connector, sine wave, 0 to +12 dBm, AC-coupled, 50 ohms, accepts 10 to 500 MHz divider input clock or PLL system reference

#### Internal Clock

**Type:** Programmable VCXO from 10 to 810 MHz

### Physical and Environmental

**Dimensions:** 16.9" W x 9.5" D x 13.4" H

**Weight:** 30 lb, approximately

**Power:** 90 to 265 VAC, 50 - 60 Hz

**Operating Temp:** 5° to +45° 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.

## Model RTR 2727 Ordering Information and Options

### Channel Configurations

<b>Option -201</b>	1-channel recording
<b>Option -202</b>	2-channel recording
<b>Option -204</b>	4-channel recording
<b>Option -221</b>	1-channel playback
<b>Option -222</b>	2-channel playback

### Storage Options

<b>Option -405</b>	1.9 TB SSD storage capacity
<b>Option -410</b>	3.8 TB SSD storage capacity
<b>Option -415</b>	7.6 TB SSD storage capacity

### General Options (append to all options)

<b>Option -014</b>	400 MHz, 14-bit A/D
<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications subject to change without notice

New!

## Model RTR 2727A

## 500 MS/sec RF/IF Rugged Portable Recorder



### Features

- Designed to operate under conditions of shock and vibration
- Portable system measuring 16.0" W x 6.9" D x 13.0" H
- Lightweight, just less than 30 pounds
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 500 MHz 12-bit A/Ds or 400 MHz 14-bit A/Ds
- 800 MHz 16-bit D/A
- 200 MHz recording and playback signal bandwidths
- Recording and playback of IF signals up to 700 MHz
- Real-time aggregate recording rates up to 4.0 GB/sec
- Windows® workstation with high performance Intel® Core™ i7 processor
- Up to 61 terabytes of SSD storage to NTFS RAID solid state disk array
- SystemFlow® GUI with Signal Viewer analysis tool
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Optional 10–36 VDC power supply

Contact the factory for options, for number and type of analog channels, recording rates, and disk capacity.

### General Information

The Talon® RTR 2727A is a turnkey, multi-band recording and playback system that allows the user to record and reproduce high-bandwidth signals with a lightweight, portable and rugged package. The RTR 2727A provides aggregate recording rates of up to 4.0 GB/sec in a two-channel system and is ideal for the user who requires both portability and solid performance in a compact recording system.

The RTR 2727A is supplied in a small footprint portable package measuring only 16.0" W x 6.9" D x 13.0" H and weighing just less than 30 pounds. With measurements similar to a small briefcase, this portable workstation includes an Intel Core i7 processor a high-resolution 17" LCD monitor, and up to 61.4 TB of SSD storage.

At the heart of the RTR 2727A are Pentek Cobalt® Series Virtex-6 software radio boards featuring A/D and D/A converters, DDCs (Digital Downconverters), DUCs (Digital Upconverters), and complementary FPGA IP cores. This architecture allows the system engineer to take full advantage of the latest technology in a turnkey system.

Optional GPS time and position stamping allows the user to record this critical signal information.

### SystemFlow Software

Included in this system is the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system. It also includes a C-callable API that allows users to easily integrate the Talon recorder into a larger system.

The GUI provides a very simple interface for system setup. This includes pull-down selections for a handful of parameters, a checkbox to enable/disable the DDC and a data-entry field for the sample rate. Once set up, the GUI provides the ability to save profiles that can be reloaded at the click of a button.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and spectrum analyzer.

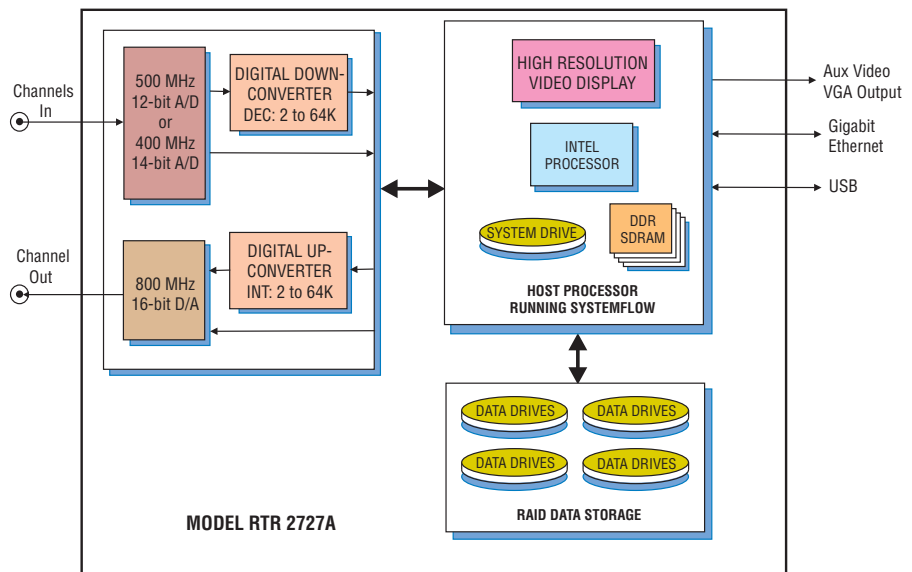
Built on a Windows 7 Professional workstation, the RTR 2727A allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2727A records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via gigabit Ethernet, USB 2.0 and USB 3.0 ports. Additionally, data can be copied to optical disk, using the 8X double-layer DVD±R/RW drive.

Option -625 replaces the DVD±R/RW drive with a removable operating system drive; an external DVD drive can be used.

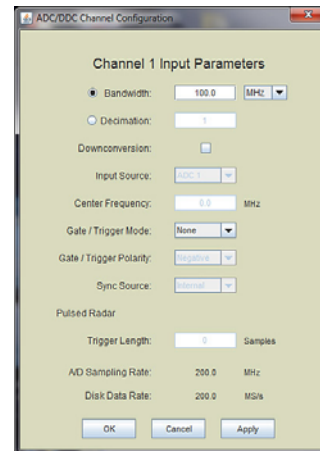
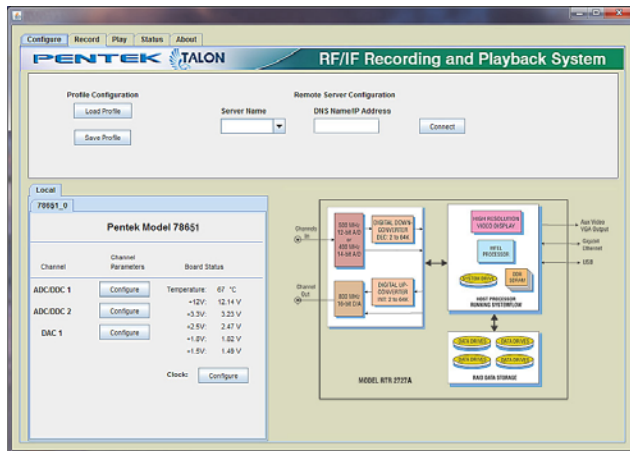
### Rugged Chassis with SSD Storage

The RTR 2727A is configured with hot-swappable SSDs, front panel USB ports, and I/O connectors on the side panel. It is built in an extremely rugged steel and aluminum chassis and is tested for shock and vibration. The SSDs provide storage capacities of up to 61.4 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0, 1, 5, and 6, provide a choice for the required level of redundancy. ▶





► SystemView Graphical User Interface

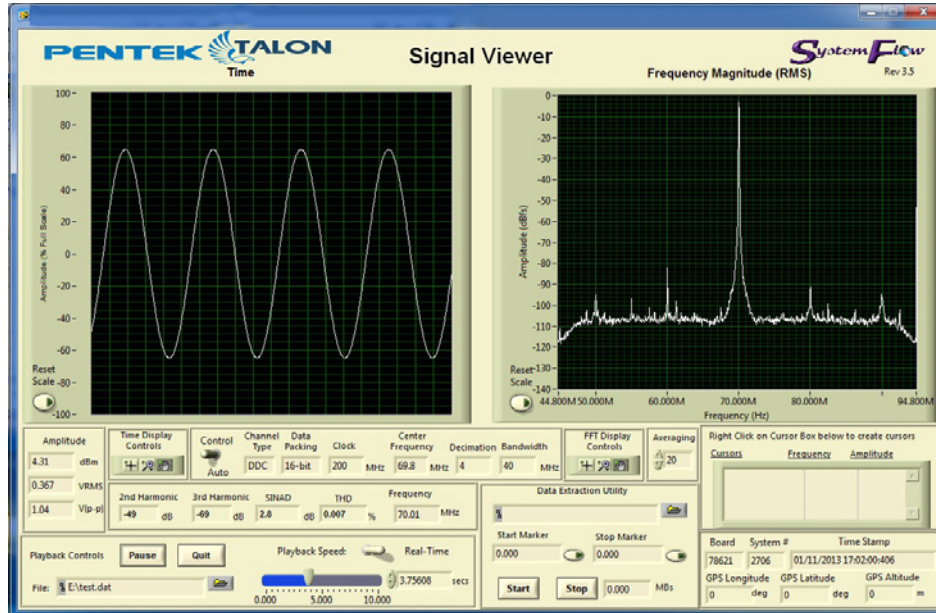


SystemFlow Recorder Interface

The RTR 2727A 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, playback 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 recorded signals on disk.

SystemFlow Hardware Configuration Interface

The RTR 2727A's Configure screens provide a simple and intuitive means for setting up the system parameters. The DDC configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ►

► Specifications

**PC Workstation (standard configuration)**

**Operating System:** 64-bit Windows workstation  
**Processor:** Intel Core i7 processor  
**Clock Speed:** 3.0 GHz or higher  
**Operating System Drive:** 128 GB SSD  
**SDRAM:** 8 GB  
**Monitor:** Built-in 17.3" high-resolution LCD,  
 1920 x 1080 pixels, 16:9 aspect ratio, anti-glare surface  
 Brightness: 300 cd/m<sup>2</sup>; Contrast ratio: 400:1 typical  
**RAID**  
**Total Storage:** 3.8 – 60.4 TB  
**Supported RAID Levels:** 0, 5 and 6  
**Drive Bays:** Hot-swap, removable, side panel  
**USB 2.0 Ports:** Four on left side, two on front panel  
**USB 3.0 Ports:** Two on left side  
**1 Gb Ethernet Ports:** Two on left side  
**Aux Video Output:** 15-pin VGA on left side

**Analog Signal Inputs**

**Connectors:** 1 or 2, transformer-coupled, female SSMC  
**Transformer Type:** Coil Craft WBC4-6TLB  
**Full Scale Input:** +5 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**A/D Converters**

**Type:** Texas Instruments ADS5463 or ADS5474 (Option -014)  
**Sampling Rate ( $f_s$ ):** 20 MHz to 500 MHz or 20 MHz to 400 MHz (Option -014)  
**Resolution:** 12 bits or 14 bits (Option -014)  
**A/D Record Bandwidth:**  $f_s/2 =$  Nyquist bandwidth  
**Anti-Aliasing Filters:** External, user-supplied

**Digital Downconverter**

**Type:** Virtex-6 FPGA Pentek DDC IP Core  
**Decimation (D):** 2 to 65,536  
**DDC Usable Bandwidth:**  $0.8 \cdot f_s / D$

**Analog Signal Output**

**Connector:** Transformer-coupled, female SSMC  
**Full Scale Output:** +4 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**Digital Upconverter and D/A**

**Output Signal:** Analog, real or quadrature  
**Type:** TI DAC5688 and Pentek-installed interpolation IP core  
**Interpolation:** 2 to 65,536  
**Input Data Rate to DAC5688:** 250 MS/sec max.  
**Output Sampling Rate:** 800 MHz, max.  
**Output IF:** 250 MHz, max.  
**D/A Resolution:** 16 bits

**Bandwidth Range:** Matches recording bandwidths  
**Clock Sources:** Selectable from onboard programmable VCXO, external or LVDS clocks

**External Clock**

**Type:** Female SSMC connector, sine wave, 0 to +12 dBm, AC-coupled, 50 ohms, accepts 10 to 500 MHz divider input clock or PLL system reference

**Internal Clock**

**Type:** Programmable VCXO from 10 to 810 MHz

**Optional DC Power supply**

**Voltage:** 10 to 36 VDC  
**Input Current:** 42 to 26 A (39 A at 24 VDC)  
**Inrush Current:** 100 A at 24 VDC  
**Temperature Range:** Oper.: 0° to 50° C, Store: -0° to 80° C  
**Efficiency:** >80% typical at 24 V full load  
**Power Good Signal:** On delay 100 to 500 msec  
**OverPower Protection:** 110% to 160%  
**Remote Control:** On/Off  
**Safety:** Meets UL, TUV, CB specifications

**Physical and Environmental**

**Size:** 16.0" W x 6.9" D x 13.0" H  
**Weight:** 30 lb max.  
**Operating Temp:** 0° to +50° C  
**Storage Temp:** -40° to +85° C  
**Relative Humidity:** 5 to 95%, non-condensing  
**Operating Shock:** 30 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  
**Non-operating Vibration:** 5 to 500 Hz: 2.06 g RMS  
**Power Requirements:** 100 to 240 VAC, 50 to 60 Hz, 500 W max.

**Model RTR 2727A Ordering Information and Options**

**Channel Configurations**

**Option -201** 1-Channel Recording  
**Option -202** 2-Channel Recording  
**Option -204** 4-Channel Recording  
**Option -221** 1-Channel Playback  
**Option -222** 2-Channel Playback

**Storage Options**

**Option -410** 3.8 TB SSD Storage  
**Option -415** 7.6 TB SSD Storage  
**Option -420** 15.3 TB SSD Storage  
**Option -430** 30.7 TB SSD Storage  
**Option -460** 61.4 TB SSD Storage

**Additional Options**

**Option -014** 400 MHz, 14-bit A/Ds  
**Option -261** GPS Time & Position Stamping  
**Option -264** IRIG-B Time Stamping  
**Option -285** RAID 5 Configuration  
**Option -286** RAID 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -311** 64 GB System Memory  
**Option -625** Removable Operating System Drive  
**Option -681** 10 to 36 VDC Power Supply

**Contact Pentek for compatible Option combinations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*



**Features**

- Designed to operate under conditions of shock and vibration
- 4U 19-inch rugged rackmount PC server chassis
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 500 MHz 12-bit A/Ds or 400 MHz 14-bit A/Ds
- 800 MHz 16-bit D/As
- 200 MHz record and playback signal bandwidths
- Recording and playback of IF signals up to 700 MHz
- Real-time aggregate recording rates of up to 4.0 GB/sec
- Up to 46 terabytes of storage to NTFS RAID disk array
- RAID levels of 0, 1, 5, 6, 10 and 50
- NTFS file format
- 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

Contact factory for options, number and type of analog channels, recording rates, and disk capacity.

**General Information**

The Talon® RTR 2747 is a turnkey, multi-band record and playback system that is built to operate under harsh conditions. Designed to withstand high vibration and operating temperatures, the RTR 2747 is intended for military, airborne and UAV applications requiring a rugged system. With scalable A/Ds, D/As and SSD (Solid-State Drive) storage, the RTR 2747 can be configured to stream data to and from disk at aggregate rates as high as 4.0 GB/sec.

The RTR 2747 uses Pentek's high-powered Virtex-6-based Cobalt® boards, that provide flexibility in channel count with optional digital downconversion and upconversion capabilities.

A/D sampling rates, DDC decimations and bandwidths, D/A sampling rates, and DUC interpolations are among the selectable system parameters, that provide a fully programmable system capable of recording and reproducing a wide range of signals.

Optional GPS time and position stamping allows the user to record this critical signal information.

**SystemFlow Software**

The RTR 2747 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system. Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

Built on a Windows 7 Professional workstation, the RTR 2747 allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2747 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded through two rear-access gigabit Ethernet ports or two USB 2.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

**Rugged and Flexible Architecture**

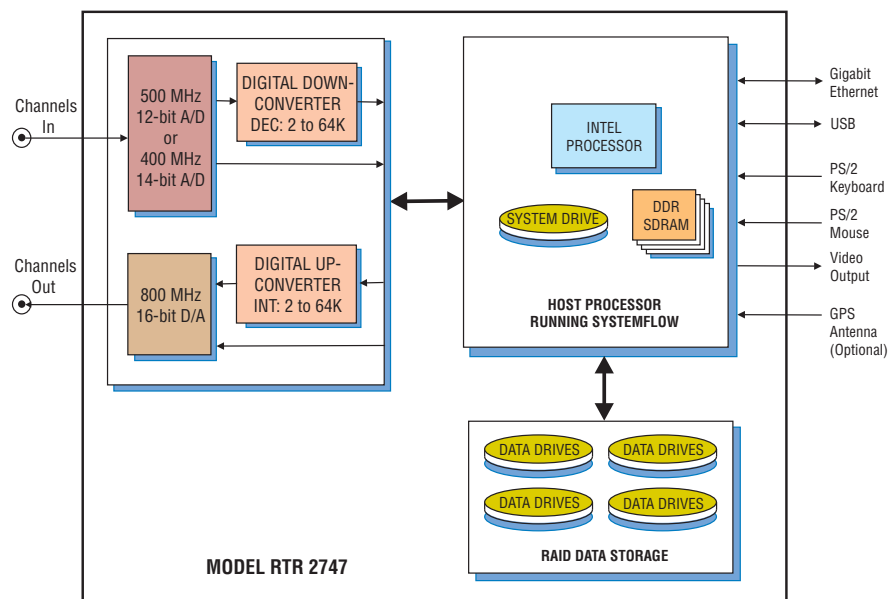
Because SSDs operate reliably under conditions of shock and vibration, the RTR 2747 performs well in ground, shipborne and airborne environments. The hot-swappable SSDs provide storage capacity of up to 46 TB. The drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

The RTR 2747 is configured in a 4U 19" rack-mountable 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.

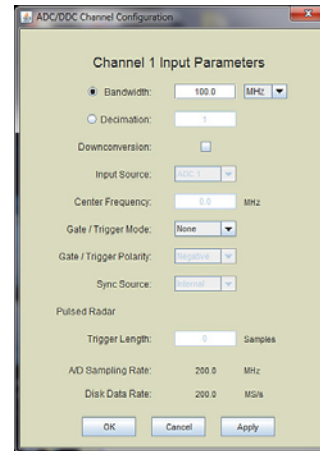
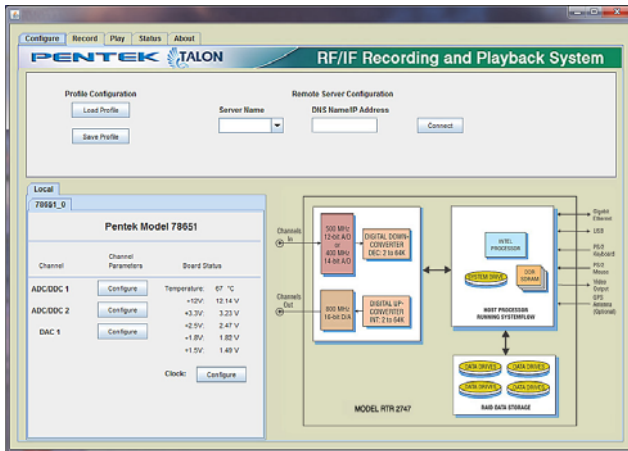
All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50, provide a choice for the required level of redundancy. ➤





► SystemFlow Graphical User Interface

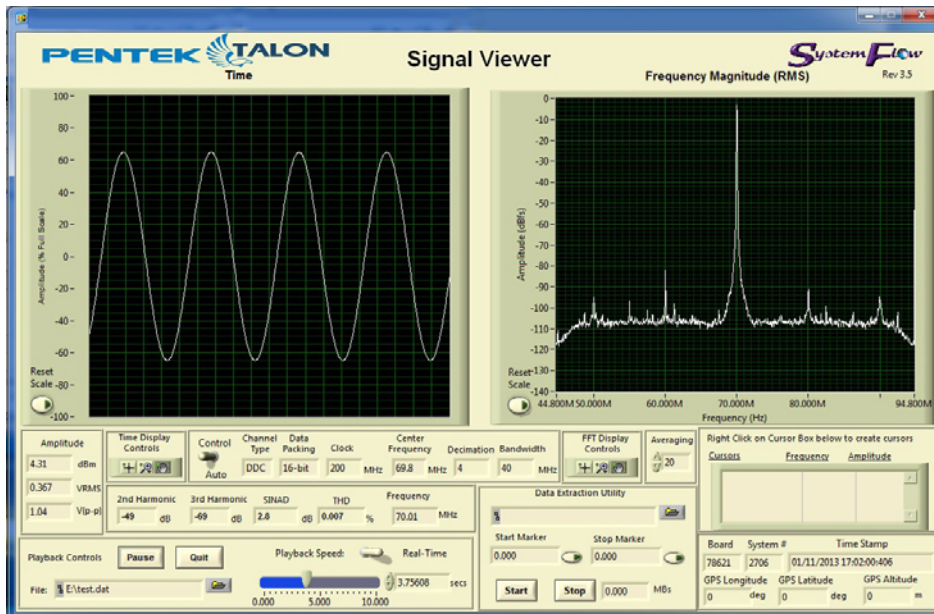


SystemFlow Recorder Interface

The RTR 2747 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 2747 Configure screens provide a simple and intuitive means for setting up the system parameters. The DDC configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ►

## ► Specifications

### PC Workstation (standard configuration)

**Operating System:** 64-bit Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 2.0 GHz or higher

**SDRAM:** 8 GB

#### RAID

**Storage:** 3.8, 7.6, 15.3, 30.7 or 46 TB

**Supported Levels:** 0, 1, 5, 6, 10 and 50

### Analog Recording Inputs

#### Analog Signal Inputs

**Input Type:** Transformer-coupled, front panel female SSMC connectors

**Transformer Type:** Coil Craft WBC4-6TLB

**Full Scale Input:** +5 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### A/D Converters

**Type:** Texas Instruments ADS5463 or ADS5474 (Option -014)

**Sampling Rate ( $f_s$ ):** 20 MHz to 500 MHz or 20 MHz to 400 MHz (Option -014)

**Resolution:** 12 bits or 14 bits (Option -014)

**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

#### Digital Downconverter

**Type:** Virtex-6 FPGA, Pentek DDC IP Core

**Decimation(D):** 2 to 65,536

**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits

**DDC Usable Bandwidth:**  $0.8 * f_s / D$

### Analog Playback Outputs

**Output Type:** Transformer-coupled, front panel female SSMC connectors

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### Digital Upconverter and D/A

**Type:** TI DAC5688 and Pentek-installed interpolation IP core

**Interpolation:** 2 to 65,536

**Input Data Rate to DAC5688:** 250 MS/sec max.

**Output IF:** 250 MHz max.

**Output Signal:** Analog, real or quadrature

**Output Sampling Rate:** 800 MHz max.

**Resolution:** 16 bits

**Bandwidth Range:** Matches recording bandwidth

**Clock Sources:** Selectable from onboard programmable VCXO, external or LVDS clocks

#### External Clock

**Type:** Female SSMC connector, sine wave, 0 to +12 dBm, AC-coupled, 50 ohms, accepts 10 to 500 MHz divider input clock or PLL system reference

#### Internal Clock

**Type:** Programmable VCXO from 10 to 810 MHz

### Physical and Environmental

#### Dimensions

**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.

## Model RTR 2747 Ordering Information and Options

### Channel Configurations

<b>Option -201</b>	1-channel recording
<b>Option -202</b>	2-channel recording
<b>Option -204</b>	4-channel recording
<b>Option -208</b>	8-channel recording
<b>Option -221</b>	1-channel playback
<b>Option -222</b>	2-channel playback

### Storage Options

<b>Option -410</b>	3.8 TB SSD storage capacity
<b>Option -415</b>	7.6 TB SSD storage capacity
<b>Option -420</b>	15.3 TB SSD storage capacity
<b>Option -430</b>	30.7 TB SSD storage capacity
<b>Option -440</b>	46.0 TB SSD storage capacity

**Note:** Options -430 and -440 require a 26-inch deep chassis

### General Options (append to all options)

<b>Option -014</b>	400 MHz, 14-bit A/Ds
<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications subject to change without notice



**Features**

- Designed to meet MIL-STD-810 shock and vibration
- Designed to meet EMC/EMI per MIL-STD-461 EMC
- 4U 19-inch rugged rackmount PC server chassis, 22" deep
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- 500 MHz 12-bit A/Ds or 400 MHz 14-bit A/Ds
- 800 MHz 16-bit D/As
- Real-time aggregate recording rates of up to 4.0 GB/sec
- 200 MHz max. record and playback signal bandwidths
- Capable of record/playback of IF frequencies to 700 MHz
- Up to four front-panel removable QuickPac SSD drive canisters with eight drives each
- Up to 30 terabytes of storage to NTFS RAID disk array
- 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® RTX 2767 is a turnkey, multi-band record and playback system that is built to operate under harsh conditions. Designed to withstand high vibration and operating temperatures, the RTX 2767 is intended for military, airborne and UAV applications requiring a rugged system. With scalable A/Ds, D/As and SSD (Solid-State Drive) storage, the RTX 2767 can be configured to stream data to and from disk at rates as high as 4.0 GB/sec

The RTX 2767 uses Pentek's high-powered Virtex-6-based Cobalt® boards that provide flexibility in channel count, with optional digital downconversion capabilities. Optional 16-bit, 800 MHz D/A converters with digital upconversion allow real-time reproduction of recorded signals.

A/D sampling rates, DDC decimations and bandwidths, D/A sampling rates and DUC interpolations are among the GUI-selectable system parameters, providing a fully-programmable system capable of recording and reproducing a wide range of signals.

Optional GPS time and position stamping allows the user to record this critical signal information.

**SystemFlow Software**

The RTX 2767 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the recorder.

Custom configurations can be stored as profiles and later loaded when needed,

allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

Built on a Windows 7 Professional workstation, the RTX 2767 allows the user to install post processing and analysis tools to operate on the recorded data. The RTX 2767 records data to the native NTFS file system, providing immediate access to the recorded data.

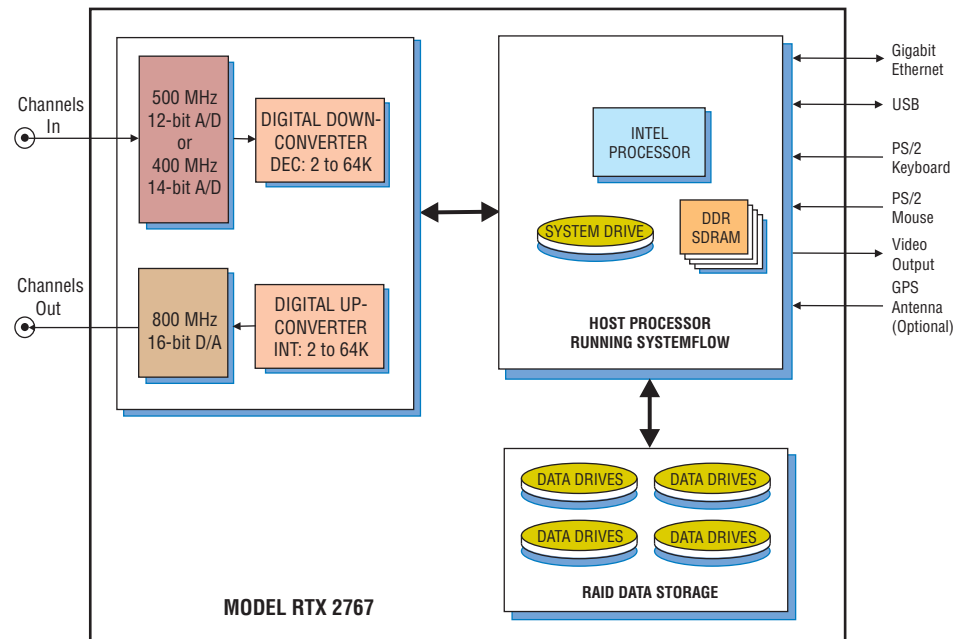
Data can be off-loaded via two rear-access gigabit Ethernet ports, two USB 3.0 ports or up to four USB 2.0 ports.

**Rugged Mil-Spec Chassis**

The Talon RTX 2767 uses a shock- and vibration-isolated inner chassis and solid-state drives to assure reliability under harsh conditions. The chassis uses an in-line EMI filter along with rear-panel MIL-style connectors to meet MIL-STD-461 emissions specifications.

Up to four front-panel removable QuickPac drive canisters are provided, each containing up to eight SSDs. Each drive canister can hold up to 7.6 TB of data storage and allows for quick and easy removal of mission-critical data.

Forced-air cooling draws air from the front of the chassis and pushes it out the back via exhaust fans. A hinged front door with a serviceable air filter provides protection against dust and sand. ➤







► Specifications

PC Workstation (standard configuration)

Operating System: Windows 7 Professional

Processor: Intel Core i7 processor

Clock Speed: 3.0 GHz or higher

SDRAM: 8 GB

Data Storage

Style: Up to four front-panel removable QuickPac drive canisters; up to eight SSDs contained in each canister

Location: Front panel

Capacity: Up to 30 TB

Number of Drives: Up to 32 total

Supported RAID Levels: 0, 1, 5 and 6

Analog Recording Inputs

Analog Signal Inputs

Connector Type: Rear-panel female SMA connectors

Input Type: Transformer-coupled

Full Scale Input: +5 dBm into 50 ohms

3 dB Passband: 300 kHz to 700 MHz

A/D Converters

Type: Texas Instruments ADS5463 or ADS5474 (Option -014)

Sample Rate ( $f_s$ ): 20 MHz to 500 MHz or 20 MHz to 400 MHz (Option -014)

Resolution: 12 bits or 14 bits (Option -014)

A/D Record Bandwidth:  $f_s/2 =$  Nyquist bandwidth

Anti-Aliasing Filters: External, user-supplied

Digital Downconverter

Type: Virtex-6 FPGA, Pentek DDC IP Core

Decimation(D): 2 to 65,536

IF Center Frequency Tuning: DC to  $f_s$ , 32 bits

DDC Usable Bandwidth:  $0.8*f_s/D$

Sample and Reference Clocks

External Sample Clock: Sine wave, 0 to +10 dBm, AC-coupled, 50 ohms 20 to 500 MHz, common to all A/Ds

VCXO Sample Clock: Programmable, 20 to 500 MHz, phase-locked to 10MHz reference, common to all A/Ds

Reference Clock: Sine wave, 0 to +10 dBm, A-C coupled, 50 ohms, 10 MHz, used for phase-locking the VCXO

Connector Type: Rear panel female SMA connector for external sample or reference clock input

External Trigger

Number: One common trigger for all input channels ►

► Input Level: LVTTTL with selectable rising or falling edge

Connector Type: Rear panel female SMA connector

Analog Playback Output Channels

Analog Signal Outputs

Output Type: Rear-panel female SSMC connectors

Full Scale Output: +4 dBm into 50 ohms

3 dB Passband: 300 kHz to 700 MHz

D/A Converters

Type: Texas Instruments DAC5688 or DAC3484, depending on option set

Output Sampling Rate: Up to 800 MHz or 1.25 GHz

Resolution: 16 bits

Input Sample Data Rate: 250 or 312.5 MHz

Output IF: Up to 400 MHz or 625 MHz

Digital Upconverters

Type: Virtex-6 FPGA, Pentek interpolation IP core

Overall Interpolation: 2 to 65,536 including D/A

Sample and Reference Clocks

External Sample Clock: Sine wave, 0 to +10 dBm, AC-coupled, 50 ohms 800 MHz or 1.25 GHz, common to all D/As

VCXO Sample Clock: Programmable, up to 1.25 GHz, phase-locked to 10MHz reference, common to all D/As

Reference Clock: Sine wave, 0 to +10 dBm, A-C coupled, 50 ohms, 10 MHz, used for phase-locking the VCXO

Connector Type: Rear panel female SMA connector for external sample or reference clock input

External Trigger

Number: One common trigger for all output channels

Input Level: LVTTTL with selectable rising or falling edge

Connector Type: Rear panel female SMA connector

Physical and Environmental

Dimensions: 19" W x 22" D x 7" H

Weight: 50 lb, approx.

Operating Temp: -20° to +50° C

Storage Temp: -40° to +85° C

Relative Humidity: 10% to 95%, non-condensing

Operating Shock: Designed to MIL-STD 810F, method 514.5, procedures I and VI

Operating Vibration: Designed to MIL-STD 810F, method 514.5, procedure I

EMI/EMC: Designed to MIL-STD 461E, CE101, CE102, CS101, CS113, RE101, RE102, RS101, RS103

Input Power: 85 to 264 VAC, 47- 400 Hz, 600 W max.

Model RTX 2767 Order Information and Options

Channel Configurations

Option -201	1-channel recording
Option -202	2-channel recording
Option -204	4-channel recording
Option -221	1-channel playback
Option -222	2-channel playback

Storage Options

		Max. Data Rate
Option -410	3.8 TB SSD storage	4.0 GB/sec
Option -415	7.6 TB SSD storage	4.0 GB/sec
Option -418	11.5 TB SSD storage	4.0 GB/sec

► Storage Options

Option -420	15.3 TB SSD storage
Option -425	23.0 TB SSD storage
Option -430	30.7 TB SSD storage

General Options (append to all options)

Option -014	400 MHz 14-bit A/Ds
Option -261	GPS time & position stamping
Option -264	IRIG-B time stamping
Option -680	28 VDC power supply
Option -625	Front-panel removable OS drive

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications are subject to change without notice



## Features

- Portable system measuring 16.9" W x 9.5" D x 13.4" H
- Lightweight: approximately 30 pounds
- Rugged aluminum alloy chassis
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 1 GHz 12-bit A/D
- 1 GHz 16-bit D/A
- 400 MHz recording and playback signal bandwidths
- Recording of IF signals up to 2 GHz
- Real-time aggregate recording rates up to 2.4 GB/sec
- Up to 7.6 TB storage with hot-swappable SSD drives
- NTFS file format
- Complete high-performance Windows® workstation with Intel® Core™ i7 processor
- SystemFlow® GUI with Signal Viewer analysis tool
- File headers include time stamping and recording parameters
- Ideal for communications, radar, wireless, SIGINT, telecom and satcom
- Optional GPS time and position stamping

Contact the factory for options, for number and type of analog channels, recording rates, and disk capacity.

## General Information

The Talon® RTR 2728 is a turnkey, multi-band recording and playback system that allows the user to record and reproduce high-bandwidth signals with a lightweight, portable and rugged package. The RTR 2728 provides recording rates of up to 2.4 GB/sec and is ideal for the user who requires portability and solid performance in a compact recording system.

The RTR 2728 is supplied in a small footprint portable package measuring only 16.9" W x 9.5" D x 13.4" H and weighing just 30 pounds. With measurements similar to a small briefcase, this portable workstation includes an Intel Core i7 processor a high-resolution 17" LCD monitor, and a high-performance SATA RAID controller.

At the heart of the RTR 2728 are Pentek Cobalt® Series Virtex-6 software radio boards featuring A/D and D/A converters. This architecture allows the system engineer to take full advantage of the latest technology in a turnkey system.

GPS time and position stamping is optionally available.

## SystemFlow Software

Included in this system is the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

Built on a Windows 7 Professional workstation, the RTR 2728 allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2728 records data to the native NTFS file format, providing immediate access to the recorded data.

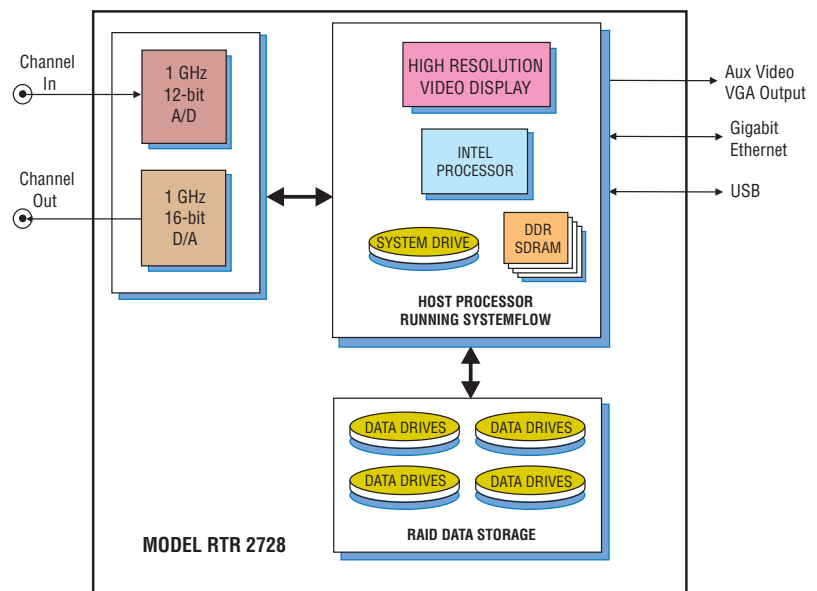
Data can be off-loaded through two 1 Gb Ethernet ports, eight USB 2.0 ports or two eSATA ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

## Rugged & Flexible Architecture

The RTR 2728 is configured in a portable, lightweight chassis with hot-swap SSDs, front panel USB ports and I/O connections on the side panel. It is built on an extremely rugged, 100% aluminum alloy unit, reinforced with shock absorbing rubber corners and an impact-resistant protective glass. Using shock- and vibration-resistant SSDs, the RTR 2728 is designed to operate reliably as a portable field instrument.

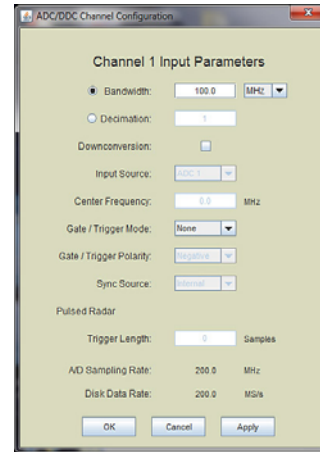
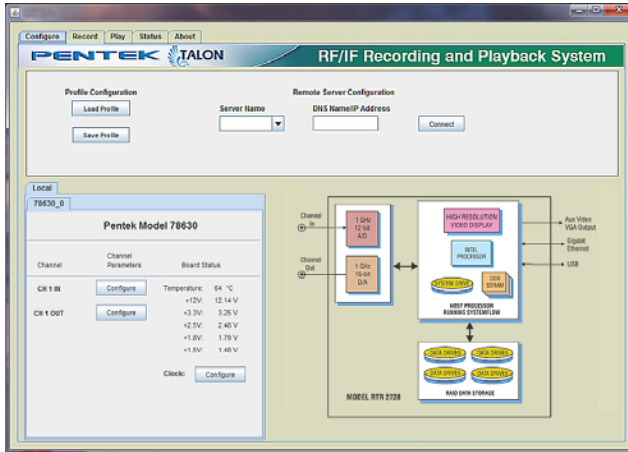
The hot-swappable SSDs provide storage capacities of up to 7.6 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

Multiple RAID levels including 0, 1, 5, and 6 provide a choice for the required level of redundancy. ➤





► SystemView Graphical User Interface

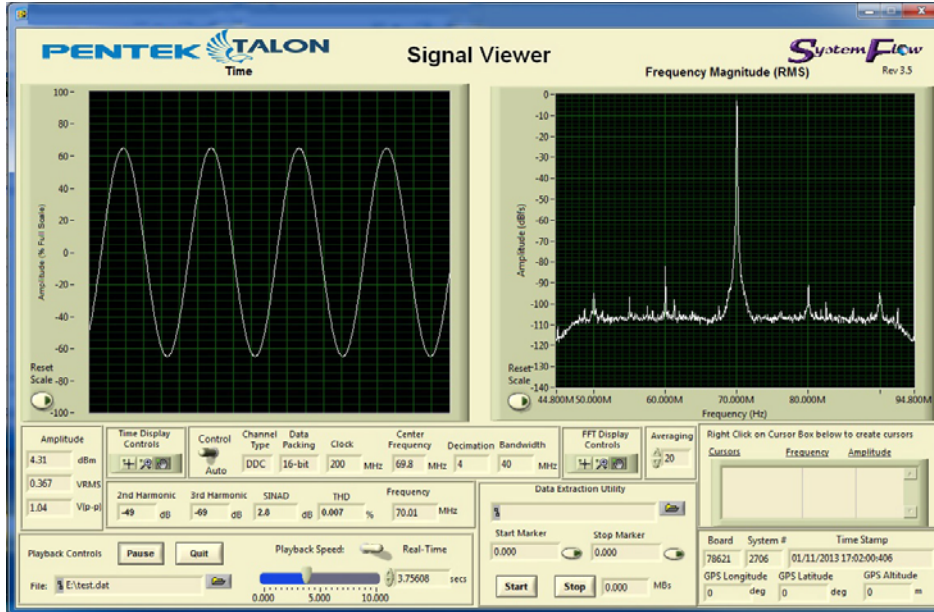


SystemFlow Recorder Interface

The RTR 2728 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 recorded signals on disk.

SystemFlow Hardware Configuration Interface

The RTR 2728's Configure screens provide a simple and intuitive means for setting up the system parameters. The ADC configuration screen shown here, allows user entries for gate/trigger mode, gate/trigger polarity, and sync source. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. This 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 (standard configuration)

**Operating System:** 64-bit Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**Operating System Drive:** 128 GB SSD

**SDRAM:** 8 GB

**Monitor:** Built-in 17" high-resolution LCD  
1440 x 900 pixels, 200 nits

### RAID

**Total Storage:** 1.9, 3.8 or 7.6 TB

**Supported RAID Levels:** 0, 1, 5, and 6

**Drive Bays:** Hot-swap, removable, rear panel

**USB 2.0 Ports:** Eight on left side, two on front panel

**USB 3.0 Ports:** Two on left side

**1 Gb Ethernet Port:** Two on left side

**eSATA 3 Ports:** Two on left side

**Aux Video Output:** 15-pin VGA on left side

### Analog Recording Inputs

#### Analog Signal Inputs

**Quantity:** 1

**Input Type:** Transformer-coupled, female SSMC connector

**Transformer Type:** Macom ETC1-1-13TR

**Full Scale Input:** +10 dBm into 50 ohms

**3 dB Passband:** 5 MHz to 2 GHz

#### A/D Converter

**Type:** Texas Instruments ADS5400

**Sampling Rate ( $f_s$ ):** 100 MHz to 1 GHz

**Resolution:** 12 bits

**A/D Record Bandwidth:**  $f_s/2 =$  Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

### Analog Playback Output

#### Analog Signal Outputs

**Quantity:** 1

**Output Type:** Transformer-coupled, female SSMC connector<sup>1</sup>

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### D/A Converter

**Type:** TI DAC5681Z

**Interpolation:** 1x, 2x or 4x

**Input Data Rate to DAC5681Z:** 500 MS/sec max.

**Output Sampling Rate:** 1 GHz, max.

**Output IF:** 700 MHz, max.

**D/A Resolution:** 16 bits

**Clock Sources:** Selectable from onboard programmable VCXO or external clock

#### External Clock

**Type:** Female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, accepts 100 MHz to 1 GHz input clock or 10 MHz system reference

#### Internal Clock

**Type:** Programmable VCXO

**VCXO Frequency Ranges:** 100 to 945 MHz, 970 MHz to 1 GHz

### Physical and Environmental

**Dimensions:** 16.9" W x 9.5" D x 13.4" H

**Weight:** 30 lb, approximately

**Power:** 90 to 265 VAC, 50 - 60 Hz

**Operating Temp:** 5° to +45° 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.

## Model RTR 2728 Ordering Information and Options

### Channel Configurations

**Option -201** 1-channel recording

**Option -202** 2-channel recording

**Option -221** 1-channel playback

**Option -222** 2-channel playback

### Storage Options

**Option -405** 1.9 TB SSD storage capacity

**Option -410** 3.8 TB SSD storage capacity

**Option -415** 7.6 TB SSD storage capacity

### General Options (append to all options)

**Option -261** GPS time & position stamping

**Option -264** IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications subject to change without notice

New!

# Model RTR 2728A

# 1 GS/sec RF/IF Rugged Portable Recorder



### Features

- Designed to operate under conditions of shock and vibration
- Portable system measuring 16.0" W x 6.9" D x 13.0" H
- Lightweight, just less than 30 pounds
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 1 GHz 12-bit A/D
- 1 GHz 16-bit D/A
- 400 MHz recording and playback signal bandwidths
- Recording and playback of IF signals up to 2 GHz
- Real-time aggregate recording rates up to 4.0 GB/sec
- Windows® workstation with high performance Intel® Core™ i7 processor
- Up to 61 terabytes of SSD storage to NTFS RAID solid state disk array
- SystemFlow® GUI with Signal Viewer analysis tool
- Optional file headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Optional 10–36 VDC power supply

Contact the factory for options, for number and type of analog channels, recording rates, and disk capacity.

### General Information

The Talon® RTR 2728A is a turnkey, multi-band recording and playback system that allows the user to record and reproduce high-bandwidth signals with a lightweight, portable and rugged package. The RTR 2728A provides recording rates of up to 4.0 GB/sec and is ideal for the user who requires portability and solid performance in a compact recording system.

The RTR 2728A is supplied in a small-footprint portable package measuring only 16.0" W x 6.9" D x 13.0" H and weighing just less than 30 pounds. With measurements similar to a small briefcase, this portable workstation includes an Intel Core i7 processor a high-resolution 17" LCD monitor, and up to 61.4 TB of SSD storage.

At the heart of the RTR 2728A are Pentek Cobalt® Series Virtex-6 software radio boards featuring A/D and D/A converters. This architecture allows the system engineer to take full advantage of the latest technology in a turnkey system.

Optional GPS time and position stamping allows the user to record this critical signal information.

### SystemFlow Software

Included in this system is the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system. It also includes a C-callable API that allows users to easily integrate the Talon recorder into a larger system.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

Built on a Windows 7 Professional workstation, the RTR 2728A allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2728A records data to the native NTFS file format, providing immediate access to the recorded data.

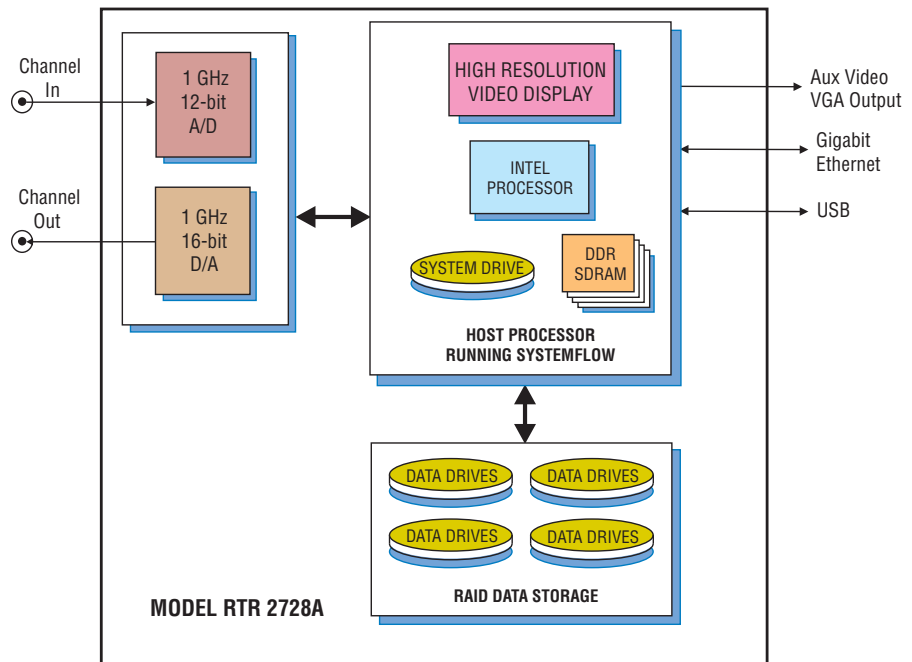
Data can be off-loaded via gigabit Ethernet, USB 2.0 and USB 3.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

Option -625 replaces the DVD±R/RW drive with a removable operating system drive; an external DVD drive can be used.

### Rugged Chassis with SSD Storage

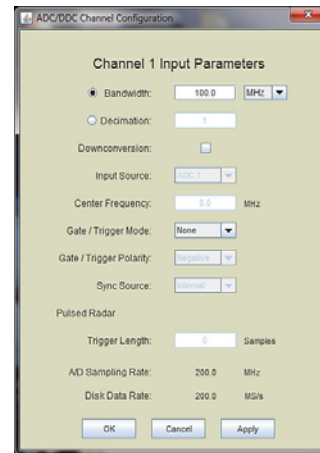
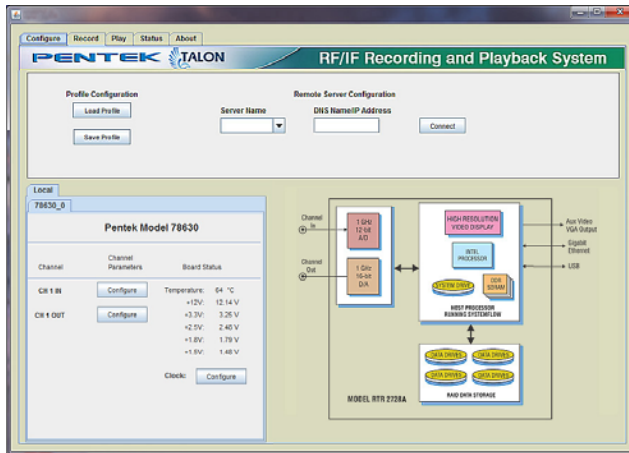
The RTR 2728A is configured with hot-swappable SSDs, front panel USB ports, and I/O connectors on the side panel. It is built in an extremely rugged steel and aluminum chassis and is tested for shock and vibration. The SSDs provide storage capacities of up to 61.4 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

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





► SystemView Graphical User Interface

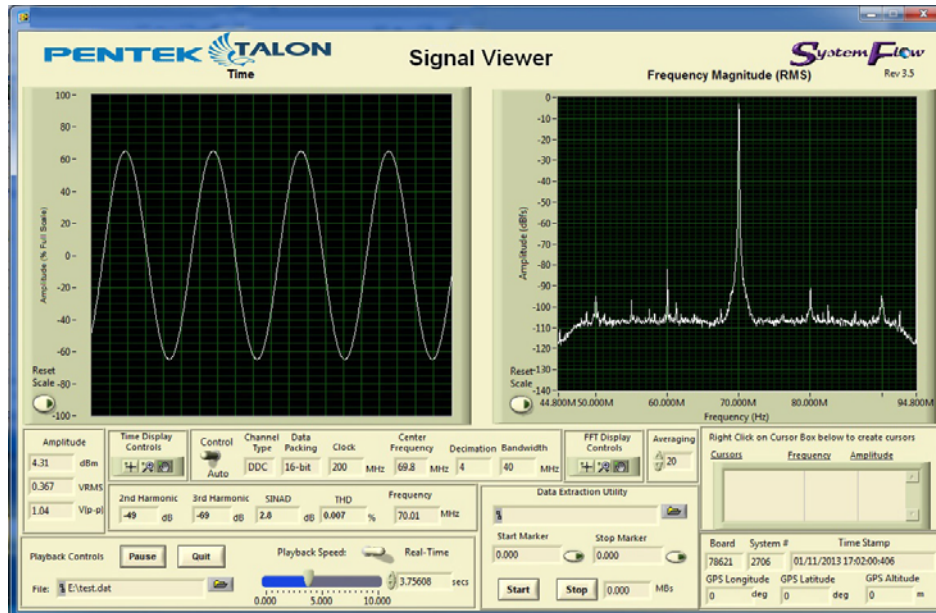


SystemFlow Recorder Interface

The RTR 2728A 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, playback 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 recorded signals on disk.

SystemFlow Hardware Configuration Interface

The RTR 2728A's Configure screens provide a simple and intuitive means for setting up the system parameters. The ADC configuration screen shown here, allows user entries for gate/trigger mode, gate/trigger polarity, and sync source. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. This 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 (standard configuration)**

**Operating System:** 64-bit Windows workstation  
**Processor:** Intel Core i7 processor  
**Clock Speed:** 3.0 GHz or higher  
**Operating System Drive:** 128 GB SSD  
**SDRAM:** 8 GB  
**Monitor:** Built-in 17.3" high-resolution LCD,  
 1920 x 1080 pixels, 16:9 aspect ratio, anti-glare surface  
 Brightness: 300 cd/m<sup>2</sup>; Contrast ratio: 400:1 typical  
**RAID**  
**Total Storage:** 3.8 – 61.4 TB  
**Supported RAID Levels:** 0, 5 and 6  
**Drive Bays:** Hot-swap, removable, side panel  
**USB 2.0 Ports:** Four on left side, two on front panel  
**USB 3.0 Ports:** Two on left side  
**1 Gb Ethernet Ports:** Two on left side  
**Aux Video Output:** 15-pin VGA on left side

**Analog Signal Input**

**Connector:** Transformer-coupled, female SSMC  
**Transformer Type:** Macom ETC1-1-13TR  
**Full Scale Input:** +10 dBm into 50 ohms  
**3 dB Passband:** 5 MHz to 2 GHz

**A/D Converter**

**Type:** Texas Instruments ADS5400  
**Sampling Rate ( $f_s$ ):** 100 MHz to 1 GHz  
**Resolution:** 12 bits  
**A/D Record Bandwidth:**  $f_s/2 =$  Nyquist bandwidth  
**Anti-Aliasing Filters:** External, user-supplied

**Analog Signal Output**

**Connector:** Transformer-coupled, female SSMC  
**Full Scale Output:** +4 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**D/A Converter**

**Type:** TI DAC5681Z  
**Interpolation:** 1x, 2x or 4x  
**Input Data Rate to DAC5681Z:** 500 MS/sec max.  
**Output Sampling Rate:** 1 GHz, max.  
**Output IF:** 700 MHz, max.  
**D/A Resolution:** 16 bits

**Clock Sources:** Selectable from onboard programmable VCXO or external clock

**External Clock**

**Type:** Female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, accepts 100 MHz to 1 GHz input clock or 10 MHz system reference

**Internal Clock**

**Type:** Programmable VCXO  
**VCXO Frequency Ranges:** 100 to 945 MHz, 970 MHz to 1 GHz

**Optional DC Power supply**

**Voltage:** 10 to 36 VDC  
**Input Current:** 42 to 26 A (39 A at 24 VDC)  
**Inrush Current:** 100 A at 24 VDC  
**Temperature Range:** Oper.: 0° to 50° C, Store: -0° to 80° C  
**Efficiency:** >80% typical at 24 V full load  
**Power Good Signal:** On delay 100 to 500 msec  
**OverPower Protection:** 110% to 160%  
**Remote Control:** On/Off  
**Safety:** Meets UL, TUV, CB specifications

**Physical and Environmental**

**Size:** 16.0" W x 6.9" D x 13.0" H  
**Weight:** 30 lb max.  
**Operating Temp:** 0° to +50° C  
**Storage Temp:** -40° to +85° C  
**Relative Humidity:** 5 to 95%, non-condensing  
**Operating Shock:** 30 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  
**Non-operating Vibration:** 5 to 500 Hz: 2.06 g RMS  
**Power Requirements:** 100 to 240 VAC, 50 to 60 Hz, 500 W max.

**Model RTR 2728A Ordering Information and Options**

**Channel Configurations**

**Option -201** 1-Channel Recording  
**Option -202** 2-Channel Recording  
**Option -221** 1-Channel Playback  
**Option -222** 2-Channel Playback

**Storage Options**

**Option -410** 3.8 TB SSD Storage  
**Option -415** 7.6 TB SSD Storage  
**Option -420** 15.3 TB SSD Storage  
**Option -430** 30.7 TB SSD Storage  
**Option -460** 61.4 TB SSD Storage

**Additional Options**

**Option -261** GPS Time & Position Stamping  
**Option -264** IRIG-B Time Stamping  
**Option -285** RAID 5 Configuration  
**Option -286** RAID 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -311** 64 GB System Memory  
**Option -625** Removable Operating System Drive  
**Option -681** 10 to 36 VDC Power Supply

**Contact Pentek for compatible Option combinations  
 Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*



## Features

- Designed to operate under conditions of shock and vibration
- Recording of IF signals up to 2 GHz.
- 1 GHz 12-bit A/Ds
- 1 GHz 16-bit D/As
- 400 MHz recording and playback signal bandwidths
- Real-time aggregate recording rates up to 4.0 GB/sec
- 4U 19-inch rugged rackmount PC server chassis
- Available in 21" deep 24-bay rackmount chassis or 26" deep 40-bay rackmount chassis
- Up to 46 terabytes of SSD storage to NTFS RAID solid state disk array
- RAID levels of 0, 1, 5, 6, 10 and 50
- Complete high-performance Windows® workstation with Intel® Core™ i7 processor
- 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

Contact factory for options, for number and type of analog channels, recording rates, and disk capacity.

## General Information

The Talon® RTR 2748 is a turnkey recording and playback system that allows users to record and reproduce signals with bandwidths up to 500 MHz. The RTR 2748 can be configured as a one- or two-channel system to provide real-time recording and playback rates up to 4.0 GB/sec to an array of solid-state drives.

The RTR 2748 uses Pentek's high-powered Virtex-6-based Cobalt® boards that provide the data streaming engine for the high-speed A/D converters.

A built-in synchronization module is provided to allow for multichannel phase-coherent operation.

GPS time and position stamping is optionally available.

## SystemFlow Software

The RTR 2748 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

Built on a Windows 7 Professional workstation, the RTR 2748 allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2748 records data to the native NTFS file system that provides immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports, six USB 2.0 ports or two eSATA ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

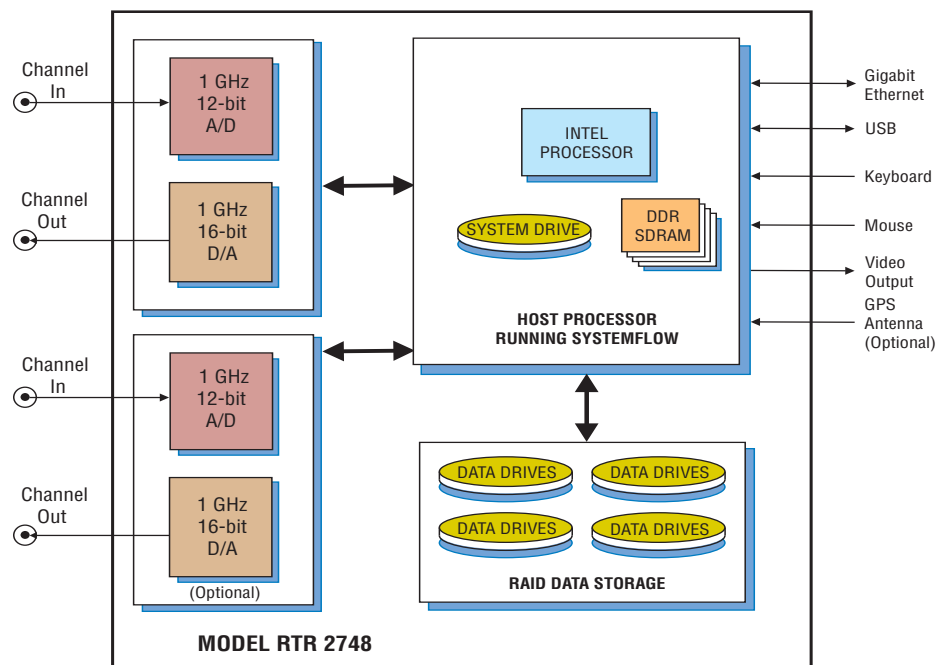
## Rugged and Flexible Architecture

Because SSDs operate reliably under conditions of shock and vibration, the RTR 2748 performs well in ground, shipborne and airborne environments. The drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Available in a 21" deep, 24-bay chassis or a 26" deep, 40-bay chassis, the system can be populated with SSD storage up to 46 TB.

The RTR 2748 is configured in a rugged rackmount chassis, with hot-swappable data drives, front panel USB ports and I/O connectors on the rear panel.

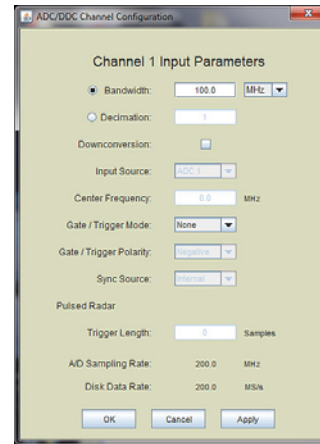
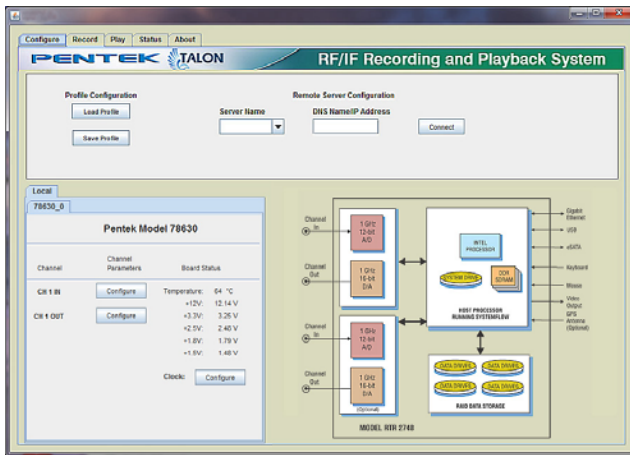
Systems are scalable to accommodate multiple chassis to increase channel counts and aggregate data rates. All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

Multiple RAID levels, including 0, 1, 5, 6, 10, and 50 provide a choice for the required level of redundancy. ➤





► SystemFlow Graphical User Interface

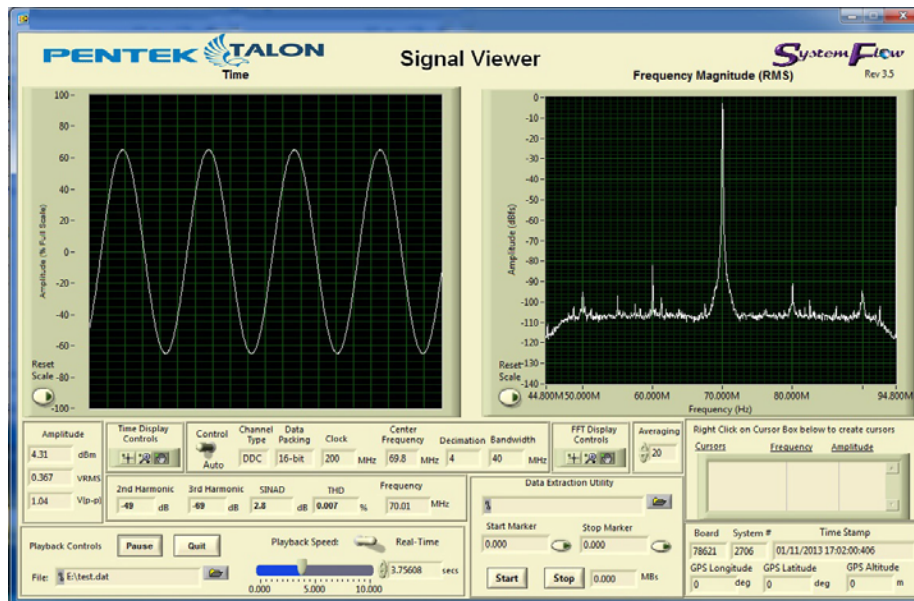


SystemFlow Recorder Interface

The RTR 2748 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 2748 Configure screens provide a simple and intuitive means for setting up the system parameters. The A/D configuration screen shown here, allows user entries for gate/trigger mode, gate/trigger polarity, and trigger source. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ►

**► Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

**RAID**

**Storage:** 3.8, 7.6, 15.3, 30.7 or 46.0 TB

**Drive Type:** SATA III SSDs

**Supported RAID Levels:** 0, 1, 5, 6, 10 and 50

**Analog Recording Input**

**Input Type:** Transformer-coupled, female SSMC connector

**Transformer Type:** Macom ETC1-1-13TR

**Full Scale Input:** +10 dBm into 50 ohms

**3 dB Passband:** 5 MHz to 2 GHz

**A/D Converter**

**Type:** Texas Instruments ADS5400

**Sampling Rate ( $f_s$ ):** 100 MHz to 1 GHz

**Resolution:** 12 bits

**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

**Analog Playback Output**

**Output Type:** Transformer-coupled, female SSMC connector

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

**D/A Converter**

**Type:** TI DAC5681Z

**Interpolation:** 1x, 2x or 4x

**Input Data Rate to DAC5681Z:** 500 MS/sec max.

**Output Sampling Rate:** 1 GHz, max.

**Output IF:** 700 MHz, max.

**D/A Resolution:** 16 bits

**Clock Sources:** Selectable from onboard programmable VCXO or external clock

**External Clock**

**Type:** Female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, accepts 100 MHz to 1 GHz input clock or 10 MHz system reference

**Internal Clock**

**Type:** Programmable VCXO

**VCXO Frequency Ranges:** 100 to 945 MHz, 970 MHz to 1 GHz

**Physical and Environmental**

**Size**

**Width:** 19"

**Height:** 7"

**Depth:** 21" (24-drive chassis)

**Depth:** 26" (40-drive chassis)

**Weight:** 60-85 lb

**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.

**Model RTR 2748 Ordering Information and Options**

**Channel Configurations**

<b>Option -201</b>	1-channel recording
<b>Option -202</b>	2-channel recording
<b>Option -221</b>	1-channel playback
<b>Option -222</b>	2-channel playback

**Storage Options**

<b>Option -410</b>	3.8 TB SSD storage capacity
<b>Option -415</b>	7.6 TB SSD storage capacity
<b>Option -420</b>	15.3 TB SSD storage capacity
<b>Option -430</b>	30.7 TB SSD storage capacity
<b>Option -440</b>	46.0 TB SSD storage capacity

**Note:** Options -430 and -440 require a 26-inch deep chassis

**General Options (append to all options)**

<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping

**Contact Pentek for compatible Option combinations  
Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*

New!



### Features

- Designed to meet MIL-STD-810 shock and vibration
- Designed to meet EMC/EMI per MIL-STD-461 EMC
- 4U 19-inch rugged rackmount PC server chassis, 22" deep
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- 1 GHz 12-bit A/Ds
- 1 GHz 16-bit D/As
- 400 MHz recording and playback signal bandwidths
- Recording of IF signals up to 2 GHz.
- Real-time aggregate recording rates up to 4.0 GB/sec
- Up to four front-panel removable QuickPac SSD drive canisters with eight drives each
- Up to 30 terabytes of storage to NTFS RAID disk array
- 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® RTX 2768 is a turnkey recording and playback system that is built to operate under harsh conditions. Designed to withstand high vibration and operating temperatures, the RTX 2768 is intended for military, airborne and UAV applications requiring a rugged system. With scalable A/Ds, D/As and SSD (Solid-State Drive) storage, the RTX 2768 can be configured to stream data to and from disk at rates as high as 4.0 GB/sec

The RTX 2768 uses Pentek's high-powered Virtex-6-based Cobalt® boards that provide the data-streaming engine for the high-speed A/D and D/A converters. This system allows users to record and reproduce signals with bandwidths up to 400 MHz.

A built-in synchronization module is provided to allow for multichannel phase-coherent operation.

Optional GPS time and position stamping allows the user to record this critical signal information.

### SystemFlow Software

The RTX 2768 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

Built on a Windows 7 Professional workstation, the RTX 2768 allows the user to install post-processing and analysis tools to operate on the recorded data. The RTX 2768 records data to the native NTFS file system that provides immediate access to the recorded data.

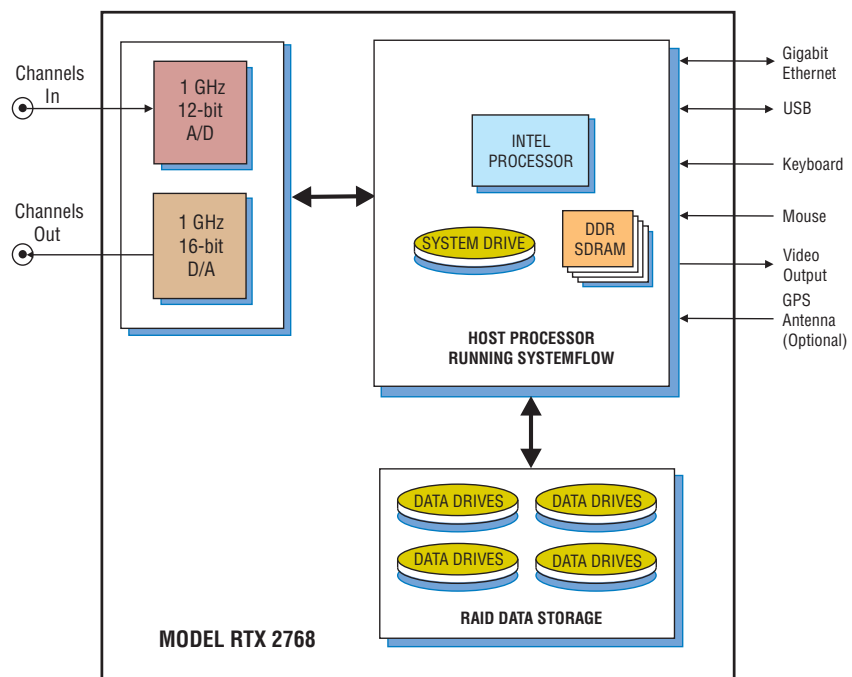
Data can be off-loaded via two rear-access gigabit Ethernet ports, two USB 3.0 ports or up to four USB 2.0 ports.

### Rugged Mil-Spec Chassis

The Talon RTX 2768 uses a shock- and vibration-isolated inner chassis and solid-state drives to assure reliability under harsh conditions. The chassis uses an in-line EMI filter along with rear-panel MIL-style connectors to meet MIL-STD-461 emissions specifications.

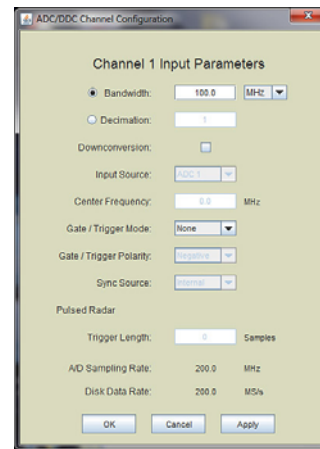
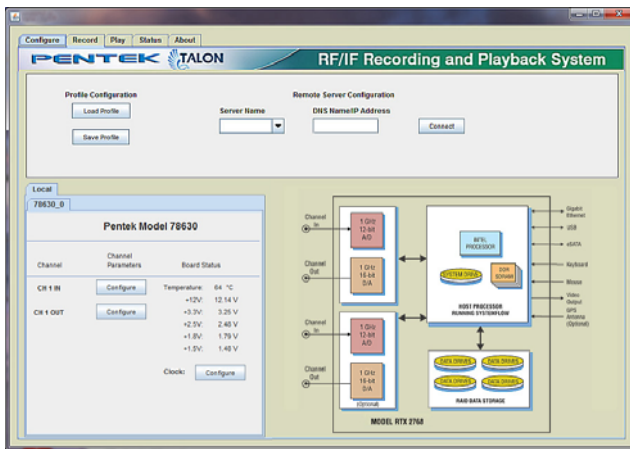
Up to four front-panel removable QuickPac drive canisters are provided, each containing up to eight SSDs. Each drive canister can hold up to 7.6 TB of data storage and allows for quick and easy removal of mission-critical data.

Forced-air cooling draws air from the front of the chassis and pushes it out the back via exhaust fans. A hinged front door with a serviceable air filter provides protection against dust and sand. ➤





► SystemFlow Graphical User Interface

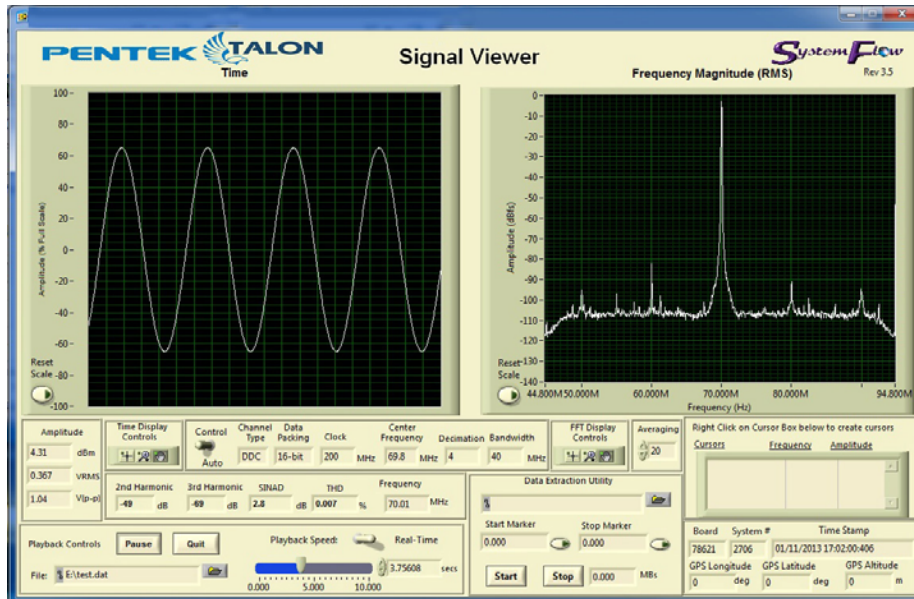


SystemFlow Recorder Interface

The RTX 2768 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 RTX 2768 Configure screens provide a simple and intuitive means for setting up the system parameters. The A/D configuration screen shown here, allows user entries for gate/trigger mode, gate/trigger polarity, and trigger source. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ►

## ► Specifications

### PC Workstation (standard configuration)

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

### Data Storage

**Style:** Up to four front-panel removable QuickPac drive canisters; up to eight SSDs contained in each canister

**Location:** Front panel

**Capacity:** Up to 30 TB

**Number of Drives:** Up to 32 total

**Supported RAID Levels:** 0, 1, 5 and 6

### Analog Recording Input Channels

#### Analog Signal Inputs

**Connector Type:** Rear-panel female SMA connectors

**Input Type:** Transformer-coupled

**Full Scale Input:** +10 dBm into 50 ohms

**3 dB Passband:** 5 MHz to 2 GHz

#### A/D Converters

**Type:** Texas Instruments ADS5400

**Sample Rate ( $f_s$ ):** 100 MHz to 1 GHz

**Resolution:** 12 bits

**A/D Record Bandwidth:**  $f_s/2 =$  Nyquist bandwidth

**Anti-Aliasing Filters:** External, user-supplied

#### Sample and Reference Clocks

**External Sample Clock:** Sine wave, 0 to +10 dBm, AC-coupled, 50 ohms 10 to 1000 MHz, common to both A/Ds

**VCXO Sample Clock:** Programmable, 10 to 1000 MHz, phase-locked to 10MHz reference, common to both A/Ds

**Reference Clock:** Sine wave, 0 to +10 dBm, A-C coupled, 50 ohms, 10 MHz, used for phase-locking the VCXO

**Connector Type:** Rear panel female SMA connector for external sample or reference clock input

#### External Trigger

**Number:** One common trigger for both input channels

**Input Level:** LVTTTL with selectable rising or falling edge

**Connector Type:** Rear panel female SMA connector

### Analog Playback Output Channels

#### Analog Signal Outputs

**Output Type:** Rear-panel female SSMC connectors

**Full Scale Output:** +4 dBm into 50 ohms

**3 dB Passband:** 300 kHz to 700 MHz

#### D/A Converters

**Type:** Texas Instruments DAC5681Z

**Output Sampling Rate:** 1 GHz, max.

**Resolution:** 16 bits

**Input Sample Data Rate to:** 500 MS/sec max.

**Output IF:** 700 MHz, max.

**Interpolation:** 1x, 2x or 4x

#### Sample and Reference Clocks

**External Sample Clock:** Sine wave, 0 to +10 dBm, AC-coupled, 50 ohms 100 MHz to 1 GHz, common to both A/Ds

**VCXO Sample Clock:** 100 to 945 MHz, 970 MHz to 1 GHz phase-locked to 10MHz reference, common to all D/As

**Reference Clock:** Sine wave, 0 to +10 dBm, A-C coupled, 50 ohms, 10 MHz, used for phase-locking the VCXO

**Connector Type:** Rear panel female SMA connector for external sample or reference clock input

#### External Trigger

**Number:** One common trigger for both output channels

**Input Level:** LVTTTL with selectable rising or falling edge

**Connector Type:** Rear panel female SMA connector

### Physical and Environmental

**Dimensions:** 19" W x 22" D x 7" H

**Weight:** 50 lb, approx.

**Operating Temp:** -20° to +50° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 10% to 95%, non-condensing

**Operating Shock:** Designed to MIL-STD 810F, method 514.5, procedures I and VI

**Operating Vibration:** Designed to MIL-STD 810F, method 514.5, procedure I

**EMI/EMC:** Designed to MIL-STD 461E, CE101, CE102, CS101, CS113, RE101, RE102, RS101, RS103

**Input Power:** 85 to 264 VAC, 47- 400 Hz, 600 W max.

## Model RTX 2768 Order Information and Options

### Channel Configurations

<b>Option -201</b>	1-channel recording
<b>Option -202</b>	2-channel recording
<b>Option -221</b>	1-channel playback
<b>Option -222</b>	2-channel playback

### Storage Options

		<b>Max. Data Rate</b>
<b>Option -410</b>	3.8 TB SSD storage	4.0 GB/sec
<b>Option -415</b>	7.6 TB SSD storage	4.0 GB/sec
<b>Option -418</b>	11.5 TB SSD storage	4.0 GB/sec ►

### ► Storage Options

<b>Option -420</b>	15.3 TB SSD storage
<b>Option -425</b>	23.0 TB SSD storage
<b>Option -430</b>	30.7 TB SSD storage

### General Options (append to all options)

<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping
<b>Option -680</b>	28 VDC power supply
<b>Option -625</b>	Front-panel removable OS drive

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications are subject to change without notice

New!

# Model RTR 2729A

# 3.6 GS/sec Ultra Wideband RF/IF Rugged Portable Recorder



### Features

- Designed to operate under conditions of shock and vibration
- Portable system measuring 16.0" W x 6.9" D x 13.0" H
- Lightweight, just less than 30 pounds
- Sample rates up to 3.6 GHz in single-channel mode
- Sample rates up to 1.8 GHz in dual-channel mode
- 12-bit A/D, with 16- and 8-bit packing modes
- 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
- Real-time sustained recording rates of up to 4.0 GB/sec
- Windows® workstation with high performance Intel® Core™ i7 processor
- Up to 61.4 terabytes of SSD storage to NTFS RAID solid state disk array
- SystemFlow® GUI with signal viewer analysis tool
- Optional file headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Optional 10–36 VDC power supply

### General Information

The Talon® RTR 2729A is a turnkey system that allows users to record very high-bandwidth signals in a lightweight and rugged portable package. Equipped with a 3.6 GHz 12-bit A/D converter and user-programmable DDC (digital downconverter) the RTR 2729A is capable of capturing RF/IF signals with bandwidths as high as 360 MHz continuously for over four hours.

The RTR 2729A is supplied in a small-footprint portable package measuring only 16.0" W x 6.9" D x 13.0" H and weighing just less than 30 pounds. With measurements similar to a small briefcase, this portable workstation includes an Intel Core i7 processor, a high-resolution 17" LCD monitor and up to 61.4 TB of SSD storage.

The RTR 2729A uses a high-powered Pentek Virtex-7-based Onyx® board that includes a PCIe Gen. 3 engine to provide data streaming for the high-speed A/D converter. Coupled with a high-performance PCIe Gen. 3 SATA III RAID controller, the RTR 2729A is capable of streaming contiguous data to disk in real-time at rates up to 4.0 GB/sec.

The RTR 2729A can operate as a single-channel 3.6 GHz or a two-channel 1.8 GHz recorder. The channel mode operation, sample rate, DDC settings, packing modes and trigger settings are controllable via the built-in SystemFlow GUI (Graphical User Interface).

An optional GPS receiver and timing card can be added to the system to provide precise time and position stamping of the recorded data.

### SystemFlow Software

The RTR 2729A includes Pentek's SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means

to configure and control the system. It also includes a C-callable API that allows users to easily integrate the Talon recorder into a larger system.

The GUI provides a very simple interface for system setup. This includes pull-down selections for a handful of parameters, a checkbox to enable/disable the DDC and a data-entry field for the sample rate. Once set up, the GUI provides the ability to save profiles that can be reloaded at the click of a button.

SystemFlow also includes signal viewing and analysis tools that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope and spectrum analyzer.

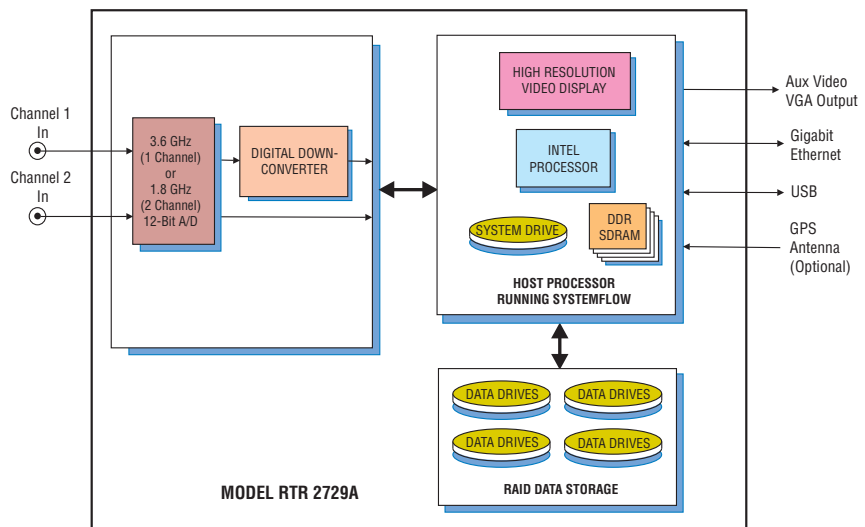
Built on a Windows 7 Professional workstation, the RTR 2729A allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2729A records data in the native NTFS file system for immediate access to the data.

Data can be off-loaded via gigabit Ethernet, USB 2.0 and USB 3.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

Option -625 replaces the DVD±R/RW drive with a removable operating system drive; an external DVD drive can be used.

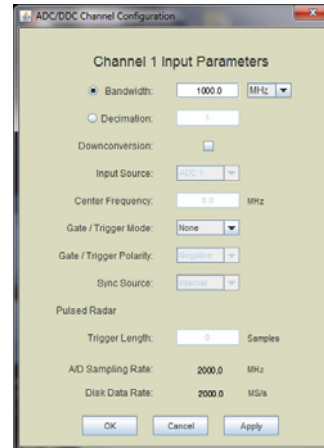
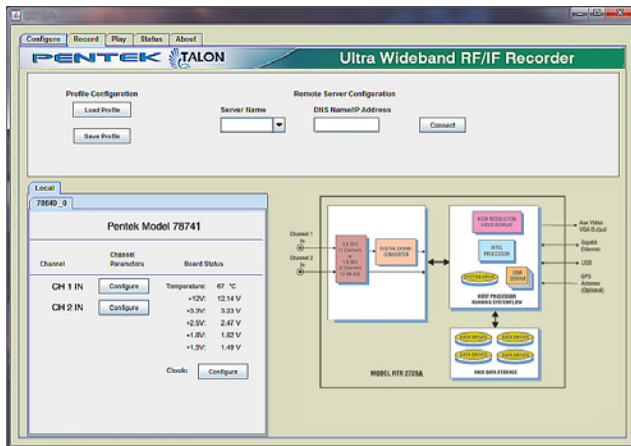
### Rugged Chassis with SSD Storage

The RTR 2729A is configured with hot-swappable SSDs, front panel USB ports, and I/O connectors on the side panel. It is built in an extremely rugged steel and aluminum chassis and is tested for shock and vibration. The SSDs provide storage capacities of up to 61.4 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0, 5, and 6, provide a choice for the required level of redundancy. ➤





► SystemFlow Graphical User Interface

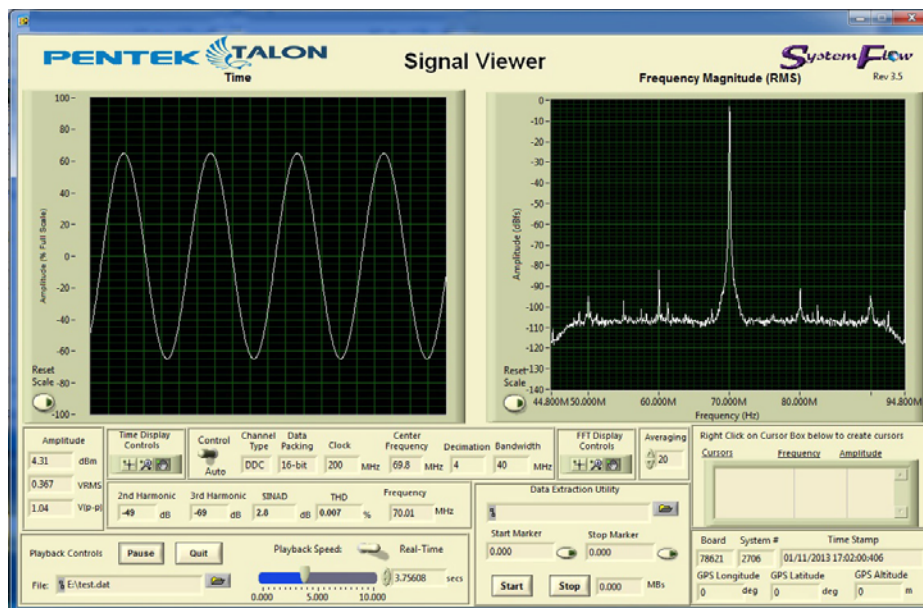


SystemFlow Recorder Interface

The RTR 2729A GUI shows a block diagram of the system and provides the user with a control interface for the recording system. It includes Configure, 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 2729A Configure screens provide a simple and intuitive means for setting up the system parameters. The configuration screen shown here, allows user entries for input source, sampling frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ►

## ► Specifications

### PC Workstation (standard configuration)

**Operating System:** 64-bit Windows workstation

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**Operating System Drive:** 128 GB SSD

**SDRAM:** 8 GB

**Monitor:** Built-in 17.3" high-resolution LCD,  
1920 x 1080 pixels, 16:9 aspect ratio, anti-glare surface  
Brightness: 300 cd/m<sup>2</sup>; Contrast ratio: 400:1 typical

### RAID

**Total Storage:** 7.6 – 61.4 TB

**Supported RAID Levels:** 0, 5 and 6

**Drive Bays:** Hot-swap, removable, side panel

**USB 2.0 Ports:** Four on left side, two on front panel

**USB 3.0 Ports:** Two on left side

**1 Gb Ethernet Ports:** Two on left side

**Aux. Video Output:** 15-pin VGA on left side

### Analog Signal Inputs

**Connectors:** Two side panel SSMC connectors, In 1 & In 2

**Input Type:** Single-ended, non-inverting

**Full Scale Input:** +4 dBm into 50 ohms

**Coupling:** Transformer-coupled

**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

**Modes:** One or two channels, programmable

**Supported Sample Rate ( $f_s$ ):**

One-channel mode: 3.6 GHz

Two-channel mode: 1.8 GHz

**Decimation Range (D):**

One-channel mode: 8x, 16x, 32x, bypass

Two-channel mode: 4x, 8x, 16x, bypass

**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

### Optional DC Power supply

**Voltage:** 10 to 36 VDC

**Input Current:** 42 to 26 A (39 A at 24 VDC)

**Inrush Current:** 100 A at 24 VDC

**Temperature Range:** Oper.: 0° to 50° C, Store: -0° to 80° C

**Efficiency:** >80% typical at 24 V full load

**Power Good Signal:** On delay 100 to 500 msec

**OverPower Protection:** 110% to 160%

**Remote Control:** On/Off

**Safety:** Meets UL, TUV, CB specifications

### Physical and Environmental

**Size:** 16.0" W x 6.9" D x 13.0" H

**Weight:** 30 lb max.

**Operating Temp:** 0° to +50° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 5 to 95%, non-condensing

**Operating Shock:** 30 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

**Non-operating Vibration:** 5 to 500 Hz: 2.06 g RMS

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

## Model RTR 2729A Ordering Information and Options

### Sample Clock Options

**Option -910** User-Programmable Sample Clock

**Option -911** 1.5 / 3.0 GHz sample clock

**Option -912** 1.6 / 3.2 GHz sample clock

**Option -915** 1.8 / 3.6 GHz sample clock

**Note** Custom fixed-frequency sample clocks available upon request.

### Storage Options

**Option -415** 7.6 TB SSD Storage

**Option -420** 15.3 TB SSD Storage

**Option -430** 30.7 TB SSD Storage

**Option -460** 61.4 TB SSD Storage

### Additional Options

**Option -261** GPS Time & Position Stamping

**Option -264** IRIG-B Time Stamping

**Option -285** RAID 5 Configuration

**Option -286** RAID 6 Configuration

**Option -309** 16 GB System Memory

**Option -311** 64 GB System Memory

**Option -625** Removable Operating System Drive

**Option -681** 10 to 36 VDC Power Supply

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications are subject to change without notice



## 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® 7 Professional workstation with high performance Intel® Core™ i7 processor
- Up to 46 terabytes of SSD storage to NTFS RAID solid state disk array
- RAID levels of 0, 1, 5, 6, 10 and 50
- N+1 redundant power supply
- 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

Contact factory for options, for number and type of analog channels, recording rates, and disk capacity.

## 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 Virtex-7-based Onyx® boards that 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.

## SystemFlow Software

The RTR 2749 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools that allow the user to monitor the signal prior to, during, and

after a recording session. These tools include a virtual oscilloscope and a virtual spectrum analyzer.

Built on a Windows 7 Professional workstation, the RTR 2749 allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2749 records data to the native NTFS file system that provides immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports, six USB 2.0 ports or two eSATA ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

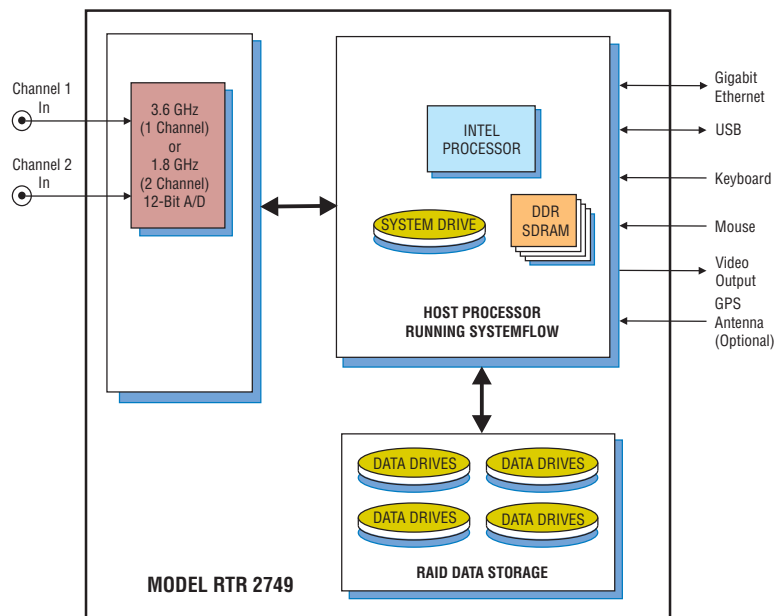
## Rugged and Flexible Architecture

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 46 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.

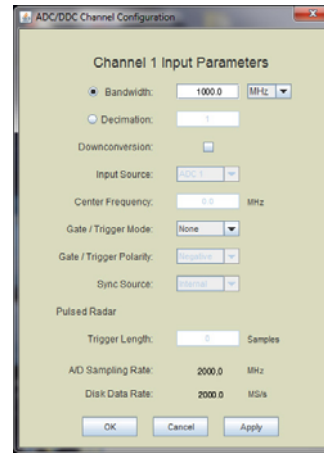
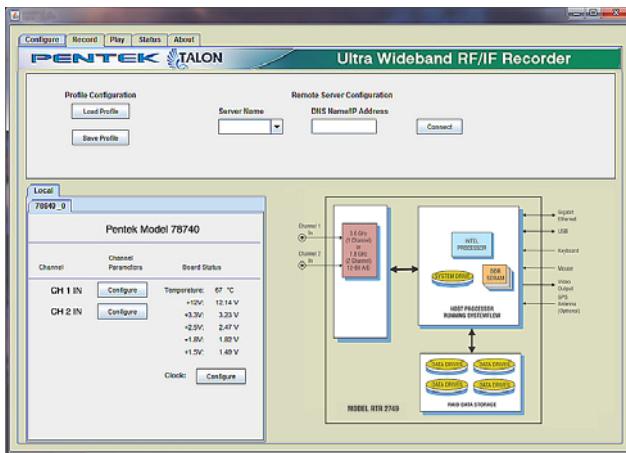
Systems are scalable to accommodate multiple chassis to increase channel counts and aggregate data rates. All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50 provide a choice for the required level of redundancy. ➤





► SystemFlow Graphical User Interface

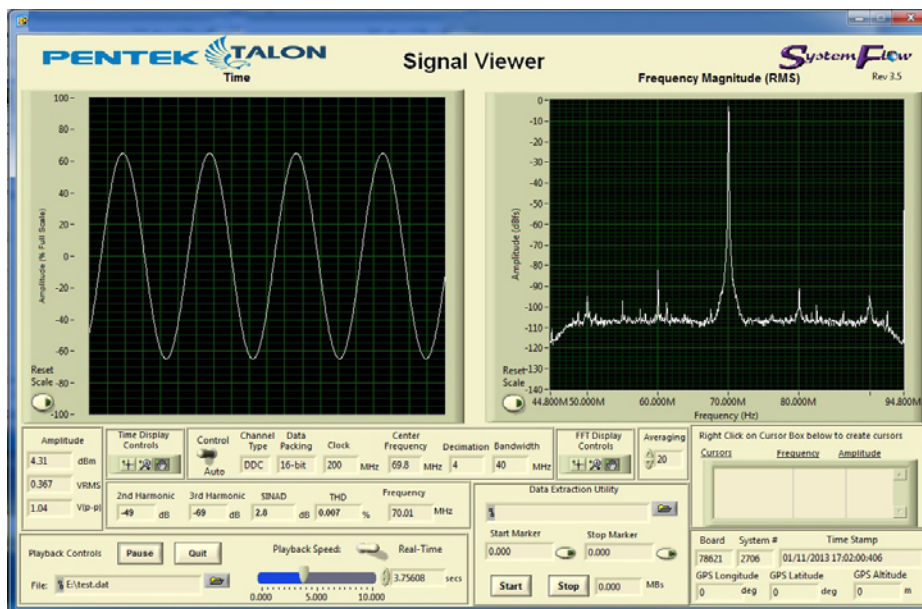


SystemFlow Recorder Interface

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.

SystemFlow Hardware Configuration Interface

The RTR 2749 Configure screens provide a simple and intuitive means for setting up the system parameters. The configuration screen shown here, allows user entries for input source, sampling frequency, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ►

## ► Specifications

### PC Workstation (standard configuration)

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 2.0 GHz or higher

**SDRAM:** 8 GB

### RAID

**Storage:** 7.6, 15.3, 30.7 or 46.0 TB

**Drive Type:** SATA III SSDs

**Supported RAID Levels:** 0, 1, 5, 6, 10 and 50

### 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

**Modes:** One or two channels, programmable

**Supported Sample Rate ( $f_s$ ):**

One-channel mode: 3.6 GHz

Two-channel mode: 1.8 GHz

**Decimation Range (D):**

One-channel mode: 8x, 16x, 32x, bypass

Two-channel mode: 4x, 8x, 16x, bypass

**Usable Output Bandwidth:**  $0.8 \cdot f_s / D$

**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

**Size:** 19" W x 26" D x 7" H

**Weight:** 60-85 lb

**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.

## Model RTR 2749 Ordering Information and Options

### 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

Custom fixed-frequency sample clocks available upon request.

### 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 -440

46.0 TB SSD storage capacity

**Note:** Options -430 and 440 require a 26-inch deep chassis

### General Options (append to all options)

#### Option -261

GPS time & position stamping

#### Option -264

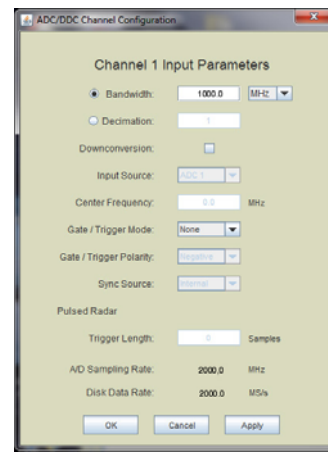
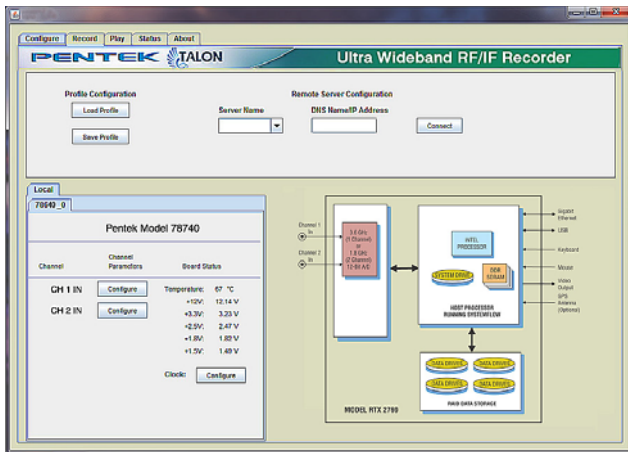
IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications are subject to change without notice

► SystemFlow Graphical User Interface

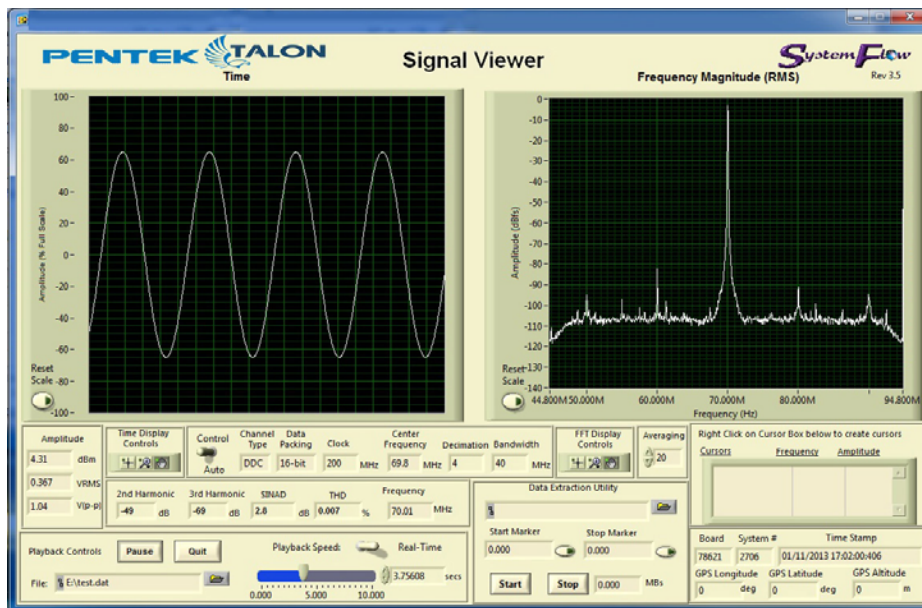


SystemFlow Recorder Interface

The RTX 2769 GUI provides the user with a control interface for the recording system. It includes Configuration, Record 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 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 RTX 2769 Configure screens provide a simple and intuitive means for setting up the system parameters. The configuration screen shown here, allows user entries for input source, sampling frequency, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ►



## ► Specifications

### PC Workstation (standard configuration)

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

### Data Storage

**Style:** Up to four front-panel removable QuickPac drive canisters; up to eight SSDs contained in each canister

**Location:** Front panel

**Capacity:** Up to 61 TB

**Number of Drives:** Up to 32 total

**Supported RAID Levels:** 0, 1, 5 and 6

### Analog Recording Input Channels

#### Analog Signal Inputs

**Connector Type:** Rear-panel female SMA connectors

**Input Type:** Transformer-coupled

**Full Scale Input:** +4 dBm into 50 ohms

**Input Transformers**

**3 dB Passband:** 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

**Full Scale Input:** +2 dBm to +4 dBm, programmable

### Digital Downconverters

**Modes:** One or two channels, programmable

**Supported Sample Rate ( $f_s$ ):**

One-channel mode: 3.6 GHz

Two-channel mode: 1.8 GHz

**Decimation Range (D):**

One-channel mode: 8x, 16x, 32x, bypass

Two-channel mode: 4x, 8x, 16x, bypass

**DDC Usable Bandwidth:**  $0.8 \cdot f_s / D$

### Sample and Reference Clocks

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

**Reference Clock:** External 10 MHz reference at

0 to +4 dBm to phase-lock the clock oscillator

**Connector Type:** Rear-panel female SMA connector

### External Trigger

**Number:** One common trigger for both channels

**Input Level:** LVTTTL with selectable rising or falling edge

**Connector Type:** Rear panel female SMA connector

### Physical and Environmental

**Dimensions:** 19" W x 22" D x 7" H

**Weight:** 50 lb, approx.

**Operating Temp:** -20° to +50° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 10% to 95%, non-condensing

**Operating Shock:** Designed to MIL-STD 810F, method 514.5, procedures I and VI

**Operating Vibration:** Designed to MIL-STD 810F, method 514.5, procedure I

**EMI/EMC:** Designed to MIL-STD 461E, CE101, CE102, CS101, CS113, RE101, RE102, RS101, RS103

**Input Power:** 85 to 264 VAC, 47–400 Hz, 600 W max.

## Model RTX 2769 Order Information and Options

### Sample Clock Options

<b>Option -910</b>	<b>User-Programmable Sample Clock</b> 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
<b>Option -911</b>	<b>Fixed-frequency clock</b> 1.5 / 3.0 GHz sample clock
<b>Option -912</b>	<b>Fixed-frequency clock</b> 1.6 / 3.2 GHz sample clock
<b>Option -915</b>	<b>Fixed-frequency clock</b> 1.8 / 3.6 GHz sample clock

Sample rates are set up for dual-channel mode first and single-channel mode second: e.g. 1.5 / 3.0 is 1.5 in dual-channel mode and 3.0 in single-channel mode.

### Storage Options

<b>Option -410</b>	3.8 TB SSD storage
<b>Option -415</b>	7.6 TB SSD storage
<b>Option -420</b>	15.3 TB SSD storage
<b>Option -430</b>	30.7 TB SSD storage
<b>Option -460</b>	61.0 TB SSD storage

### General Options

<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping
<b>Option -680</b>	28 VDC power supply
<b>Option -625</b>	Front-panel removable OS drive

**Contact Pentek for compatible Option combinations**

**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications are subject to change without notice*

New!

# Model RTR 2613

# Talon 3 GHz RF/IF Sentinel Intelligent Signal Scanning Portable Recorder



### Features

- Search and capture system using Pentek's Sentinel™ Intelligent Signal Scanner
- Captures RF signals up to 3 GHz
- Capture and scan bandwidths up to 40 MHz
- 30 GHz/sec scan rate
- Selectable threshold triggered or manual record modes
- 16-bit A/D with 75 dB SNR & 86 dB SFDR
- Built-in DDC with selectable decimation range from 2 to 65,536
- Portable system measuring 16.0" W x 6.9" D x 13.0" H
- Lightweight, just less than 30 pounds
- Storage capacities to 61.4 TB
- RAID levels 0, 5, and 6
- Windows® workstation with Intel Core™ i7 processor
- Optional RF upconversion
- SystemFlow GUI with virtual oscilloscope, spectrum analyzer and spectrogram displays

### General Information

The Talon® RTR 2613 combines Pentek's Sentinel Intelligent Signal Scanning software with real-time recording in a lightweight, portable and rugged package. The RTR 2613 provides SIGINT engineers the ability to scan the 3 GHz spectrum for signals of interest and monitor or record bandwidths up to 40 MHz wide once a signal band of interest is detected.

A spectral scan facility allows the user to sweep the spectrum at 30 GHz/sec, while threshold detection allows the system to automatically lock onto and record signal bands. Scan results are displayed in a waterfall plot and can also be recorded to allow users to look back at some earlier spectral activity.

Once a signal of interest is detected, the real-time recorder can capture and store up to 61.4 terabytes of data to disk, allowing users to store days'-worth of data.

### Hardware Features

The Pentek Model 78621 Cobalt board transceiver serves as the engine of the RTR 2613 and is coupled with a 3 GHz tuner to provide excellent dynamic range across the entire spectrum. The 200 MHz 16-bit A/D board provides 86 dB of spurious-free dynamic range and 75 dB of SNR.

The FPGA-based DDC with selectable decimations up to 64 k provides exceptional processing gain while allowing users to zoom into communications signals of varying bandwidths.

The RTR 2613 is supplied in a small footprint portable package measuring only 16.0" W x 6.9" D x 13.0" H and weighing

just less than 30 pounds. With measurements similar to a small briefcase, this portable workstation includes an Intel Core i7 processor a high-resolution 17 in. LCD monitor, and up to 61.4 TB of SSD storage.

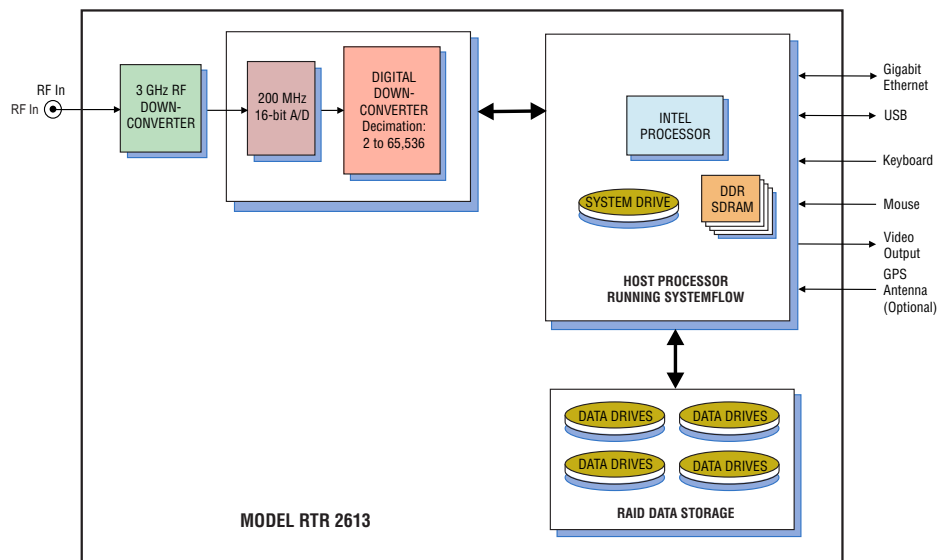
An optional GPS receiver and built-in PLLs allow all devices in the RF chain to be locked in phase and correlated to GPS time. GPS position information can optionally be recorded, allowing the recorder's position to be tracked while acquiring RF signals.

### Sentinel Features

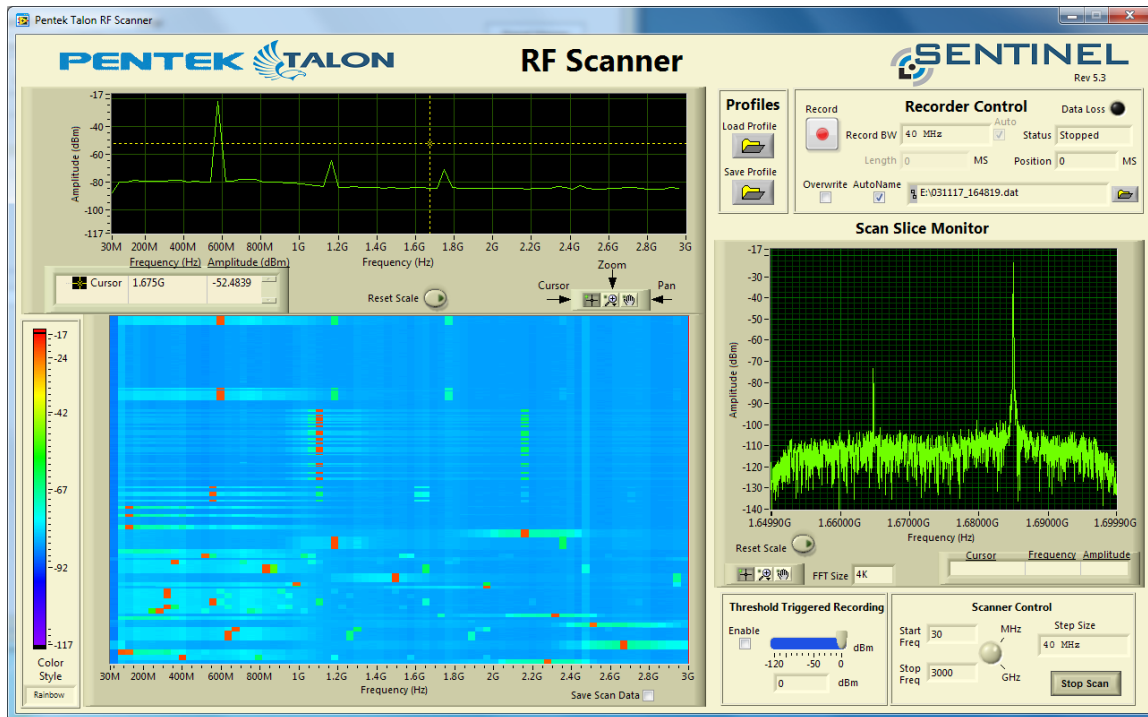
Pentek's Sentinel™ recorders add intelligent signal monitoring and detection for Talon real-time recording systems. The intuitive GUI allows users to monitor the entire spectrum or select a region of interest, while a selectable resolution bandwidth allows the user to trade sweep rate for a finer resolution and better dynamic range. Scan settings can be saved as profiles to allow for quick setup in the field.

RF energy in each band of the scan is detected and presented in a waterfall display. Any RF band can be selected for real-time monitoring or recording. In addition to manually selecting a band for recording, a recording can be automatically started by configuring signal strength threshold levels to trigger a recording.

The Sentinel hardware resources are controlled through enhancements to Talon's SystemFlow® software package that includes a virtual oscilloscope, virtual spectrum analyzer and spectrogram displays. These provide a complete suite of analysis tools to compliment the Sentinel hardware resources. ➤



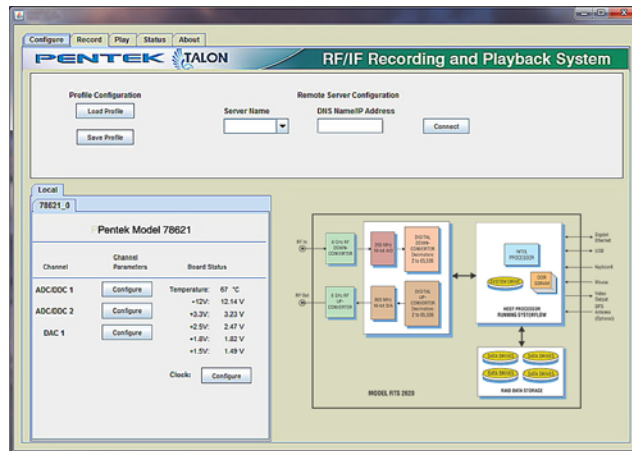
► Graphical User Interface



**RF Scanner GUI**

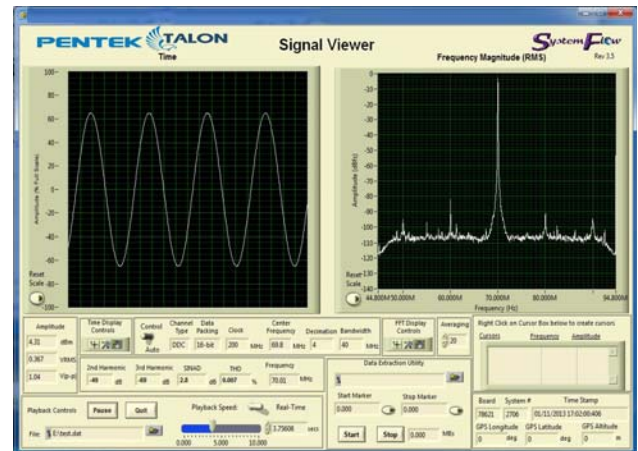
An RF Scanner GUI allows complete control of the system through a single interface. Start and stop frequencies of a scan can be set by the user as well as the resolution bandwidth. All user parameters can be saved as profiles for easy setup in the field.

Frequency slices from the waterfall display can be selected and monitored, allowing the user to zoom into bands of interest. Threshold triggering levels can be set to record signals that exceed a specified energy. Recordings can also be manually started and stopped from the RF Scanner GUI.



**SystemFlow Recorder Interface**

The RTR 2613 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, and play back a recorded signal. The signal viewer, integrated into the recording GUI, allows the user to monitor real-time signals or signals recorded on disk.



**SystemFlow 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.

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). ►



### ► SystemFlow Software

The RTR 2613 includes the SystemFlow® Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the recorder.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include virtual oscilloscope, spectrum analyzer and spectrogram displays.

Built on a Windows workstation, the RTR 2613 allows the user to install post-processing and analysis tools to operate on the recorded

data. The RTR 2613 records data to the native NTFS file system providing immediate access to the recorded data.

Data can be off-loaded via gigabit Ethernet ports or USB 3.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

## Specifications

### RF Tuner Specifications

**RF Tuner Frequency Range:** 30 to 3000 MHz

**Tuning resolution:** 1 kHz

**Internal frequency accuracy:** ±1.0 ppm (-20 to +60°C)

**External Reference Input Frequency:** 10 MHz

**External Reference Input Level:** 0 dBm ±3 dBm

**RF input:** 50 ohms nominal

**Noise figure:** 13 dB typical, 16 dB max

**Maximum RF input without damage:** +15 dBm

**In-Band Input IP3:** +3 dBm typical, -3 dBm min

**In-Band Input IP2:** +30 dBm min, +36 dBm typical

**IF bandwidth:** Nominal 40 MHz bandwidth (3 dB)

**IF center frequency:** 70 MHz center

**Gain:** +15 dB nominal above RF input

**Gain control:** Manual -40 dB range (min)

**Image rejection:** 65 dB min (> 80 dB typical)

**IF rejection:** 65 dB min (80 dB typical)

**Phase noise at 2.500 MHz:**

**1 kHz offset:** -75 dBc/Hz typical

**20 kHz offset:** -80 dBc/Hz max

**100 kHz offset:** -100 dBc/Hz typical

**1 MHz offset:** -125 dBc/Hz typical

**Internally generated spurious:** -100 dBm equivalent  
RF input typical

Specifications continued on next page ►

► **PC Workstation Specifications**

**Operating System:** Windows workstation  
**Processor:** Intel Core i7 processor  
**Clock Speed:** 3.2 GHz or higher  
**SDRAM:** 8 GB  
**RAID:**  
**Storage:** 480 GB – 61.4 TB  
**Supported RAID Levels:** 0, 5 and 6

**A/D Converter Specifications**

**Type:** Texas Instruments ADS5485  
**Sampling Rate:** 10 MHz to 200 MHz  
**Resolution:** 16 bits  
**SNR:** 75 dB<sub>f<sub>s</sub></sub> typical at 70 MHz  
**SFDR:** 86 dBc typical at 70 MHz  
**2<sup>nd</sup> Harmonic:** 95 dBc typical at 70 MHz  
**3<sup>rd</sup> Harmonic:** 87 dBc typical at 70 MHz  
**Next Worst Harmonic/Spurious:** 90 dBc typical at 70 MHz  
**THD:** 85 dBc typical at 70 MHz  
**SINAD:** 73.7 dBc typical at 70 MHz  
**ENOB:** 12.1 bits typical at 10 MHz

**Digital Downconverter IP Core Specifications**

**Decimation Range:** 2 to 64 k in two programmable stages of 2 to 256  
**LO Tuning Frequency Resolution:** 32 bits, 0 to  $f_s$   
**LO SFDR:** >120 dB  
**FIR Filter:** 16-bit coefficients, 24-bit output with user programmable coefficients  
**Default Filter Set:** 80% bandwidth, <0.3 dB passband ripple >100 dB stopband attenuation

**Optional DC Power supply**

**Voltage:** 10 to 36 VDC  
**Input Current:** 42 to 26 A (39 A at 24 VDC)  
**Inrush Current:** 100 A at 24 VDC  
**Temperature Range:** Oper.: 0° to 50° C, Store: -0° to 80° C  
**Efficiency:** >80% typical at 24 V full load  
**Power Good Signal:** On delay 100 to 500 msec  
**OverPower Protection:** 110% to 160%  
**Remote Control:** On/Off  
**Safety:** Meets UL, TUV, CB specifications

**Physical and Environmental Specifications**

**Dimensions:** Height: 13.0"  
 Width: 16.0"  
 Depth: 6.9"  
**Weight:** 30 lb max.  
**Operating Temperature:** 0 to +50 deg C  
**Storage Temperature:** -40 to +85 deg C  
**Relative Humidity:** 5 to 95%, non-condensing  
**Operating Shock:** 30 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  
**Non-operating Vibration:** 5 to 500 Hz: 2.06 g RMS  
**Power Requirements:** 100 to 240 VAC, 50-60 Hz, ~500 W max.

**Model RTR 2613 Ordering Information and Options**

**General Options**

**Option -261** GPS Time and Position Stamping  
**Option -264** IRIG-B Time Stamping  
**Option -285** RAID 5 Configuration  
**Option -286** RAID 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -311** 64 GB System Memory  
**Option -625** Removable Operating System Drive  
**Option -681** 10 to 36 VDC Power Supply

**Storage Options**

**Option -402** 480 GB SSD Storage Capacity  
**Option -410** 3.8 TB SSD Storage Capacity  
**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

**Contact Pentek for compatible Option combinations**  
**Storage and General Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*

New!

# Model RTR 2623

# Talon 6 GHz RF/IF Sentinel Intelligent Signal Scanning Portable Recorder



### Features

- Search and capture system using Pentek's Sentinel™ Intelligent Signal Scanner
- Captures RF signals up to 6 GHz
- Capture and scan bandwidths up to 40 MHz
- 30 GHz/sec scan rate
- Selectable threshold triggered or manual record modes
- 16-bit A/D with 75 dB SNR & 87 dB SFDR
- Built-in DDC with selectable decimation range from 2 to 65,536
- Portable system measuring 16.0" W x 6.9" D x 13.0" H
- Lightweight, just less than 30 pounds
- Storage capacities to 61 TB
- RAID levels 0, 5, and 6
- Windows workstation with Intel Core™ i7 processor
- Optional RF upconversion
- SystemFlow GUI with virtual Oscilloscope, Spectrum Analyzer and Spectrogram displays

### General Information

The Talon® RTR 2623 combines Pentek's Sentinel Intelligent Signal Scanning software with real-time recording in a lightweight, portable and rugged package. The RTR 2623 provides SIGINT engineers the ability to scan the 6 GHz spectrum for signals of interest and monitor or record bandwidths up to 40 MHz wide once a signal band of interest is detected.

A spectral scan facility allows the user to sweep the spectrum at 30 GHz/sec, while threshold detection allows the system to automatically lock onto and record signal bands. Scan results are displayed in a waterfall plot and can also be recorded to allow users to look back at some earlier spectral activity.

Once a signal of interest is detected, the real-time recorder can capture and store up to 30 terabytes of data to disk, allowing users to store days worth of data.

### Hardware Features

The Pentek Model 78621 Cobalt board transceiver serves as the engine of the RTR 2623 and is coupled with a 6 GHz tuner to provide excellent dynamic range across the entire spectrum. The 200 MHz 16-bit A/D board provides 86 dB of spurious-free dynamic range and 74 dB of SNR.

The Virtex-6-based DDC with selectable decimations up to 64 k provides exceptional processing gain while allowing users to zoom into communications signals of varying bandwidths.

The RTR 2623 is supplied in a small footprint portable package measuring only 16.0" W x 6.9" D x 13.0" H and weighing

just less than 30 pounds. With measurements similar to a small briefcase, this portable workstation includes an Intel Core i7 processor a high-resolution 17 in. LCD monitor, and up to 61.4 TB of SSD storage.

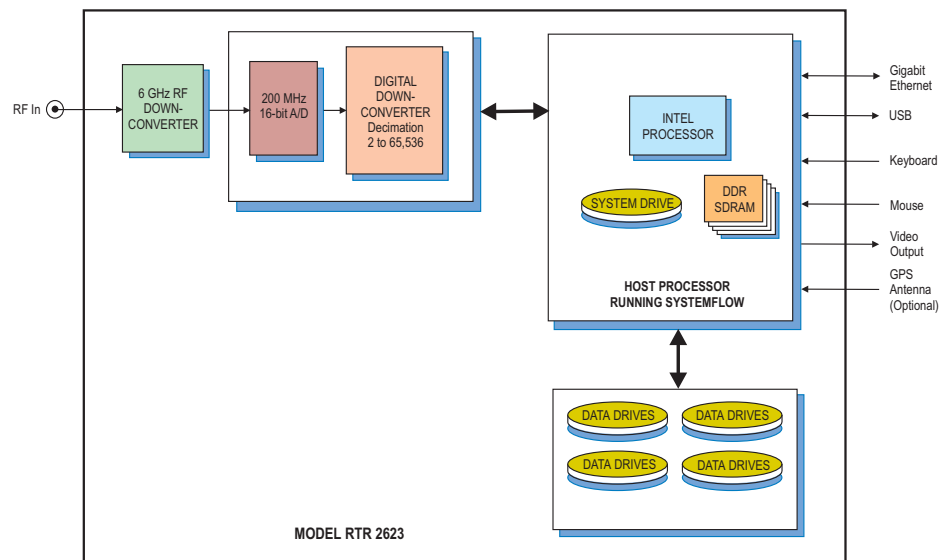
An optional GPS receiver and built-in PLLs allow all devices in the RF chain to be locked in phase and correlated to GPS time. GPS position information can optionally be recorded, allowing the recorder's position to be tracked while acquiring RF signals.

### Sentinel Features

Pentek's Sentinel™ recorders add intelligent signal monitoring and detection for Talon real-time recording systems. The intuitive GUI allows users to monitor the entire spectrum or select a region of interest, while a selectable resolution bandwidth allows the user to trade sweep rate for a finer resolution and better dynamic range. Scan settings can be saved as profiles to allow for quick setup in the field.

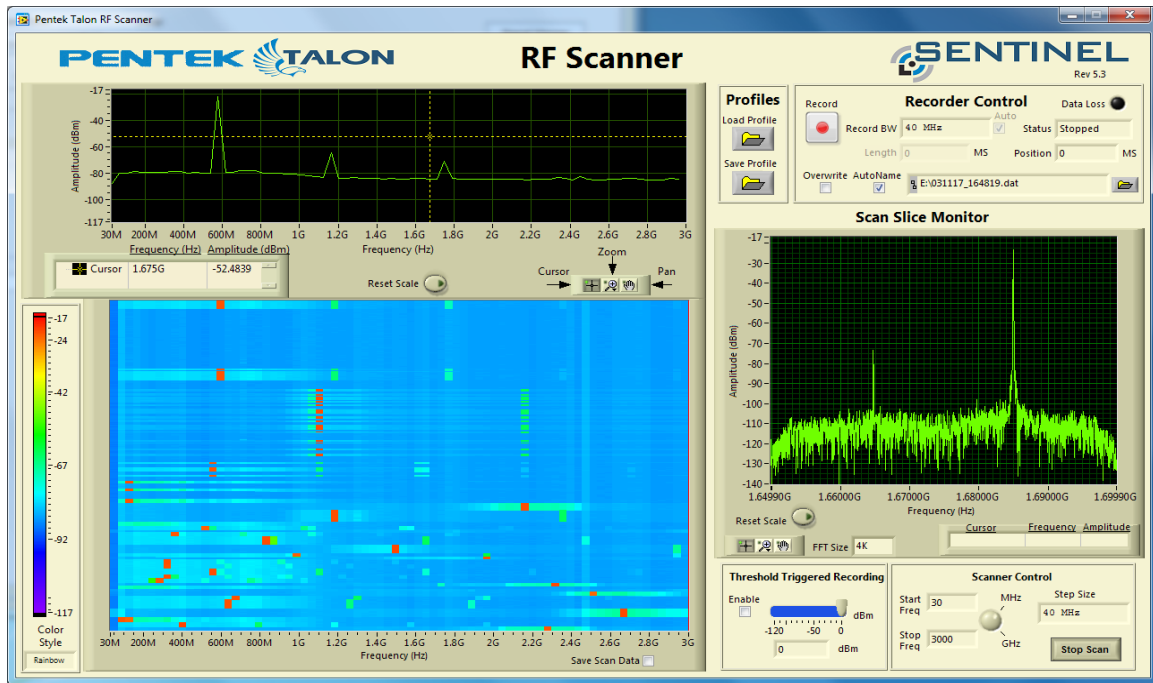
RF energy in each band of the scan is detected and presented in a waterfall display. Any RF band can be selected for real-time monitoring or recording. In addition to manually selecting a band for recording, a recording can be automatically started by configuring signal strength threshold levels to trigger a recording.

The Sentinel hardware resources are controlled through enhancements to Talon's SystemFlow® software package that includes a Virtual Oscilloscope, Virtual Spectrum Analyzer and Spectrogram displays. These provide a complete suite of analysis tools to compliment the Sentinel hardware resources. ➤





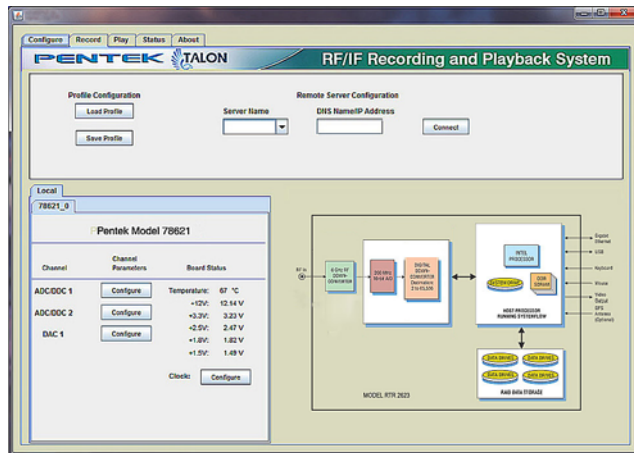
► Graphical User Interface



**RF Scanner GUI**

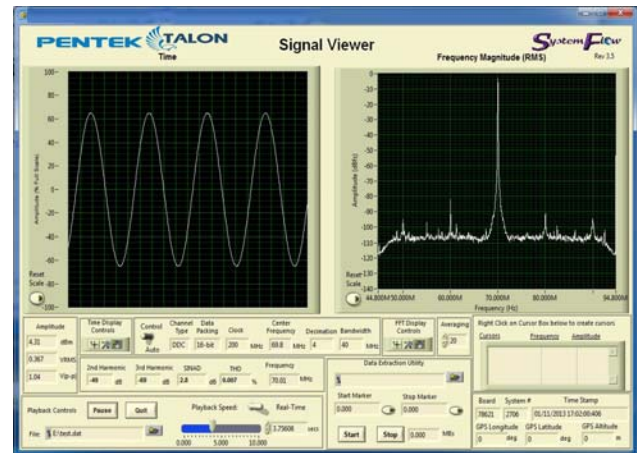
An RF Scanner GUI allows complete control of the system through a single interface. Start and stop frequencies of a scan can be set by the user as well as the resolution bandwidth. All user parameters can be saved as profiles for easy setup in the field.

Frequency slices from the waterfall display can be selected and monitored, allowing the user to zoom into bands of interest. Threshold triggering levels can be set to record signals that exceed a specified energy. Recordings can also be manually started and stopped from the RF Scanner GUI.



**SystemFlow Recorder Interface**

The RTR 2623 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, and play back a recorded signal. The signal viewer, integrated into the recording GUI, allows the user to monitor real-time signals or signals recorded on disk.



**SystemFlow 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.

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). ►

### ► SystemFlow Software

The RTR 2623 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the recorder.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

SystemFlow also includes signal viewing and analysis tools, that allow the user to monitor the signal prior to, during, and after a recording session. These tools include virtual oscilloscope, spectrum analyzer and spectrogram displays.

Built on a Windows 7 Professional workstation, the RTR 2623 allows the user to install post-processing and analysis tools to

operate on the recorded data. The RTR 2623 records data to the native NTFS file system providing immediate access to the recorded data.

Data can be off-loaded via gigabit Ethernet ports or USB 3.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

## Specifications

### RF Tuner Specifications

**RF Tuner Frequency Range:** 30 to 6000 MHz

**Tuning resolution:** 1 kHz

**Internal frequency accuracy:** ±1.0 ppm (-20 to +60°C)

**External Reference Input Frequency:** 10 MHz

**External Reference Input Level:** 0 dBm ±3 dBm

**RF input:** 50 ohms nominal

**Noise figure:** 13 dB typical, 16 dB max

**Maximum RF input without damage:** +15 dBm

**In-Band Input IP3:** +3 dBm typical, -3 dBm min

**In-Band Input IP2:** +30 dBm min, +36 dBm typical

**IF bandwidth:** Nominal 40 MHz bandwidth (3dB)

**IF center frequency:** 70 MHz center

**Gain:** +15 dB nominal above RF input

**Gain control:** Manual -40 dB range (min)

**Image rejection:** 65 dB min (> 80 dB typical)

**IF rejection:** 65 dB min (80 dB typical)

**Phase noise at 5000 MHz:**

**1 kHz offset:** -75 dBc/Hz typical

**20 kHz offset:** -80 dBc/Hz max

**100 kHz offset:** -100 dBc/Hz typical

**1 MHz offset:** -125 dBc/Hz typical

**Internally generated spurious:** -100 dBm equivalent RF input typical

Specifications continued on next page ►

► **PC Workstation Specifications**

**Operating System:** Windows workstation  
**Processor:** Intel Core i7 processor  
**Clock Speed:** 3.2 GHz or higher  
**SDRAM:** 8 GB  
**RAID:**  
**Storage:** 1.9 - 61.4 TB  
**Supported RAID Levels:** 0, 5 and 6

**A/D Converter Specifications**

**Type:** Texas Instruments ADS5485  
**Sampling Rate:** 10 MHz to 200 MHz  
**Resolution:** 16 bits  
**SNR:** 75 dB<sub>f<sub>s</sub></sub> typical at 70 MHz  
**SFDR:** 87 dBc typical at 70 MHz  
**2<sup>nd</sup> Harmonic:** 95 dBc typical at 70 MHz  
**3<sup>rd</sup> Harmonic:** 87 dBc typical at 70 MHz  
**Next Worst Harmonic/Spurious:** 90 dBc typical at 70 MHz  
**THD:** 85 dBc typical at 70 MHz  
**SINAD:** 73.7 dBc typical at 70 MHz  
**ENOB:** 12.1 bits typical at 10 MHz

**Digital Downconverter IP Core Specifications**

**Decimation Range:** 2 to 64 k in two programmable stages of 2 to 256  
**LO Tuning Frequency Resolution:** 32 bits, 0 to  $f_s$   
**LO SFDR:** >120 dB  
**FIR Filter:** 16-bit coefficients, 24-bit output with user programmable coefficients  
**Default Filter Set:** 80% bandwidth, <0.3 dB passband ripple >100 dB stopband attenuation

**Optional DC Power supply**

**Voltage:** 10 to 36 VDC  
**Input Current:** 42 to 26 A (39 A at 24 VDC)  
**Inrush Current:** 100 A at 24 VDC  
**Temperature Range:** Oper.: 0° to 50° C, Store: -0° to 80° C  
**Efficiency:** >80% typical at 24 V full load  
**Power Good Signal:** On delay 100 to 500 msec  
**OverPower Protection:** 110% to 160%  
**Remote Control:** On/Off  
**Safety:** Meets UL, TUV, CB specifications

**Physical and Environmental Specifications**

**Dimensions:** Height: 13.0"  
 Width: 16.0"  
 Depth: 6.9"  
**Weight:** 30 lb max.  
**Operating Temperature:** 0 to +50 deg C  
**Storage Temperature:** -40 to +85 deg C  
**Relative Humidity:** 5 to 95%, non-condensing  
**Operating Shock:** 30 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  
**Non-operating Vibration:** 5 to 500 Hz: 2.06 g RMS  
**Power Requirements:** 100 to 240 VAC, 50-60 Hz, ~500 W max.

**Model RTR 2623 Ordering Information and Options**

**General Options**

**Option -261** GPS Time and Position Stamping  
**Option -264** IRIG-B Time Stamping  
**Option -285** RAID 5 Configuration  
**Option -286** RAID 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -311** 64 GB System Memory  
**Option -625** Removable Operating System Drive  
**Option -681** 10 to 36 VDC Power Supply

**Storage Options**

**Option -405** 1.9 TB HDD Storage Capacity  
**Option -410** 3.8 TB HDD Storage Capacity  
**Option -415** 7.6 TB HDD Storage Capacity  
**Option -420** 15.3 TB HDD Storage Capacity  
**Option -430** 30.7 TB HDD Storage Capacity  
**Option -460** 61.4 TB HDD Storage Capacity

**Contact Pentek for compatible Option combinations**  
**Storage and General Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*



New!

# Model RTR 2546

# 200 MS/sec RF/IF Rugged SFF Recorder



### Features

- Housed in a small chassis measuring 5.25" H x 8.5" W x 14" D
- Weighs 17 lb (7.7 kg)
- Shock and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 200 MHz 16-bit A/Ds
- 800 MHz 16-bit D/As
- Real-time aggregate recording rates of up to 1.6 GB/sec
- DDC decimation and DUC interpolation range from 2 to 65,536
- 80 MHz record and playback signal bandwidths
- Recording and playback of IF signals up to 700 MHz
- Up to 30 terabytes of SSD storage to NTFS RAID solid state disk array
- Windows® workstation with high performance Intel® Core™ i7 processor
- SystemFlow® GUI with Signal Viewer analysis tool
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping

### General Information

Optimized for SWaP (size, weight and power,) the Pentek Talon® RTR Small Form Factor (SFF) product line provides the performance and storage capacity previously only possible in much larger rackmountable chassis. Measuring 5.25" H x 8.5" W x 14" D and weighing only 17 pounds (7.7 kg), this small package can hold up to 30.6 TB of SSD storage.

Configured with four 200 MS/sec 16-bit A/Ds the RTR 2546 is capable of recording the full four-channel bandwidth at a 1.6 GB/sec sustained rate to disk. An 800 MHz 16-bit D/A allows for real-time full-bandwidth signal reproduction.

Built-in digital downconverters and upconverters allow for IF signals to be converted to baseband and reproduced at the original IF frequency.

A/D sampling rates, DDC decimations and bandwidths, D/A sampling rates, and DUC interpolations are among the GUI-selectable system parameters, providing a fully programmable system capable of recording and reproducing a wide range of signals.

An ATX power supply accepts 110-240 VAC, drawing under 150 W and typically around 100 W. SFF Models have the option for a 6-30 VDC power supply.

Eight front panel data drives can be easily removed along with a front panel removable OS drive to allow all non-volatile memory to be removed from the system in seconds. An optional GPS receiver allows for precise GPS time and position stamping.

### SystemFlow Software

All Talon Rugged Small Form Factor recorders include the Pentek SystemFlow recording software. SystemFlow features a

Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the recorder. A user API is also included to allow custom recorder control interfaces to be easily built.

SystemFlow provides signal viewing and analysis tools that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope, spectrum analyzer and spectrogram displays.

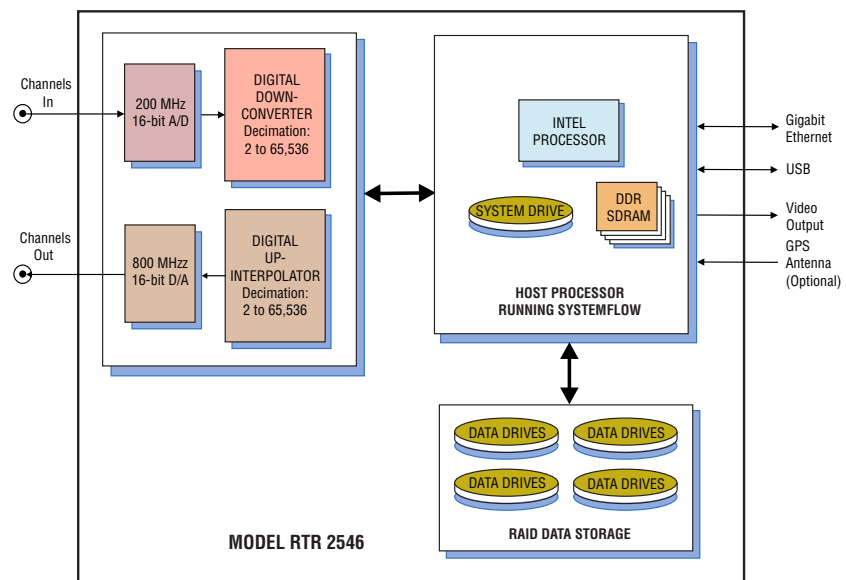
Built on a Windows Professional workstation, all Talon SFF recorders allow the user to install post-processing and analysis tools to operate on the recorded data. The system records data to the native NTFS file system, providing immediate access to the recorded data files.

### Rugged Chassis with SSD Storage

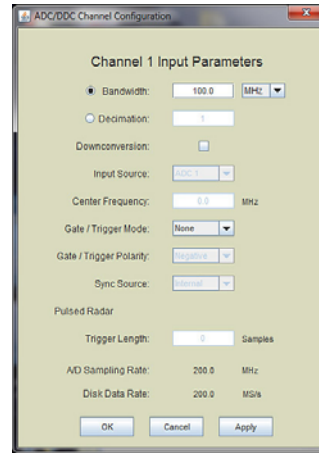
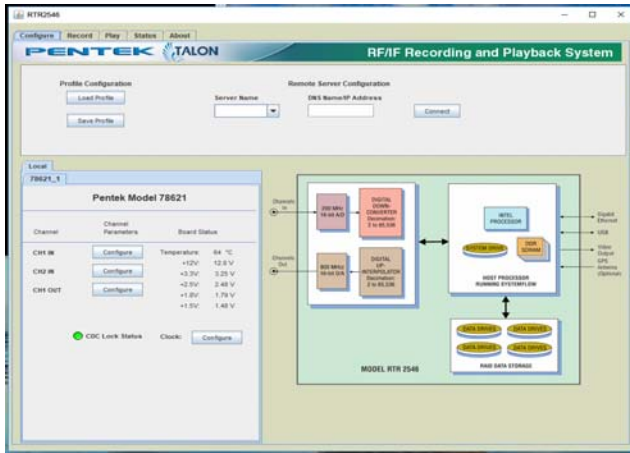
The SFF system is configured with hot-swappable SSDs, front-panel USB ports, and I/O connectors on the rear panel. It is built in an extremely rugged steel and aluminum chassis and is tested for shock and vibration. The SSDs provide storage capacities of up to 30.6 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0, 5, and 6, provide a choice for the required level of redundancy.

A push of a button unlatches each of the data drives and the OS drive. Drives are mounted on sleds and can be easily transferred to an offload system while the recorder stays in the field.

PC and signal I/O is available on the rear panel with standard connectors. ➤



► SystemView Graphical User Interface

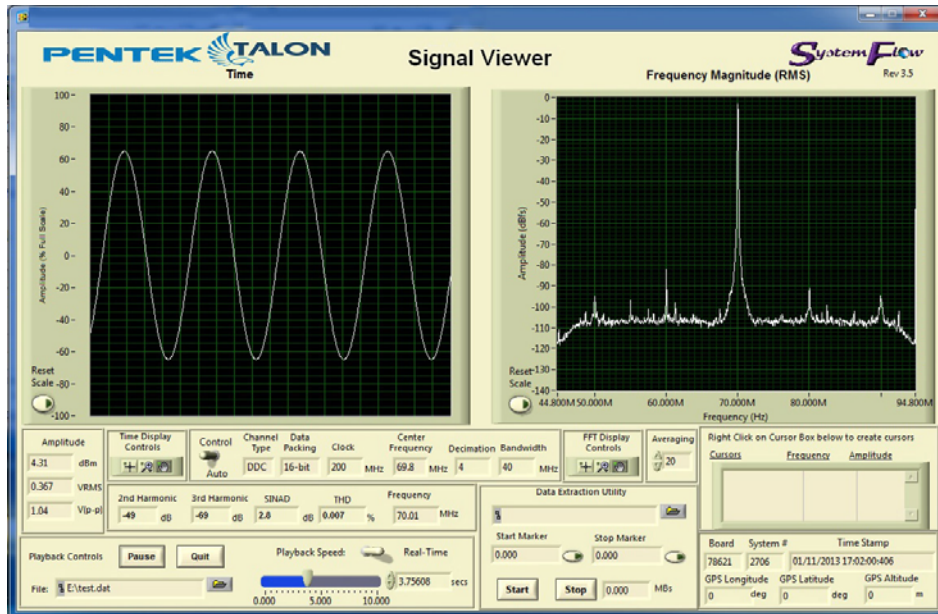


SystemFlow Recorder Interface

The RTR 2546 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, playback 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 recorded signals on disk.

SystemFlow Hardware Configuration Interface

The RTR 2546's Configure screens provide a simple and intuitive means for setting up the system parameters. The DDC configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



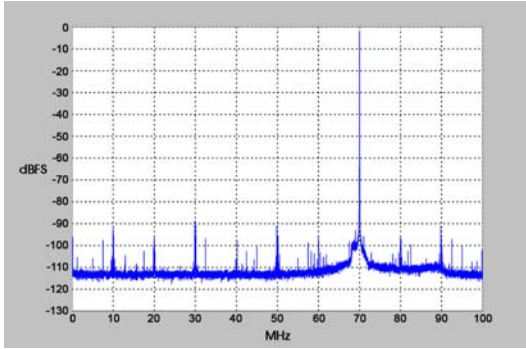
SystemFlow Signal Viewer

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. ►

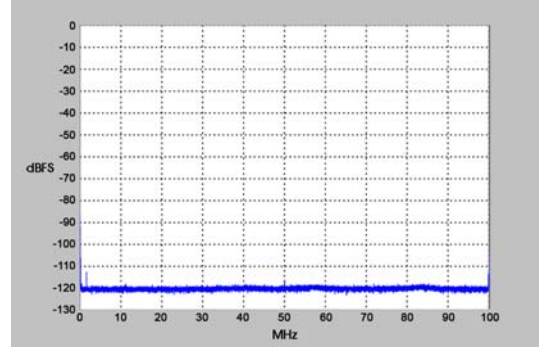
► A/D Performance

Spurious Free Dynamic Range



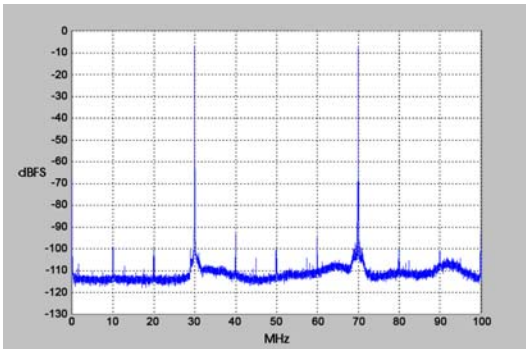
$f_{in} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Internal Clock

Spurious Pick-up



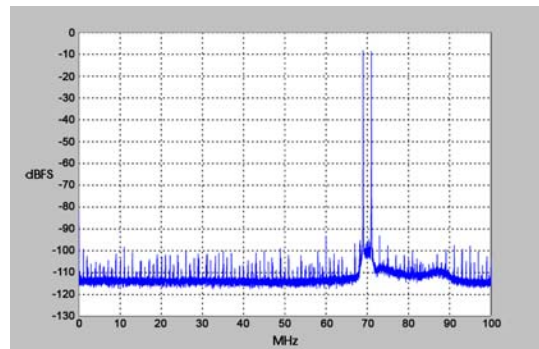
$f_s = 200 \text{ MHz}$ , Internal Clock

Two-Tone SFDR



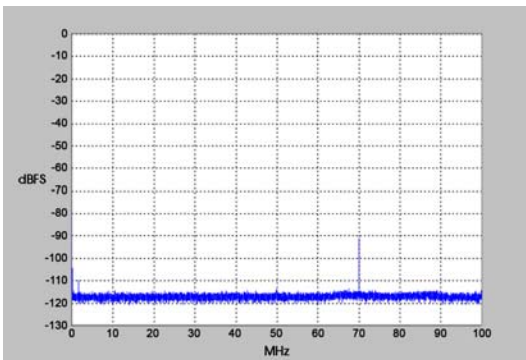
$f_1 = 30 \text{ MHz}$ ,  $f_2 = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$

Two-Tone SFDR



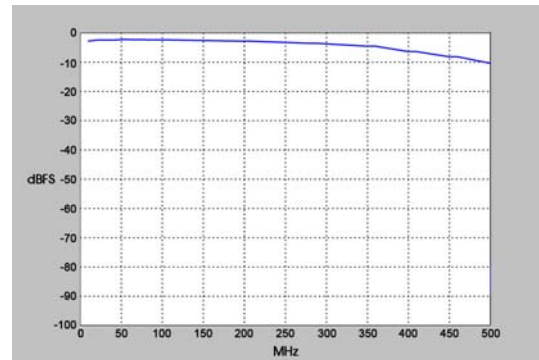
$f_1 = 69 \text{ MHz}$ ,  $f_2 = 71 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$

Adjacent Channel Crosstalk



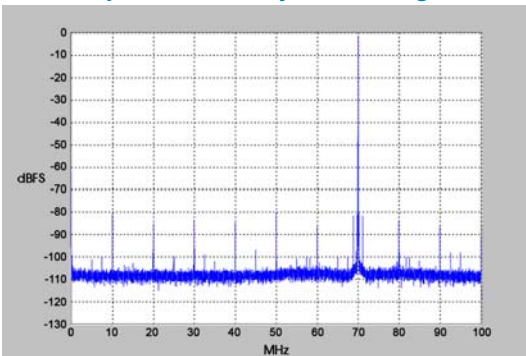
$f_{in \text{ Ch2}} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Ch 1 shown

Input Frequency Response



$f_s = 200 \text{ MHz}$ , Internal Clock

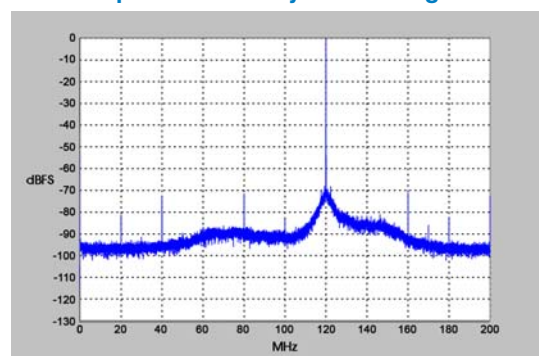
Spurious Free Dynamic Range



$f_{out} = 70 \text{ MHz}$ ,  $f_s = 200 \text{ MHz}$ , Internal Clock

D/A Performance

Spurious Free Dynamic Range



$f_{out} = 120 \text{ MHz}$ ,  $f_s = 400 \text{ MHz}$ , External Clock



**Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows workstation  
**Processor:** Intel i7 7700K (7th Gen) quad core processor  
**Clock Speed:** 4.2 GHz  
**Operating System Drive:** 250 GB SSD  
**SDRAM:** 8 standard, 16 or 32 GB optional  
**RAID**

**Total Storage:** 3.8 TB – 30.6 TB  
**Supported RAID Levels:** 0, 5 and 6  
**Drive Bays:** Hot-swap, removable, front panel

**Rear Panel I/O**

Four USB 3.0 ports  
 Two Gigabit RJ45 ports  
 Two HDMI and One DVI ports  
 Audio and PS2 ports  
 USB 3.0 Type-C port  
 Two Wi-Fi antenna ports

**Front Panel I/O**

Two USB 2.0 ports  
 Power and recessed RESET buttons  
 LED indicators for power and HDD access

**Analog Signal Inputs**

Transformer-coupled, female SSMC connectors  
**Transformer Type:** Coil Craft WBC4-6TLB  
**Full Scale Input:** +8 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**A/D Converters**

**Type:** Texas Instruments ADS5485  
**Sampling Rate ( $f_s$ ):** 10 MHz to 200 MHz  
**Resolution:** 16 bits  
**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth  
**Anti-Aliasing Filters:** External, user-supplied

**Digital Downconverter**

**Type:** Pentek IP Core  
**Decimation(D):** 2 to 65,536  
**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits  
**DDC Usable Bandwidth:**  $0.8*f_s/D$

**Analog Signal Outputs**

**Connectors:** Transformer-coupled, female SSMC  
**Full Scale Output:** +4 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**Digital Upconverter, Interpolator and D/As**

**D/A Resolution:** 16 bits  
**Output Signal:** Analog, real or quadrature  
**Type:** TI DAC5688 and Pentek-installed IP core interpolator  
**Interpolation:** 2 to 65,536

**Input Data Rate to DAC5688:** 250 MS/sec max.

**Output Sampling Rate:** 800 MHz max

**Output IF:** DC to 400 MHz

**Bandwidth Range:** Matches recording bandwidths

**Clock Sources:** Selectable from onboard programmable VCXO, external or LVDS clocks

**External Clocks**

**Type:** Female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, 10 to 200 MHz

**Physical and Environmental**

**Size:** 5.25" H x 8.5" W x 14.0" D

**Weight:** 17 lb (7.7 kg)

**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, 150 W max.

**Model RTR 2546 Ordering Information and Options**

**Channel Configurations**

**Option -201** 1-Channel Recording  
**Option -202** 2-Channel Recording  
**Option -203** 3-Channel Recording  
**Option -204** 4-Channel Recording  
**Option -221** 1-Channel Playback  
**Option -222** 2-Channel Playback  
**Option -224** 4-Channel Playback

**Storage Options**

**Option -410** 3.8 TB SSD Storage  
**Option -415** 7.6 TB SSD Storage  
**Option -420** 15.3 TB SSD Storage  
**Option -430** 30.6 TB SSD Storage

**Additional Options**

**Option -261** GPS Time and Position Stamping  
**Option -285** Raid 5 Configuration  
**Option -286** Raid 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -310** 32 GB System Memory  
**Option -630** 6 to 30 VDC Power Supply

**Contact Pentek for compatible Option combinations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*



**Features**

- Housed in a small chassis measuring 5.25" H x 8.5" W x 14" D
- Weighs 17 pounds (7.7 kg)
- Shock and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 500 MHz 12-bit A/Ds or 400 MHz 14-bit A/Ds
- 800 MHz 16-bit D/As
- 200 MHz record and playback signal bandwidths
- Real-time aggregate recording rates of up to 2.0 GB/sec
- DDC decimation and DUC interpolation range from 2 to 65,536
- Up to 200 MHz record and playback signal bandwidths
- Recording and playback of IF signals up to 700 MHz
- Up to 30 terabytes of SSD storage to NTFS RAID solid state disk array
- Windows® workstation with high performance Intel® Core™ i7 processor
- SystemFlow® GUI with Signal Viewer analysis tool
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping

**General Information**

Optimized for SWaP (size, weight and power,) the Pentek Talon® RTR Small Form Factor (SFF) product line provides the performance and storage capacity previously only possible in much larger rackmountable chassis. Measuring 5.25" H x 8.5" W x 14" D and weighing only 17 pounds (7.7 kg), this small package can hold up to 30.6 TB of SSD storage.

Configured with two A/Ds and two D/As, the 2547 provides the ability to play back two channels of real data or one channel of complex data with the available DUC.

Built-in digital downconverters and upconverters allow for IF signals to be converted to baseband and reproduced at the original IF frequency.

A/D sampling rates, DDC decimations and bandwidths, D/A sampling rates, and DUC interpolations are among the GUI-selectable system parameters, providing a fully programmable system capable of recording and reproducing a wide range of signals.

An ATX power supply accepts 110-240 VAC, drawing under 150 W and typically around 100 W. SFF Models have the option for a 6-30 VDC power supply.

Eight front panel data drives can be easily removed along with a front panel removable OS drive to allow all non-volatile memory to be removed from the system in seconds. An optional GPS receiver allows for precise GPS time and position stamping.

**SystemFlow Software**

All Talon Rugged Small Form Factor recorders include the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Inter-

face) that provides a simple means to configure and control the recorder. A user API is also included to allow custom recorder control interfaces to be easily built.

SystemFlow provides signal viewing and analysis tools that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope, spectrum analyzer and spectrogram displays.

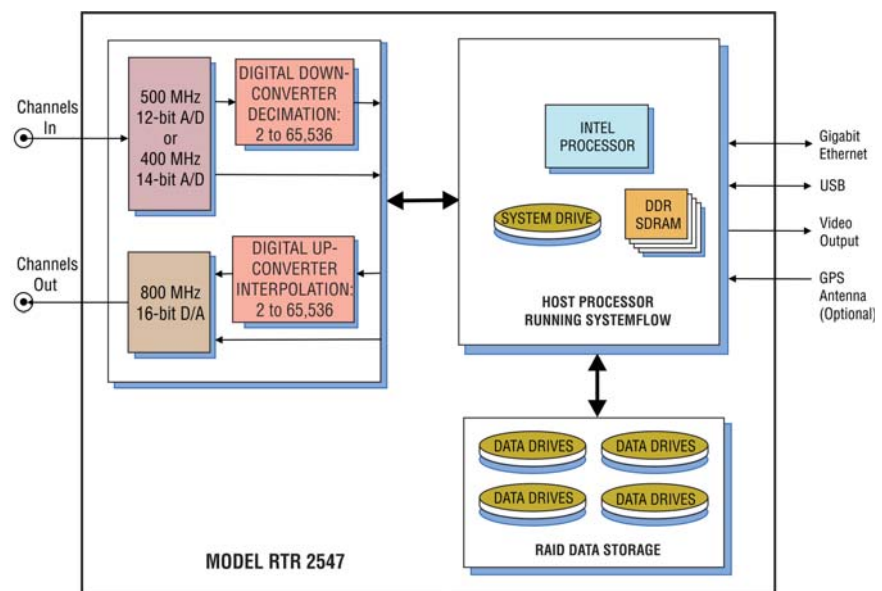
Built on a Windows Professional workstation, all Talon SFF recorders allow the user to install post-processing and analysis tools to operate on the recorded data. The system records data to the native NTFS file system, providing immediate access to the recorded data files.

**Rugged and Flexible Architecture**

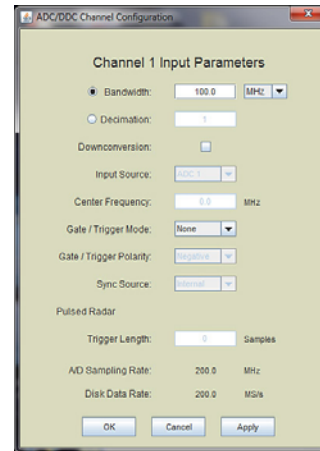
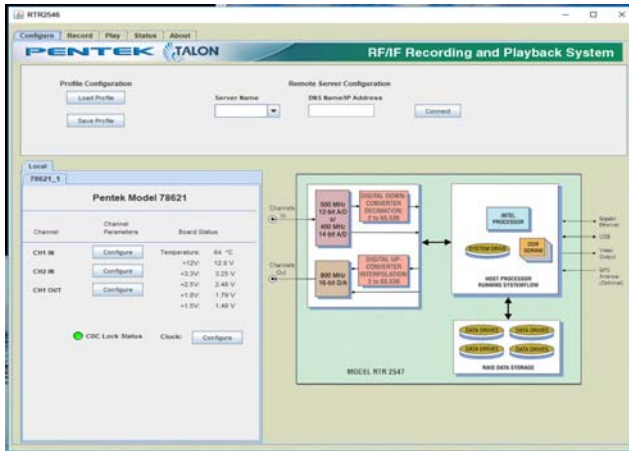
The SFF system is configured with hot-swappable SSDs, front-panel USB ports, and I/O connectors on the rear panel. It is built in an extremely rugged steel and aluminum chassis and is tested for shock and vibration. The SSDs provide storage capacities of up to 30.6 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0, 5, and 6, provide a choice for the required level of redundancy.

A push of a button unlatches each of the data drives and the OS drive. Drives are mounted on sleds and can be easily transferred to an offload system while the recorder stays in the field.

PC and signal I/O is available on the rear panel with standard connectors. ➤



► SystemFlow Graphical User Interface

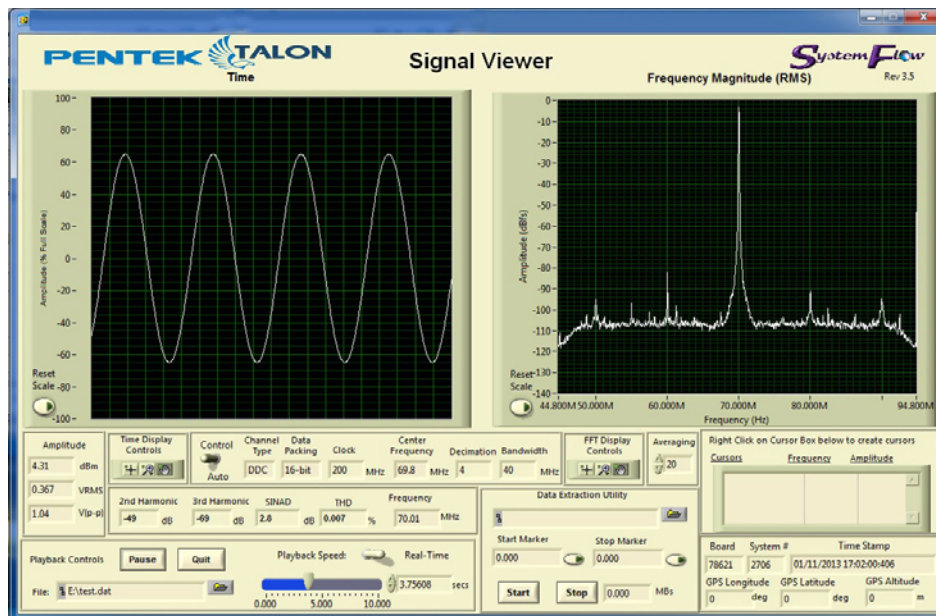


SystemFlow Recorder Interface

The RTR 2747 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 2747 Configure screens provide a simple and intuitive means for setting up the system parameters. The DDC configuration screen shown here, allows user entries for input source, center frequency, decimation, as well as gate and trigger information. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ►



► Specifications

**PC Workstation (standard configuration)**

**Operating System:** Windows workstation  
**Processor:** Intel i7 7700K (7th Gen) quad core processor  
**Clock Speed:** 4.2 GHz  
**Operating System Drive:** 250 GB SSD  
**SDRAM:** 8 GB standard, 16 GB or 32 GB optional  
**RAID**

**Total Storage:** 3.8 TB – 30.6 TB  
**Supported RAID Levels:** 0, 5 and 6  
**Drive Bays:** Hot-swap, removable, front panel

**Rear Panel I/O**

Four USB 3.0 ports  
 Two Gigabit RJ45 ports  
 Two HDMI and One DVI ports  
 Audio and PS2 ports  
 USB 3.0 Type-C port  
 Two Wi-Fi antenna ports

**Front Panel I/O**

Two USB 2.0 ports  
 Power and recessed RESET buttons  
 LED indicators for power and HDD access

**Analog Signal Inputs**

Transformer-coupled, female SSMC connectors  
**Transformer Type:** Coil Craft WBC4-6TLB  
**Full Scale Input:** +5 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**A/D Converters**

**Type:** Texas Instruments ADS5463 or ADS5474(Option-014)  
**Sampling Rate ( $f_s$ ):** 10 MHz to 500 MHz  
**Resolution:** 12 Bits or 14 bits (Option -014)  
**A/D Record Bandwidth:**  $f_s/2$  = Nyquist bandwidth  
**Anti-Aliasing Filters:** External, user-supplied

**Digital Downconverter**

**Type:** Pentek IP Core  
**Decimation(D):** 2 to 65,536  
**IF Center Frequency Tuning:** DC to  $f_s$ , 32 bits  
**DDC Usable Bandwidth:**  $0.8 \cdot f_s / D$

**Analog Signal Outputs**

**Connectors:** Transformer-coupled, female SSMC  
**Full Scale Output:** +4 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**Digital Upconverter, Interpolator and D/As**

**D/A Resolution:** 16 bits  
**Output Signal:** Analog, real or quadrature  
**Type:** TI DAC5688 and Pentek-installed IP core interpolator  
**Interpolation:** 2 to 65,536

**Input Data Rate to DAC5688:** 250 MS/sec max.

**Output Sampling Rate:** 800 MHz max

**Output IF:** DC to 400 MHz

**Bandwidth Range:** Matches recording bandwidths

**Clock Sources:** Selectable from onboard programmable VCXO, external or LVDS clocks

**External Clocks**

**Type:** Female SSMC connector, sine wave, 0 to +12 dBm, AC-coupled, 50 ohms, 10 to 500 MHz divider input clock or PLL system reference

**Internal Clock:**

**Type:** Programmable VCXO from 10 to 810 MHz

**Physical and Environmental**

**Size:** 5.25" H x 8.5" W x 14.0" D

**Weight:** 17 lb (7.7 kg)

**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, 150 W max.

**Model RTR 2547 Ordering Information and Options**

**Channel Configurations**

**Option -201** 1-channel recording  
**Option -202** 2-channel recording  
**Option -221** 1-channel playback  
**Option -222** 2-channel playback

**Storage Options**

**Option -410** 3.8 TB SSD storage capacity  
**Option -415** 7.6 TB SSD storage capacity  
**Option -420** 15.3 TB SSD storage capacity  
**Option -430** 30.6 TB SSD storage capacity

**Additional Options**

**Option -261** GPS Time and Position Stamping  
**Option -285** Raid 5 Configuration  
**Option -286** Raid 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -310** 32 GB System Memory  
**Option -014** 400 MHz, 14-bit A/Ds  
**Option -630** 6 to 30 VDC Power Supply

**Contact Pentek for compatible Option combinations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*



**Features**

- Housed in a small chassis measuring 5.25" H x 8.5" W x 14" D
- Weighs 17 lb (7.7 kg)
- Shock and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 1 GHz 12-bit A/D
- 1 GHz 16-bit D/A
- Real-time aggregate recording rate of up to 2.0 GB/sec
- 400 MHz record and playback signal bandwidth
- Recording of IF signals up to 2.0 GHz.
- Up to 30 terabytes of SSD storage to NTFS RAID solid state disk array
- RAID levels of 0, 5 and 6
- Windows® workstation with high-performance Intel® Core™ i7 processor
- 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**

Optimized for SWaP (size, weight and power,) the Pentek Talon® RTR Small Form Factor (SFF) product line provides the performance and storage capacity previously only possible in much larger rackmountable chassis. Measuring 5.25" H x 8.5" W x 14" D and weighing only 17 pounds (7.7 kg), this small package can hold up to 30.6 TB of SSD storage.

Configured with 1.0 GS/sec 12-bit A/D the RTR 2548 is capable of recording the full-channel bandwidth at a 2.0 GB/sec sustained rate to disk. A 1.0 GHz 16-bit D/A allows for real-time full-bandwidth signal reproduction.

A/D and D/A sampling rates are among the GUI-selectable system parameters, providing a fully programmable system capable of recording and reproducing a wide range of signals. A built-in synchronization module is provided to allow for multichannel phase-coherent operation.

An ATX power supply accepts 110-240 VAC, drawing under 150 W and typically around 100 W. SFF Models have the option for a 6-30 VDC power supply.

Eight front panel data drives can be easily removed along with a front panel removable OS drive to allow all non-volatile memory to be removed from the system in seconds. An optional GPS receiver allows for precise GPS time and position stamping.

**SystemFlow Software**

All Talon Rugged Small Form Factor recorders include the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Inter-

face) that provides a simple means to configure and control the recorder. A user API is also included to allow custom recorder control interfaces to be easily built.

SystemFlow provides signal viewing and analysis tools that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope, spectrum analyzer and spectrogram displays.

Built on a Windows Professional workstation, all Talon SFF recorders allow the user to install post-processing and analysis tools to operate on the recorded data. The system records data to the native NTFS file system, providing immediate access to the recorded data files.

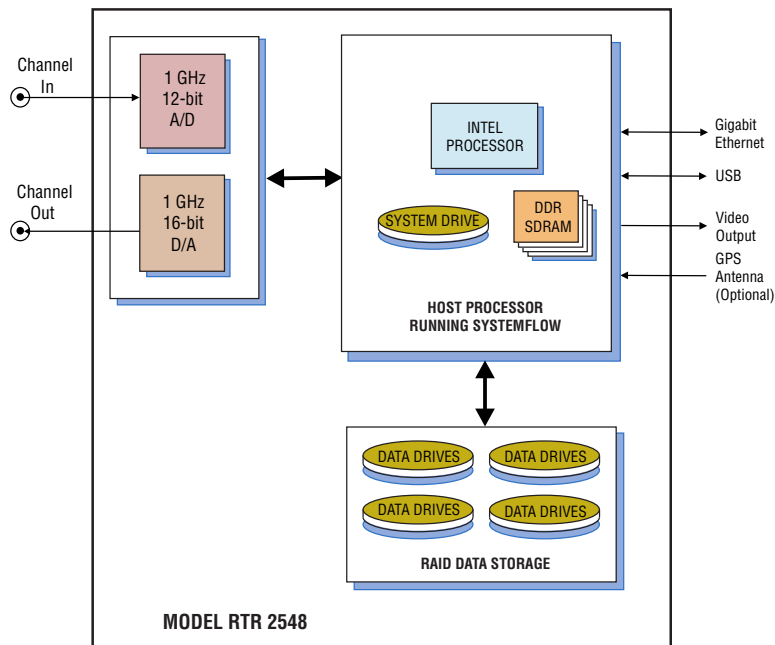
**Rugged Chassis with SSD Storage**

The SFF system is configured with hot-swappable SSDs, front-panel USB ports, and I/O connectors on the rear panel. It is built in a rugged steel and aluminum chassis and is tested for shock and vibration.

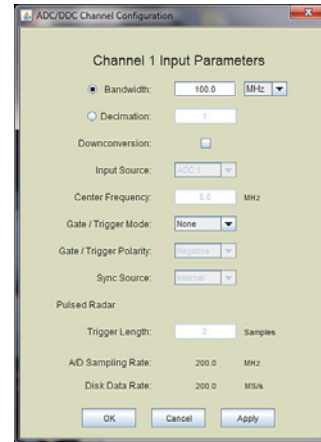
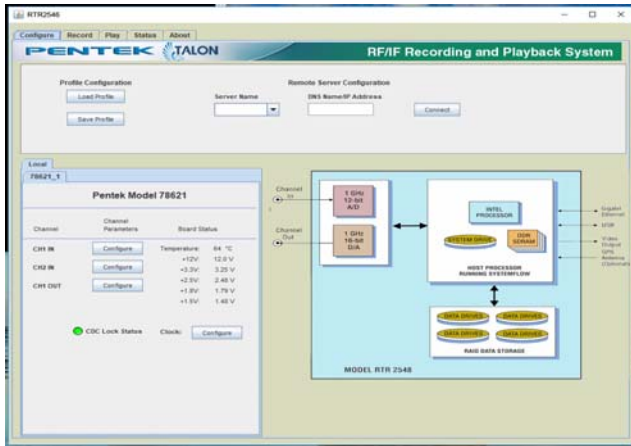
The SSDs provide storage capacities of up to 30.6 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels including 0, 5, and 6, provide a choice for the required level of redundancy.

A push of a button unlatches each of the data drives and the OS drive. Drives are mounted on sleds and can be easily transferred to an offload system while the recorder stays in the field.

PC and signal I/O is available on the rear panel with standard connectors. ➤



► SystemFlow Graphical User Interface

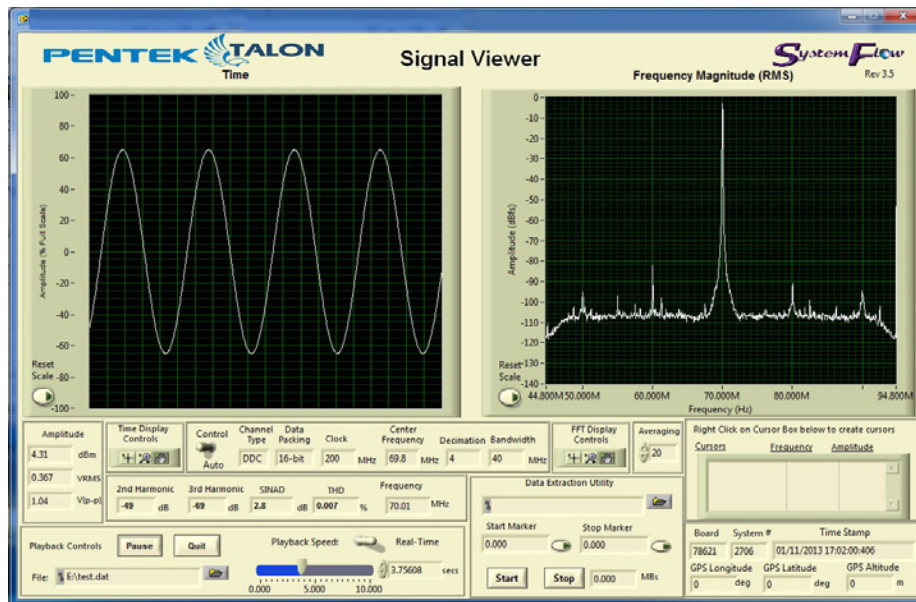


SystemFlow Recorder Interface

The RTR 2548 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 2548 Configure screens provide a simple and intuitive means for setting up the system parameters. The A/D configuration screen shown here, allows user entries for gate/trigger mode, gate/trigger polarity, and trigger source. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow 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. ►



**► Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows workstation  
**Processor:** Intel i7 7700K (7th Gen) quad core processor  
**Clock Speed:** 4.2 GHz  
**Operating System Drive:** 250 GB SSD  
**SDRAM:** 8 GB standard, 16 GB or 32 GB optional  
**RAID**

**Total Storage:** 3.8 TB – 30.6 TB  
**Supported RAID Levels:** 0, 5 and 6  
**Drive Bays:** Hot-swap, removable, front panel

**Rear Panel I/O**

Four USB 3.0 ports  
 Two Gigabit RJ45 ports  
 Two HDMI and One DVI ports  
 Audio and PS2 ports  
 USB 3.0 Type-C port  
 Two Wi-Fi antenna ports

**Front Panel I/O**

Two USB 2.0 ports  
 Power and recessed RESET buttons  
 LED indicators for power and HDD access

**Analog Recording Input**

**Input Type:** Transformer-coupled, female SSMC connector  
**Transformer Type:** Macom ETC1-1-13TR  
**Full Scale Input:** +10 dBm into 50 ohms  
**3 dB Passband:** 5 MHz to 2 GHz

**A/D Converter**

**Type:** Texas Instruments ADS5400  
**Sampling Rate ( $f_s$ ):** 100 MHz to 1 GHz  
**Resolution:** 12 bits  
**A/D Record Bandwidth:**  $f_s/2 =$  Nyquist bandwidth  
**Anti-Aliasing Filters:** External, user-supplied

**Analog Playback Output**

**Output Type:** Transformer-coupled, female SSMC connector  
**Full Scale Output:** +4 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**D/A Converter**

**Type:** TI DAC5681Z  
**Interpolation:** 1x, 2x or 4x  
**Input Data Rate to DAC5681Z:** 500 MS/sec max.  
**Output Sampling Rate:** 1 GHz, max.  
**Output IF:** 700 MHz, max.  
**D/A Resolution:** 16 bits

**Clock Sources:** Selectable from onboard programmable VCXO or external clock

**External Clock**

**Type:** Female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, accepts 100 MHz to 1 GHz input clock or 10 MHz system reference

**Internal Clock**

**Type:** Programmable VCXO  
**VCXO Frequency Ranges:** 100 to 945 MHz, 970 MHz to 1 GHz

**Physical and Environmental**

**Size:** 5.25" H x 8.5" W x 14.0" D  
**Weight:** 17 lb (7.7 kg)  
**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, 150 W max.

**Model RTR 2548 Ordering Information and Options**

**Channel Configurations**

**Option -201** 1-channel recording  
**Option -221** 1-channel playback

**Storage Options**

**Option -410** 3.8 TB SSD storage capacity  
**Option -415** 7.6 TB SSD storage capacity  
**Option -420** 15.3 TB SSD storage capacity  
**Option -430** 30.6 TB SSD storage capacity

**Additional Options**

**Option -261** GPS Time and Position Stamping  
**Option -285** Raid 5 Configuration  
**Option -286** Raid 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -310** 32 GB System Memory  
**Option -630** 6 to 30 VDC Power Supply

**Contact Pentek for compatible Option combinations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*

**► Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows workstation  
**Processor:** Intel i7 7700K (7th Gen) quad core processor  
**Clock Speed:** 4.2 GHz  
**Operating System Drive:** 250 GB SSD  
**SDRAM:** 8 GB standard, 16 GB or 32 GB optional  
**RAID**

**Total Storage:** 3.8 TB – 30.6 TB  
**Supported RAID Levels:** 0, 5 and 6  
**Drive Bays:** Hot-swap, removable, front panel

**Rear Panel I/O**

Four USB 3.0 ports  
 Two Gigabit RJ45 ports  
 Two HDMI and One DVI ports  
 Audio and PS2 ports  
 USB 3.0 Type-C port  
 Two Wi-Fi antenna ports

**Front Panel I/O**

Two USB 2.0 ports  
 Power and recessed RESET buttons  
 LED indicators for power and HDD access

**Analog Recording Input**

**Input Type:** Transformer-coupled, female SSMC connector  
**Transformer Type:** Macom ETC1-1-13TR  
**Full Scale Input:** +10 dBm into 50 ohms  
**3 dB Passband:** 5 MHz to 2 GHz

**A/D Converter**

**Type:** Texas Instruments ADS5400  
**Sampling Rate ( $f_s$ ):** 100 MHz to 1 GHz  
**Resolution:** 12 bits  
**A/D Record Bandwidth:**  $f_s/2 =$  Nyquist bandwidth  
**Anti-Aliasing Filters:** External, user-supplied

**Analog Playback Output**

**Output Type:** Transformer-coupled, female SSMC connector  
**Full Scale Output:** +4 dBm into 50 ohms  
**3 dB Passband:** 300 kHz to 700 MHz

**D/A Converter**

**Type:** TI DAC5681Z  
**Interpolation:** 1x, 2x or 4x  
**Input Data Rate to DAC5681Z:** 500 MS/sec max.  
**Output Sampling Rate:** 1 GHz, max.  
**Output IF:** 700 MHz, max.  
**D/A Resolution:** 16 bits

**Clock Sources:** Selectable from onboard programmable VCXO or external clock

**External Clock**

**Type:** Female SSMC connector, sine wave, 0 to +10 dBm, AC-coupled, 50 ohms, accepts 100 MHz to 1 GHz input clock or 10 MHz system reference

**Internal Clock**

**Type:** Programmable VCXO  
**VCXO Frequency Ranges:** 100 to 945 MHz, 970 MHz to 1 GHz

**Physical and Environmental**

**Size:** 5.25" H x 8.5" W x 14.0" D  
**Weight:** 17 lb (7.7 kg)  
**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, 150 W max.

**Model RTR 2548 Ordering Information and Options**

**Channel Configurations**

**Option -201** 1-channel recording  
**Option -221** 1-channel playback

**Storage Options**

**Option -410** 3.8 TB SSD storage capacity  
**Option -415** 7.6 TB SSD storage capacity  
**Option -420** 15.3 TB SSD storage capacity  
**Option -430** 30.6 TB SSD storage capacity

**Additional Options**

**Option -261** GPS Time and Position Stamping  
**Option -285** Raid 5 Configuration  
**Option -286** Raid 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -310** 32 GB System Memory  
**Option -630** 6 to 30 VDC Power Supply

**Contact Pentek for compatible Option combinations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*



**Features**

- Housed in a small chassis measuring 5.25" H x 8.5" W x 14" D
- Weighs 17 lb (7.7 kg)
- Shock and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 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-bit and 8-bit packing modes
- Real-time aggregate recording rate of up to 4.0 GB/sec
- Up to 30 terabytes of SSD storage to NTFS RAID solid state disk array
- Windows® workstation with high-performance Intel® Core™ i7 processor
- 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**

Optimized for SWaP (size, weight and power,) the Pentek Talon® RTR Small Form Factor (SFF) product line provides the performance and storage capacity previously only possible in much larger rackmountable chassis. Measuring 5.25" H x 8.5" W x 14" D and weighing only 17 pounds (7.7 kg), this small package can hold up to 30.6 TB of SSD storage.

The RTR 2549 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 4.0 GB/sec.

An ATX power supply accepts 110-240 VAC, drawing under 150 W and typically around 100 W. SFF Models have the option for a 6-30 VDC power supply.

Eight front panel data drives can be easily removed along with a front panel removable OS drive to allow all non-volatile memory to be removed from the system in seconds.

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

**SystemFlow Software**

All Talon Rugged Small Form Factor recorders include the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to

configure and control the recorder. A user API is also included to allow custom recorder control interfaces to be easily built.

SystemFlow provides signal viewing and analysis tools that allow the user to monitor the signal prior to, during, and after a recording session. These tools include a virtual oscilloscope, spectrum analyzer and spectrogram displays.

Built on a Windows Professional workstation, all Talon SFF recorders allow the user to install post-processing and analysis tools to operate on the recorded data. The system records data to the native NTFS file system, providing immediate access to the recorded data files.

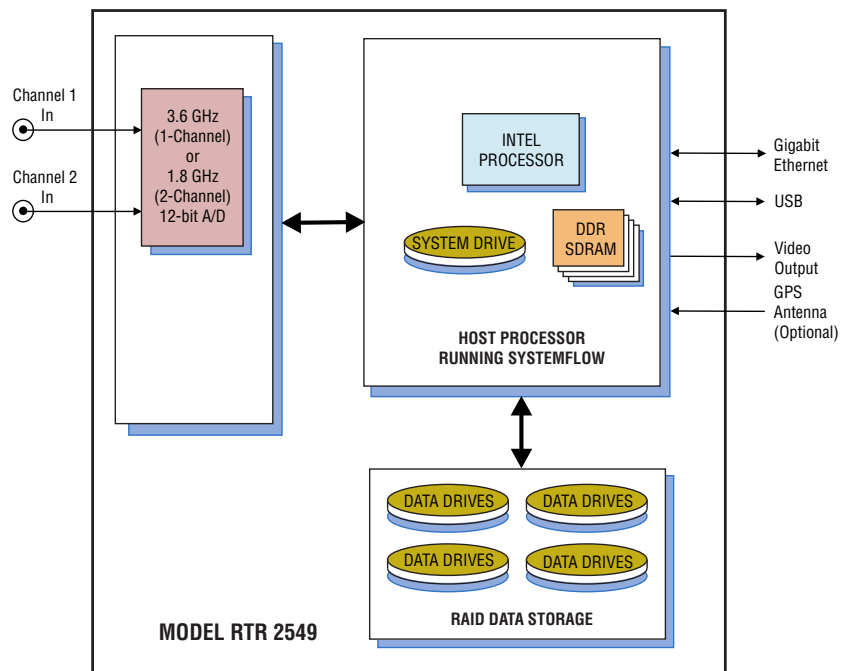
**Rugged Chassis with SSD Storage**

The SFF system is configured with hot-swappable SSDs, front-panel USB ports, and I/O connectors on the rear panel. It is built in a rugged steel and aluminum chassis and is tested for shock and vibration.

The SSDs provide storage capacities of up to 30.6 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels including 0, 5, and 6, provide a choice for the required level of redundancy.

A push of a button unlatches each of the data drives and the OS drive. Drives are mounted on sleds and can be easily transferred to an offload system while the recorder stays in the field.

PC and signal I/O is available on the rear panel with standard connectors. ➤







**► Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows workstation  
**Processor:** Intel i7 7700K (7th Gen) quad core processor  
**Clock Speed:** 4.2 GHz

**Operating System Drive:** 250 GB SSD  
**SDRAM:** 8 GB standard, 16 GB or 32 GB optional  
**RAID**

**Total Storage:** 3.8 TB – 30.6 TB  
**Supported RAID Levels:** 0, 5 and 6  
**Drive Bays:** Hot-swap, removable, front panel

**Rear Panel I/O**

Four USB 3.0 ports  
 Two Gigabit RJ45 ports  
 Two HDMI and One DVI ports  
 Audio and PS2 ports  
 USB 3.0 Type-C port  
 Two Wi-Fi antenna ports

**Front Panel I/O**

Two USB 2.0 ports  
 Power and recessed RESET buttons  
 LED indicators for power and HDD acces

**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**

**Modes:** One or two channels, programmable  
**Supported Sample Rate ( $f_s$ ):**  
 One-channel mode: 3.6 GHz  
 Two-channel mode: 1.8 GHz  
**Decimation Range (D):**  
 One-channel mode: 8x, 16x, 32x, bypass  
 Two-channel mode: 4x, 8x, 16x, bypass  
**Usable Output Bandwidth:**  $0.8 \cdot f_s / D$

**Physical and Environmental**

**Size:** 5.25" H x 8.5" W x 14.0" D  
**Weight:** 17 lb (7.7 kg)  
**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, 150 W max.

**Model RTR 2549 Ordering Information and Options**

**Storage Options**

**Option -415** 7.6 TB SSD storage capacity  
**Option -420** 15.3 TB SSD storage capacity  
**Option -430** 30.6 TB SSD storage capacity

**Additional Options**

**Option -261** GPS Time and Position Stamping  
**Option -285** Raid 5 Configuration  
**Option -286** Raid 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -310** 32 GB System Memory  
**Option -630** 6 to 30 VDC Power Supply

**Contact Pentek for compatible Option combinations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications are subject to change without notice*



**General Information**

The Talon® RTS 2715 is a complete turn-key recording system for storing one or two ten-gigabit Ethernet (10GbE) streams. It is ideal for capturing any type of streaming sources including live transfers from sensors or data from other computers and supports both TCP and UDP protocols.

Using highly-optimized disk storage technology, the system achieves aggregate recording rates up to 1.6 GB/sec.

Rear panel SFP+ connectors accommodate copper, multi-mode or single-mode fibre interfaces.

Optional GPS time and position stamping accurately identifies each record in the file header.

**SystemFlow Software**

The RTS 2715 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple and intuitive means to configure and control the system.

Custom configurations can be stored as profiles and later loaded as needed, allowing the user to select preconfigured settings with a single click.

Built on a server-class Windows 7 Professional workstation, the RTS 2715 allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTS 2715 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports or six USB 2.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

**Flexible Architecture**

The RTS 2715 is configured in a 4U or 5U 19" 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.

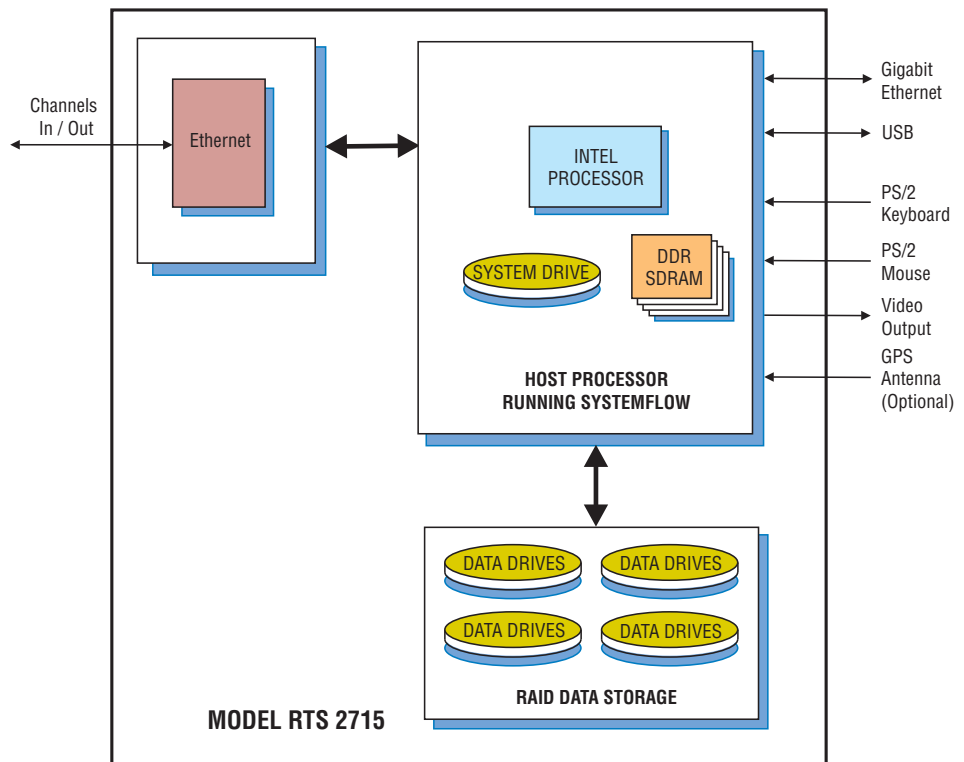
All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50, provide a choice for the required level of redundancy. The hot-swappable HDDs provide storage capacities of up to 100 TB in a single 6U chassis. ➤

**Features**

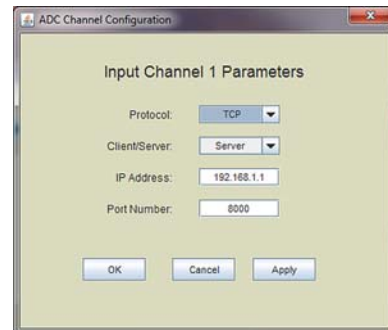
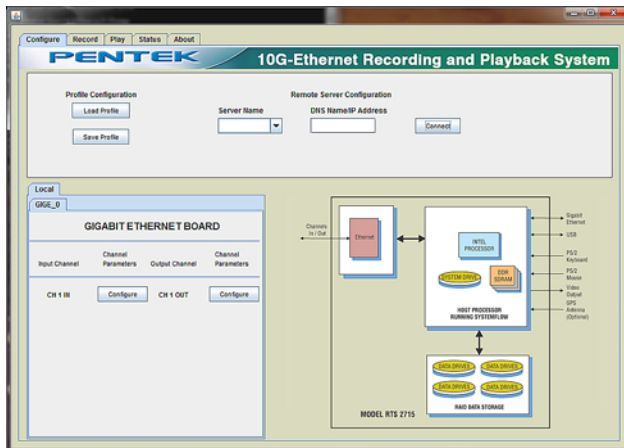
- Records 10-gigabit Ethernet streams
- TCP and UDP protocols
- Copper or optical 10GbE interfaces
- Aggregate recording rates to 1.6 GB/sec
- 4U or 5U 19-inch industrial rackmount PC server chassis
- Windows® 7 Professional workstation with a high performance Intel® Core™ i7 processor
- Up to 100 terabytes storage to NTFS RAID disk array
- RAID levels of 0, 1, 5, 6, 10 and 50
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into applications
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping

Contact factory for options, number of channels, recording rates, and disk capacity.





► SystemFlow Graphical User Interface

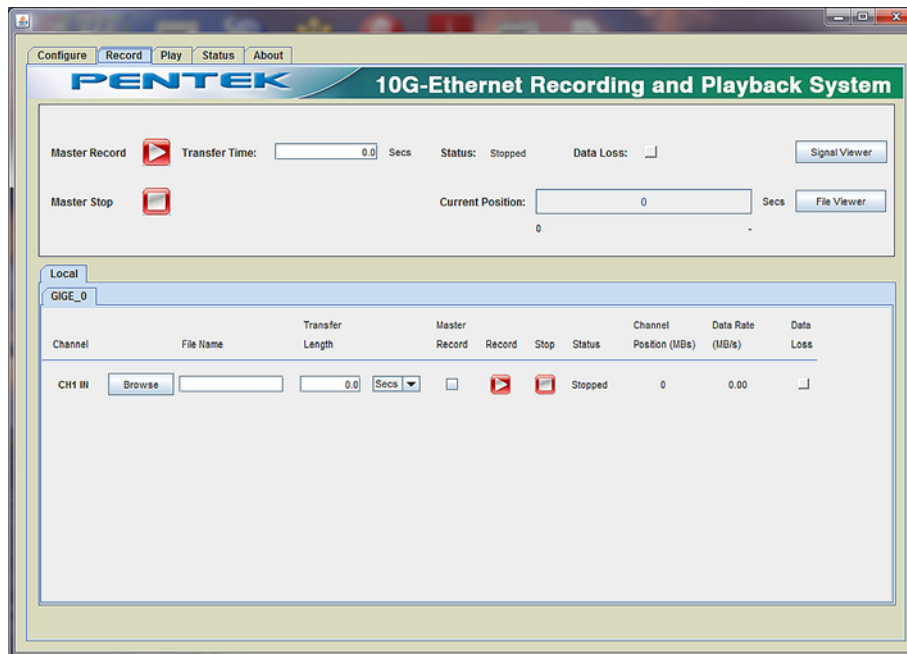


SystemFlow Main Interface

The RTS 2715 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying UDP or TCP protocol, client or server connection, the IP address and port number. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

### ► SystemFlow API

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTS 2715 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTS 2715 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

### Specifications

#### PC Workstation

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

#### RAID

**Storage:** 2–100 TB

**Drive Type:** Hard disk drives

**Supported Levels:** 0, 1, 5, 6, 10 and 50

### Physical and Environmental

#### Dimensions

**4U Long Chassis:** 19" W x 26" D x 7" H

**5U Long Chassis:** 19" W x 26" D x 8.75" H

**Weight:** 50–80 lb

**Operating Temp:** +5° to +45° C

**Storage Temp:** –40° to +85° C

**Relative Humidity:** 5 to 95%, non-condensing

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

## Model RTS 2715 Ordering Information and Options

### Interface Options

<b>Option -101</b>	Gigabit Ethernet
<b>Option -102</b>	10-Gigabit Ethernet

### Channel Configuration

<b>Option -201</b>	1-Ethernet port
<b>Option -202</b>	2-Ethernet ports
<b>Option -204</b>	4-Ethernet ports
<b>Option -208</b>	8-Ethernet ports

**Note:** Option -208 available only with Option -101

### 10GbE Interface

<b>Option -280</b>	SFP+ connectors
<b>Option -281</b>	Multi-mode optical, LC connectors
<b>Option -282</b>	Single-mode optical, LC connectors
<b>Option -284</b>	RJ45 Connector

### Storage Options

<b>Option -406</b>	2.0 TB HDD storage capacity
<b>Option -411</b>	4.0 TB HDD storage capacity
<b>Option -416</b>	8.0 TB HDD storage capacity
<b>Option -421</b>	16.0 TB HDD storage capacity
<b>Option -423</b>	20.0 TB HDD storage capacity
<b>Option -439</b>	30.0 TB HDD storage capacity
<b>Option -450</b>	45.0 TB HDD storage capacity
<b>Option -460</b>	60.0 TB HDD storage capacity
<b>Option -480</b>	100.0 TB HDD storage capacity

**Note:** Options -450 and -460 require a 5U Chassis; Option -480 requires a 6U chassis

### General Options (append to all options)

<b>Option -261</b>	GPS time & position stamping
<b>Option -264</b>	IRIG-B time stamping

**Contact Pentek for compatible Option combinations**

**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*



## Features

- Designed to operate under conditions of shock and vibration
- Records 10-Gigabit Ethernet streams
- TCP and UDP protocols
- Copper or optical 10GbE interfaces
- Aggregate recording rates to 4.0 GB/sec
- Removable SSD drives
- 4U short 19-inch rugged rackmount PC server chassis
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- Up to 46 terabytes of storage to NTFS RAID solid state disk array
- RAID levels of 0, 1, 5, 6, 10 and 50
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into applications
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping

Contact factory for options, number of channels, recording rates, and disk capacity.

## General Information

The Talon® RTR 2755 is a complete turn-key recording system for storing 10-Gigabit Ethernet (10GbE) streams. It is ideal for capturing any type of streaming sources including live transfers from sensors or data from other computers and supports both TCP and UDP protocols.

Using highly-optimized disk storage technology, the system guarantees loss-free performance at aggregate recording rates up to 4.0 GB/sec.

Two rear panel SFP+ LC connectors for 850 nm multi-mode or single-mode fibre cables, or CX4 connectors for copper twinax cables accommodate all popular 10GbE interfaces.

Optional GPS time and position stamping accurately identifies each record in the file header.

## SystemFlow Software

The RTR 2755 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple and intuitive means to configure and control the system.

Custom configurations can be stored as profiles and later loaded as needed, allowing the user to select preconfigured settings with a single click.

Built on a server-class Windows 7 Professional workstation, the RTR 2755 allows the

user to install post-processing and analysis tools to operate on the recorded data.

The RTR 2755 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports or six USB 2.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

## Rugged and Flexible Architecture

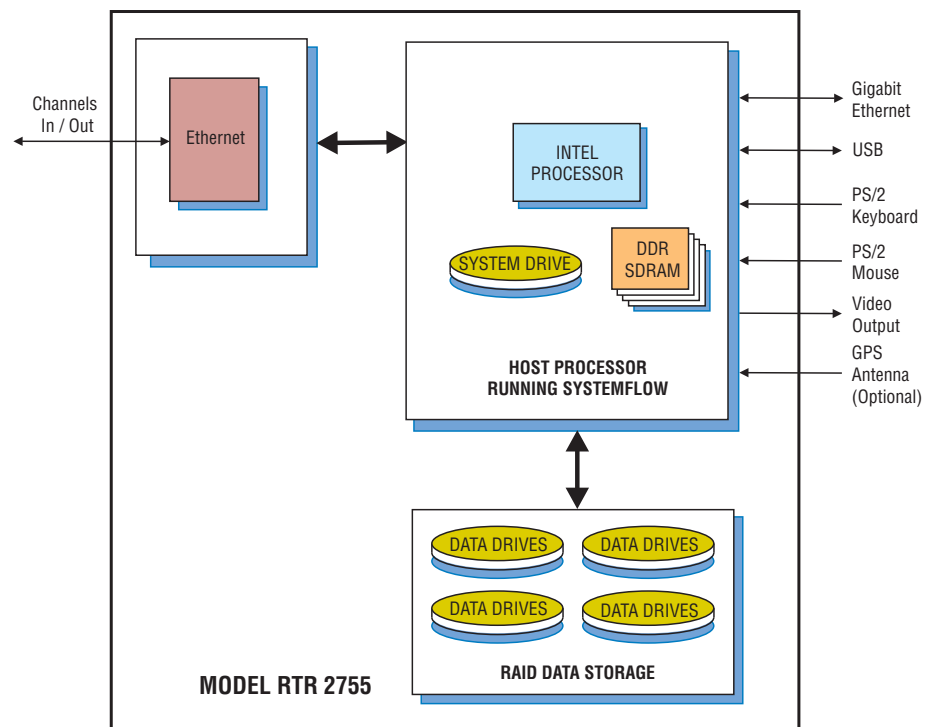
Because SSDs operate reliably under conditions of shock and vibration, the RTR 2755 performs well in ground, shipborne and airborne environments. The hot-swappable SSDs provide storage capacity of up to 46 TB. The drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

The RTR 2755 is configured in a 4U 19" 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.

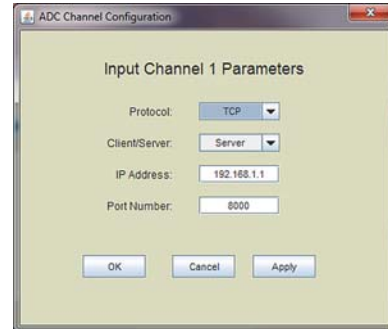
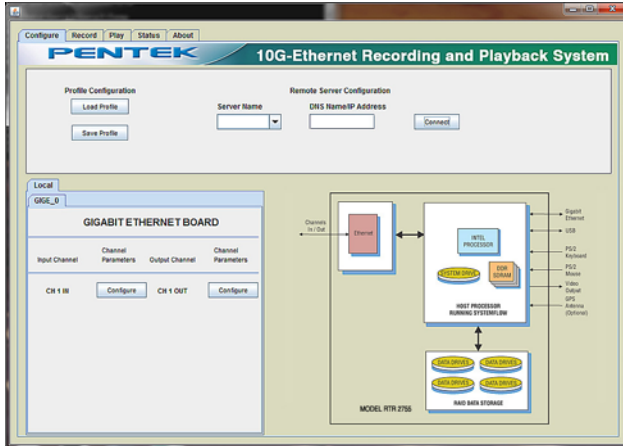
All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50, provide a choice for the required level of redundancy. ➤





► SystemFlow Graphical User Interface

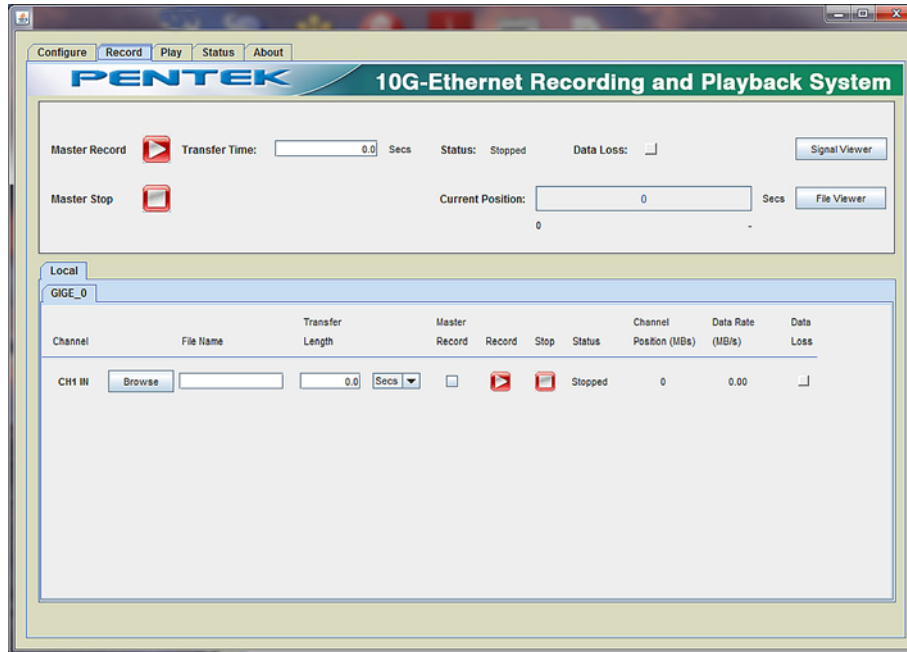


SystemFlow Main Interface

The RTR 2755 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying UDP or TCP protocol, client or server connection, the IP address and port number. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

## ► SystemFlow API

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTR 2755 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2755 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

## Specifications

### PC Workstation

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

### RAID

**Storage:** 3.8, 7.6, 15.3, 30.7 or 46.0 TB

**Drive Type:** Solid-state drive

**Supported Levels:** 0, 1, 5, 6, 10 and 50

## 10-Gigabit Ethernet Interface

**Option 280: SFP+**

**Quantity:** 2 ports

**Connector Type:** SFP+

**Option 281: Multi-mode Fibre Optical**

**Quantity:** 2 ports

**Cable:** Multi-mode fibre, 850 nm

**Connector Type:** LC

**Max. Cable Length:** Up to 300 m

**Option 282: Single-mode Fibre Optical**

**Quantity:** 2 ports

**Cable:** Single-mode fibre, 1310 nm

**Connector Type:** LC

**Max Cable Length:** Up to 10 km

## Physical and Environmental

### Dimensions

**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.

## Model RTR 2755 Ordering Information and Options

### Interface Options

**Option -101** 1-Gigabit Ethernet

**Option -102** 10-Gigabit Ethernet

### Channel Configuration

**Option -201** 1-Ethernet port

**Option -202** 2-Ethernet ports

**Option -204** 4-Ethernet ports

**Option -208** 8-Ethernet ports

**Note:** Option -208 available only with Option -101

### 10GbE Interface

**Option -280** SFP+ connectors

**Option -281** Multi-mode optical, LC connectors

**Option -282** Single-mode optical, LC connectors

### Storage Options

**Option -410** 3.8 TB SSD storage capacity

**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 -440** 46.0 TB SSD storage capacity

**Note:** Options -430 and 440 require a 26-inch deep chassis

### General Options (append to all options)

**Option -261** GPS time and position stamping

**Option -264** IRIG-B Time Stamping

Contact Pentek for other configurations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications are subject to change without notice



**Features**

- Designed to meet MIL-STD-810 shock and vibration
- Designed to meet EMC/EMI per MIL-STD-461 EMC
- 4U 19-inch rugged rackmount PC server chassis, 22" deep
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- Records 10-gigabit Ethernet streams
- One or two channels
- TCP and UDP protocols
- Copper or optical 10GbE interfaces
- Real-time aggregate recording rates up to 4.0 GB/sec
- Up to four front-panel removable QuickPac SSD drive canisters with eight drives each
- Up to 30 terabytes of storage to NTFS RAID disk array
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- 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® RTX 2775 is a turnkey record and playback system that is built to operate under harsh conditions. Designed to withstand high vibration and operating temperatures, the RTX 2775 is intended for military, airborne and UAV applications requiring a rugged system.

The RTX 2775 records one or two 10-gigabit Ethernet (10GbE) streams; it is ideal for capturing any type of streaming sources, including live transfers from sensors or data from other computers, and supports both TCP and UDP protocols.

Using highly-optimized disk storage technology, the system guarantees loss-free performance at aggregate recording rates up to 4.0 GB/sec.

Two rear panel SFP+ LC connectors for 850 nm multi-mode or single-mode fibre cables, or CX4 connectors for copper twinax cables accommodate all popular 10GbE interfaces.

Optional GPS time and position stamping accurately identifies each record in the file header.

**SystemFlow Software**

The RTX 2775 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple and intuitive means to configure and control the system.

Custom configurations can be stored as profiles and later loaded as needed, allowing the user to select preconfigured settings with a single click.

Built on a server-class Windows 7 Professional workstation, the RTX 2775 allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTX 2775 records data to the native NTFS file system, providing immediate access to the recorded data.

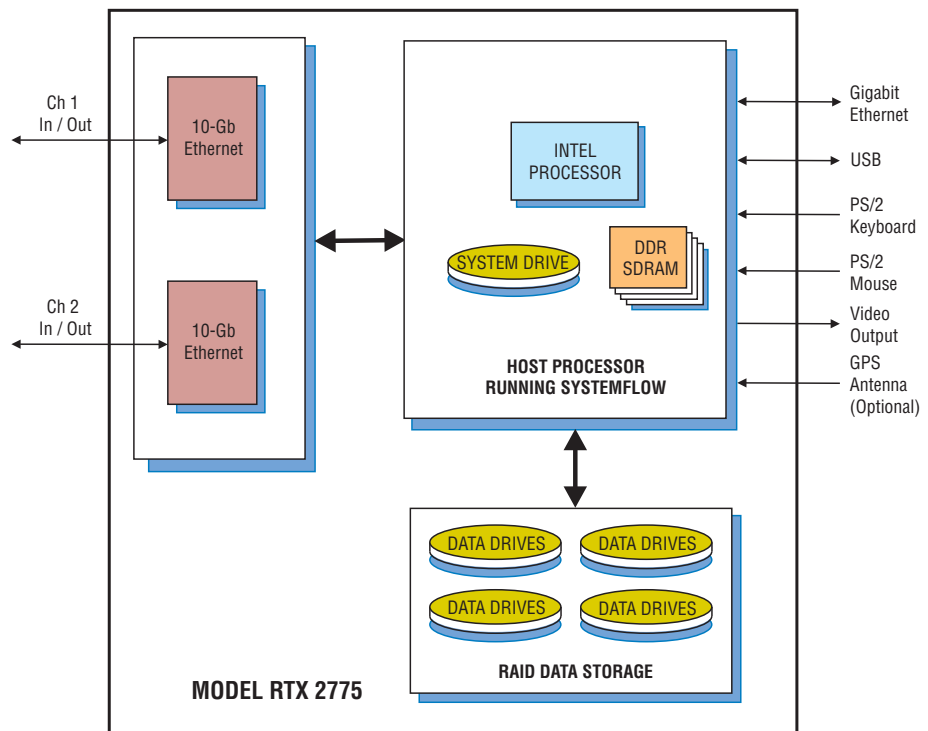
Data can be off-loaded via two rear-access gigabit Ethernet ports, two USB 3.0 ports or up to four USB 2.0 ports.

**Rugged Mil-Spec Chassis**

The Talon RTX 2775 uses a shock- and vibration-isolated inner chassis and solid-state drives to assure reliability under harsh conditions. The chassis uses an in-line EMI filter along with rear-panel MIL-style connectors to meet MIL-STD-461 emissions specifications.

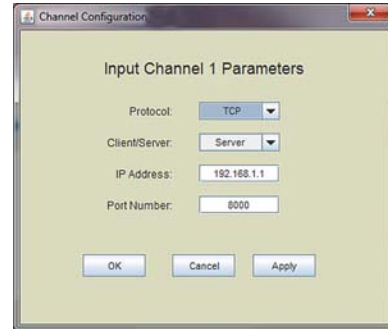
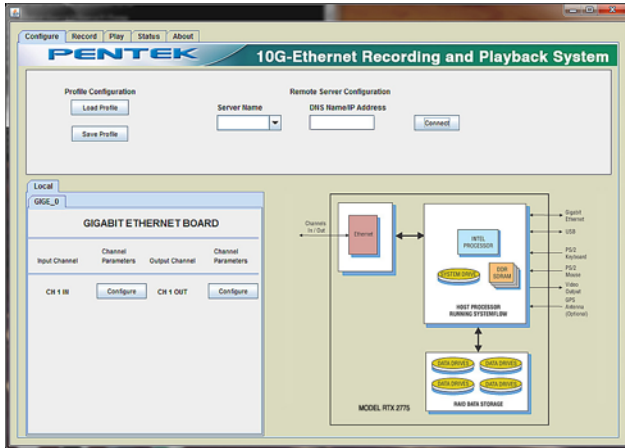
Up to four front-panel removable QuickPac drive canisters are provided, each containing up to eight SSDs. Each drive canister can hold up to 7.6 TB of data storage and allows for quick and easy removal of mission-critical data.

Forced-air cooling draws air from the front of the chassis and pushes it out the back via exhaust fans. A hinged front door with a serviceable air filter provides protection against dust and sand. ➤





► SystemFlow Graphical User Interface

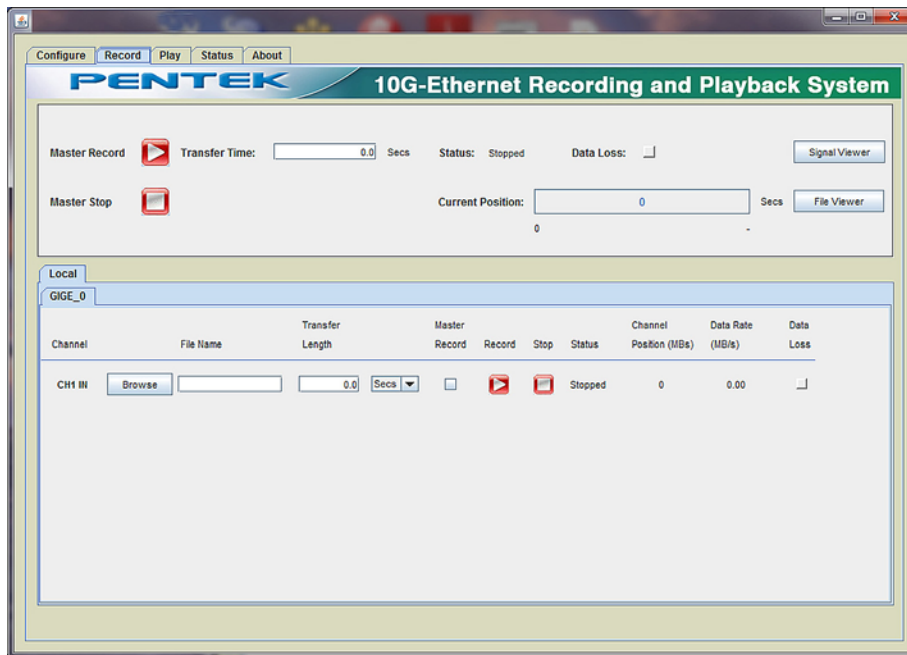


SystemFlow Main Interface

The RTX 2775 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying UDP or TCP protocol, client or server connection, the IP address and port number. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

### ► SystemFlow API

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTR 2755 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2755 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

### Specifications

#### PC Workstation (standard configuration)

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

#### Data Storage

**Style:** Up to four front-panel removable QuickPac drive canisters; up to eight SSDs contained in each canister

**Location:** Front panel

**Capacity:** Up to 30 TB

**Number of Drives:** Up to 32 total

**Supported RAID Levels:** 0, 1, 5 and 6

#### Ten-Gigabit Ethernet Interface

**Option 280: SFP+**

**Quantity:** 2 ports

**Connector Type:** SFP+

**Option 281: Multi-mode Fibre Optical**

**Quantity:** 2 ports

**Cable:** Multi-mode fibre, 850 nm

**Connector Type:** LC

**Max. Cable Length:** Up to 300 m

**Option 282: Single-mode Fibre Optical**

**Quantity:** 2 ports

**Cable:** Single-mode fibre, 1310 nm

**Connector Type:** LC

**Max Cable Length:** Up to 10 km

#### Physical and Environmental

**Dimensions:** 19" W x 22" D x 7" H

**Weight:** 50 lb, approx.

**Operating Temp:** -20° to +50° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 10% to 95%, non-condensing

**Operating Shock:** Designed to MIL-STD 810F, method 514.5, procedures I and VI

**Operating Vibration:** Designed to MIL-STD 810F, method 514.5, procedure I

**EMI/EMC:** Designed to MIL-STD 461E, CE101, CE102, CS101, CS113, RE101, RE102, RS101, RS103

**Input Power:** 85 to 264 VAC, 47–400 Hz, 600 W max.

## Model RTX 2775 Ordering Information and Options

### Interface Options

**Option -101** Gigabit Ethernet

**Option -102** 10-Gigabit Ethernet

### Channel Configuration

**Option -201** 1-Ethernet port

**Option -202** 2-Ethernet ports

**Option -204** 4-Ethernet ports

**Option -208** 8-Ethernet ports

**Note:** Option -208 available only with Option -101

### 10GbE Interface

**Option -280** SFP+ connectors

**Option -281** Multi-mode optical, LC connectors

**Option -282** Single-mode optical, LC connectors

### Storage Options

**Option -410** 3.8 TB SSD storage

**Option -415** 7.6 TB SSD storage

**Option -418** 11.5 TB SSD storage

**Option -420** 15.3 TB SSD storage

**Option -425** 23.0 TB SSD storage

**Option -430** 30.7 TB SSD storage

### General Options (append to all options)

**Option -261** GPS time and position stamping

**Option -264** IRIG-B Time Stamping

**Option -680** 28 VDC power supply

**Option -625** Front-panel removable OS drive

Contact Pentek for other configurations

Storage and Channel-count Options may change, contact Pentek for the latest information

Specifications are subject to change without notice

New!

# Model RTR 2735A

# 1-, 10-, 40-Gigabit Portable Ethernet Recorder



### Features

- Designed to operate under conditions of shock and vibration
- Portable system measuring 16.0" W x 6.9" D x 13.0" H
- Lightweight, approximately 25 pounds
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- Records gigabit, 10-gigabit or 40-gigabit Ethernet streams
- TCP and UDP protocols
- Copper or optical interfaces
- Aggregate recording rates to 4.0 GB/sec
- Windows workstation with a high performance Intel® Core™ i7 processor
- Up to 61 terabytes of SSD storage to NTFS RAID solid state disk array
- Multiple RAID levels, including 0, 5, and 6,
- SystemFlow® GUI with Signal Viewer analysis tool
- C-callable API for integration of recorder into applications
- Optional file headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Optional 10–36 VDC power supply

Contact factory for options, number of channels, recording rates, and disk capacity.

### General Information

The Talon® RTR 2735A can accommodate multiple Ethernet datastreams. It is ideal for capturing any type of streaming sources including live transfers from sensors or data from other computers and supports both TCP and UDP protocols.

The RTR 2735A can accommodate gigabit, 10-gigabit and 40-gigabit Ethernet interfaces.

Using highly-optimized disk storage technology, the system achieves aggregate recording rates up to 4.0 GB/sec.

Rear panel SFP+ or RJ45 connectors accommodate copper, multi-mode or single-mode fibre interfaces.

Optional GPS time and position stamping allows the user to mark the beginning of a recording in the recording file's header.

### SystemFlow Software

The RTR 2735A includes the Pentek System-Flow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple and intuitive means to configure and control the system.

Custom configurations can be stored as profiles and later loaded as needed, allowing the user to select preconfigured settings with a single click.

Built on a server-class Windows Server 2016 workstation, the RTR 2735A allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTR 2735A records data to the native NTFS file system, providing immediate access to the recorded data.

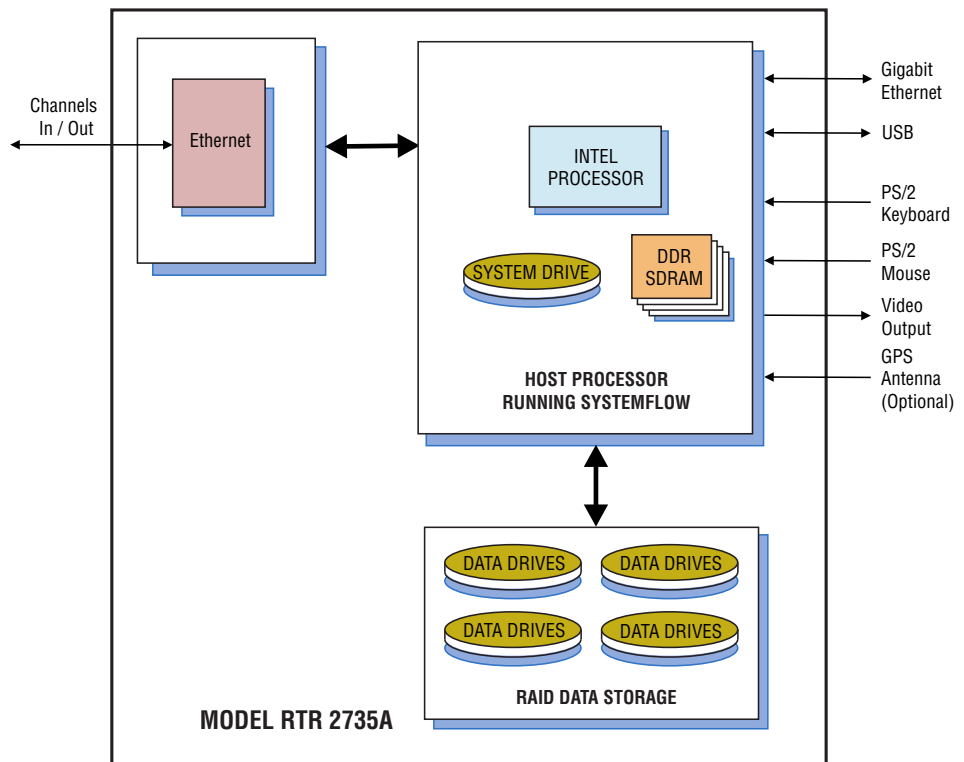
Data can be off-loaded via gigabit Ethernet, USB 2.0 and USB 3.0 ports. Additionally, data can be copied to optical disk using the 8X double layer DVD±R/RW drive.

Option -625 replaces the DVD±R/RW drive with a removable operating system drive; an external DVD drive can be used.

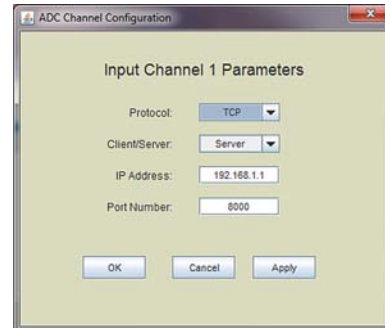
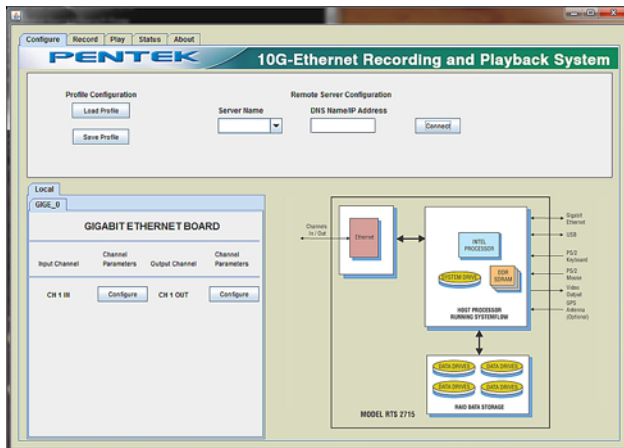
### Rugged Chassis with SSD Storage

The RTR 2735A is configured with hot-swappable SSDs, front panel USB ports, and I/O connectors on the side panel. It is built in an extremely rugged steel and aluminum chassis and is tested for shock and vibration.

The SSDs provide storage capacities of up to 61.4 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0, 5, and 6, provide a choice for the required level of redundancy. ▶



► SystemFlow Graphical User Interface

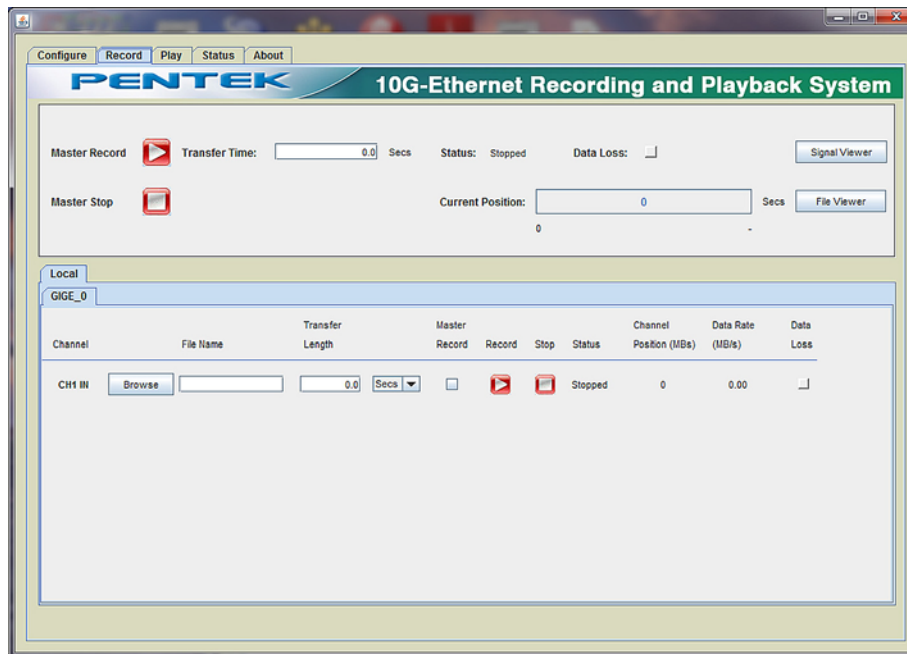


SystemFlow Main Interface

The RTR 2735A GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying UDP or TCP protocol, client or server connection, the IP address and port number. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►



**► SystemFlow API**

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTR 2735A from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2735A 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

**Specifications**

**PC Workstation (standard configuration)**

- Operating System:** 64-bit Windows workstation
- Processor:** Intel Core i7 processor
- Clock Speed:** 3.0 GHz or higher
- Operating System Drive:** 250 GB SSD
- SDRAM:** 8 GB standard, optionally up to 64 GB
- Monitor:** Built-in 17.3" high-resolution LCD, 1920 x 1080 pixels, 16:9 aspect ratio, anti-glare surface
- Brightness:** 300 cd/m<sup>2</sup>; **Contrast ratio:** 400:1 typical
- RAID**
  - Storage:** 3.8 to 61.4 TB
  - Drive Type:** Solid-state drives
  - Supported RAID Levels:** 0, 5, and 6
  - Drive Bays:** Hot-swap, removable, side panel
- USB 2.0 Ports:** Four on left side, two on front panel
- USB 3.0 Ports:** Two on left side
- 1 Gb Ethernet Ports:** Two on left side
- Aux Video Output:** 15-pin VGA on left side

**Optional DC Power supply**

- Voltage:** 10 to 36 VDC
- Input Current:** 42 to 26 A (39 A at 24 VDC)
- Inrush Current:** 100 A at 24 VDC
- Temperature Range:** Oper.: 0° to 50° C, Store: -0° to 80° C
- Efficiency:** >80% typical at 24 V full load
- Power Good Signal:** On delay 100 to 500 msec
- OverPower Protection:** 110% to 160%
- Remote Control:** On/Off
- Safety:** Meets UL, TUV, CB specifications

**Physical and Environmental**

- Size:** 16.0" W x 6.9" D x 13.0" H
- Weight:** 30 lb max.
- Operating Temp:** 0° to +50° C
- Storage Temp:** -40° to +85° C
- Relative Humidity:** 5 to 95%, non-condensing
- Operating Shock:** 30 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
- Non-operating Vibration:** 5 to 500 Hz: 2.06 g RMS
- Power Requirements:** 100 to 240 VAC, 50 to 60 Hz, 500 W max.

**Model RTR 2735A Ordering Information and Options**

**Interface Options**

- Option -101** Gigabit Ethernet
- Option -102** 10-Gigabit Ethernet
- Option -103** 40-Gigabit Ethernet

**Channel Configuration**

- Option -201** 1-Ethernet port
- Option -202** 2-Ethernet ports
- Option -204** 4-Ethernet ports
- Option -208** 8-Ethernet ports

**10GBE Interfaces available with Option -102**

- Option -280** SFP+ connectors
- Option -281** Multi-mode optical, LC connectors
- Option -282** Single-mode optical, LC connectors
- Option -284** RJ45 Connector

**Storage Options**

- Option -410** 3.8 TB SSD storage capacity
- 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

**Additional Options**

- Option -261** GPS Time & Position Stamping
- Option -264** IRIG-B Time Stamping
- Option -285** RAID 5 Configuration
- Option -286** RAID 6 Configuration
- Option -309** 16 GB System Memory
- Option -311** 64 GB System Memory
- Option -625** Removable Operating System Drive
- Option -681** 10 to 36 VDC Power Supply

**Contact Pentek for compatible Option combinations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications subject to change without notice*

New!



Features

- Complete Serial FPDP record and playback system
- Lowest-cost entry into Serial FPDP
- Quick delivery: Model RTV 2602 ships from stock
- 4U 19-inch industrial rack-mount PC server chassis
- Windows® 7 Professional workstation with high-performance Intel® Core™ i3 processor
- Real-time aggregate recording rates up to 400 MB/sec
- 4 TB of data storage to NTFS RAID disk array
- SystemFlow® recording software
- 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® RTV 2602 Serial FPDP Value Recorder is designed to provide a low-cost solution to users looking to capture and play back multiple Serial FPDP streams. It can record up to four Serial FPDP channels to the built-in 4 TB RAID consisting of cost-effective, enterprise-class HDD storage. It is a complete turnkey recording system, ideal for capturing any type of streaming sources. These include live transfers from sensors or data from other computers and is fully compatible with the VITA 17.1 specification.

Like all Talon recorders in the RTV Value Recorder series, the RTV 2602 ships from stock allowing users to be up and running in the field just days after purchase.

The RTV 2602 comes in a 4U 19 in. rack-mount package that is 22.75 in. deep. Signal I/O is provided in the rear of the unit, while the hot-swappable data drives are available in the front. Air is pulled through the system from front to back to allow operation at ambient temperatures from 5° to 35° C.

The RTV 2606 can be populated with up to four SFP connectors supporting Serial FPDP over copper, single-mode, or multi-mode fiber, to accommodate all popular Serial FPDP interfaces. It is capable of both receiving and transmitting data over these links and supports real-time data storage to disk.

Programmable modes include flow control in both receive and transmit directions, CRC support, and copy/loop modes. The system is capable of handling 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates. Up to four channels can be recorded simultaneously with an aggregate recording rate of up to 400 MB/sec.

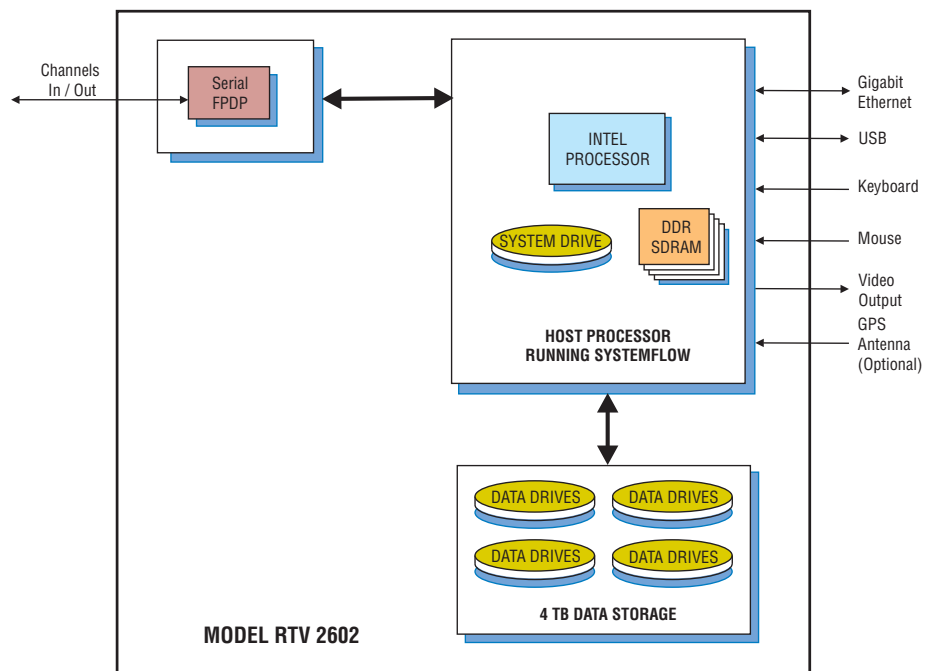
As an option, a GPS or IRIG receiver card can be supplied with the system providing accurate time stamping of recorded data. Additionally, the GPS receiver delivers GPS position information that can be recorded along with the input signals.

SystemFlow Software and API

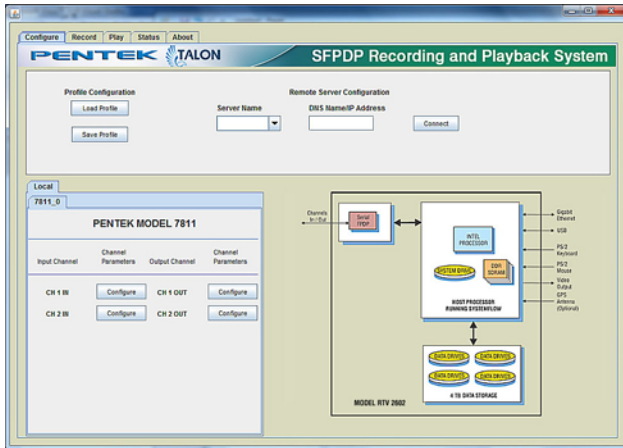
The RTV 2602 includes the Pentek SystemFlow recording software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the recorder.

Custom configurations can be stored as profiles and later loaded when needed, so users can select preconfigured settings with a single click.

In addition to the GUI, the RTV 2602 provides a C-callable API that allows the user to integrate the recorder control into any application. A simple set of commands that provide configuration and control come with source code and examples to allow for an exceptionally fast integration. ➤



► SystemFlow Graphical User Interface

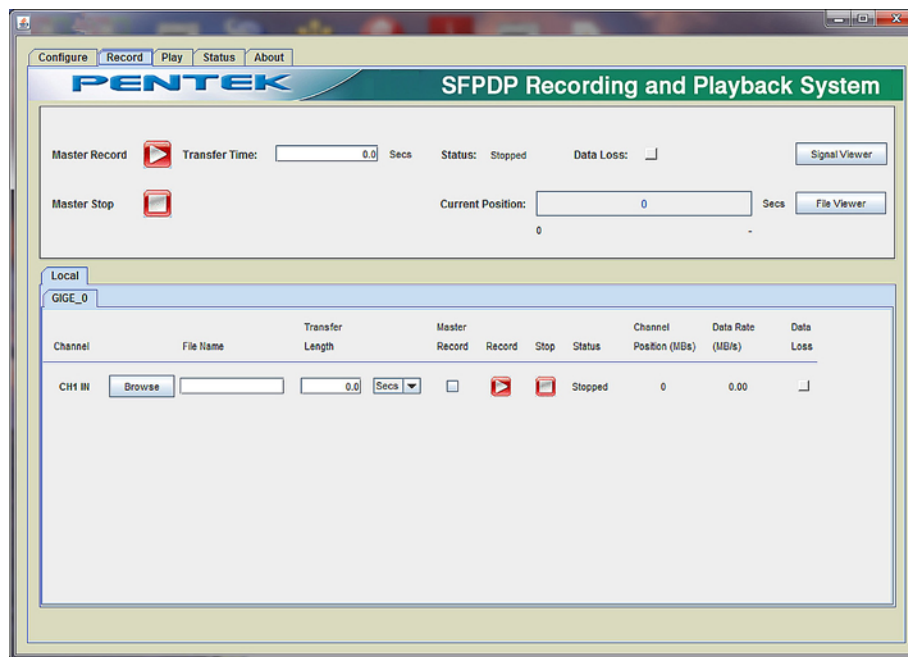


SystemFlow Main Interface

The RTV 2602 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying the flow control settings and the recognition of a CRC in the data stream. Each channel can also be set up to utilize Serial FPDP's copy/loop mode. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified and monitoring functions inform the operator of recording progress. ►

**► System Architecture**

Built on a Windows 7 Professional workstation, the RTV 2602 allows the user to install post-processing and analysis tools to operate on the recorded data. The recorder stores data in the native NTFS file system, providing immediate access to any installed Windows application. Alternately, the NTFS drive can be accessed remotely over the built-in gigabit Ethernet link from a remote Windows or Linux machine.

Recorded data can be off-loaded via the rear-panel gigabit Ethernet port, two front-panel USB 3.0 ports, two rear-panel USB 3.0 ports or four rear-panel USB 2.0 ports. A built-in DVD +/- R/RW drive allows the user to burn recorded data to disk. Hot-swappable front-panel drives can be easily removed and replaced with empty drives to provide additional data storage.

**Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i3 processor

**Clock Speed:** 2.0 GHz or higher

**SDRAM:** 8 GB

**RAID**

**Storage:** 4 TB

**Number of Drives:** Six, removable, front panel access

**Optical Drive:** DVD +/- R/RW, front panel access

**USB Ports:** Front panel: Two USB 3.0; rear panel:

Two USB 3.0; Four USB 2.0

**Ethernet:** Single 1GbE, rear panel

**Supported RAID Levels:** 0

**Serial FPDP Interface**

**Copper - Option 280**

**Cable:** 100-ohm shielded twin-ax

**Connector Type:** SFP+

**Max. Cable Length:** 20 m

**Multi-mode Fiber Optical - Option 281**

**Cable:** Multi-mode fiber, 850 nm

**Connector Type:** LC

**Max. Cable Length:** Up to 300 m

**Single-mode Fiber Optical - Option 282**

**Cable:** Single-mode fiber

**Connector Type:** LC

**Max. Cable Length:** Up to 10 km

**Physical and Environmental**

**Size:** 19" W x 22.75" D x 7" H

**Weight:** 50 lbs

**Operating Temp:** +5° to +35° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 5 to 95%, non-condensing

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

**Model RTV 2602 Options Information**

**General Options**

**Option -261**      GPS time & position stamping

**Option -264**      IRIG-B time stamping

**Serial FPDP Interface**

**Option -280**      SFP+ connectors

**Option -281**      Multi-mode optical, LC connectors

**Option -282**      Single-mode optical, LC connectors

*Specifications are subject to change without notice*





## Features

- Complete Serial FPDP record and playback system
- Up to eight I/O channels in a single 4U or 5U 19 inch industrial rackmount PC server chassis
- Supports Flow Control, CRC, and Copy/Loop Mode as a receiver and transmitter
- Supports 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates
- Copper, single-mode and multi-mode fiber interfaces available
- Real-time aggregate recording rates of up to 1.6 GB/sec
- Up to 100 terabytes of storage to NTFS RAID disk array
- RAID levels of 0, 1, 5, 6, 10 and 50
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Windows® 7 Professional workstation with high performance Intel® Core™ i7 processor

Contact factory for options, number of channels, recording rates, and disk capacity.

## General Information

The Talon® RTS 2716 is a complete turn-key recording system capable of recording and playing multiple Serial FPDP data streams. It is ideal for capturing any type of streaming sources including live transfers from sensors or data from other computers and is fully compatible with the VITA 17.1 specification. Using highly-optimized disk storage technology, the system achieves aggregate recording rates up to 1.6 GB/sec.

The RTS 2716 can be populated with up to eight SFP connectors supporting Serial FPDP over copper, single-mode, or multi-mode fiber, to accommodate all popular Serial FPDP interfaces. It is capable of both receiving and transmitting data over these links and supports real-time data storage to disk.

Programmable modes include flow control in both receive and transmit directions, CRC support, and copy/loop modes. The system is capable of handling 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates supporting data transfer rates of up to 420 MB/sec per Serial FPDP link.

Optional GPS time and position stamping allows the user to mark the beginning of a recording in the recording file's header.

## SystemFlow Software

The RTS 2716 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple and intuitive means to configure and control the system.

Custom configurations can be stored as profiles and later loaded as needed, allowing the user to select preconfigured settings with a single click.

Built on a server-class Windows 7 Professional workstation, the RTS 2716 allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTS 2716 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports or six USB 2.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

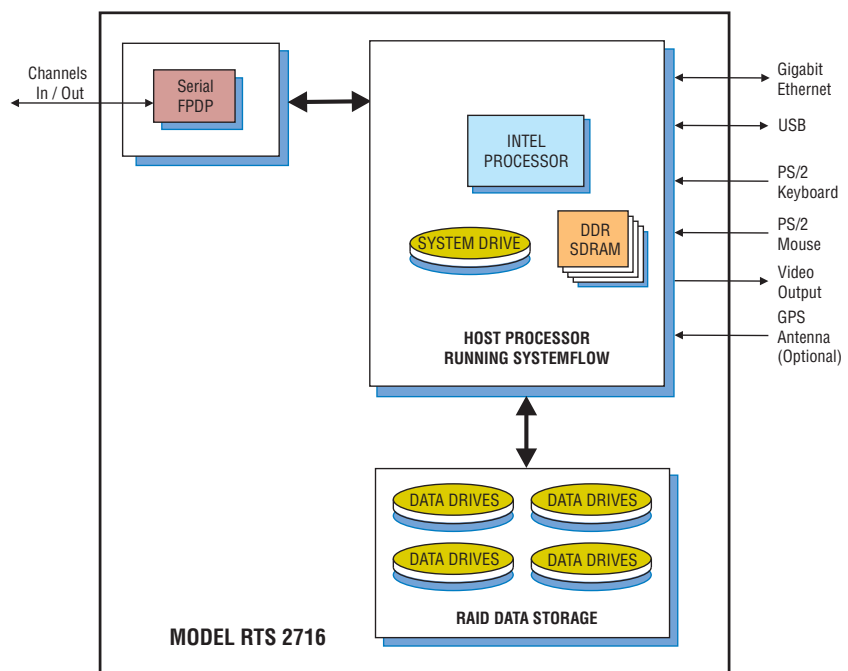
## Flexible Architecture

The RTS 2716 is configured in a 4U or 5U 19" rack-mountable chassis, with hot-swap data drives, front panel USB ports and I/O connectors on the rear panel.

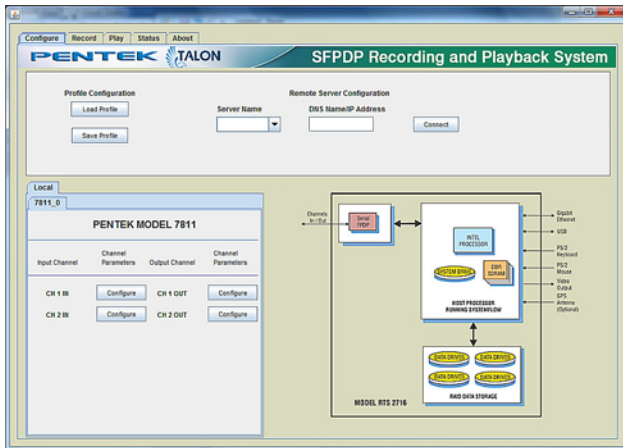
Systems are scalable to accommodate multiple chassis to increase channel counts and aggregate data rates.

All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50, provide a choice for the required level of redundancy. The hot-swappable HDDs provide storage capacities of up to 100 TB in a single 6U chassis. ➤



► SystemFlow Graphical User Interface

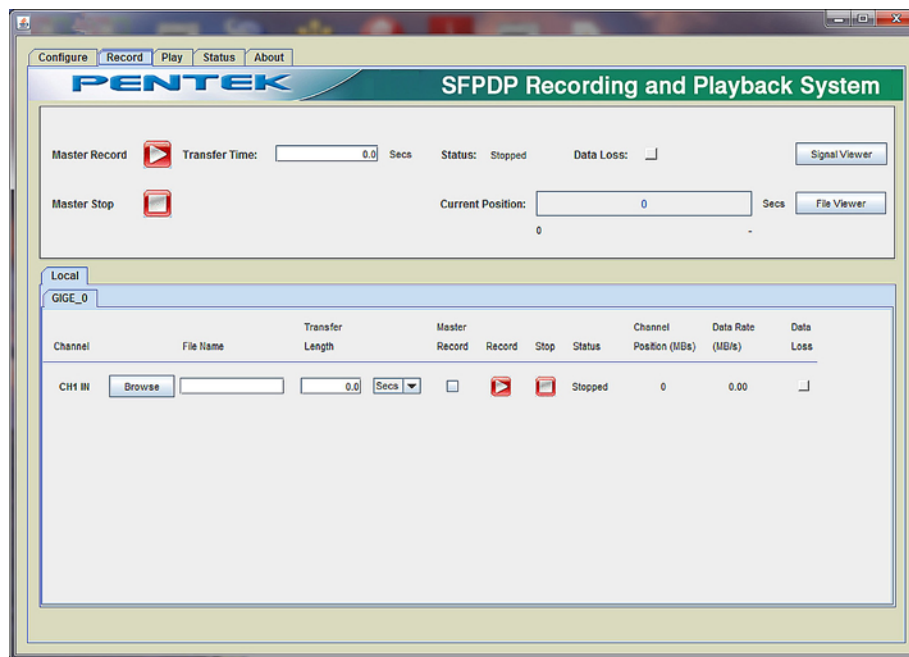


SystemFlow Main Interface

The RTS 2716 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying the flow control settings and the recognition of a CRC in the data stream. Each channel can also be set up to utilize Serial FPDP's copy/loop mode. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

### ► SystemFlow API

SystemFlow includes a complete API (Application Programming Interface) that supports control and status queries of all operations of the RTS 2716 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTS 2716 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

### Specifications

#### PC Workstation

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or greater

**SDRAM:** 6 GB

**RAID**

**Storage:** 2.0–100.0 TB

**Drive Type:** 3.5" HDD

**Supported Levels:** 0, 1, 5, 6, 10 and 50

#### Serial FPDP Interface

##### Copper - Option 280

**Cable:** 100-ohm shielded twin-ax

**Connector Type:** SFP+

**Max. Cable Length:** 20 m

##### Multi-mode Fiber Optical - Option 281

**Cable:** Multi-mode fiber, 850 nm

**Connector Type:** LC

**Max. Cable Length:** Up to 300 m

##### Single-mode Fiber Optical - Option 282

**Cable:** Single-mode fiber

**Connector Type:** LC

**Max. Cable Length:** Up to 10 km

#### Physical and Environmental

##### Dimensions

**Full 4U Chassis:** 19" W x 26" D x 7" H

**Weight:** 30 – 80 lb

**Operating Temp:** +5° to +45° C

**Storage Temp:** –40° to +85° C

**Relative Humidity:** 5 to 95%, non-condensing

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

## Model RTS 2716 Ordering Information and Options

### Channel Configuration

**Option -204** 4-channel recording

**Option -208** 8-channel recording

### SFPDP Interface

**Option -280** SFP+ connectors

**Option -281** Multi-mode optical, LC connectors

**Option -282** Single-mode optical, LC connectors

### Storage Options

**Option -406** 2.0 TB HDD storage capacity

**Option -411** 4.0 TB HDD storage capacity

**Option -416** 8.0 TB HDD storage capacity

**Option -421** 16.0 TB HDD storage capacity

**Option -423** 20.0 TB HDD storage capacity

**Option -439** 30.0 TB HDD storage capacity

**Option -450** 45.0 TB HDD storage capacity

**Option -460** 60.0 TB HDD storage capacity

**Option -480** 100.0 TB HDD storage capacity

**Note:** Options -450 and -460 require a 5U Chassis; Option -480 requires a 6U chassis

### General Options (append to all options)

**Option -261** GPS time & position stamping

**Option -264** IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

*Specifications subject to change without notice*



## Features

- Designed to operate under conditions of shock and vibration
- Portable system measures 16.9" W x 9.5" D x 13.4" H
- Rugged aluminum alloy chassis
- Lightweight, approximately 30 pounds
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- Up to eight I/O channels
- Supports Flow Control, CRC, and Copy/Loop Mode as a receiver and transmitter
- Supports 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates
- Copper, single-mode and multi-mode fiber interfaces available
- Real-time aggregate recording rates of up to 2.4 GB/sec
- Up to 7.6 terabytes of storage to NTFS RAID disk array
- RAID levels of 0, 1, 5 and 6
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor

Contact factory for options, number of channels, recording rates, and disk capacity.

## General Information

The Talon® RTR 2736 is a complete turn-key recording system capable of recording and playing back multiple Serial FPDP data streams in a rugged, lightweight portable package. It is ideal for capturing any type of streaming sources including live transfers from sensors or data from other computers and is fully compatible with the VITA 17.1 specification. Using highly-optimized disk storage technology, the system achieves aggregate recording rates up to 2.4 GB/sec.

The RTR 2736 can be populated with up to eight SFP connectors supporting Serial FPDP over copper, single-mode, or multi-mode fiber, to accommodate all popular Serial FPDP interfaces. It is capable of both receiving and transmitting data over these links and supports real-time data storage to disk.

Programmable modes include flow control in both receive and transmit directions, CRC support, and copy/loop modes. The system is capable of handling 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates supporting data transfer rates of up to 420 MB/sec per Serial FPDP link.

Optional GPS time and position stamping allows the user to mark the beginning of a recording in the recording file's header.

## SystemFlow Software

The RTR 2736 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple and intuitive means to configure and control the system.

Custom configurations can be stored as profiles and later loaded as needed, allowing the user to select preconfigured settings with a single click.

Built on a server-class Windows 7 Professional workstation, the RTR 2736 allows the user to install post-processing and analysis tools to operate on the recorded data.

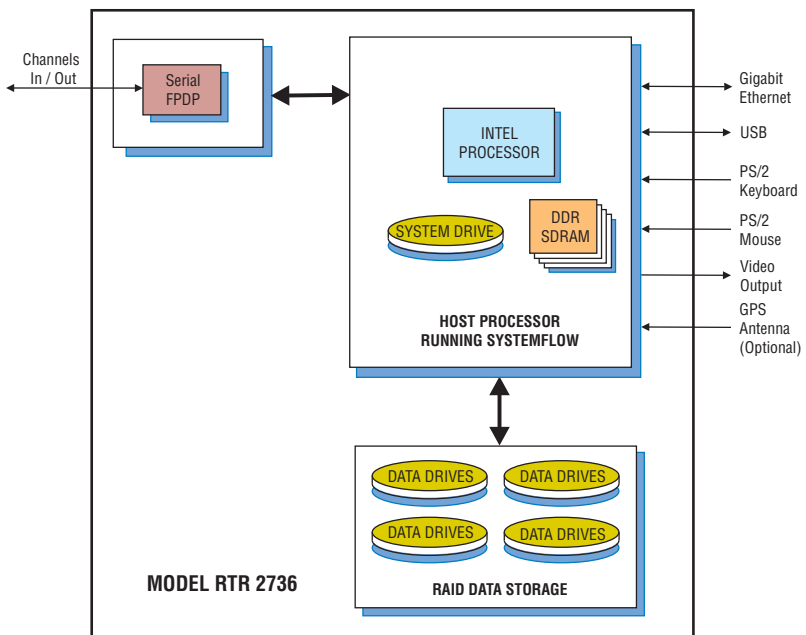
The RTR 2736 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via a gigabit Ethernet port, eight USB 2.0 ports, two USB 3.0 ports or two eSATA 3 Ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

## Rugged and Flexible Architecture

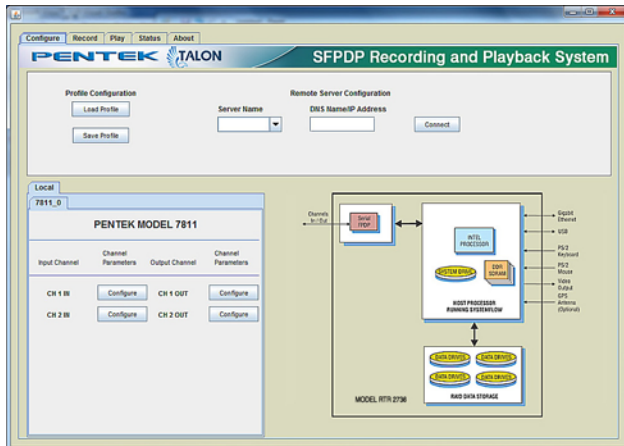
The RTR 2736 is configured in a portable, lightweight chassis with hot-swap SSDs, front panel USB ports and I/O connections on the side panel. It is built on an extremely rugged, 100% aluminum alloy unit, reinforced with shock absorbing rubber corners and an impact-resistant protective glass. Using shock- and vibration-resistant SSDs, the RTR 2736 is designed to reliably operate as a portable field instrument.

The hot-swappable SSDs provide storage capacities of up to 7.6 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0, 1, 5 and 6, provide a choice for the required level of redundancy. ▶





► SystemFlow Graphical User Interface

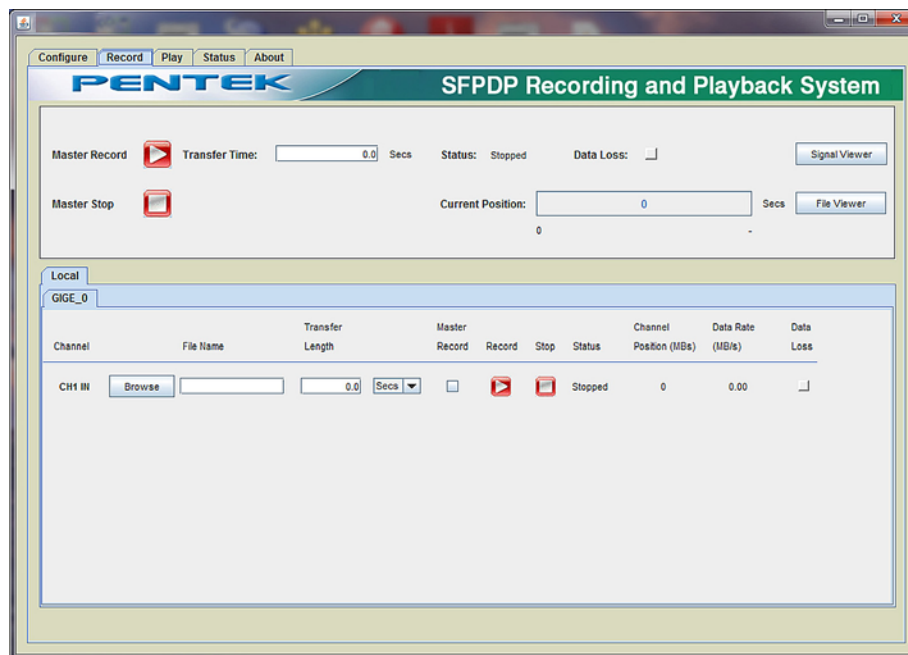


SystemFlow Main Interface

The RTR 2736 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying the flow control settings and the recognition of a CRC in the data stream. Each channel can also be set up to utilize Serial FPDP's copy/loop mode. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

**► SystemFlow API**

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTR 2736 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2736 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

**Specifications**

**PC Workstation**

- Operating System:** Windows 7 Professional
- Processor:** Intel Core i7 processor
- Clock Speed:** 2.0 GHz or greater
- SDRAM:** 6 GB
- Monitor:** Built-in 17" high-resolution LCD, 1440 x 900 pixels, 200 nits
- RAID**
  - Storage:** 1.9, 3.8, or 7.6 TB
  - Supported RAID Levels:** 0, 1, 5 and 6
  - Drive Bays:** Hot-swap, removable, rear panel
- USB 2.0 Ports:** Eight left side, two front panel
- USB 3.0 Ports:** Two left side
- 1 Gb Ethernet Port:** One left side
- eSATA Ports:** Two left side
- Aux Video Output:** 15-pin VGA left side

**Serial FPDP Interface**

**Copper - Option 280**

- Cable:** 100-ohm shielded twin-ax
- Connector Type:** SFP+
- Max. Cable Length:** 20 m

**Multi-mode Fiber Optical - Option 281**

- Cable:** Multi-mode fiber, 850 nm
- Connector Type:** LC
- Max. Cable Length:** Up to 300 m

**Single-mode Fiber Optical - Option 282**

- Cable:** Single-mode fiber
- Connector Type:** LC
- Max. Cable Length:** Up to 10 km

**Physical and Environmental**

- Dimensions:** 16.9" W x 9.5" D x 13.4" H
- Weight:** 30 lb, approximately
- 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.

**Model RTR 2736 Ordering Information and Options**

**Channel Configurations**

- Option -204**      4-channel recording
- Option -208**      8-channel recording

**Storage Options**

- Option -405**      1.9 TB SSD storage capacity
- Option -410**      3.8 TB SSD storage capacity
- Option -415**      7.6 TB SSD storage capacity

**Serial FPDP Interface (append to all options)**

- Option -280**      Copper, SFP+ connectors
- Option -281**      Multi-mode optical, LC connectors
- Option -282**      Single-mode optical, LC connectors

**General Options (append to all options)**

- Option -261**      GPS time & position stamping
- Option -264**      IRIG-B time stamping

**Contact Pentek for compatible Option combinations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications are subject to change without notice*

New!

# Model RTR 2736A

# Serial FPDP Rugged Portable Recorder



### Features

- Designed to operate under conditions of shock and vibration
- Portable system measuring 16.0" W x 6.9" D x 13.0" H
- Lightweight, just less than 30 pounds
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- Up to eight I/O channels
- Supports Flow Control, CRC, and Copy/Loop Mode as a receiver and transmitter
- Supports 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates
- Copper, single-mode and multi-mode fiber interfaces available
- Real-time aggregate recording rates of up to 3.2 GB/sec
- Windows® workstation with high performance Intel® Core™ i7 processor
- Up to 61 terabytes of SSD storage to NTFS RAID solid state disk array
- SystemFlow® GUI with Signal Viewer analysis tool
- Optional file headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Optional 10–36 VDC power supply

Contact factory for options, number of channels, recording rates, and disk capacity.

### General Information

The Talon® RTR 2736A is a complete turn-key recording system capable of recording and playing back multiple Serial FPDP data streams in a rugged, lightweight portable package. It is ideal for capturing any type of streaming sources including live transfers from sensors or data from other computers and is fully compatible with the VITA 17.1 specification. Using highly-optimized disk storage technology, the system achieves aggregate recording rates up to 3.2 GB/sec.

The RTR 2736A can be populated with up to eight SFP connectors supporting Serial FPDP over copper, single-mode, or multi-mode fiber, to accommodate all popular Serial FPDP interfaces. It is capable of both receiving and transmitting data over these links and supports real-time data storage to disk.

Programmable modes include flow control in both receive and transmit directions, CRC support, and copy /loop modes. The system is capable of handling 1.0625, 2.125, 2.5, 3.125, and 4.25 GBaud link rates supporting data transfer rates of up to 420 MB/sec per Serial FPDP link.

Optional GPS time and position stamping allows the user to mark the beginning of a recording in the recording file's header.

### SystemFlow Software

The RTR 2736A includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple and intuitive

means to configure and control the system. It also includes a C-callable API that allows users to easily integrate the Talon recorder into a larger system.

Custom configurations can be stored as profiles and later loaded as needed, allowing the user to select preconfigured settings with a single click.

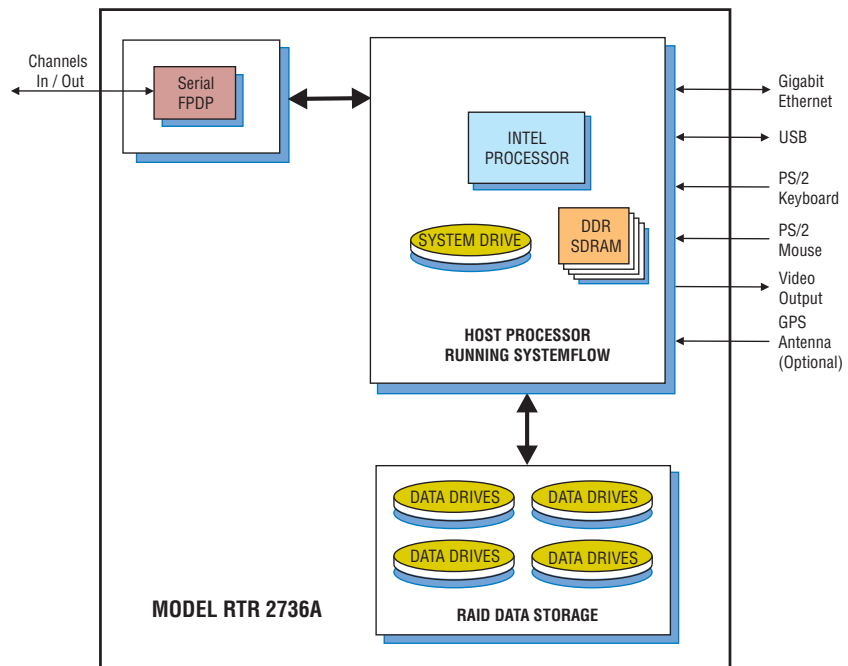
Built on a server-class Windows workstation, the RTR 2736A allows the user to install post-processing and analysis tools to operate on the recorded data. The RTR 2736A records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via gigabit Ethernet, USB 2.0 and USB 3.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

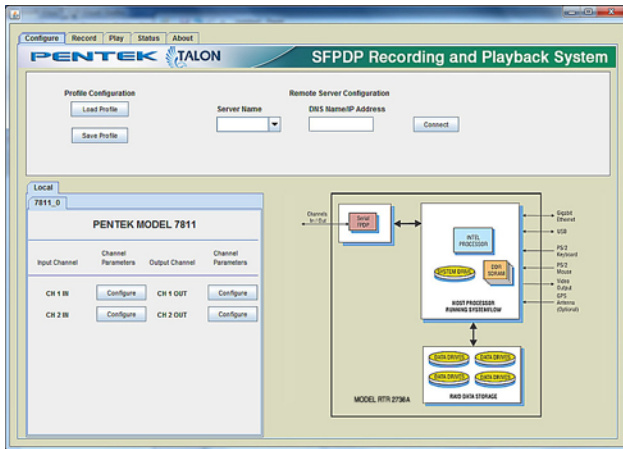
Option -625 replaces the DVD±R/RW drive with a removable operating system drive; an external DVD drive can be used.

### Rugged Chassis with SSD Storage

The RTR 2736A is configured with hot-swappable SSDs, front panel USB ports, and I/O connectors on the side panel. It is built in an extremely rugged steel and aluminum chassis and is tested for shock and vibration. The SSDs provide storage capacities of up to 61.4 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0, 5, and 6, provide a choice for the required level of redundancy. ➤



► SystemFlow Graphical User Interface

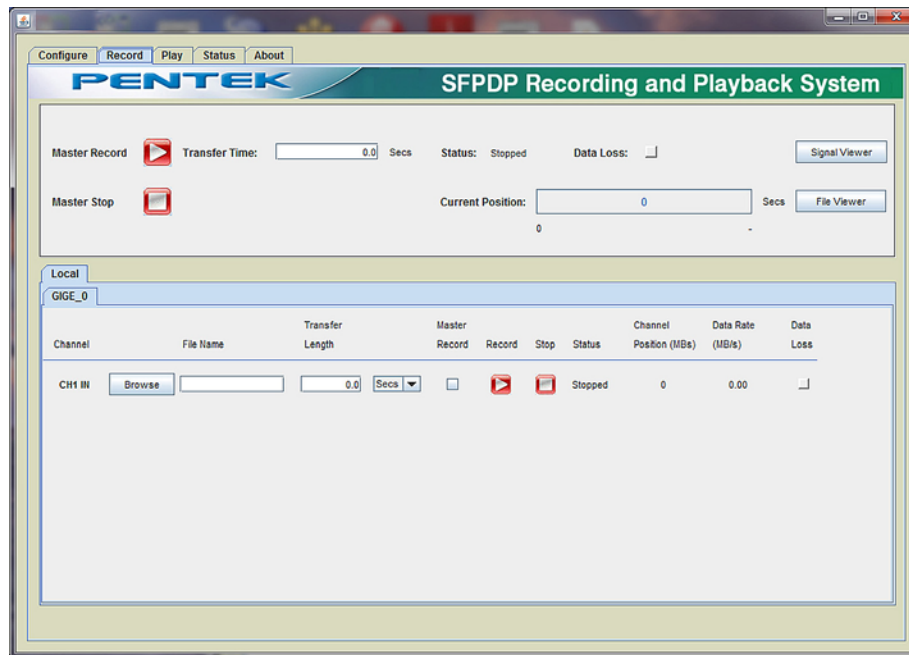


SystemFlow Main Interface

The RTR 2736A GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying the flow control settings and the recognition of a CRC in the data stream. Each channel can also be set up to utilize Serial FPDP's copy/loop mode. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►



**► SystemFlow API**

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTR 2736A from a custom application. High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2736A 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

**Specifications**

**PC Workstation (standard configuration)**

- Operating System:** 64-bit Windows 7 Professional
- Processor:** Intel Core i7 processor
- Clock Speed:** 3.0 GHz or higher
- Operating System Drive:** 128 GB SSD
- SDRAM:** 8 GB
- Monitor:** Built-in 17.3" high-resolution LCD, 1920 x 1080 pixels, 16:9 aspect ratio, anti-glare surface  
Brightness: 300 cd/m<sup>2</sup>; Contrast ratio: 400:1 typical
- RAID**
  - Total Storage:** 1.9, 3.8, 7.6 or 15.3 TB
  - Supported RAID Levels:** 0, 1, 5 and 6
  - Drive Bays:** Hot-swap, removable, side panel
- USB 2.0 Ports:** Four on left side, two on front panel
- USB 3.0 Ports:** Two on left side
- 1 Gb Ethernet Ports:** Two on left side
- Aux Video Output:** 15-pin VGA on left side

**Serial FPDP Interface**

**Copper - Option 280**

- Cable:** 100-ohm shielded twin-ax
- Connector Type:** SFP+
- Max. Cable Length:** 20 m

**Multi-mode Fiber Optical - Option 281**

- Cable:** Multi-mode fiber, 850 nm
- Connector Type:** LC
- Max. Cable Length:** Up to 300 m

**Single-mode Fiber Optical - Option 282**

- Cable:** Single-mode fiber
- Connector Type:** LC
- Max. Cable Length:** Up to 10 km

**Optional DC Power supply**

- Voltage:** 18 to 36 VDC
- Input Current:** 42 to 26 A (39 A at 24 VDC)
- Inrush Current:** 100 A at 24 VDC
- Temperature Range:** Oper.: 0° to 50° C, Store: -0° to 80° C
- Efficiency:** >80% typical at 24 V full load
- Power Good Signal:** On delay 100 to 500 msec
- OverPower Protection:** 110% to 160%
- Remote Control:** On/Off
- Safety:** Meets UL, TUV, CB specifications

**Physical and Environmental**

- Size:** 16.0" W x 6.9" D x 13.0" H
- Weight:** 30 lb max.
- Operating Temp:** 0° to +50° C
- Storage Temp:** -40° to +85° C
- Relative Humidity:** 5 to 95%, non-condensing
- Operating Shock:** 30 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
- Non-operating Vibration:** 5 to 500 Hz: 2.06 g RMS
- Power Requirements:** 100 to 240 VAC, 50 to 60 Hz, 500 W max.

**Model RTR 2736A Ordering Information and Options**

**Channel Configurations**

- Option -204** 4-channel recording
- Option -208** 8-channel recording

**Storage Options**

- Option -405** 1.9 TB SSD storage capacity
- Option -410** 3.8 TB SSD storage capacity
- Option -415** 7.6 TB SSD storage capacity
- Option -420** 15.3 TB SSD storage capacity

**Serial FPDP Interface (append to all options)**

- Option -280** Copper, SFP+ connectors
- Option -281** Multi-mode optical, LC connectors
- Option -282** Single-mode optical, LC connectors

**General Options (append to all options)**

- Option -261** GPS time & position stamping
- Option -264** IRIG-B time stamping
- Option -625** Removable operating system drive
- Option -681** 18 to 36 VDC Power Supply

**Contact Pentek for compatible Option combinations  
Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications are subject to change without notice*



## Features

- Designed to operate under conditions of shock and vibration
- Complete Serial FPDP record and playback system
- Up to eight I/O channels in a single 4U 19-inch rugged rack-mount PC server chassis
- Removable SSDs
- Up to 46 terabytes of storage to NTFS RAID disk array
- Copper, single-mode and multi-mode fiber interfaces available
- Real-time aggregate recording rates of up to 3.2 GB/sec
- Supports Flow Control, CRC, and Copy/Loop Mode as a receiver and transmitter
- Supports 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates
- RAID levels of 0, 1, 5, 6, 10 and 50
- Optional N+1 redundant power supply
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor

Contact factory for options, for number and type of channels, recording rates, and disk capacity.

## General Information

The Talon® RTR 2756 is a complete turn-key recording system capable of recording and playing back multiple Serial FPDP data streams. It is ideal for capturing any type of streaming sources including live transfers from sensors or data from other computers and is fully compatible with the VITA 17.1 specification. Using highly-optimized disk storage technology, the system achieves aggregate recording rates up to 3.2 GB/sec.

The RTR 2756 can be populated with up to eight SFP connectors supporting Serial FPDP over copper, single-mode, or multi-mode fiber, to accommodate all popular Serial FPDP interfaces. It is capable of both receiving and transmitting data over these links and supports real-time data storage to disk.

Programmable modes include flow control in both receive and transmit directions, CRC support, and copy/loop modes. The system is capable of handling 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates supporting data transfer rates of up to 425 MB/sec per Serial FPDP link.

Optional GPS time and position stamping allows the user to mark the beginning of a recording in the recording file's header.

## SystemFlow Software

The RTR 2756 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple and intuitive means to configure and control the system.

Custom configurations can be stored as profiles and later loaded as needed, allowing the user to select preconfigured settings with a single click.

Built on a server-class Windows 7 Professional workstation, the RTR 2756 allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTR 2756 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports or six USB 2.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

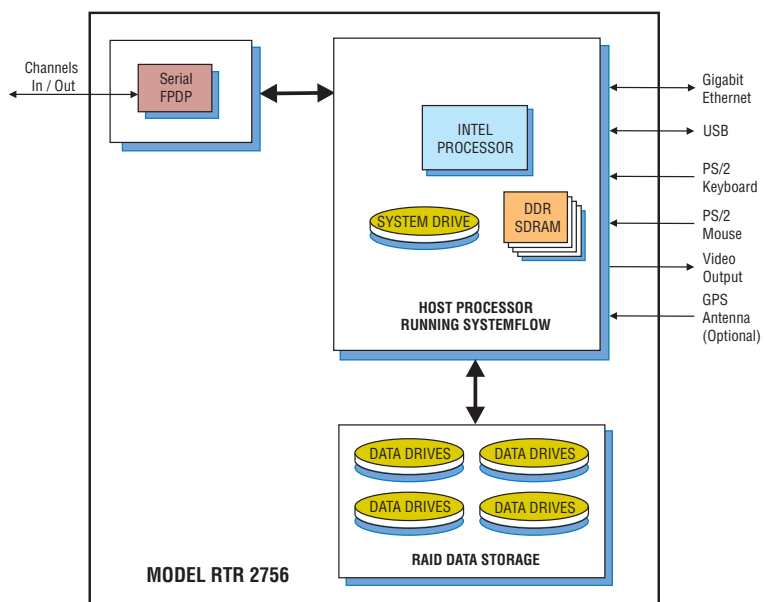
## Rugged and Flexible Architecture

Because SSDs operate reliably under conditions of shock and vibration, the RTR 2756 performs well in ground, shipborne and airborne environments. Configurable with hot-swappable SSDs, the RTR 2756 can provide storage capacities of up to 46 TB in a rugged chassis. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

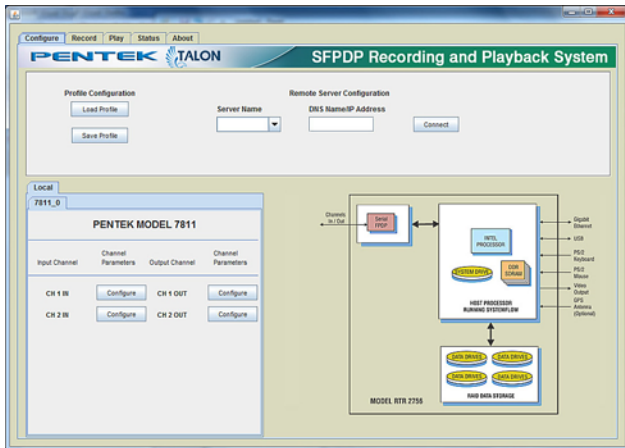
The RTR 2756 is configured in a 4U 19" rack-mountable chassis, with hot-swap data drives, front-panel USB ports and I/O connectors on the rear panel.

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

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50 provide a choice for the required level on redundancy. Redundant power supplies are optionally available to provide a robust and reliable high-performance recording system. ➤



► SystemFlow Graphical User Interface

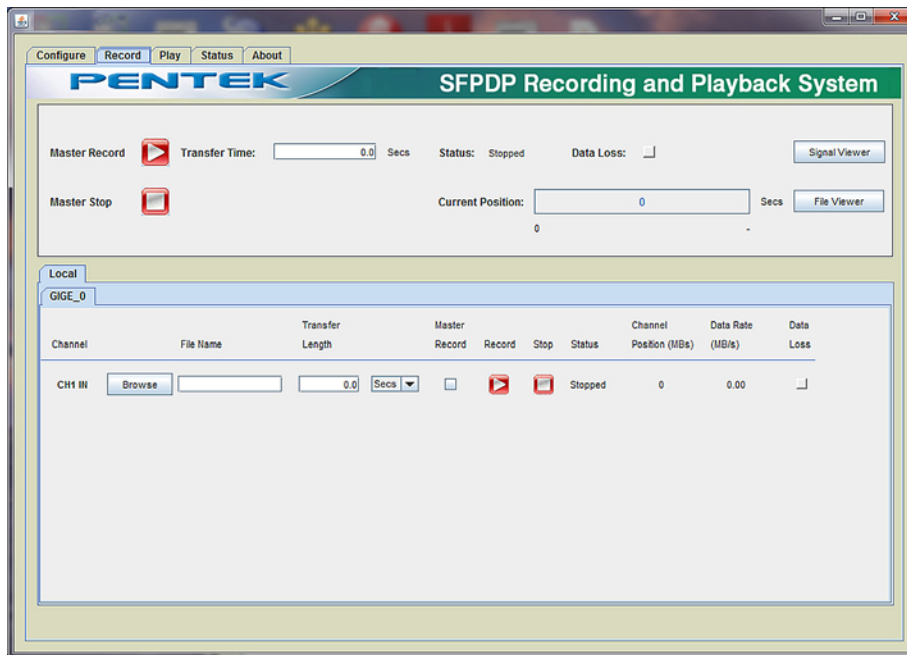


SystemFlow Main Interface

The RTR 2756 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying the flow control settings and the recognition of a CRC in the data stream. Each channel can also be set up to utilize Serial FPDP's copy/loop mode. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

### ► SystemFlow API

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTR 2756 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2756 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

### Specifications

#### PC Workstation

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 2.0 GHz or greater

**SDRAM:** 6 GB

#### RAID

**Storage:** 3.8, 7.6, 15.3, 30.7 or 46.0 TB

**Supported Levels:** 0, 1, 5, 6, 10 and 50

#### Serial FPDP Interface

##### Copper - Option 280

**Cable:** 100-ohm shielded twin-ax

**Connector Type:** SFP+

**Max. Cable Length:** 20 m

##### Multi-mode Fiber Optical - Option 281

**Cable:** Multi-mode fiber, 850 nm

**Connector Type:** LC

**Max. Cable Length:** Up to 300 m

##### Single-mode Fiber Optical - Option 282

**Cable:** Single-mode fiber

**Connector Type:** LC

**Max. Cable Length:** Up to 10 km

#### Physical and Environmental

##### Dimensions & Weights

**All options except 085:** 19" W x 21" D x 7" (4U) H

**Weight:** 50 lb, approx.

**Option 085:** 19" W x 26" D x 7" (4U) H

**Weight:** 65-90 lb

**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

## Model RTR 2756 Ordering Information and Options

### Channel Configurations

**Option -204** 4-channel recording

**Option -208** 8-channel recording

### Storage Options

**Option -410** 3.8 TB SSD storage capacity

**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 -440** 46.0 TB SSD storage capacity

**Note:** Options -430 and -440 require 26-inch deep chassis

### Serial FPDP Interface (append to all options)

**Option -280** Copper, SFP+ connectors

**Option -281** Multi-mode optical, LC connectors, 4 ports

**Option -282** Single-mode optical, LC connectors, 4 ports

### General Options (append to all options)

**Option -261** GPS time & position stamping

**Option -264** IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

*Specifications are subject to change without notice*



New!



Features

- Designed to meet MIL-STD-810 shock and vibration
- Designed to meet EMC/EMI per MIL-STD-461 EMC
- 4U 19-inch rugged rackmount PC server chassis, 22" deep
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- Four or eight channels
- Copper, single-mode and multi-mode fiber interfaces available
- Real-time aggregate recording rates of up to 3.2 GB/sec in eight-channel configuration
- Supports Flow Control, CRC, and Copy/Loop Mode as a receiver and transmitter
- Supports 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates
- Up to four front-panel removable QuickPac™ SSD drive canisters with eight drives each
- Up to 30 terabytes of storage to NTFS RAID disk array
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- 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® RTX 2776 is a turnkey record and playback system that is built to operate under harsh conditions. Designed to withstand high vibration and operating temperatures, the RTX 2776 is intended for military, airborne and UAV applications requiring a rugged system.

The Talon RTX 2776 is a complete turnkey recording system capable of recording and playing back multiple Serial FPDP data streams. It is ideal for capturing any type of streaming sources including live transfers from sensors or data from other computers and is fully compatible with the VITA 17.1 specification. Using highly-optimized disk storage technology, the system achieves aggregate recording rates up to 3.2 GB/sec.

The RTX 2776 can be populated with up to eight SFP connectors supporting Serial FPDP over copper, single-mode, or multi-mode fiber, to accommodate all popular Serial FPDP interfaces. It is capable of both receiving and transmitting data over these links and supports real-time data storage to disk.

Programmable modes include flow control in both receive and transmit directions, CRC support, and copy/loop modes. The system is capable of handling 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates.

Optional GPS time and position stamping allows the user to mark the beginning of a recording in the recording file's header.

SystemFlow Software

The RTX 2776 includes the SystemFlow Recording Software. SystemFlow features a

Windows-based GUI (Graphical User Interface) that provides a simple and intuitive means to configure and control the system.

Custom configurations can be stored as profiles and later loaded as needed, allowing the user to select preconfigured settings with a single click.

Built on a server-class Windows 7 Professional workstation, the RTX 2776 allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTX 2776 records data to the native NTFS file system, providing immediate access to the recorded data.

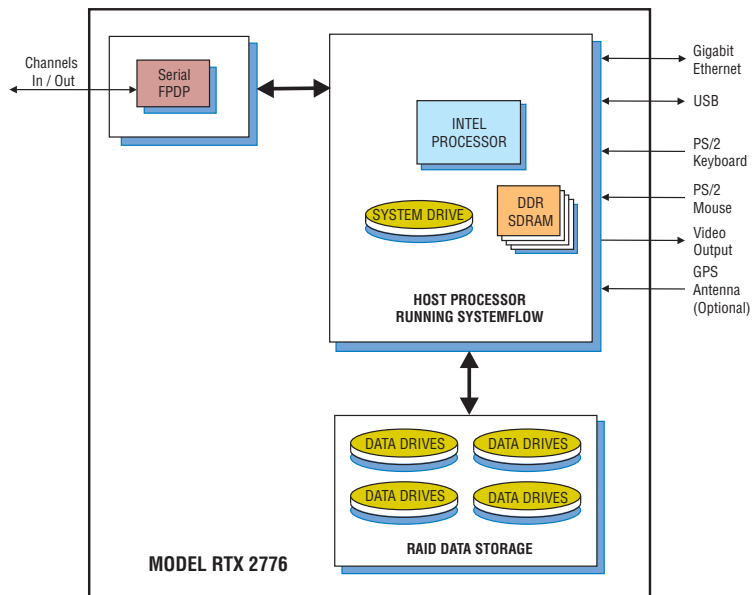
Data can be off-loaded via two rear-access gigabit Ethernet ports, two USB 3.0 ports or up to four USB 2.0 ports.

Rugged Mil-Spec Chassis

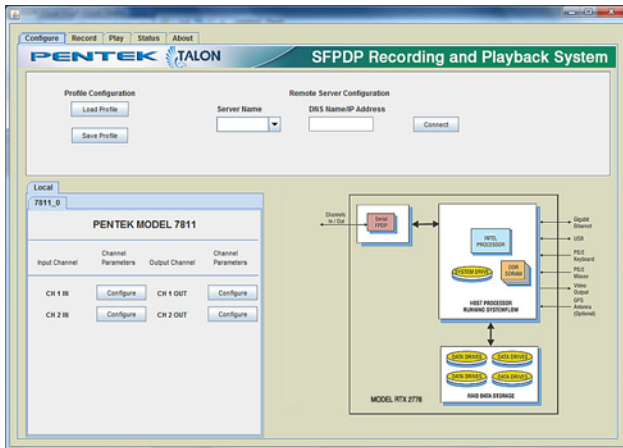
The Talon RTX 2776 uses a shock and vibration-isolated inner chassis and solid-state drives to assure reliability under harsh conditions. The chassis uses an in-line EMI filter along with rear-panel MIL-style connectors to meet MIL-STD-461 emissions specifications.

Up to four front-panel removable QuickPac drive canisters are provided, each containing up to eight SSDs. Each drive canister can hold up to 7.6 TB of data storage and allows for quick and easy removal of mission-critical data.

Forced-air cooling draws air from the front of the chassis and pushes it out the back via exhaust fans. A hinged front door with a serviceable air filter provides protection against dust and sand. ▶



► SystemFlow Graphical User Interface

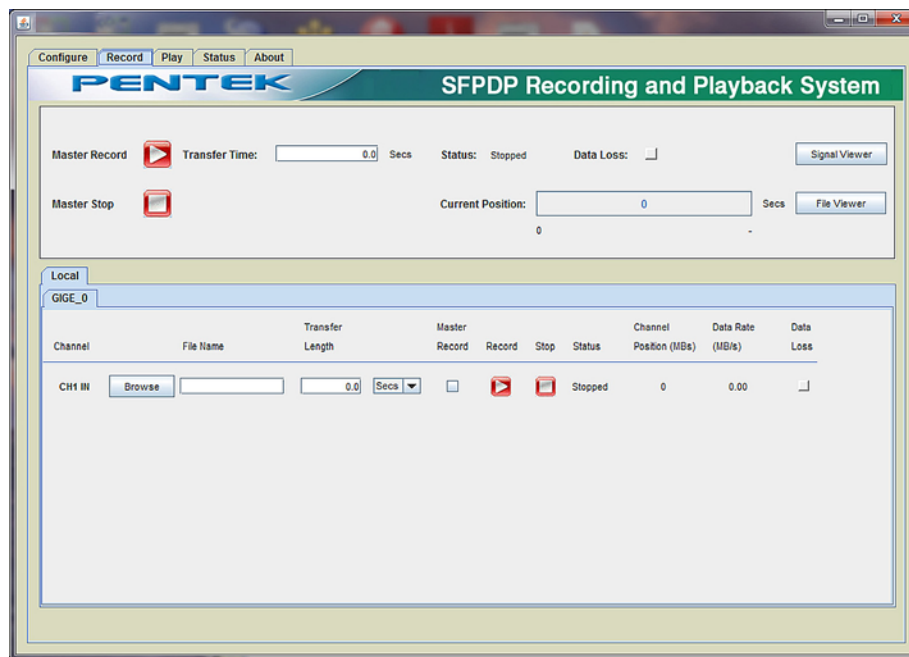


SystemFlow Main Interface

The RTX 2776 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying the flow control settings and the recognition of a CRC in the data stream. Each channel can also be set up to utilize Serial FPDP's copy/loop mode. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

**► SystemFlow API**

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTX 2776 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTX 2776 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

**Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

**Data Storage**

**Style:** Up to four front-panel removable QuickPac drive canisters; up to eight SSDs contained in each canister

**Location:** Front panel

**Capacity:** Up to 30 TB

**Number of Drives:** Up to 32 total

**Supported RAID Levels:** 0, 1, 5 and 6

**Serial FPDP Interface**

**Copper - Option 280**

**Cable:** 100-ohm shielded twin-ax

**Connector Type:** SFP+

**Max. Cable Length:** 20 m

**Multi-mode Fiber Optical - Option 281**

**Cable:** Multi-mode fiber, 850 nm

**Connector Type:** LC

**Max. Cable Length:** Up to 300 m

**Single-mode Fiber Optical - Option 282**

**Cable:** Single-mode fiber

**Connector Type:** LC

**Max. Cable Length:** Up to 10 km

**Physical and Environmental**

**Dimensions:** 19" W x 22" D x 7" H

**Weight:** 50 lb, approx.

**Operating Temp:** -20° to +50° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 10% to 95%, non-condensing

**Operating Shock:** Designed to MIL-STD 810F, method 514.5, procedures I and VI

**Operating Vibration:** Designed to MIL-STD 810F, method 514.5, procedure I

**EMI/EMC:** Designed to MIL-STD 461E, CE101, CE102, CS101, CS113, RE101, RE102, RS101, RS103

**Input Power:** 85 to 264 VAC, 47– 400 Hz, 600 W max.

**Model RTX 2776 Ordering Information and Options**

**Channel Configuration**

- Option -204** 4-channel record/payback
- Option -208** 8-channel record/playback

**Serial FPDP Interface**

- Option -280** SFP+ connectors
- Option -281** Multi-mode optical, LC connectors
- Option -282** Single-mode optical, LC connectors

**Storage Options**

- Option -410** 3.8 TB SSD storage
- Option -415** 7.6 TB SSD storage
- Option -418** 11.5 TB SSD storage
- Option -420** 15.3 TB SSD storage
- Option -425** 23.0 TB SSD storage
- Option -430** 30.7 TB SSD storage

**General Options (append to all options)**

- Option -261** GPS time and position stamping
- Option -264** IRIG-B Time Stamping
- Option -680** 28 VDC power supply
- Option -625** Front-panel removable OS drive

**Contact Pentek for other configurations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications are subject to change without notice*



**Features**

- 32 bits of LVDS digital I/O
- LVDS clock, Data Valid and Data Suspend signals
- Supports clock rates up to 250 MHz
- Real-time aggregate recording rates up to 1.6 GB/s
- Up to 20 terabytes of storage to NTFS RAID disk array
- RAID levels of 0, 1, 5, 6, 10 and 50
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor

Contact factory for options, recording rates, and disk capacity.

**General Information**

The Talon® RTS 2718 is a complete turn-key system for recording and playing back digital data using the Pentek Model 78610 LVDS digital I/O board. Using highly optimized disk storage technology, the system achieves sustained recording rates of up to 1.6 GB/sec.

The RTS 2718 utilizes a 32-bit LVDS interface that can be clocked at speeds up to 250 MHz. It includes Data Valid and Suspend signals and provides the ability to turn these signals on and off as well as control their polarity.

Optional GPS time and position stamping accurately identifies each record in the file header.

**SystemFlow Software**

The RTS 2718 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

Built on a Windows 7 Professional workstation, the RTS 2718 allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTS 2718 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports or eight USB ports. Additionally, data can be copied to optical disk

using the 8X double layer DVD±R/RW drive.

**Flexible Architecture**

The RTS 2718 is configured in a 4U 19" 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.

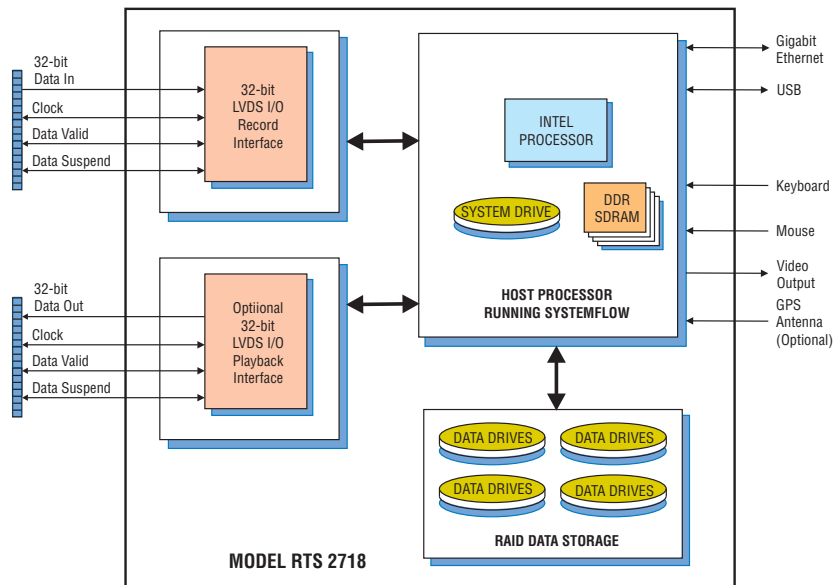
All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50, provide a choice for the required level of redundancy. Up to 16 hot-swappable SATA drives are optionally available, allowing up to 20 terabytes of real-time data storage space in a single 4U chassis.

**SystemFlow API**

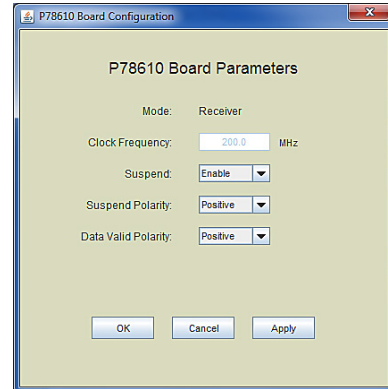
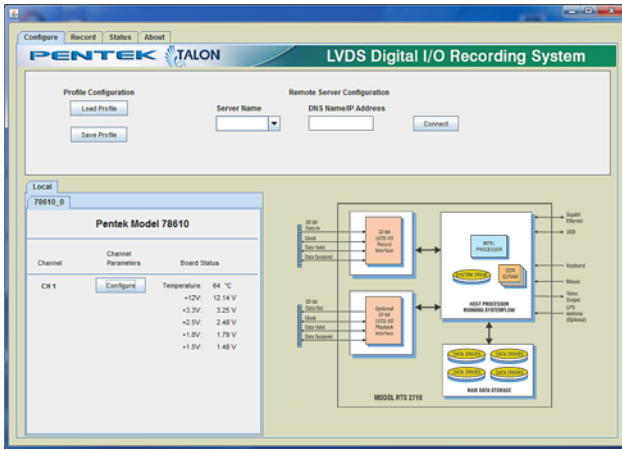
SystemFlow includes a complete API (Application Programming Interface) that supports control and status queries of all operations of the RTS 2718 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTS 2718 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection. ➤





► SystemFlow Graphical User Interface

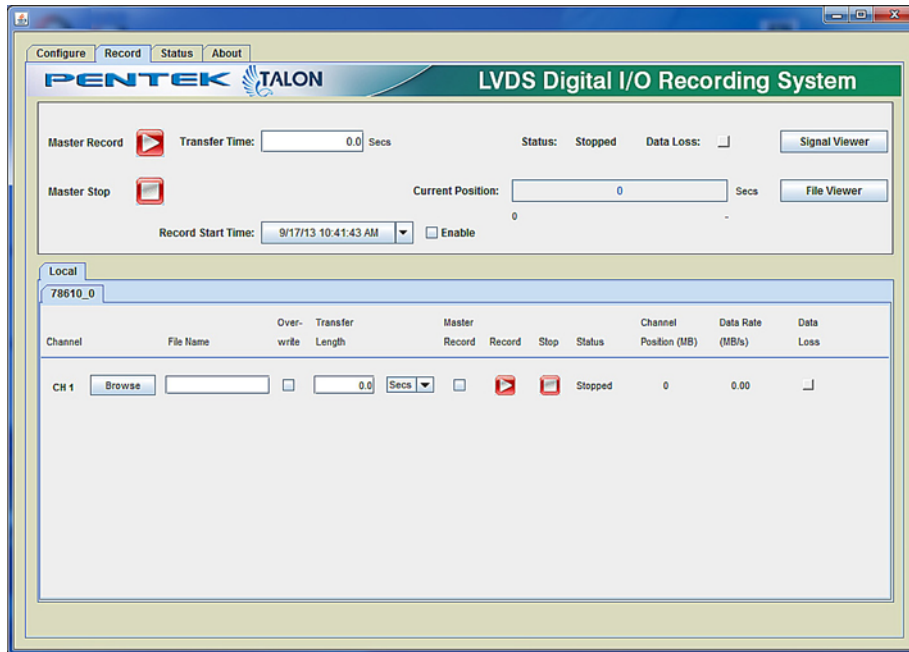


SystemFlow Main Interface

The RTS 2718 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. These parameters include data valid and suspend enables, as well as polarity control for both signals. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The SystemFlow Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

## Specifications

### PC Workstation

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

### RAID

**Storage:** 2.0–100.0 TB

**Drive Type:** 3.5" HDD

**Supported RAID Levels:** 0, 1, 5, 6, 10 and 50

### LVDS Interface

**Cable:** 80-pin ribbon cable

**Connector Type:** 2x40 pin IDC

**Data Lines:** 32 LVDS pairs, 2.5 V compliant

**Clock:** One LVDS pair, 2.5 V compliant

**Data Valid:** One LVDS pair, 2.5 V compliant

**Data Suspend:** One LVDS pair, 2.5 V compliant

### Physical and Environmental

#### Dimensions

**4U Long Chassis:** 19" W x 26" D x 7" H

**Size:** 19" W x 26" D x 7" H

**Weight:** 50-80 lb

**Operating Temp:** +5° to +45° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 5 to 95%, non-condensing

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

## Model RTS 2716 Ordering Information and Options

### Channel Configuration

**Option -201** Recording interface

**Option -221** Playback interface

### Storage Options

**Option -406** 2.0 TB HDD storage capacity

**Option -411** 4.0 TB HDD storage capacity

**Option -416** 8.0 TB HDD storage capacity

**Option -421** 16.0 TB HDD storage capacity

**Option -423** 20.0 TB HDD storage capacity

**Option -439** 30.0 TB HDD storage capacity

**Option -450** 45.0 TB HDD storage capacity

**Option -460** 60.0 TB HDD storage capacity

**Option -480** 100.0 TB HDD storage capacity

**Note:** Options -450 and -460 require a 5U Chassis; Option -480 requires a 6U chassis

### General Options (append to all options)

**Option -261** GPS time & position stamping

**Option -264** IRIG-B time stamping

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

*Specifications subject to change without notice*

New!

# Model RTR 2738A

# LVDS Digital I/O Rugged Portable Recorder



### Features

- Designed to operate under conditions of shock and vibration
- Portable system measures 16.0" W x 6.9" D x 13.0" H
- Lightweight, just less than 30 pounds
- Shock- and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 32 bits of LVDS digital I/O
- LVDS clock, Data Valid and Data Suspend signals
- Supports clock rates up to 250 MHz
- Real-time aggregate recording rates up to 1.0 GB/s
- Windows® workstation with high performance Intel® Core™ i7 processor
- Up to 61 terabytes of SSD storage to NTFS RAID solid state disk array
- SystemFlow® GUI with Signal Viewer analysis tool
- Optional file headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Optional 18–36 VDC power supply

Contact factory for options, recording rates, and disk capacity.

### General Information

The Talon® RTR 2738A is a complete turn-key system for recording and playing back digital data using the Pentek Model 78610 LVDS digital I/O board. Using highly optimized disk storage technology, the rugged, lightweight portable package achieves sustained recording rates of up to 1.0 GB/sec.

The RTR 2738A utilizes a 32-bit LVDS interface that can be clocked at speeds up to 250 MHz. It includes Data Valid and Suspend signals and provides the ability to turn these signals on and off as well as control their polarity.

Optional GPS time and position stamping allows the user to mark the beginning of a recording in the recording file's header.

### SystemFlow Software

The RTR 2738A includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system. It also includes a C-callable API that allows users to easily integrate the Talon recorder into a larger system.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

Built on a server-class Windows 7 Professional workstation, the RTR 2738A allows the user to install post-processing and analysis tools to operate on the recorded data.

Data can be off-loaded via gigabit Ethernet, USB 2.0 and USB 3.0 ports. Additionally,

data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

Option -625 replaces the DVD±R/RW drive with a removable operating system drive; an external DVD drive can be used.

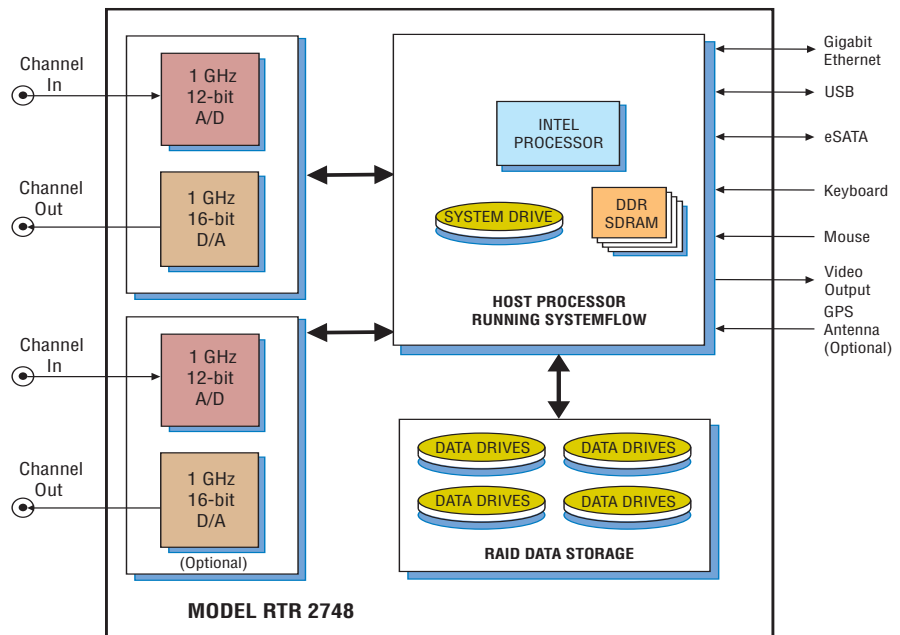
### Rugged Chassis with SSD Storage

The RTR 2736A is configured with hot-swappable SSDs, front panel USB ports, and I/O connectors on the side panel. It is built in an extremely rugged steel and aluminum chassis and is tested for shock and vibration. The SSDs provide storage capacities of up to 61.4 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels, including 0, 5, and 6, provide a choice for the required level of redundancy.

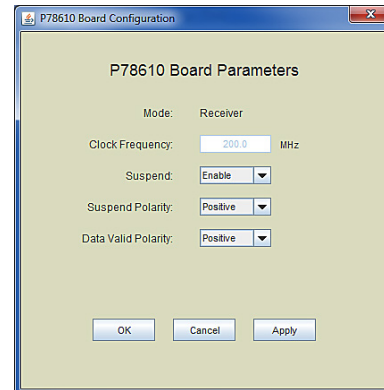
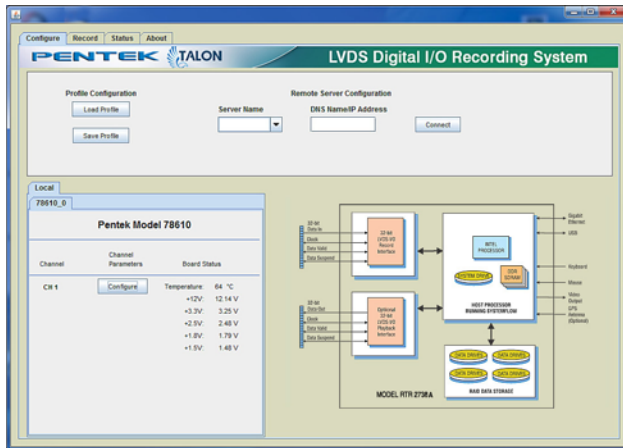
### SystemFlow API

SystemFlow includes a complete API (Application Programming Interface) that supports control and status queries of all operations of the RTR 2738A from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2738A 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection. ▶



► SystemFlow Graphical User Interface

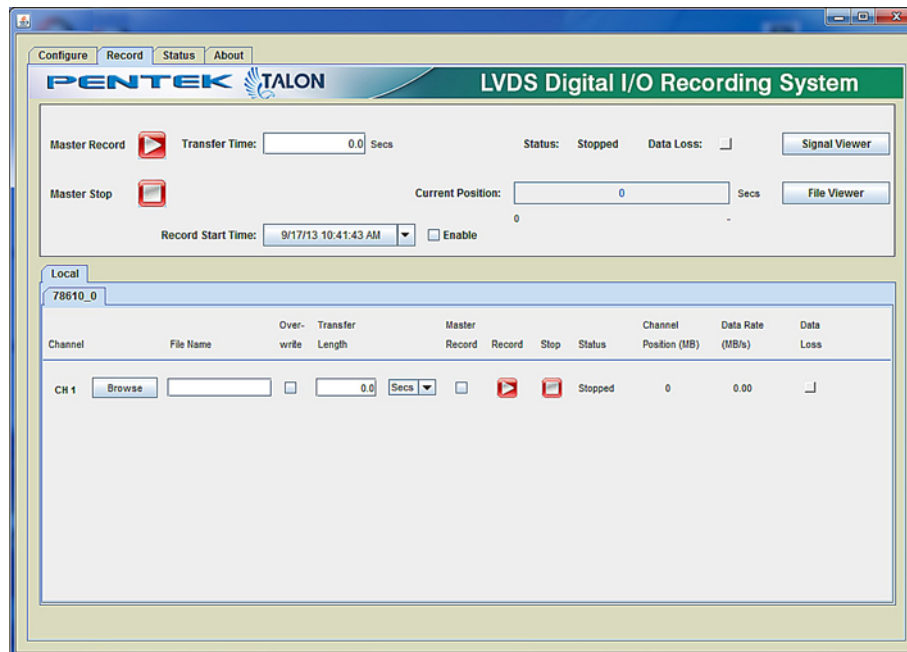


SystemFlow Main Interface

The RTR 2738A GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. These parameters include data valid and suspend enables, as well as polarity control for both signals. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The SystemFlow Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►



**► Specifications**

**PC Workstation (standard configuration)**

**Operating System:** 64-bit Windows workstation  
**Processor:** Intel Core i7 processor  
**Clock Speed:** 3.0 GHz or higher  
**Operating System Drive:** 128 GB SSD  
**SDRAM:** 8 GB  
**Monitor:** Built-in 17.3" high-resolution LCD,  
 1920 x 1080 pixels, 16:9 aspect ratio, anti-glare surface  
 Brightness: 300 cd/m<sup>2</sup>; Contrast ratio: 400:1 typical  
**RAID**

**Total Storage:** 3.8 – 61.4 TB  
**Supported RAID Levels:** 0, 5 and 6  
**Drive Bays:** Hot-swap, removable, side panel  
**USB 2.0 Ports:** Four on left side, two on front panel  
**USB 3.0 Ports:** Two on left side  
**1 Gb Ethernet Ports:** Two on left side  
**Aux Video Output:** 15-pin VGA on left side

**LVDS Interface**

**Cable:** 80-pin ribbon cable  
**Connector Type:** 2x40 pin IDC  
**Data Lines:** 32 LVDS pairs, 2.5 V compliant  
**Clock:** One LVDS pair, 2.5 V compliant  
**Data Valid:** One LVDS pair, 2.5 V compliant  
**Data Suspend:** One LVDS pair, 2.5 V compliant

**Optional DC Power supply**

**Voltage:** 10 to 36 VDC  
**Input Current:** 42 to 26 A (39 A at 24 VDC)  
**Inrush Current:** 100 A at 24 VDC  
**Temperature Range:** Oper.: 0° to 50° C, Store: -0° to 80° C  
**Efficiency:** >80% typical at 24 V full load  
**Power Good Signal:** On delay 100 to 500 msec  
**OverPower Protection:** 110% to 160%  
**Remote Control:** On/Off  
**Safety:** Meets UL, TUV, CB specifications

**Physical and Environmental**

**Size:** 16.0" W x 6.9" D x 13.0" H  
**Weight:** 30 lb max.  
**Operating Temp:** 0° to +50° C  
**Storage Temp:** -40° to +85° C  
**Relative Humidity:** 5 to 95%, non-condensing  
**Operating Shock:** 30 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  
**Non-operating Vibration:** 5 to 500 Hz: 2.06 g RMS  
**Power Requirements:** 100 to 240 VAC, 50 to 60 Hz, 500 W max.

**Model RTR 2738A Ordering Information and Options**

**Channel Configurations**

**Option -201** Recording Interface  
**Option -221** Playback Interface

**Storage Options**

**Option -410** 3.8 TB SSD Storage  
**Option -415** 7.6 TB SSD Storage  
**Option -420** 15.3 TB SSD Storage  
**Option -430** 30.7 TB SSD Storage  
**Option -460** 61.4 TB SSD Storage

**Additional Options**

**Option -261** GPS Time & Position Stamping  
**Option -264** IRIG-B Time Stamping  
**Option -285** RAID 5 Configuration  
**Option -286** RAID 6 Configuration  
**Option -309** 16 GB System Memory  
**Option -311** 64 GB System Memory  
**Option -625** Removable Operating System Drive  
**Option -681** 10 to 36 VDC Power Supply

**Contact Pentek for compatible Option combinations  
 Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications are subject to change without notice*



**Features**

- Designed to operate under conditions of shock and vibration
- Removable SSDs
- 32 bits of LVDS digital I/O
- LVDS clock, Data Valid and Data Suspend signals
- Supports clock rates up to 250 MHz
- Real-time aggregate recording rates up to 1.0 GB/sec
- Up to 46 terabytes storage to NTFS RAID disk array
- RAID levels of 0 , 1 , 5 , 6 , 10 and 50
- Optional N+1 redundant power supply
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor

Contact factory for options, recording rates, and disk capacity.

**General Information**

The Talon® RTR 2758 is a complete turn-key system for recording and playing back digital data using the Pentek Model 78610 LVDS digital I/O board. Using highly optimized disk storage technology, the system achieves sustained recording rates of up to 1.0 GB/sec.

The RTR 2758 utilizes a 32-bit LVDS interface that can be clocked at speeds up to 250 MHz. It includes Data Valid and Suspend signals and provides the ability to turn these signals on and off as well as control their polarity.

Optional GPS time and position stamping accurately identifies each record in the file header.

**SystemFlow Software**

The RTR 2758 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

Built on a Windows 7 Professional workstation, the RTR 2758 allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTR 2758 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports or six USB ports. Additionally, data can be copied to optical disk using the 8X double layer DVD±R/RW drive.

**Rugged and Flexible Architecture**

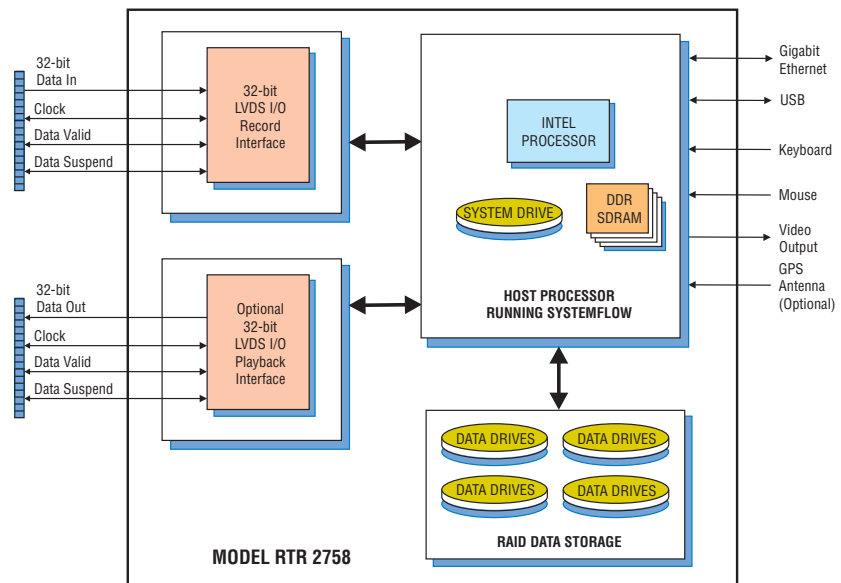
Because SSDs operate reliably under conditions of shock and vibration, the RTR 2758 performs well in ground, shipborne and airborne environments. Configurable with hot-swappable SSDs, the RTR 2758 can provide storage capacities of up to 46 TB in a rugged 4U chassis. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

The RTR 2758 is configured in a 4U 19" rack-mountable chassis, with hot-swap data drives, front panel USB ports and I/O connectors on the rear panel.

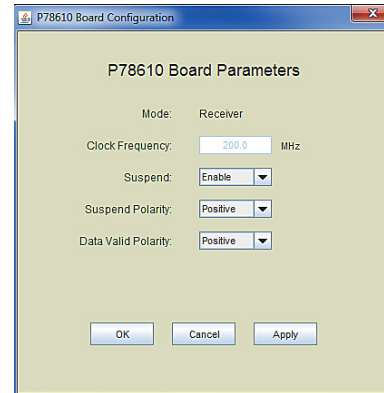
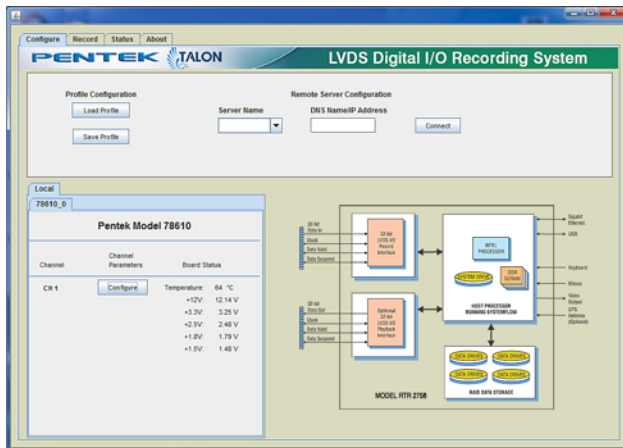
Systems are scalable to accommodate multiple chassis to increase channel counts and aggregate data rates.

All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

Multiple RAID levels, including 0, 1, 5, 6, 10 and 50 provide a choice for the required level on redundancy. Redundant power supplies are optionally available to provide a robust and reliable high-performance recording system. ➤



► SystemFlow Graphical User Interface

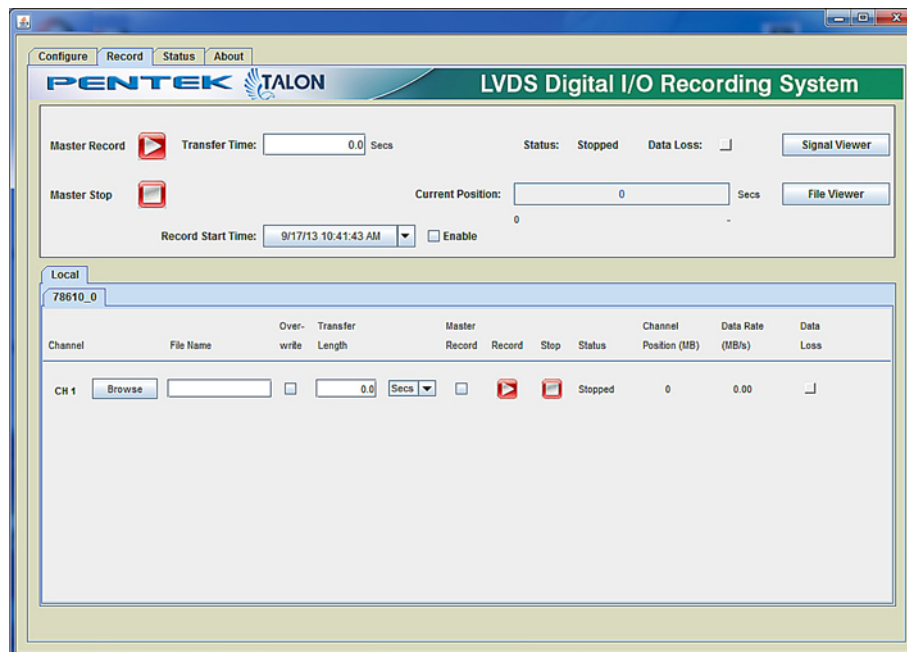


SystemFlow Main Interface

The RTR 2758 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. These parameters include data valid and suspend enables, as well as polarity control for both signals. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

**► SystemFlow API**

SystemFlow includes a complete API (Application Programming Interface) that supports control and status queries of all operations of the RTR 2758 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2758 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

**Specifications**

**PC Workstation**

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

**RAID**

**Storage:** 3.8, 7.6, 15.3, 30.7 or 46.0 TB

**Supported Levels:** 0, 1, 5, 6, 10 and 50

**LVDS Interface**

**Cable:** 80-pin ribbon cable

**Connector Type:** 2x40 pin IDC

**Data Lines:** 32 LVDS pairs, 2.5 V compliant

**Clock:** One LVDS pair, 2.5 V compliant

**Data Valid:** One LVDS pair, 2.5 V compliant

**Data Suspend:** One LVDS pair, 2.5 V compliant

**Physical and Environmental**

**Dimensions & Weights**

**Dimensions:** 19" W x 21" D x 7" (4U) 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

**Model RTR 2758 Ordering Information and Options**

**Channel Configurations**

- Option -201** Recording interface
- Option -221** Playback interface

**Storage Options**

- Option -410** 3.8 TB SSD storage capacity
  - 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 -440** 46.0 TB SSD storage capacity
- Note:** Options -430 and -440 require 26-inch deep chassis

**General Options (append to all options)**

- Option -261** GPS time & position stamping
- Option -264** IRIG-B time stamping

**Contact Pentek for compatible Option combinations  
Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications are subject to change without notice*



New!



### Features

- Designed to meet MIL-STD-810 shock and vibration
- Designed to meet EMC/EMI per MIL-STD-461 EMC
- 4U 19-inch rugged rackmount PC server chassis, 22" deep
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor
- 32 bits of LVDS digital I/O
- LVDS clock, Data Valid and Data Suspend signals
- Supports clock rates up to 250 MHz
- Real-time aggregate recording rates of up to 1.0 GB/sec
- Up to four front-panel removable QuickPac SSD drive canisters with eight drives each
- Up to 30 terabytes of storage to NTFS RAID disk array
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Optional playback mode

### General Information

The Talon® RTX 2778 is a turnkey record and playback system that is built to operate under harsh conditions. Designed to withstand high vibration and operating temperatures, the RTX 2778 is intended for military, airborne and UAV applications requiring a rugged system.

The RTX 2778 records and plays back digital data using the Pentek Model 78610 LVDS digital I/O board. Using highly optimized disk storage technology, the system achieves aggregate recording rates of up to 1.0 GB/sec.

The RTX 2778 utilizes a 32-bit LVDS interface that can be clocked at speeds up to 250 MHz. It includes Data Valid and Suspend signals and provides the ability to turn these signals on and off as well as control their polarity.

Optional GPS time and position stamping accurately identifies each record in the file header.

### SystemFlow Software

The RTX 2778 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed,

allowing the user to select preconfigured settings with a single click.

Built on a Windows 7 Professional workstation, the RTX 2778 allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTX 2778 records data to the native NTFS file system, providing immediate access to the recorded data.

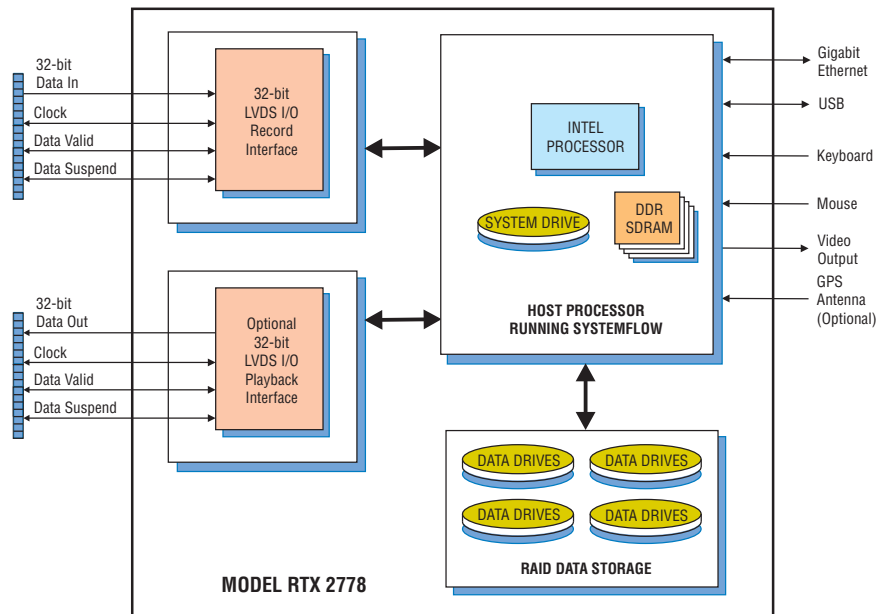
Data can be off-loaded via two rear-access gigabit Ethernet ports, two USB 3.0 ports or up to four USB 2.0 ports.

### Rugged Mil-Spec Chassis

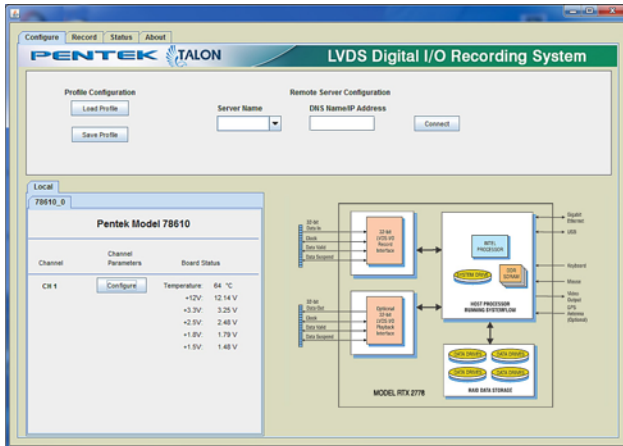
The Talon RTX 2778 uses a shock- and vibration-isolated inner chassis and solid-state drives to assure reliability under harsh conditions. The chassis uses an in-line EMI filter along with rear-panel MIL-style connectors to meet MIL-STD-461 emissions specifications.

Up to four front-panel removable QuickPac drive canisters are provided, each containing up to eight SSDs. Each drive canister can hold up to 7.6 TB of data storage and allows for quick and easy removal of mission-critical data.

Forced-air cooling draws air from the front of the chassis and pushes it out the back via exhaust fans. A hinged front door with a serviceable air filter provides protection against dust and sand. ➤



► SystemFlow Graphical User Interface



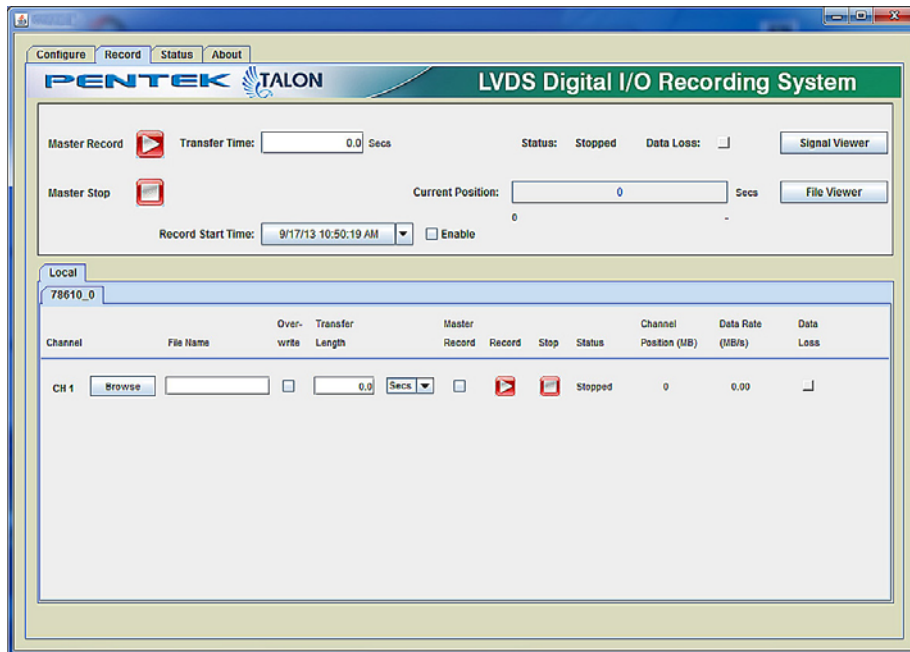
SystemFlow Main Interface

The RTX 2778 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. These parameters include data valid and suspend enables, as well as polarity control for both signals. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The SystemFlow Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

► **SystemFlow API**

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTX 2776 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTX 2776 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

**Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows 7 Professional

**Processor:** Intel Core i7 processor

**Clock Speed:** 3.0 GHz or higher

**SDRAM:** 8 GB

**Data Storage**

**Style:** Up to four front-panel removable QuickPac drive canisters; up to eight SSDs contained in each canister

**Location:** Front panel

**Capacity:** Up to 30 TB

**Number of Drives:** Up to 32 total

**Supported RAID Levels:** 0, 1, 5 and 6

**LVDS Interface**

**Cable:** 80-pin ribbon cable

**Connector Type:** 2x40 pin IDC

**Data Lines:** 32 LVDS pairs, 2.5 V compliant

**Clock:** One LVDS pair, 2.5 V compliant

**Data Valid:** One LVDS pair, 2.5 V compliant

**Data Suspend:** One LVDS pair, 2.5 V compliant

**Physical and Environmental**

**Dimensions:** 19" W x 22" D x 7" H

**Weight:** 50 lb, approx.

**Operating Temp:** -20° to +50° C

**Storage Temp:** -40° to +85° C

**Relative Humidity:** 10% to 95%, non-condensing

**Operating Shock:** Designed to MIL-STD 810F, method 514.5, procedures I and VI

**Operating Vibration:** Designed to MIL-STD 810F, method 514.5, procedure I

**EMI/EMC:** Designed to MIL-STD 461E, CE101, CE102, CS101, CS113, RE101, RE102, RS101, RS103

**Input Power:** 85 to 264 VAC, 47– 400 Hz, 600 W max.

**Model RTX 2778 Ordering Information and Options**

**Channel Configuration**

**Option -201** Recording interface

**Option -221** Playback interface

**Storage Options**

**Option -410** 3.8 TB SSD storage

**Option -415** 7.6 TB SSD storage

**Option -418** 11.5 TB SSD storage

**Option -420** 15.3 TB SSD storage

**Option -425** 23.0 TB SSD storage

**Option -430** 30.7 TB SSD storage

**General Options (append to all options)**

**Option -261** GPS time and position stamping

**Option -264** IRIG-B Time Stamping

**Option -680** 28 VDC power supply

**Option -625** Front-panel removable OS drive

Contact Pentek for other configurations

Storage and Channel-count Options may change, contact Pentek for the latest information

*Specifications are subject to change without notice*



**Features**

- Housed in a small chassis measuring 5.25" H x 8.5" W x 14" D
- Weighs 17 lb (7.7 kg)
- Shock and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- Records gigabit, 10-gigabit or 40-gigabit Ethernet streams
- TCP and UDP protocols
- Copper or optical interfaces
- Aggregate recording rates to 4.0 GB/sec
- Up to 30 terabytes of storage to NTFS RAIDdisk array
- RAID levels of 0, 5 and 6
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into applications
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor

**General Information**

Optimized for SWaP (size, weight and power) the Pentek Talon® RTR Small Form Factor (SFF) product line provides the performance and storage capacity previously only possible in much larger rackmountable chassis. Measuring 5.25" H x 8.5" W x 14" D and weighing only 17 pounds (7.7 kg), this small package can hold up to 30.6 TB of SSD storage.

The Talon® RTR 2555 is a complete turn-key recording and playback system for storing 1-, 10- and 40-gigabit Ethernet streams. It is ideal for capturing any type of streaming sources including live transfers from sensors or data from other computers and supports both TCP and UDP protocols.

An ATX power supply accepts 110-240 VAC, drawing under 150 W and typically around 100 W. These models have the option for a 6-30 VDC power supply.

Eight front panel data drives can be easily removed along with a front panel removable OS drive to allow all non-volatile memory to be removed from the system in seconds.

Optional GPS time and position stamping accurately identifies each record in the file header.

**SystemFlow Software**

The RTR 2555 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed,

allowing the user to select preconfigured settings with a single click.

Built on a Windows 7 Professional workstation, the RTR 2555 allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTR 2555 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports or six USB ports. Additionally, data can be copied to optical disk using the 8X double layer DVD±R/RW drive.

**Rugged and Flexible Architecture**

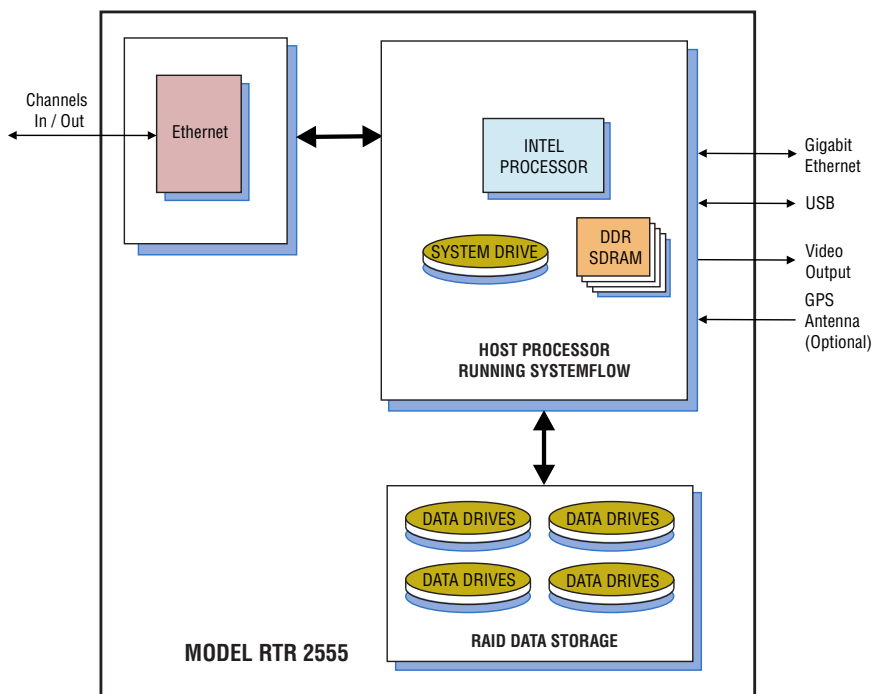
Because SSDs operate reliably under conditions of shock and vibration, the RTR 2555 performs well in ground, shipborne and airborne environments.

Configurable with hot-swappable SSDs, the RTR 2555 can provide storage capacities of up to 30.6 TB in a rugged chassis. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

The RTR 2555 is configured 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.

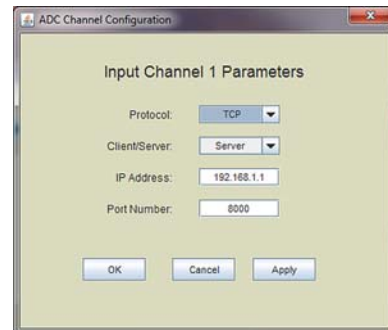
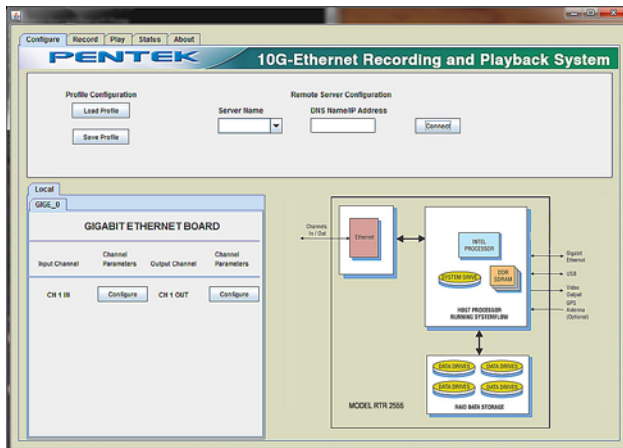
All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

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





► SystemFlow Graphical User Interface

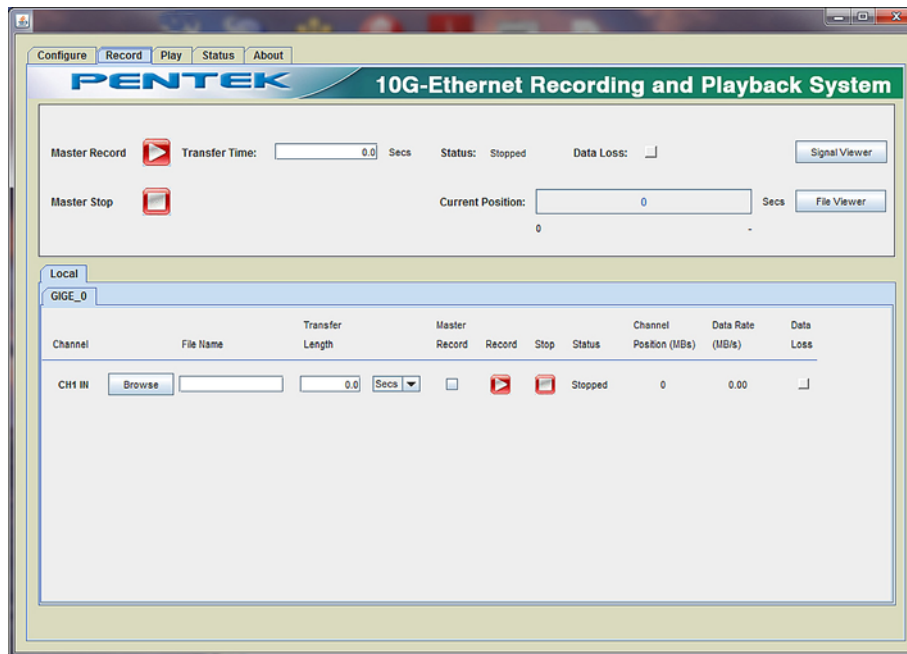


SystemFlow Main Interface

The RTR 2555 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying UDP or TCP protocol, client or server connection, the IP address and port number. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

► **SystemFlow API**

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTR 2555 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2555 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

**Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows workstation

**Processor:** Intel i7 7700K (7th Gen) quad core processor

**Clock Speed:** 4.2 GHz

**Operating System Drive:** 250 GB SSD

**SDRAM:** 8 standard, 16 or 32 GB optional

**RAID**

**Total Storage:** 3.8 TB – 30.6 TB

**Supported RAID Levels:** 0, 5 and 6

**Drive Bays:** Hot-swap, removable, front panel

**Rear Panel I/O**

Four USB 3.0 ports

Two Gigabit RJ45 ports

Two HDMI and One DVI ports

Audio and PS2 ports

USB 3.0 Type-C port

Two Wi-Fi antenna ports

**Front Panel I/O**

Two USB 2.0 ports

Power and recessed RESET buttons

LED indicators for power and HDD access

**Physical and Environmental**

**Size:** 5.25" H x 8.5" W x 14.0" D

**Weight:** 17 lb (7.7 kg)

**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, 150 W max.

**Model RTR 2555 Ordering Information and Options**

**Ethernet Interface Options**

- Option -101** Gigabit Ethernet
- Option -102** 10-Gigabit Ethernet
- Option -103** 40-Gigabit Ethernet

**Channel Configuration**

- Option -201** 1-Ethernet port
- Option -202** 2-Ethernet ports
- Option -204** 4-Ethernet ports

**Ethernet Connector Options**

- Option -280** SFP+ connectors
- Option -281** Multi-mode optical, LC connectors
- Option -282** Single-mode optical, LC connectors
- Option -284** RJ45 connectors

**Storage Options**

- Option -410** 3.8 TB SSD storage
- Option -415** 7.6 TB SSD storage
- Option -420** 15.3 TB SSD storage
- Option -430** 30.6 TB SSD storage

**General Options**

- Option -261** GPS Time and Position Stamping
- Option -285** Raid 5 Configuration
- Option -286** Raid 6 Configuration
- Option -309** 16 GB System Memory
- Option -310** 32 GB System Memory
- Option -630** 6 to 30 VDC Power Supply

**Contact Pentek for other configurations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications are subject to change without notice*



## Features

- Housed in a small chassis measuring 5.25" H x 8.5" W x 14" D
- Weighs 17 lb (7.7 kg)
- Shock and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- Complete Serial FPDP record and playback system
- Up to four I/O channels
- Removable SSDs
- Up to 30 terabytes of storage to NTFS RAID disk array
- Copper, single-mode and multi-mode fiber interfaces available
- Real-time aggregate recording rates of up to 1.6 GB/sec
- Supports Flow Control, CRC, and Copy/Loop Mode as a receiver and transmitter
- Supports 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates
- RAID levels of 0, 5 and 6
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor

## General Information

Optimized for SWaP (size, weight and power) the Pentek Talon® RTR Small Form Factor (SFF) product line provides the performance and storage capacity previously only possible in much larger rackmountable chassis. Measuring 5.25" H x 8.5" W x 14" D and weighing only 17 pounds (7.7 kg), this small package can hold up to 30.6 TB of SSD storage.

Configured as a complete turnkey system capable of recording and playing back multiple Serial FPDP data streams, it is ideal for capturing any type of streaming sources such as live transfers from sensors or data from other computers. It is fully compatible with the VITA 17.1 specification. Using highly-optimized disk storage technology, the system achieves aggregate recording rates up to 3.2 GB/sec.

The RTR 2556 can be populated with up to four SFP connectors supporting Serial FPDP over copper, single-mode, or multi-mode fiber, to accommodate all popular Serial FPDP interfaces. It is capable of both receiving and transmitting data over these links and supports real-time data storage to disk.

Programmable modes include flow control in both receive and transmit directions, CRC support, and copy/loop modes. The system is capable of handling 1.0625, 2.125, 2.5, 3.125 and 4.25 GBaud link rates supporting data transfer rates of up to 425 MB/sec per Serial FPDP link.

Eight front panel data drives can be easily removed along with a front panel removable OS drive to allow all non-volatile memory to be removed from the system in seconds.

## SystemFlow Software

The RTR 2556 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple and intuitive means to configure and control the system.

Custom configurations can be stored as profiles and later loaded as needed, allowing the user to select preconfigured settings with a single click.

Built on a server-class Windows 7 Professional workstation, the RTR 2556 allows the user to install post-processing and analysis tools to operate on the recorded data.

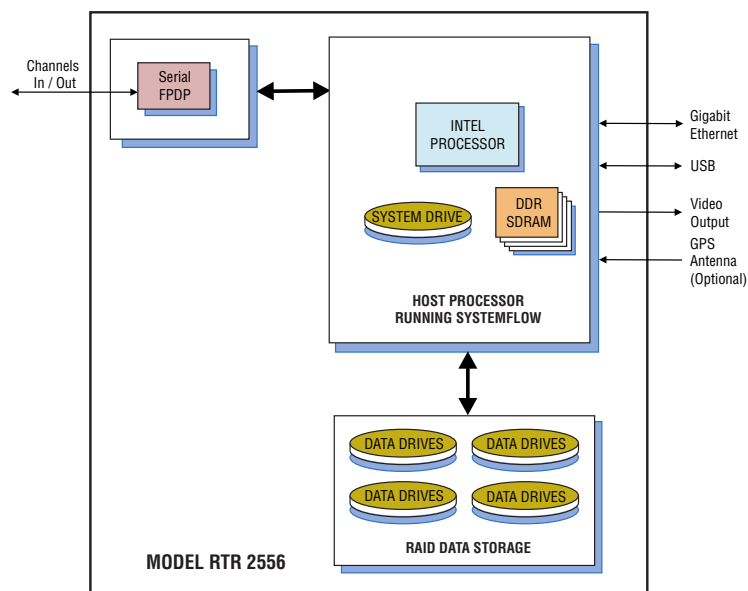
The RTR 2556 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports or six USB 2.0 ports. Additionally, data can be copied to optical disk, using the 8X double layer DVD±R/RW drive.

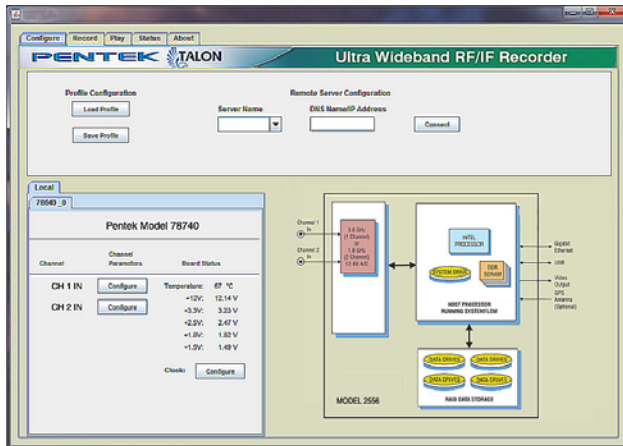
## Rugged and Flexible Architecture

Because SSDs operate reliably under conditions of shock and vibration, the RTR 2556 performs well in ground, shipborne and airborne environments. Configurable with hot-swappable SSDs, the RTR 2556 can provide storage capacities of up to 30.6 TB in a rugged chassis. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

The RTR 2556 is configured 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. Multiple RAID levels, including 0, 5, and 6 provide a choice for the required level of redundancy. ➤



► SystemFlow Graphical User Interface

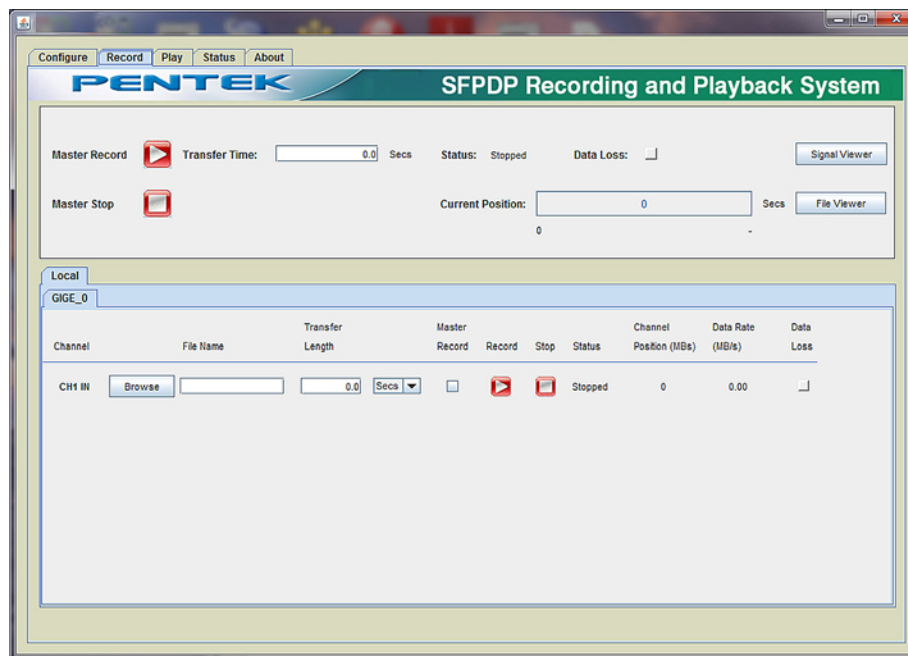


SystemFlow Main Interface

The RTR 2556 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. Parameters are entered for each input or output channel specifying the flow control settings and the recognition of a CRC in the data stream. Each channel can also be set up to utilize Serial FPDP's copy/loop mode. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►



► **SystemFlow API**

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the RTR 2556 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2556 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, stand-alone acquisition. Recorded NTFS files can be easily retrieved through the same connection.

**Specifications**

**PC Workstation (standard configuration)**

**Operating System:** Windows workstation

**Processor:** Intel i7 7700K (7th Gen) quad core processor

**Clock Speed:** 4.2 GHz

**Operating System Drive:** 250 GB SSD

**SDRAM:** 8 standard, 16 or 32 GB optional

**RAID**

**Total Storage:** 3.8 TB – 30.6 TB

**Supported RAID Levels:** 0, 5 and 6

**Drive Bays:** Hot-swap, removable, front panel

**Rear Panel I/O**

- Four USB 3.0 ports
- Two Gigabit RJ45 ports
- Two HDMI and One DVI ports
- Audio and PS2 ports
- USB 3.0 Type-C port
- Two Wi-Fi antenna ports

**Front Panel I/O**

- Two USB 2.0 ports
- Power and recessed RESET buttons
- LED indicators for power and HDD access

**Physical and Environmental**

**Size:** 5.25" H x 8.5" W x 14.0" D

**Weight:** 17 lb (7.7 kg)

**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, 150 W max.

**Model RTR 2556 Ordering Information and Options**

**Storage Options**

- Option -410** 3.8 TB SSD storage capacity
- Option -415** 7.6 TB SSD storage capacity
- Option -420** 15.3 TB SSD storage capacity
- Option -430** 30.6 TB SSD storage capacity

**Serial FPDP Interface**

- Option -280** Copper, SFP+ connectors
- Option -281** Multi-mode optical, LC connectors
- Option -282** Single-mode optical, LC connectors

**Additional Options**

- Option -261** GPS Time and Position Stamping
- Option -285** Raid 5 Configuration
- Option -286** Raid 6 Configuration
- Option -309** 16 GB System Memory
- Option -310** 32 GB System Memory
- Option -630** 6 to 30 VDC Power Supply

**Contact Pentek for compatible Option combinations**  
**Storage and Channel-count Options may change, contact Pentek for the latest information**

*Specifications are subject to change without notice*



**Features**

- Housed in a small chassis measuring 5.25" H x 8.5" W x 14" D
- Weighs 17 lb (7.7 kg)
- Shock and vibration-resistant SSDs perform well in vehicles, ships and aircraft
- 32 bits of LVDS digital I/O
- LVDS clock, Data Valid and Data Suspend signals
- Supports clock rates up to 250 MHz
- Real-time aggregate recording rates up to 1.0 GB/sec
- Up to 30 terabytes storage to NTFS RAID disk array
- RAID levels of 0, 5, and 6
- SystemFlow® GUI virtual instrumentation panel for fast, intuitive operation
- C-callable API for integration of recorder into application
- File headers include time stamping and recording parameters
- Optional GPS time and position stamping
- Windows® 7 Professional workstation with high-performance Intel® Core™ i7 processor

**General Information**

Optimized for SWaP (size, weight and power) the Pentek Talon® RTR Small Form Factor (SFF) product line provides the performance and storage capacity previously only possible in much larger rackmountable chassis. Measuring 5.25" H x 8.5" W x 14" D and weighing only 17 pounds (7.7 kg), this small package can hold up to 30.6 TB of SSD storage.

The Talon® RTR 2558 is a complete turn-key system for recording or playing back digital data. Using highly optimized disk storage technology, the system achieves sustained recording rates of up to 1.0 GB/sec.

The RTR 2558 utilizes a 32-bit LVDS interface that can be clocked at speeds up to 250 MHz. It includes Data Valid and Suspend signals and provides the ability to turn these signals on and off as well as control their polarity.

An ATX power supply accepts 110-240 VAC, drawing under 150 W and typically around 100 W. These models have the option for a 6-30 VDC power supply.

Eight front panel data drives can be easily removed along with a front panel removable OS drive to allow all non-volatile memory to be removed from the system in seconds.

Optional GPS time and position stamping accurately identifies each record in the file header.

**SystemFlow Software**

The RTR 2558 includes the SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system.

Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select preconfigured settings with a single click.

Built on a Windows 7 Professional workstation, the RTR 2558 allows the user to install post-processing and analysis tools to operate on the recorded data.

The RTR 2558 records data to the native NTFS file system, providing immediate access to the recorded data.

Data can be off-loaded via two gigabit Ethernet ports or six USB ports. Additionally, data can be copied to optical disk using the 8X double layer DVD±R/RW drive.

**Rugged and Flexible Architecture**

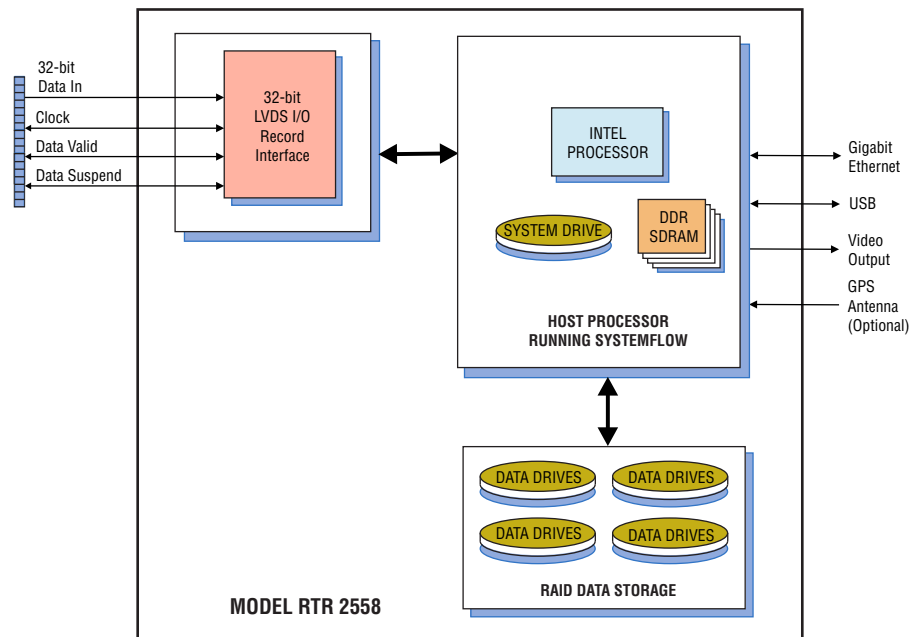
Because SSDs operate reliably under conditions of shock and vibration, the RTR 2558 performs well in ground, shipborne and airborne environments.

Configurable with hot-swappable SSDs, the RTR 2558 can provide storage capacities of up to 30.6 TB in a rugged chassis. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data.

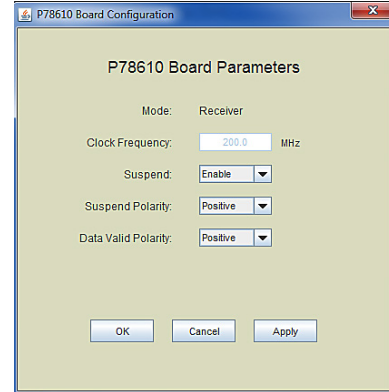
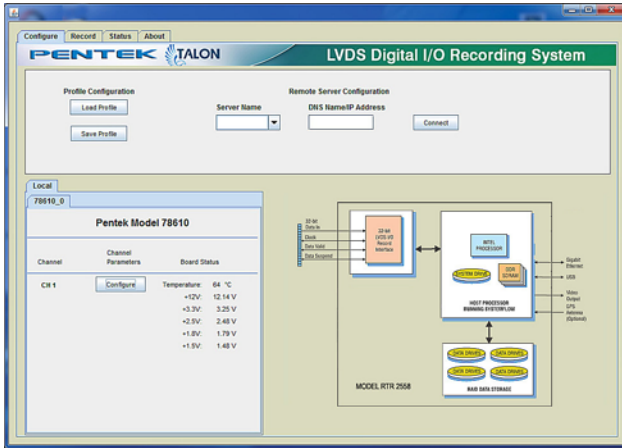
The RTR 2558 is configured with hot-swap data drives, front panel USB ports and I/O connectors on the rear panel. Systems are scalable to accommodate multiple chassis to increase channel counts and aggregate data rates.

All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

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



► SystemFlow Graphical User Interface

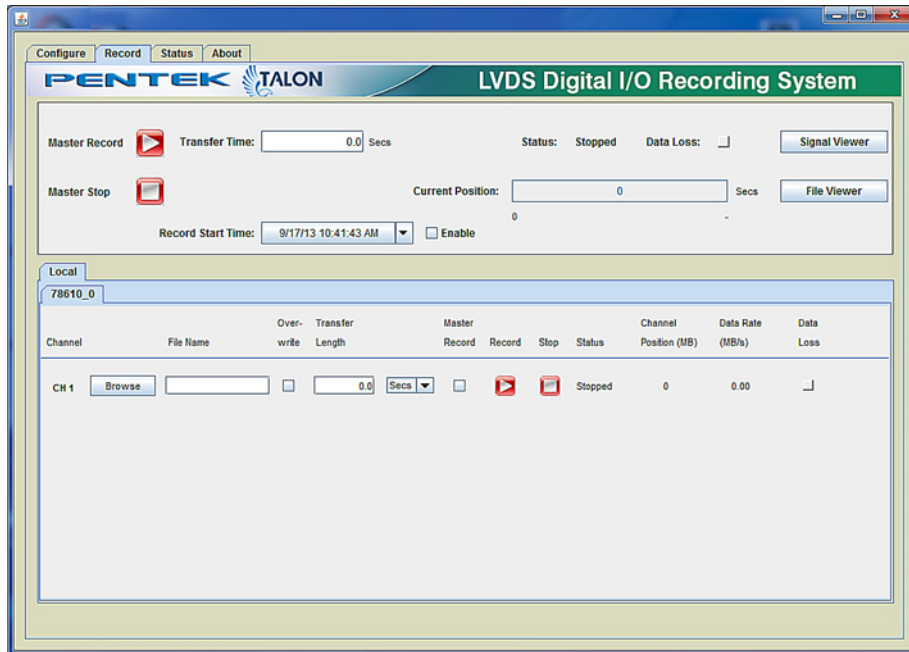


SystemFlow Main Interface

The RTR 2558 GUI shows a block diagram of the system and provides the user with a control interface for the recording system. 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 Hardware Configuration Interface

The Configure screen presents operational system parameters including temperature and voltages. These parameters include data valid and suspend enables, as well as polarity control for both signals. All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box experience.



SystemFlow Record Interface

The Record screen allows you to browse a folder and enter a file name for the recording. The length of the recording for each channel can be specified in megabytes or in seconds. Intuitive buttons for Record, Pause and Stop simplify operation. Status indicators for each channel display the mode, the number of recorded bytes, and the average data rate. A Data Loss indicator alerts the user to any problem, such as a disk full condition.

By checking the Master Record boxes, any combination of channels in the lower screen can be grouped for synchronous recording via the upper Master Record screen. The recording time can be specified, and monitoring functions inform the operator of recording progress. ►

### ► SystemFlow API

SystemFlow includes a complete API (Application Programming Interface) that supports control and status queries of all operations of the RTR 2558 from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2558 as a high-performance server front end to a larger system. This is supported using a socket interface through the Ethernet interface

### Specifications

#### PC Workstation (standard configuration)

**Operating System:** Windows workstation

**Processor:** Intel i7 7700K (7th Gen) quad core processor

**Clock Speed:** 4.2 GHz

**Operating System Drive:** 250 GB SSD

**SDRAM:** 8 standard, 16 or 32 GB optional

#### RAID

**Total Storage:** 3.8 TB – 30.6 TB

**Supported RAID Levels:** 0, 5 and 6

**Drive Bays:** Hot-swap, removable, front panel

#### Rear Panel I/O

Four USB 3.0 ports

Two Gigabit RJ45 ports

Two HDMI and One DVI ports

Audio and PS2 ports

USB 3.0 Type-C port

Two Wi-Fi antenna ports

#### Front Panel I/O

Two USB 2.0 ports

Power and recessed RESET buttons

LED indicators for power and HDD access

### LVDS Interface

**Cable:** 80-pin ribbon cable

**Connector Type:** 2x40 pin IDC

**Data Lines:** 32 LVDS pairs, 2.5 V compliant

**Clock:** One LVDS pair, 2.5 V compliant

**Data Valid:** One LVDS pair, 2.5 V compliant

**Data Suspend:** One LVDS pair, 2.5 V compliant

### Physical and Environmental

**Size:** 5.25" H x 8.5" W x 14.0" D

**Weight:** 17 lb (7.7 kg)

**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, 150 W max.

## Model RTR 2558 Ordering Information and Options

### Channel Configurations

**Option -201** Recording interface

**Option -221** Playback interface

**Note:** Record and playback interfaces not available together.

### Additional Options

**Option -261** GPS Time and Position Stamping

**Option -285** Raid 5 Configuration

**Option -286** Raid 6 Configuration

**Option -309** 16 GB System Memory

**Option -310** 32 GB System Memory

**Option -630** 6 to 30 VDC Power Supply

### Storage Options

**Option -410** 3.8 TB SSD storage capacity

**Option -415** 7.6 TB SSD storage capacity

**Option -420** 15.3 TB SSD storage capacity

**Option -430** 30.6 TB SSD storage capacity

Contact Pentek for compatible Option combinations

Storage and Channel-count Options may change, contact Pentek for the latest information

*Specifications are subject to change without notice*



# Customer Information

## Placing an Order

When placing a purchase order for Pentek products, please provide the model number and product description. You may place your orders by letter, telephone, email or fax; you should confirm a verbal order by mail, email or fax.

All orders should specify a purchase order number, bill-to and ship-to address, method of shipment, and a contact name and telephone number.

U.S. orders should be made out to Pentek, Inc. and may be placed directly at our office address, or c/o our authorized sales representative in your area.

International orders may be placed with us, or with our authorized distributor in your country. They have pricing and availability information and they will be pleased to assist you.

## Prices and Price Quotations

All prices are F.O.B. factory in U.S. dollars. Shipping charges and applicable import, federal, state or local taxes, are paid by the purchaser.

We're glad to respond to your request for price quotation just contact the corporate office, or your local representative. Price and delivery quotations are valid for 30 days, unless otherwise stated.

Quantity discounts for large orders are available and will be included in our price quotation, if applicable.

## Terms

Terms are Net 30 days for accounts with established credit; until credit is established, we require prepayment, or will ship C.O.D.

## Shipping

For new orders, we normally ship UPS ground with shipping charges prepaid and added to our invoice. If you are in a hurry, we will ship UPS Red, UPS Blue, FedEx, or the carrier of your choice, as you request.

## Order Cancellation and Returns

All orders placed with Pentek are considered binding and are subject to cancellation charges. Hardware products may be returned within 30 days after receipt, subject to a restocking charge. Before returning a product, please call Customer Service to obtain a Return Material Authorization (RMA) number. Software purchases are final and we cannot allow returns.

## Warranty

Pentek warrants its products to conform to published specifications and to be free from defects in materials and workmanship for a period of one year from the date of delivery, when used under normal operating conditions and within the service conditions for which they were furnished.

The obligation of Pentek arising from a warranty claim shall be limited to repairing or, optionally, replacing without charge any product which proves to be defective within the term and scope of the warranty.

Pentek must be notified of the defect or nonconformity within the warranty period. The affected product must be returned with shipping charges and insurance prepaid. Pentek will pay shipping charges for the return of product to buyer, except for products returned from outside the USA.

## Limitations of Warranty

This warranty does not apply to products which have been repaired or altered by anyone other than Pentek or its authorized representatives.

The warranty does not extend to products that have been damaged by misuse, neglect, improper installation, unauthorized modification, or extreme environmental conditions, that fall outside of the scope of the product's environmental specifications.

Due to the normal, finite write-cycle limits of Solid State Drives (SSDs), Pentek shall not be liable for warranty coverage of SSDs caused by wear-related issues that arise as an SSD reaches its write-cycle limit.

Pentek specifically disclaims merchantability or fitness for a particular purpose. Pentek shall not be held liable for incidental or consequential damages arising from the sale, use, or installation of any Pentek product. Regardless of circumstances, Pentek's liability under this warranty shall not exceed the purchase price of the product.

## Extended Warranty

You may purchase an extended warranty on our board-level products for a fee of 1% of the list price per month of coverage, or 10% of the list price per year of coverage.

All Pentek software products (excluding 3rd-party products) include free maintenance and free upgrades for one year. Extended software maintenance is available for one, two, and three years, starting after the first year.

## Service and Repair

You must obtain a Return Material Authorization (RMA) before returning any product to Pentek for service or repair. RMA requests must be submitted online at:

[Return Material Authorization Form](#)

After the form is completed in its entirety and submitted, Pentek shall email you a receipt and start processing your request. Once your request has been approved, Pentek shall e-mail you an RMA number, shipping instructions, and a quotation if the product is out of warranty.

Carefully package the product in its original packaging, if it is still available, and ship it to Pentek prepaid (if within the US) or free domicile DDP (if outside the US). Pentek shall not be responsible for loss or damage in shipment to Pentek, so you are strongly encouraged to insure the shipment for its full replacement value.

When the work is completed, we will return the product to you along with a statement of work performed.

Customer Service phone: 201-818-5900 • fax: 201-818-5697  
• email: [custsrvc@pentek.com](mailto:custsrvc@pentek.com)