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

General Information

The Talon® RTS 2620 combines the power of a Pentek Talon Recording System with those of an RF tuner and RF upconverter hardware plus Pentek's Sentinel Intelligent Signal Scanner. The RTS 2620 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 hundreds of terabytes of data to disk, allowing users to store days worth of data. The optional RF upconverter reproduces signals captured at RF frequencies up to 6 GHz.

Hardware Features

The Pentek Model 78621 Cobalt board transceiver serves as the engine of the RTS 2620 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.

All system components are integrated into a rackmount chassis that ranges in size from 3U to 6U depending on storage requirements. Front panel removable HDDs, configured as a RAID are hot-swappable and configurable for redundancy and performance.
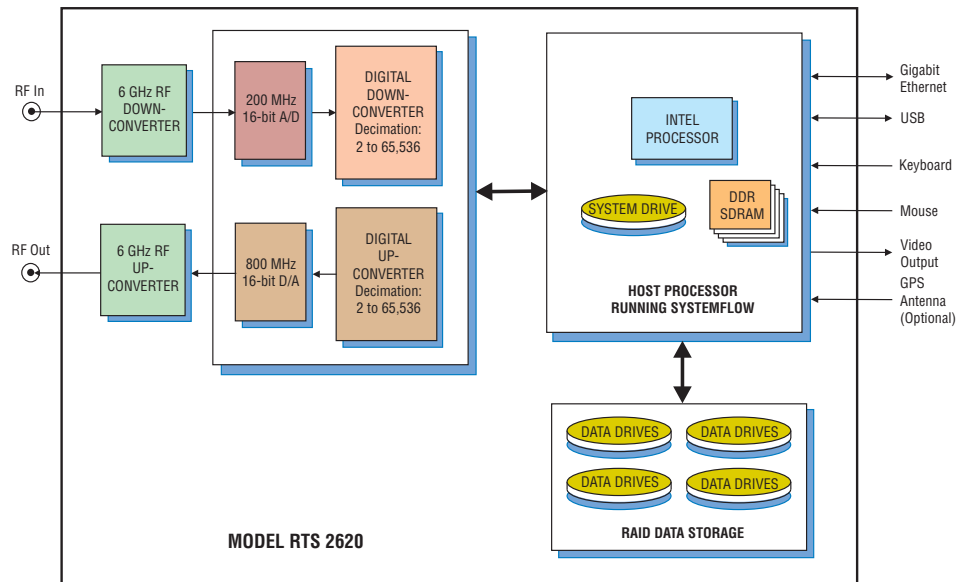
An optional GPS receiver and built-in PLLs allow all devices in the RF chain to be locked in phase and correlated to GPS time. GPS position information can optionally be recorded, allowing the recorder's position to be tracked while acquiring RF signals.
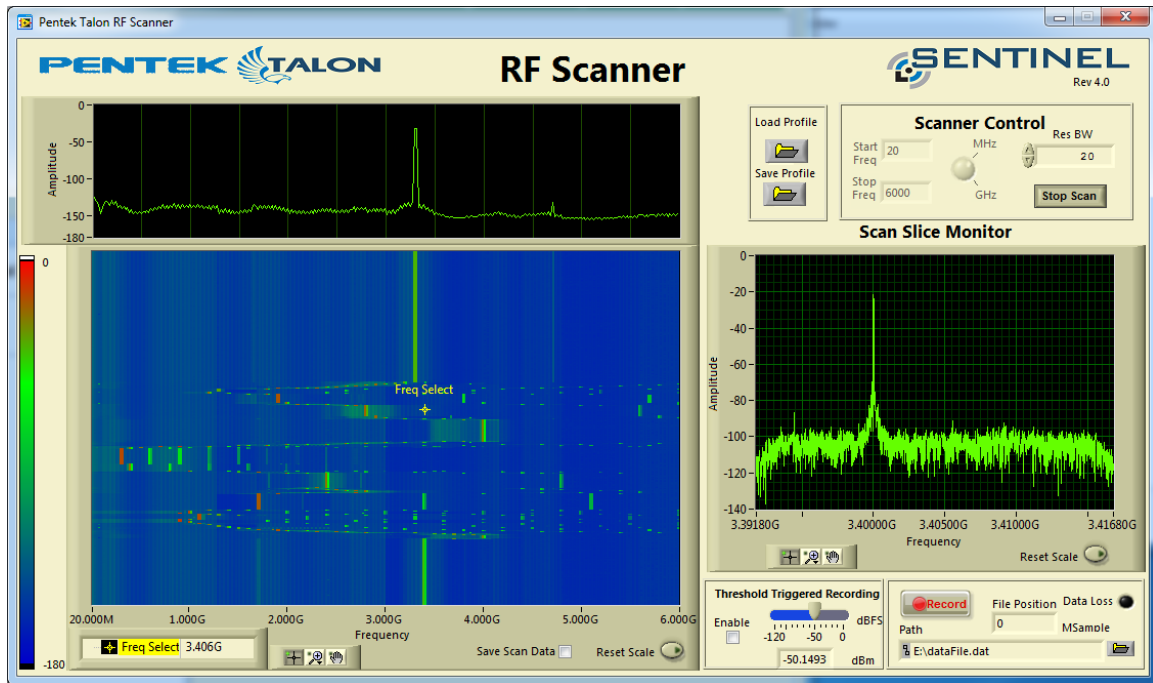
Sentinel Features

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, providing a complete suite of analysis tools to complement the Sentinel hardware resources. ➤

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
- Built-in DUC with selectable interpolation range from 2 to 65,536
- 3U to 6U 19-inch rackmount server chassis with hot-swappable HDDs
- Storage capacities to 192 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

MODEL RTS 2620

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➤ 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.
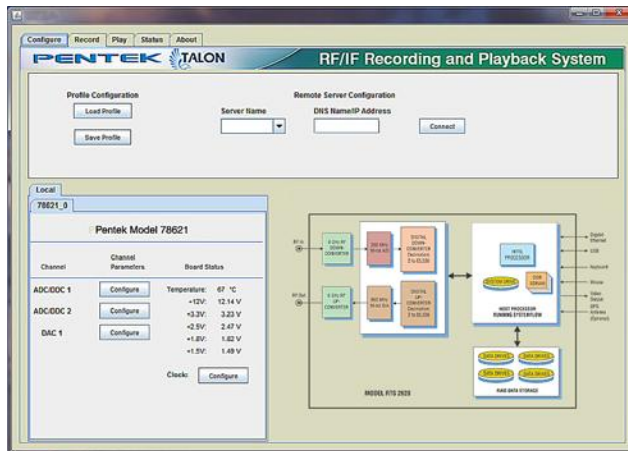
SystemFlow Recorder Interface

The RTS 2620 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.
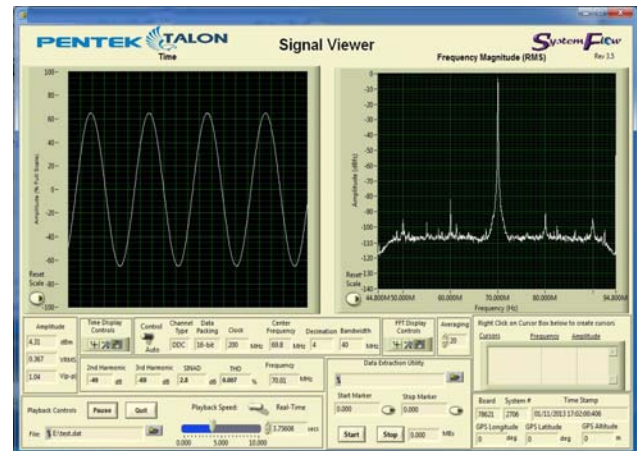
SystemFlow Signal Viewer

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 RTS 2620 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 RTS 2620 allows the user to install post-processing and analysis tools to operate on the recorded data. The RTS 2620 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

Depending on storage requirements, the RTS 2620 is configured in a 3U to 6U 19" rack-mountable chassis, with hot-swappable data drives, front panel USB ports and I/O connectors on the rear panel.

Multiple RAID levels, including 0, 5, and 6 provide a choice for the required level of redundancy. The hot-swappable HDDs provide storage capacities of up to 192 TB in a single 6U chassis.

Specifications

RF Tuner Specifications

RF Tuner Bypass Range: 2 to 70 MHz
RF Tuner Frequency Range: 70 to 6000 MHz
Tuning resolution: 1 kHz
Instantaneous bandwidth:
   40 MHz from 70 to 6000 MHz
   20 MHz from 10 to 70 MHz
   2x tuning frequency from 2 to 10 MHz
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

RF Upconverter Specifications (Optional)

RF Upconverter Bypass Range: 2 to 70 MHz
RF Upconverter Frequency Range: 70 to 6000 MHz
Tuning Resolution: 1 kHz
Instantaneous bandwidth:
   40 MHz from 70 to 6000 MHz
   20 MHz from 10 to 70 MHz
   2x tuning frequency from 2 to 10 MHz
Internal Frequency Accuracy: ± 1.0 ppm (-20 to +60°C)
External Reference Frequency: 10 MHz
External Reference Input Level: 0 dBm ± 3 dB
VSWR: 3:1 max, <2.0:1 typical at the tuned frequency
Noise Figure: 23 dB max (at 30 dB Gain)
Output 3rd-order Intercept Point: +13 dBm typ, +10 dBm min
Output 1dB Compression Point: +5 dBm min
IF to RF Gain: Nominal 30 dB gain above IF input
IF Input Center Frequency: 70 MHz standard
Input Level: –30 to 0 dBm
Output Level (ALC mode): 0 to –20 dBm
Gain control (Manual mode): 50 dB min (0.5 dB steps)
Harmonic Rejection: 20 dB min, 40 dB typ
   (0 dBm output power)
Non-Harmonic Spurious Rejection: 60 dB typ, 50 dB min
   (0 dBm output power)
Phase Noise (typical at 3 GHz)
   1 kHz offset: –80 dBc/Hz
   20 kHz offset: –90 dBc/Hz
   100 kHz offset: –100 dBc/Hz
   1 MHz offset: –120 dBc/Hz

➤ PC Workstation Specifications

Operating System: Windows 7 Professional
Processor: Intel Core i7 processor
Clock Speed: 3.2 GHz or higher
SDRAM: 8 GB
RAID:
    Storage: 8–192 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 dBf_s typical at 70 MHz
SFDR: 87 dBc typical at 70 MHz
2nd Harmonic: 95 dBc typical at 70 MHz
3rd 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

Digital Upconverter IP Core Specifications

Interpolation 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

D/A Specifications

Type: Texas Instruments DAC5688
Sampling Rate: 800 MHz Max
Resolution: 16 bits
SNR: 64 dBf_s typical at NCO = 140 MHz, f_{out} = 150.1 MHz
SFDR: 79 dBc typical at f_{out} = 20.1 MHz

Physical and Environmental Specifications

Dimensions: Height: 3U to 6U
    Width: 19"
    Depth: 26"
Weight: 40–85 lb depending on options
Operating Temperature: +5 to +45 deg C
Storage Temperature: –40 to +85 deg C
Relative Humidity: 5 to 95%, non-condensing
Power Requirements: 100 to 240 VAC, 50-60 Hz, ~400 W

Model RTS 2620 Ordering Information and Options

General Options

Option -201	6 GHz RF Upconverter
Option -261	GPS Time and Position Stamping
Option -264	IRIG-B Time Stamping
Option -267	Dual 10GbE Offload
Option -268	Dual 40GbE Offload
Option -285	RAID 5 Configuration
Option -286	RAID 6 Configuration
Option -309	16 GB System Memory
Option -311	64 GB System Memory
Option -623	Solid State OS Drive
Option -625	Removable OS Drive Enclosure

Storage Options

Option -416	8.0 TB HDD storage capacity
Option -421	16.0 TB HDD storage capacity
Option -440	32.0 TB HDD storage capacity
Option -451	48.0 TB HDD storage capacity
Option -461	64.0 TB HDD storage capacity
Option -482	128.0 TB HDD storage capacity
Option -485	192.0 TB HDD storage capacity

Note: Options -451 and -461 require a 5U Chassis; Options -482 and -485 require a 6U chassis

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

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Specifications subject to change without notice

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