Model RTX 2786

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

TALON RTX EXTREME RECORDER

SystemFlow

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

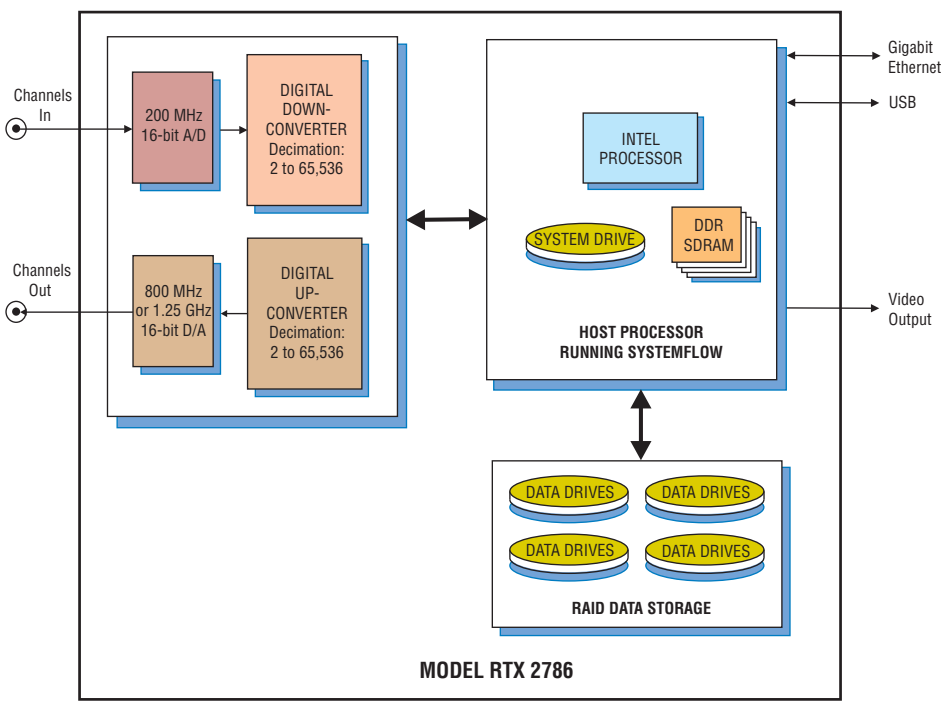
The RTX 2786 includes Pentek's SystemFlow Recording Software. SystemFlow features a Windows-based GUI (Graphical User Interface) that provides a simple means to configure and control the system. Custom configurations can be stored as profiles and later loaded when needed, allowing the user to select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



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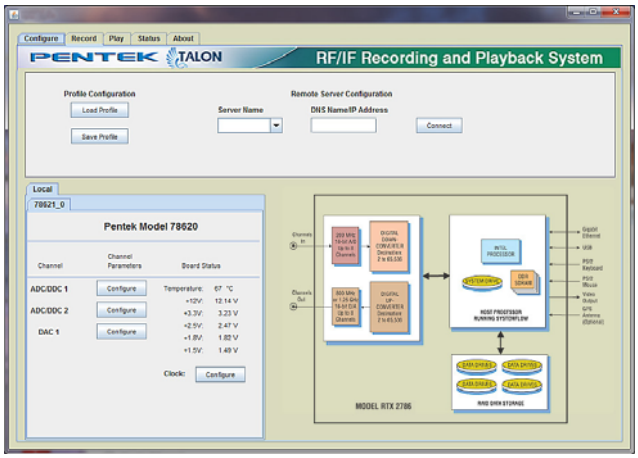
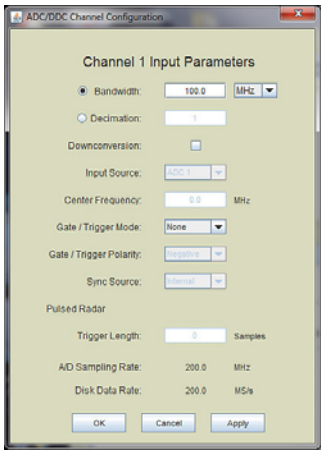
➤ SystemFlow Graphical User Interface



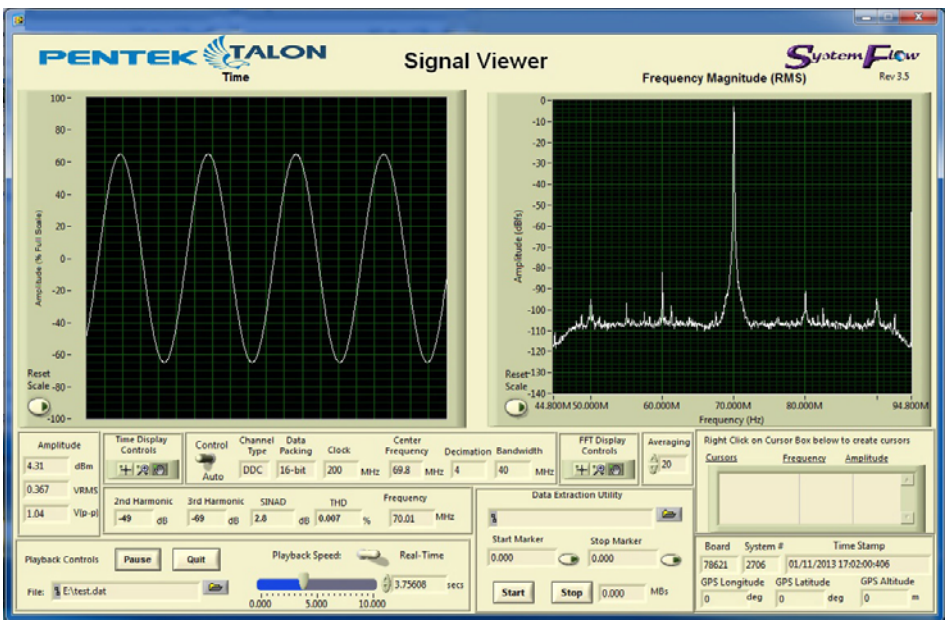


SystemFlow Recorder Interface

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

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. ➤

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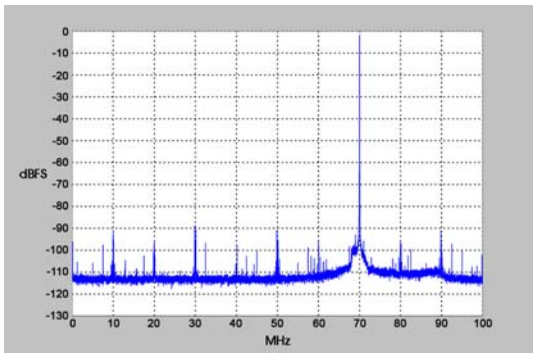
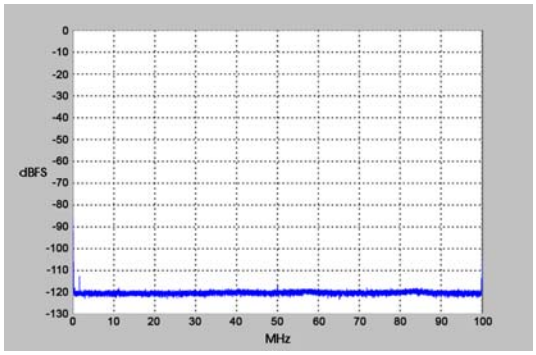
➤ A/D Performance

Spurious Free Dynamic Range



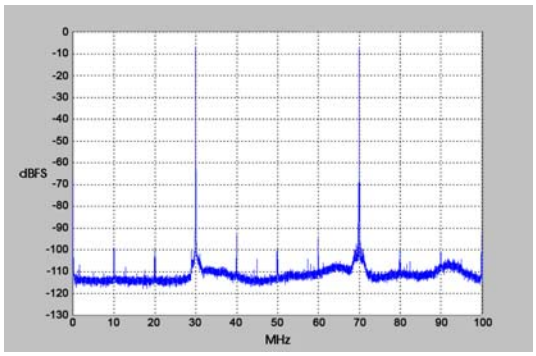
f_{in} = 70 MHz, f_s = 200 MHz, Internal Clock

Spurious Pick-up



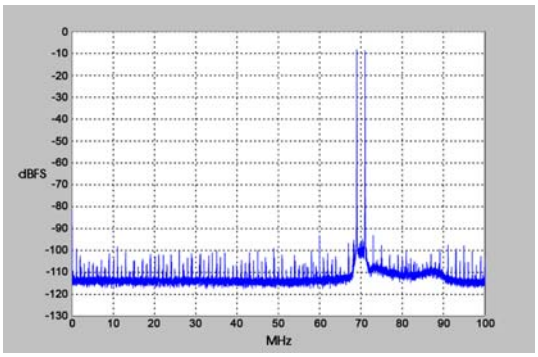
f_s = 200 MHz, Internal Clock

Two-Tone SFDR



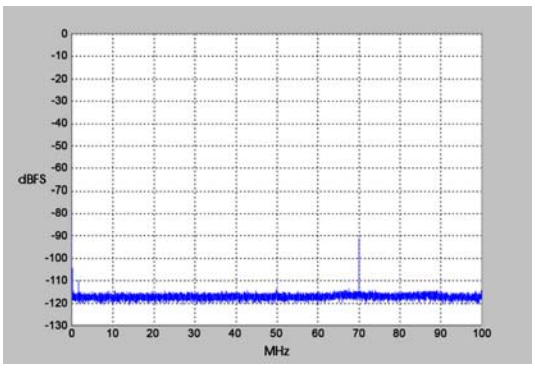
f_1 = 30 MHz, f_2 = 70 MHz, f_s = 200 MHz

Two-Tone SFDR



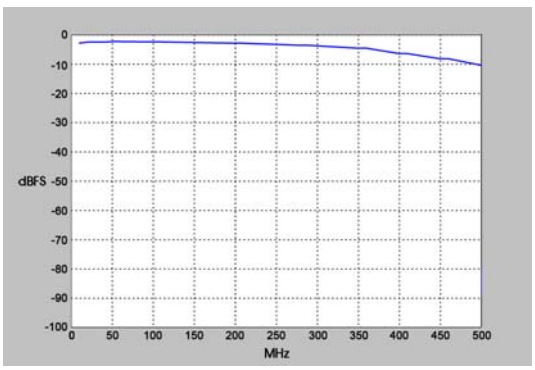
f_1 = 69 MHz, f_2 = 71 MHz, f_s = 200 MHz

Adjacent Channel Crosstalk



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

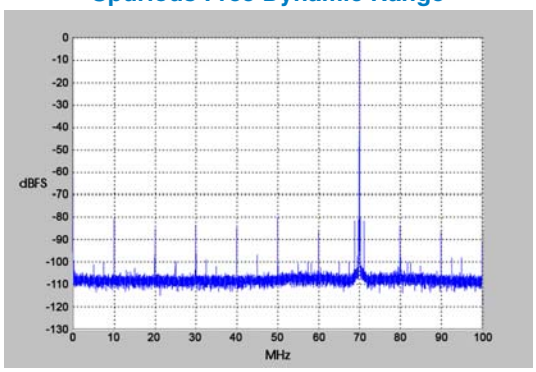
Input Frequency Response



f_s = 200 MHz, Internal Clock

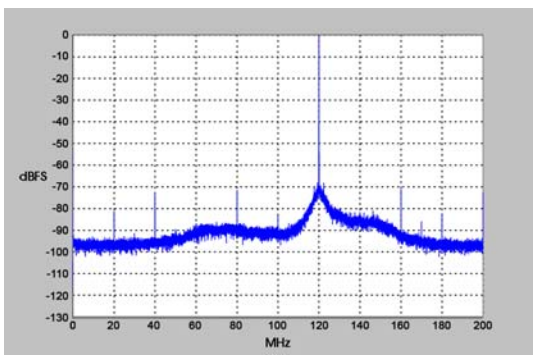
D/A Performance

Spurious Free Dynamic Range



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

Spurious Free Dynamic Range



f_{out} = 120 MHz, f_s = 400 MHz, External Clock ➤

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Model RTX 2786 — 200 MS/sec RF/IF Extreme 3U VPX Recorder

➤ 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:** $0.4*f_s/D$

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

Option -201	One-channel recording and one-channel playback
Option -202	Two-channel recording and one-channel playback
Option -203	Three-channel recording and one channel playback
Option -204	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

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