Features

- Designed to operate under conditions of shock and vibration
- 16.0" W x 6.9" D x 13.0" H Portable system
- Lightweight: approximately 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 recording and playback signal bandwidths
- IF signal record/playback at up to 700 MHz
- Real-time sustained recording rates up to 3.2 GB/sec
- Windows® workstation with high-performance Intel® processor
- Up to of 30.7 TB 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 18-36 VDC power supply

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 inches wide, 6.9 inches deep, and 13 inches high, 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-inch LCD monitor, and up to 30.7 TB of SSD storage.

At the heart of the RTR 2726A are Pentek's 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.

2726A Block Diagram

Channels In

200 MHz 16-bit A/D

DIGITAL DOWN CONVERTER DEC: 2 to 64K

Channels Out

800 MHz 16-bit D/A

DIGITAL UP CONVERTER INT: 2 to 512K

HIGH RESOLUTION VIDEO DISPLAY

INTEL PROCESSOR

SYSTEM DRIVE

DDR SDRAM

HOST PROCESSOR RUNNING SYSTEMFLOW

Aux Video VGA Output

Gigabit Ethernet

USB

DATA DRIVES DATA DRIVES

DATA DRIVES DATA DRIVES

RAID DATA STORAGE

MODEL RTR 2726A
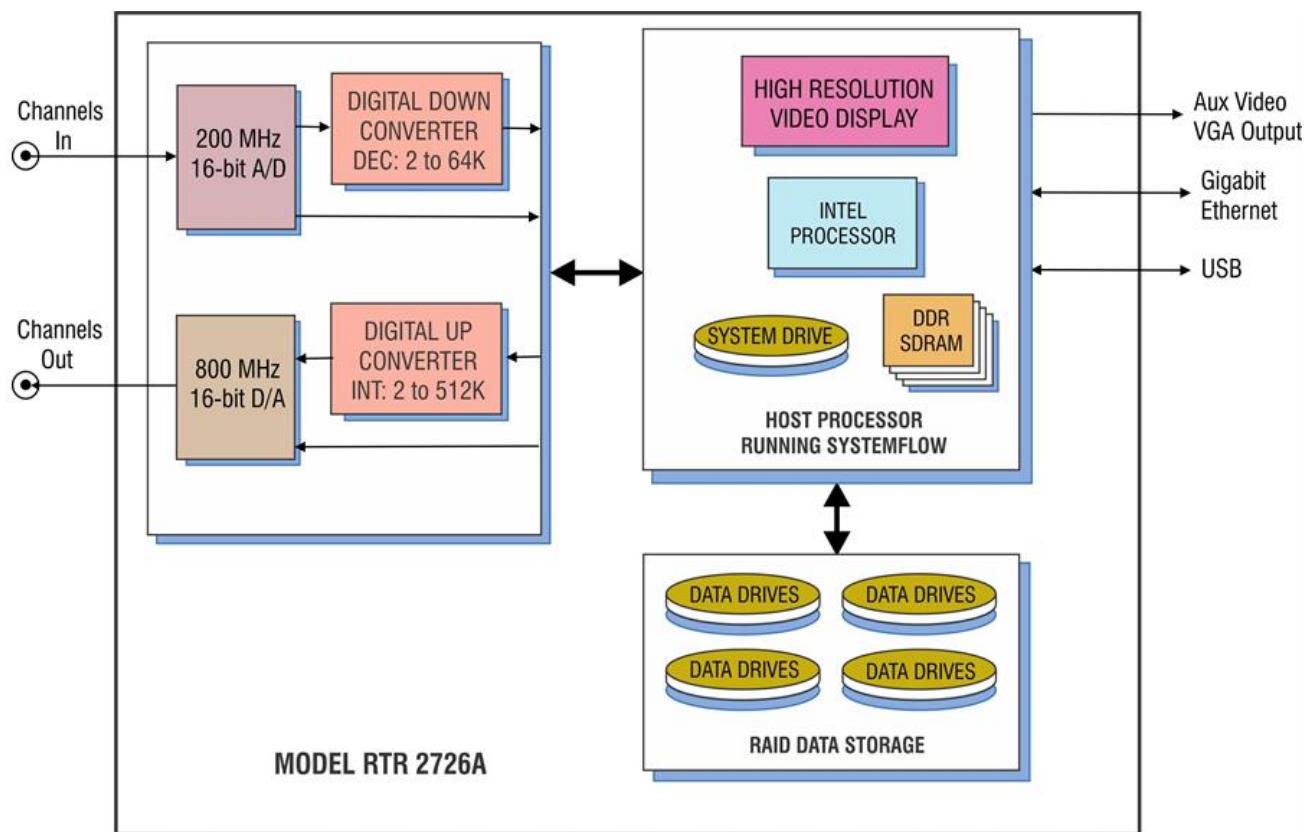
Rugged Chassis with SSD Storage

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 30.7 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 Software

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

- The SystemFlow GUI provides a point-and-click user interface. It includes Configure, Record, Playback, and Status screens, each with intuitive controls and indicators. The user can easily move between screens to configure parameters, control and monitor a recording, and play back a recorded stream.

- The SystemFlow API provides a set of C-callable libraries that allow engineers to develop their own user interface to configure and control their Talon recorder.

- The SystemFlow Telnet interface provides a simple set of commands to configure and control the recorder. This eliminates the need for any software development and is most suitable for unmanned operation.

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

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

Click below to view a video about SystemFlow.

SystemFlow Simulator

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

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

Features

- Provides real-time recording system simulation
- Demonstrates SystemFlow signal & file viewer tools
- Capable of simulating all Talon analog and digital recording systems
- Full Talon SystemFlow GUI
- Simulator can be used to develop Talon system profiles for use in the final system
- Can be used with the SystemFlow API to develop and test custom user interface

SystemFlow GUI

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, play back a recorded signal, and monitor board temperature and voltage levels. The Signal Viewer, integrated into the recording GUI, allows the user to monitor real-time signals or signals recorded on disk.
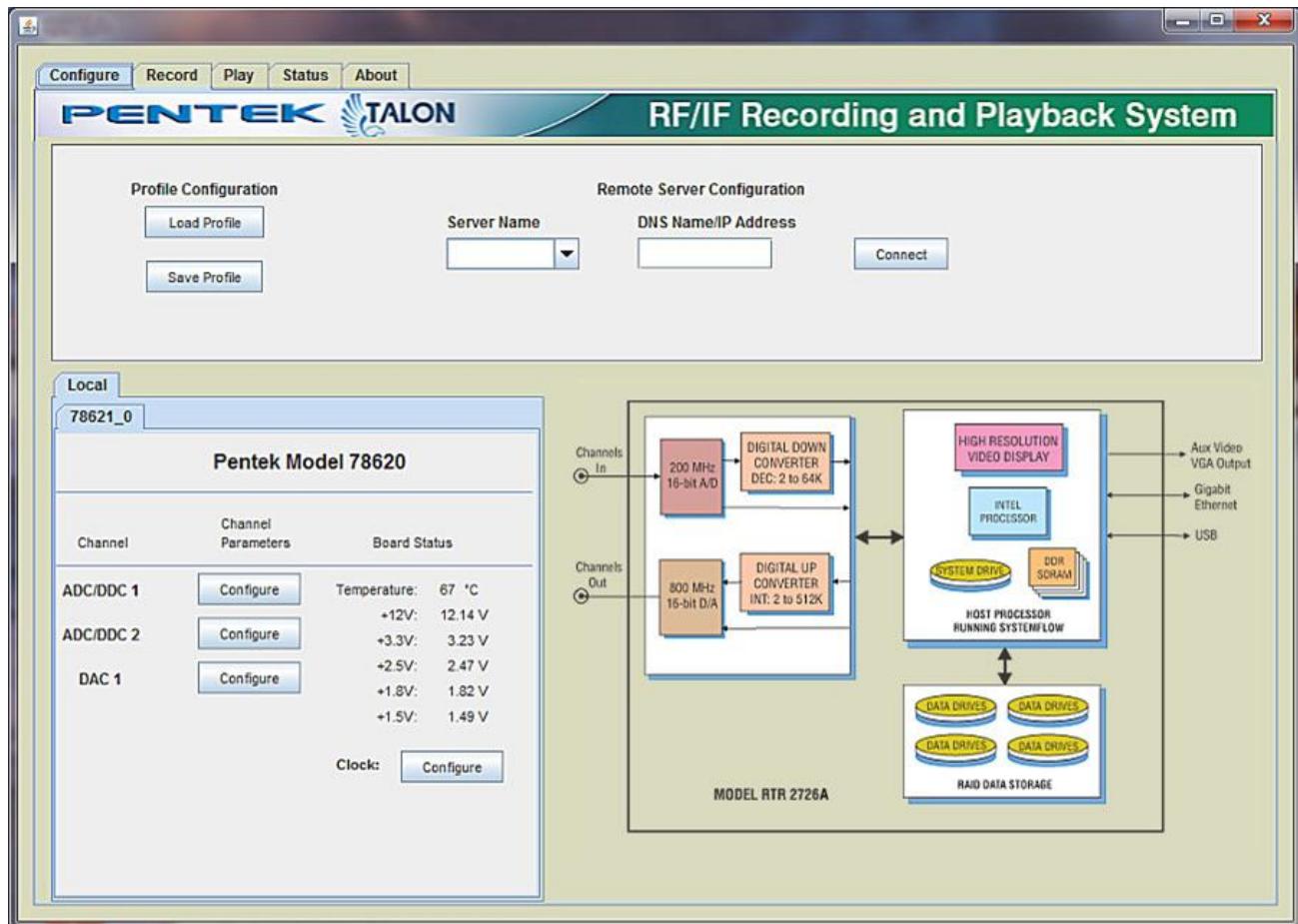
Setting System Parameters

The RTR 2726A configuration GUI provides a simple and intuitive means for setting up the system para-
meters:

- Pull–down selections are implemented with an arrow next to the parameter window.
- User entry fields allow numeric data entry.
- Grayed–out fields are unavailable for change or data entry because of other configuration
  selections.

All parameters contain limit-checking and integrated help to provide an easier-to-use out-of-the-box
experience. Details about each field on the configuration screens are provided in the RTR 2726A user
manual.
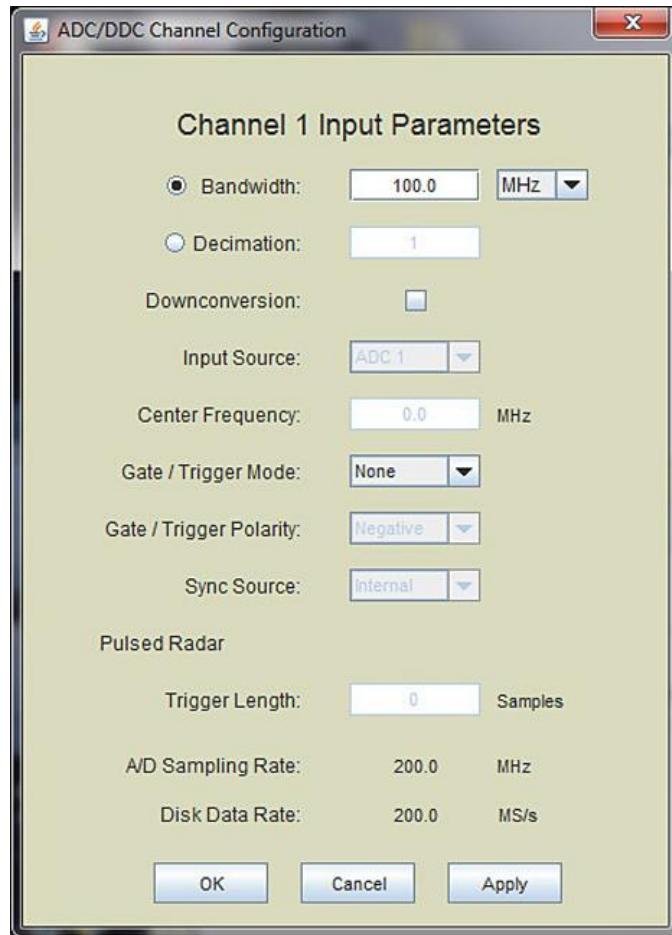
Signal Viewer

The SystemFlow Signal Viewer includes a virtual oscilloscope and spectrum analyzer for signal monitoring in both the time and frequency domains. It is extremely useful for previewing live inputs prior to recording, and for monitoring signals as they are being recorded to help ensure successful recording sessions. The viewer can also be used to inspect and analyze the recorded files after the recording is complete.

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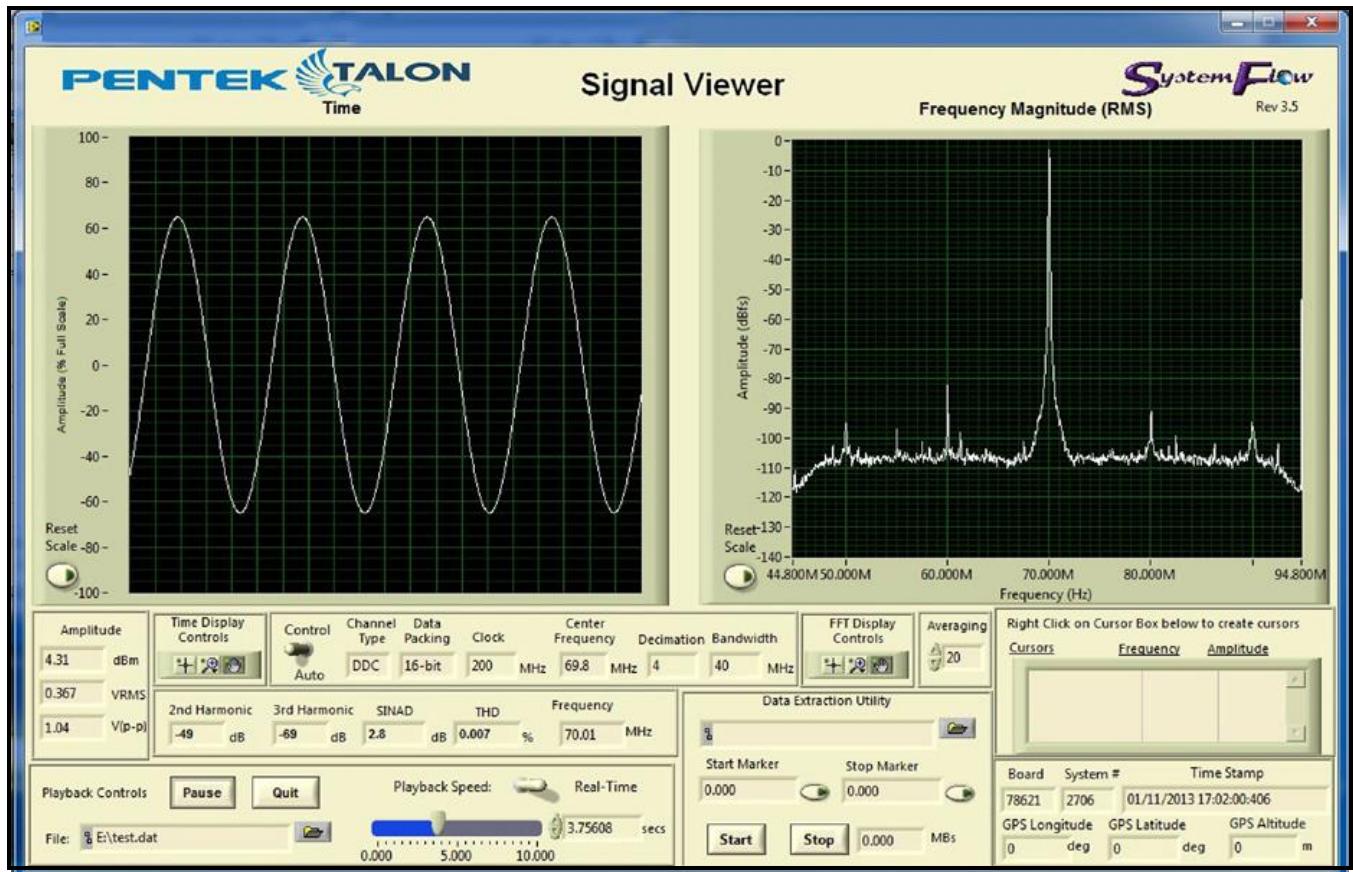
SystemFlow API

SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the Talon recorder from a custom application.

High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2726A 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.

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

```
728             }
729             //transfer until end of disk
730             else if (transferType == TRANSFER_END_OF_DISK)
731             {
732                 recordParams->transferTime    = 0;                      // must set to 0
733                 recordParams->transferLength  = 0;                      // must set to 0
734             }
735
736             ////////////////////////// Start the record //////////////////////////
737             SetConsoleTextAttribute (hConsole, FOREGROUND_GREEN | FOREGROUND_INTENSITY );
738             printf("\nCase 6: RTS_Record\n");
739             SetConsoleTextAttribute (hConsole, wOldColorAttrs);
740
741             //trigger immediately
742             if(recordParams->trigger == RTS_TRIGGER_IMMEDIATELY)
743             {
744                 //send record command
745                 if ((error = RTS_Record(++msgNum,
746                                         serverInfo,
747                                         recordParams,
748                                         recordChanId,
749                                         fileName[0])) != RTS_SUCCESS)
750                 {
751                     printf("Record Error # 0x%lx.\n", error);
752                     exitHandler(error);
753                     goto freeMem;
754                 }
755
756                 Sleep(500);
757             }
758
759             //wait for SW trigger
760             else if(recordParams->trigger == RTS_WAIT_FOR_SW_TRIGGER)
761             {
762                 //send record command which set up record and start DMA
763                 if ((error = RTS_Record(++msgNum,
764                                         serverInfo,
765                                         recordParams,
766                                         recordChanId,
767                                         fileName[0])) != RTS_SUCCESS)
```

SystemFlow Telnet

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

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

Below is an example of use of the "record" command:
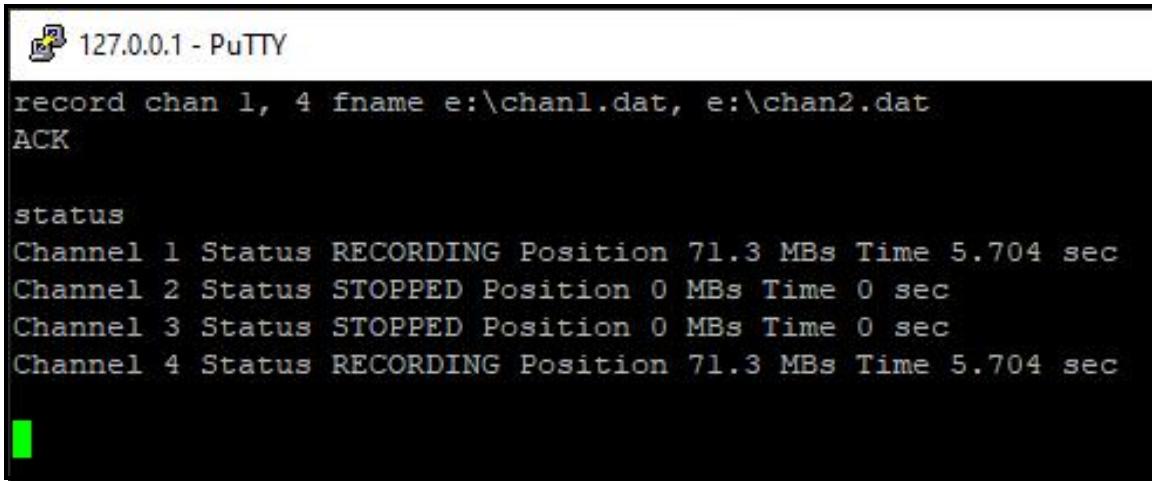
```
127.0.0.1 - PuTTY

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

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

A/D Performance

Spurious Free Dynamic Range
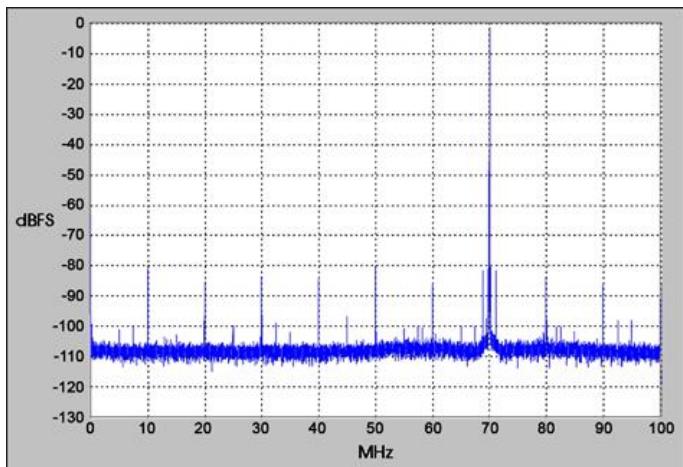
f_{in} = 70 MHz, f_s = 200 MHz, Internal Clock

Spurious Pick-up
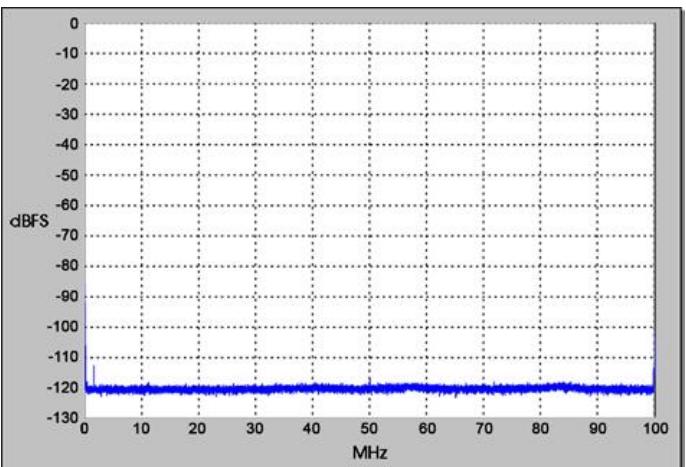
f_s = 200 MHz, Internal Clock

Two-Tone SFDR
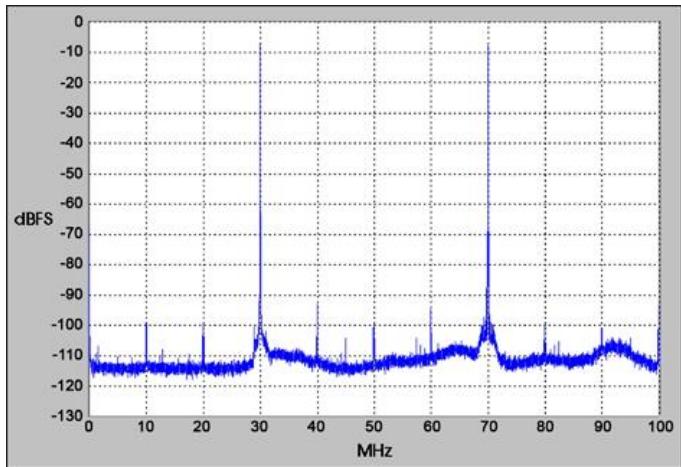
f_1 = 30 MHz, f_2 = 70 MHz, f_s = 200 MHz

Two-Tone SFDR
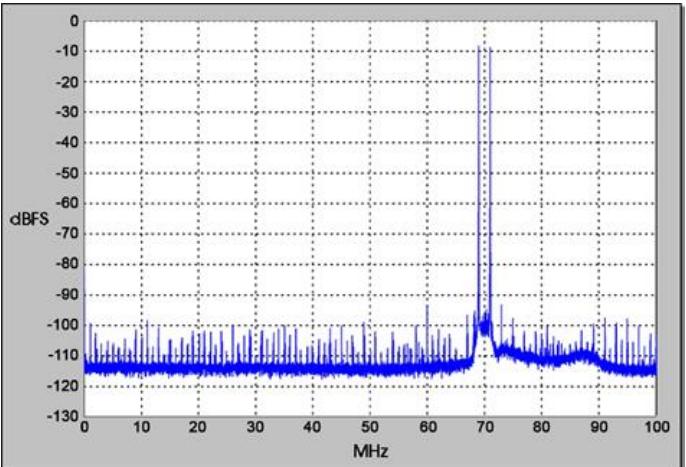
f_1 = 69 MHz, f_2 = 71 MHz, f_s = 200 MHz

Adjacent Channel Crosstalk
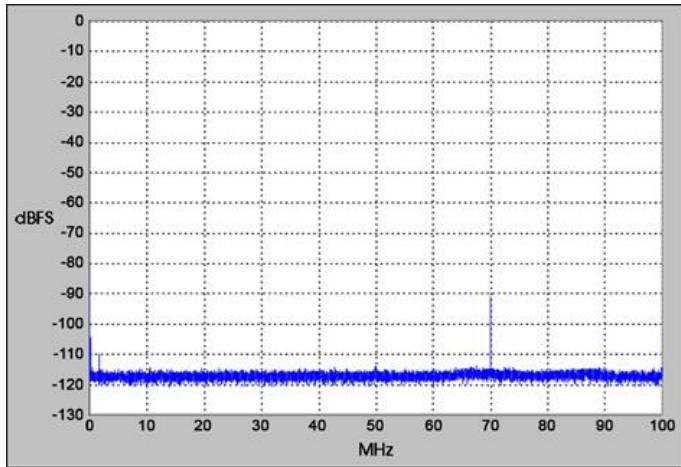
f_{in} Ch2 = 70 MHz, f_s = 200 MHz, Ch1 shown

Input Frequency Response
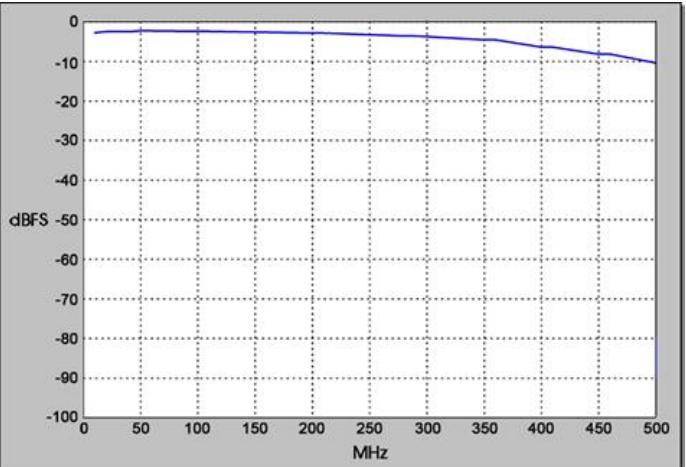
f_s = 200 MHz, Internal Clock

D/A Performance

Spurious Free Dynamic Range
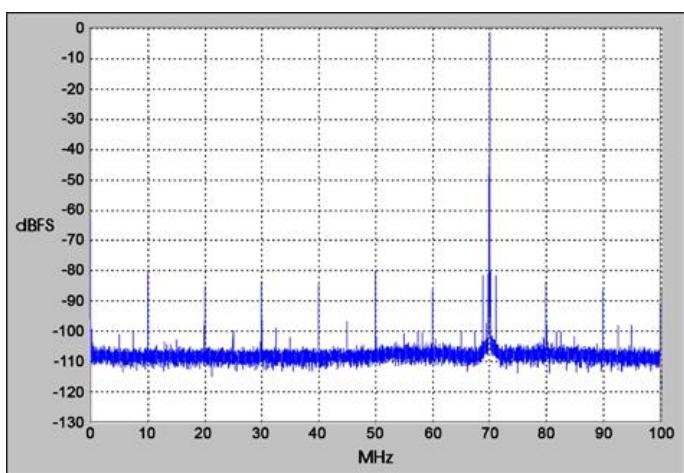
f_{out} = 70 MHz, f_s = 200 MHz, Internal Clock

Spurious Free Dynamic Range
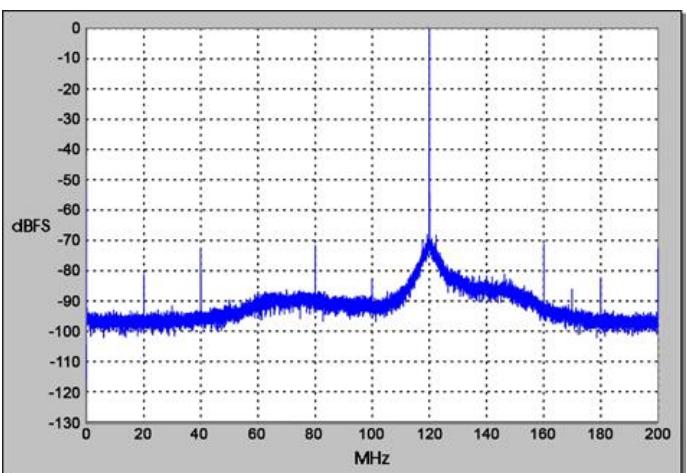
f_{out} = 120 MHz, f_s = 400 MHz, External Clock

Specifications

PC Workstation (standard configuration)

Operating System: Windows
Processor: Intel Core i7 processor
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^2; Contrast ration: 400:1 typical
RAID
Total Storage: 1.92, 3.8, 7.6, 15.3 or 30.7 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 Port: 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: $0.8*f_s/D$
Bandwidth Range: 2.5 kHz to 80 MHz at f_s = 200 MHz

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: Texas Instruments 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 Source

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: 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: Height: 13.0"; Width: 16.0"; Depth: 6.9"
Weight: 30 lb maximum
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.

Specifications are subject to change without notice.

Pricing and Availability

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

Pentek, Inc.
One Park Way
Upper Saddle River, NJ 07458 USA
Tel: +1 (201) 818-5900
Email: sales@pentek.com

Ordering Information

Format: Model RTR 2726A-xxx-yyy..., where xxx and yyy are options shown below.

Click here for more information.

General Options	
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 -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
Option -430	30.7 SSD storage capacity
General Options (append to all options)	
Option -261	GPS time and 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 General Options may change, contact Pentek for latest information.	

Lifetime Applications Support

Pentek offers the worldwide military embedded computing community shorter development time, reliable, rugged solutions for a variety of environments, reduced costs, and mature software development tools. We offer free lifetime support from our engineering staff, which customers can depend on through phone and email, as well as software updates. Take advantage of Pentek's 30 years of experience in delivering high-performance radar, communications, SIGINT, EW, and data acquisition MIL-Aero solutions worldwide.