Talon RTR 2726A

200 MS/sec RF/IF rugged portable recorder

Portability and performance in a compact recorder

- Records and plays up to 4 channels of 80 MHz IBW
- Up to of 122 TB of SSD storage
- IF signal record/playback at up to 700 MHz
- Real-time sustained recording rates up to 1.6 GB/sec

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 1.6 GB/sec in a four-channel system and is ideal for the user who requires both portability and 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 122 TB of SSD storage.

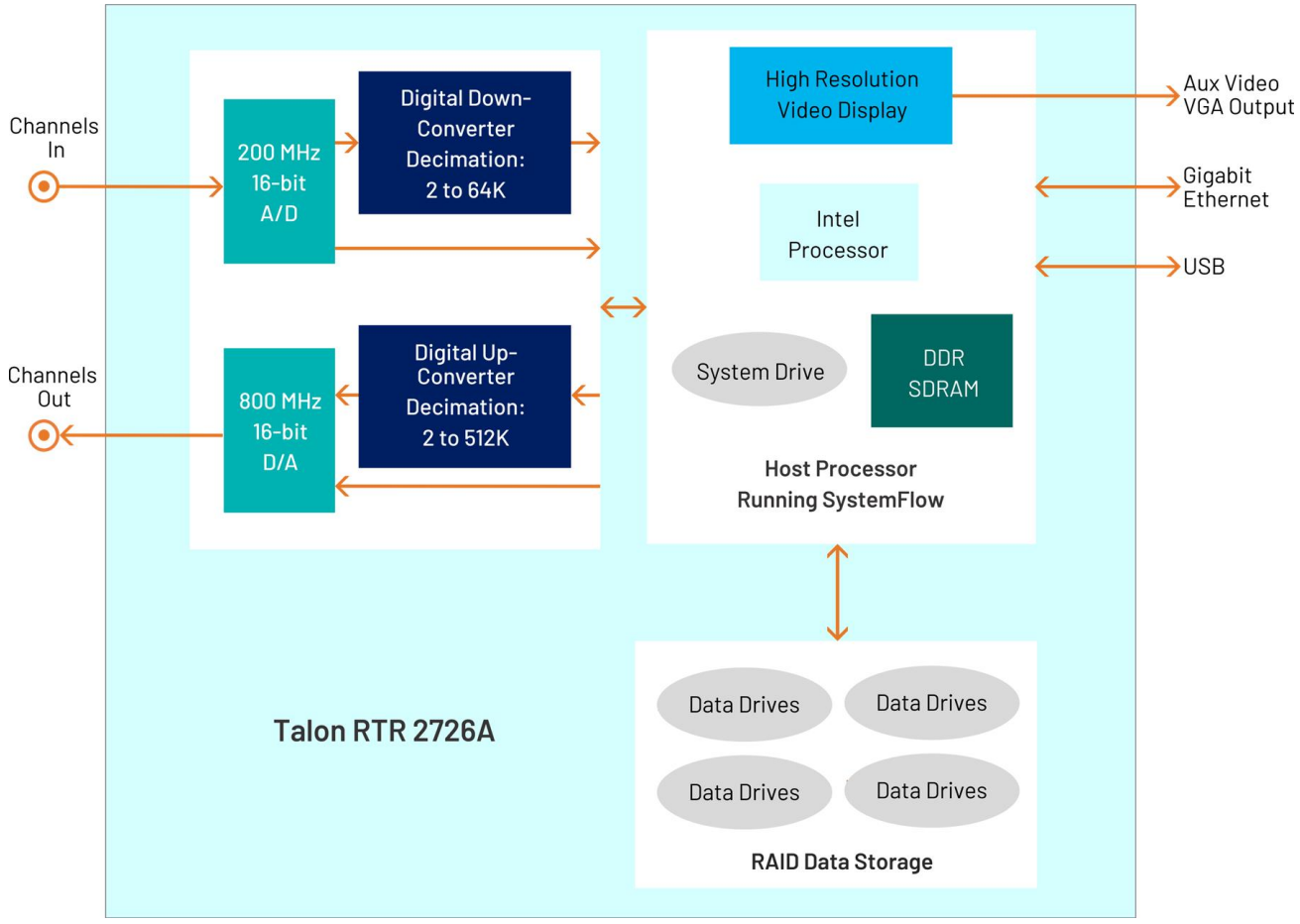
At the heart of the RTR 2726A are Mercury's software radio boards featuring A/D and D/A converters, DDCs (Digital Downconverters), DUCs (Digital Upconverters), and complementary FPGA IP cores. This architecture allows the system engineer to take full advantage of the latest technology in a turnkey system. Optional GPS time and position stamping allows the user to record this critical signal information.

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 a rugged steel and aluminum chassis and is designed for shock and vibration. The SSDs provide storage capacities of up to 122 TB. Drives can be easily removed or exchanged during or after a mission to retrieve recorded data. Multiple RAID levels provide a choice for the required level of redundancy.

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 1.6 GB/sec
- Windows® workstation with high-performance Intel® processor
- Up to 122 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



SYSTEMFLOW SOFTWARE

All Talon recorders include the Mercury SystemFlow® recording software. SystemFlow software enables 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.
- 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. Additional high-level libraries, like Python, are available upon request.

The SystemFlow GUI and API can be run from a remote connection over Gigabit Ethernet. Recorders can be set up to run autonomously by implementing scripts using the API interface.

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

SYSTEMFLOW SIMULATOR

To learn more about SystemFlow software, contact Mercury at techsales@mrcy.com. The SystemFlow Simulator allows you to learn how to use a Talon recorder's SystemFlow software interface before you acquire a recorder or while you are waiting for delivery of a recorder.

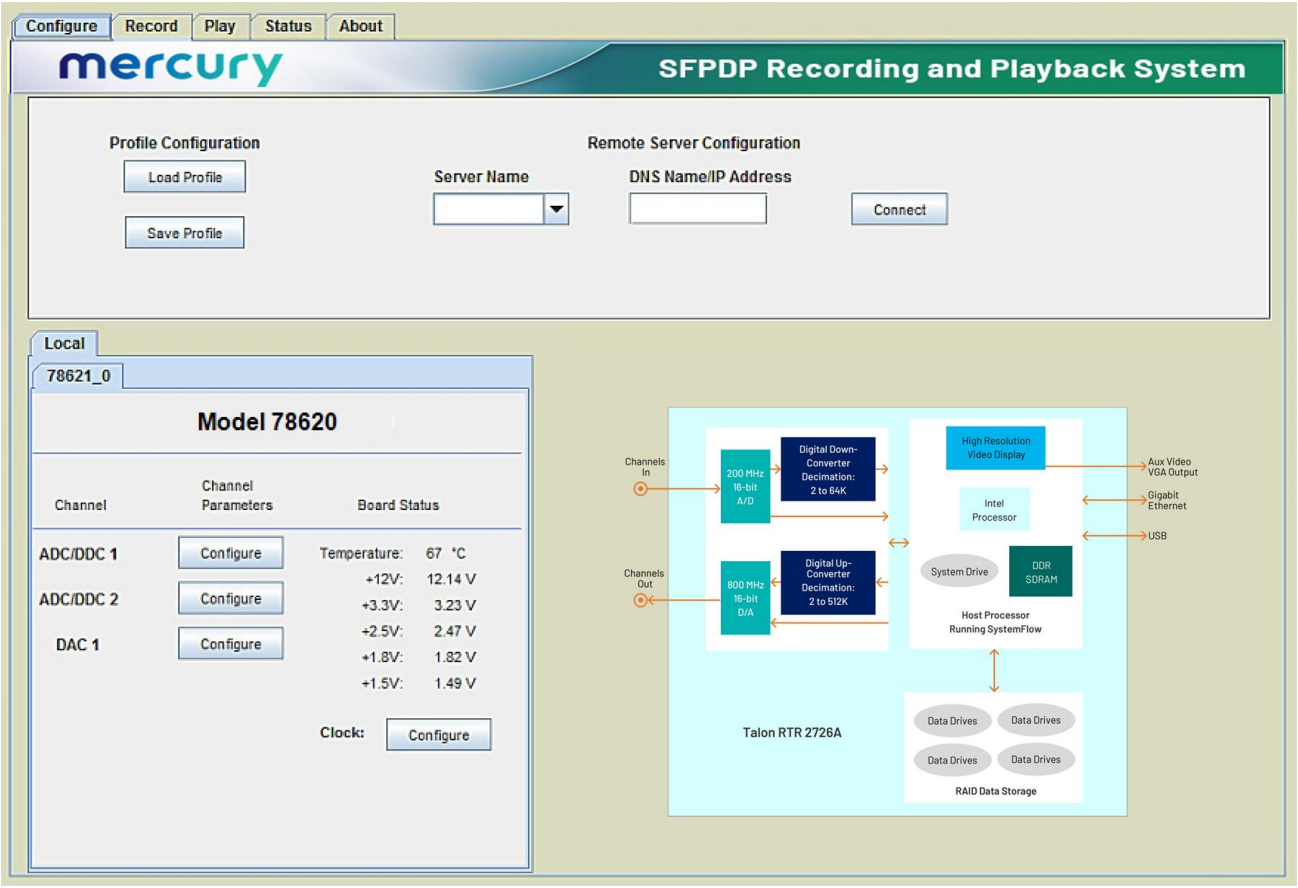
The Simulator can simulate the operating environment of all the different Talon recorder models. The Simulator also demonstrates the SystemFlow Signal Viewer by playing recorded signals to simulate the appearance of live signals being digitized and recorded by a Talon analog signal recorder.

Features

- Provides real-time recording system simulation
- Allows engineers to write and test their application (built using the SystemFlow API) before receiving the recorder hardware
- Demonstrates SystemFlow signal and file viewer tool
- 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

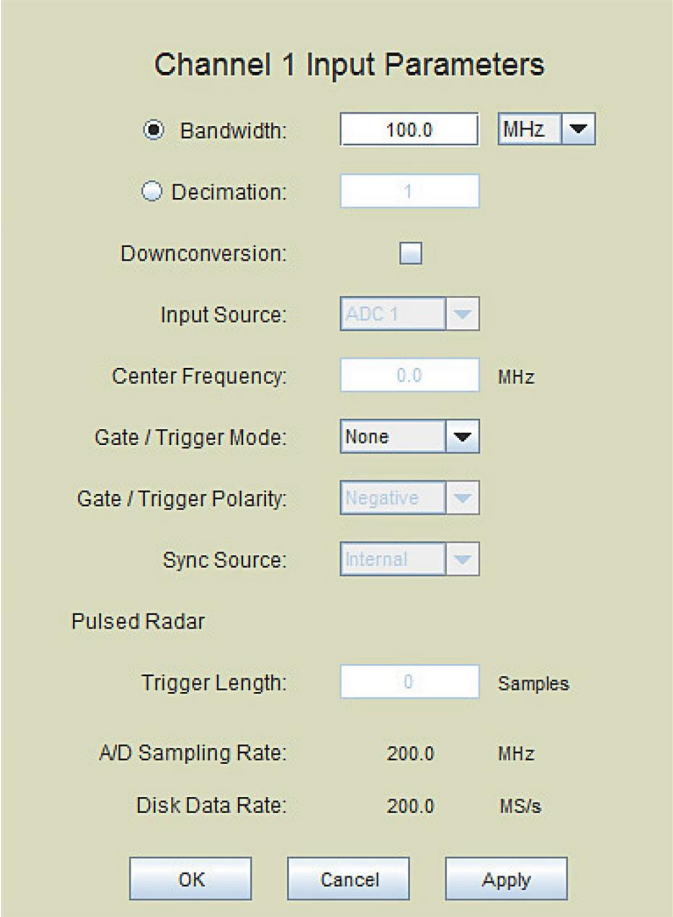
SYSTEMFLOW GUI

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.



SYSTEMFLOW HARDWARE CONFIGURATION INTERFACE

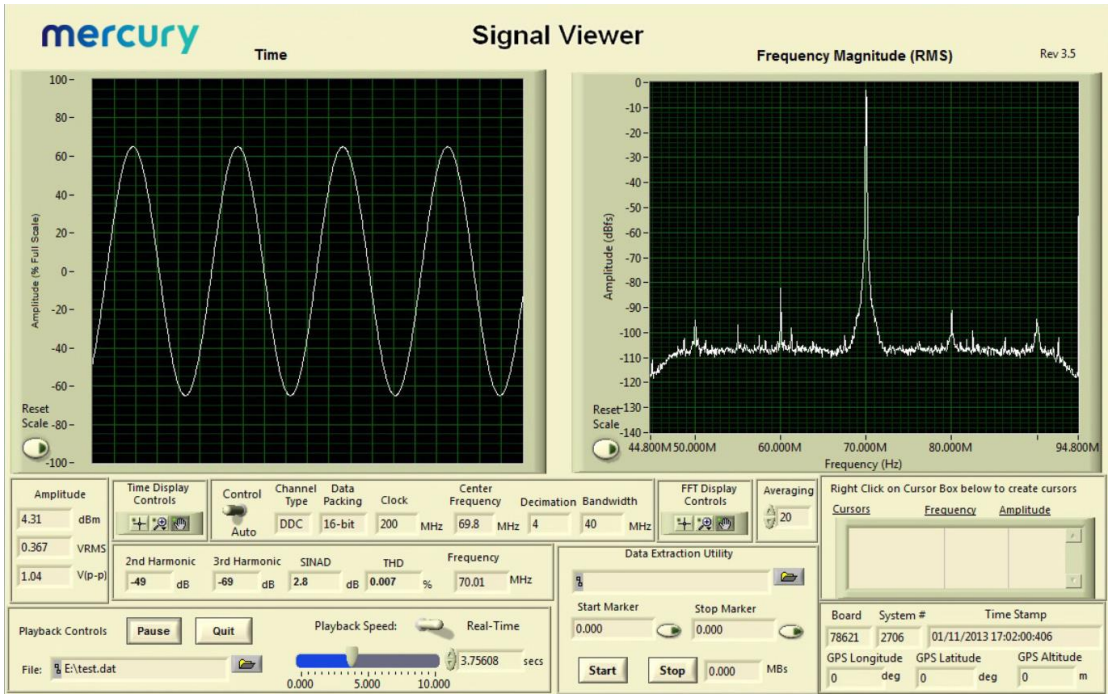
The RTR 2726A configuration screens provide a simple and intuitive means for setting up the system parameters. The input channel configuration screen, shown below, allows user entries for input source, center frequency, decimation, and gate and trigger information. All parameters contain limit-checking and integrated help.



SIGNAL VIEWER

The SystemFlow Signal Viewer includes a spectrogram, 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

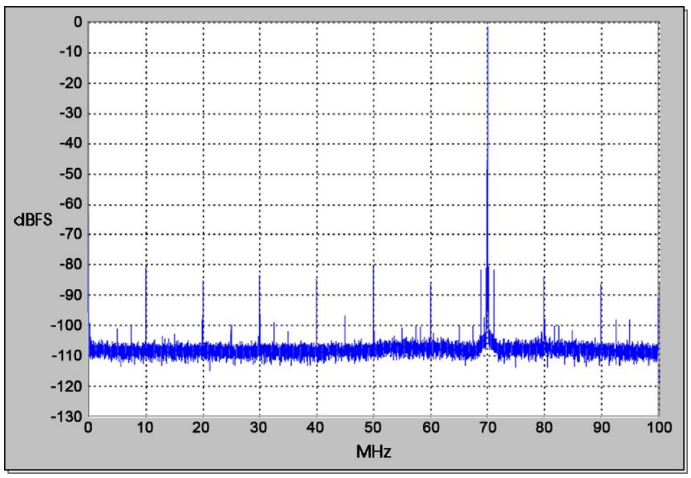
SystemFlow includes a complete API (Application Programming Interface) supporting control and status queries of all operations of the Talon recorder from a custom application.

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, standalone acquisition. Recorded NTFS files can be easily retrieved through the same connection. In addition to C, support is also provided for high level languages such as Python and C#. 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)
```

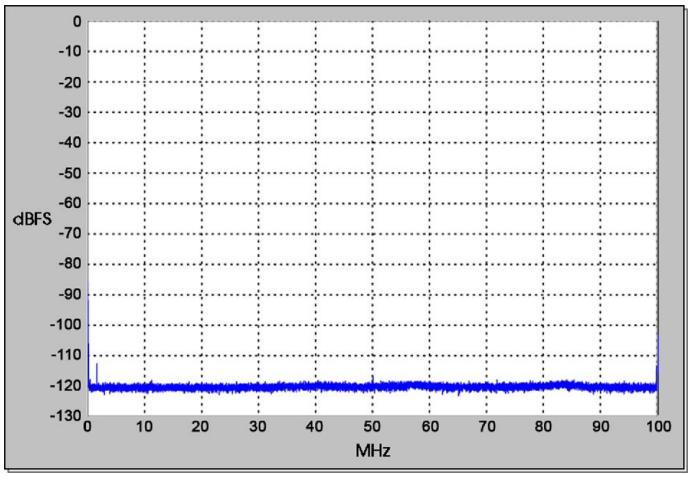
A/D PERFORMANCE

Spurious Free Dynamic Range



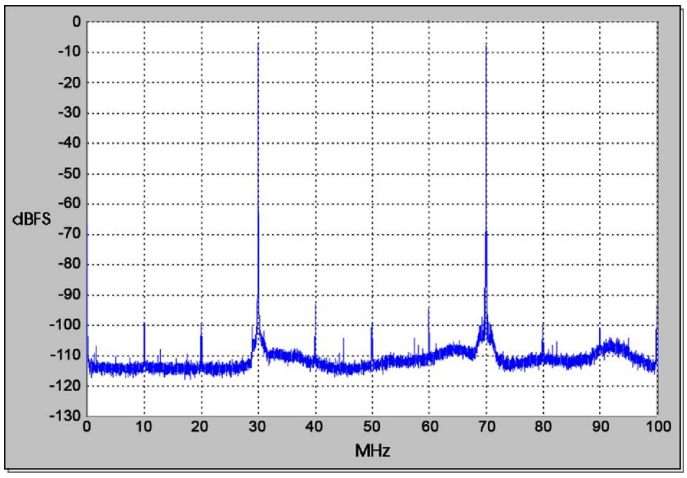
f_{in} = 70 MHz, f_s = 200 MHz, Internal Clock

Spurious Pick-up



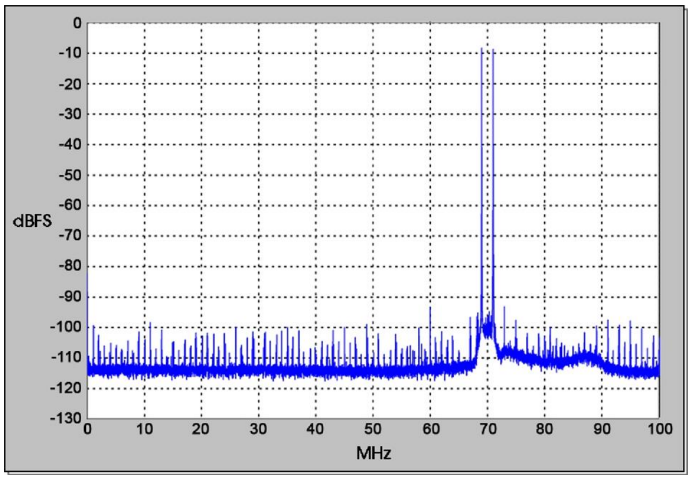
f_s = 200 MHz, Internal Clock

Two-Tone SFDR



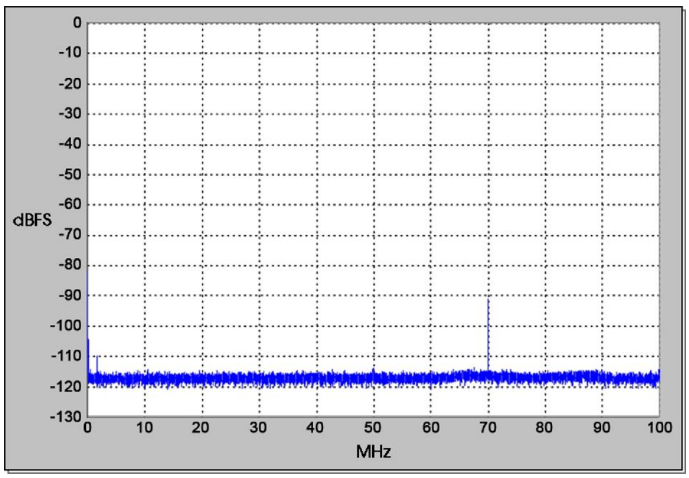
f_1 = 30 MHz, f_2 = 70 MHz, f_s = 200 MHz

Two-Tone SFDR



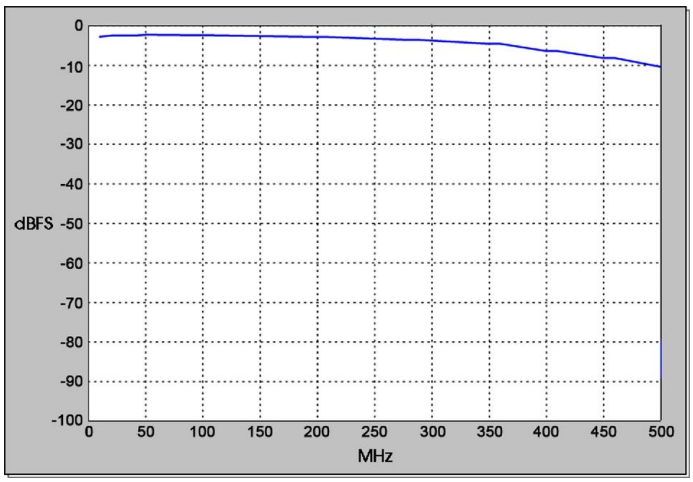
f_1 = 69 MHz, f_2 = 71 MHz, f_s = 200 MHz

Adjacent Channel Crosstalk



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

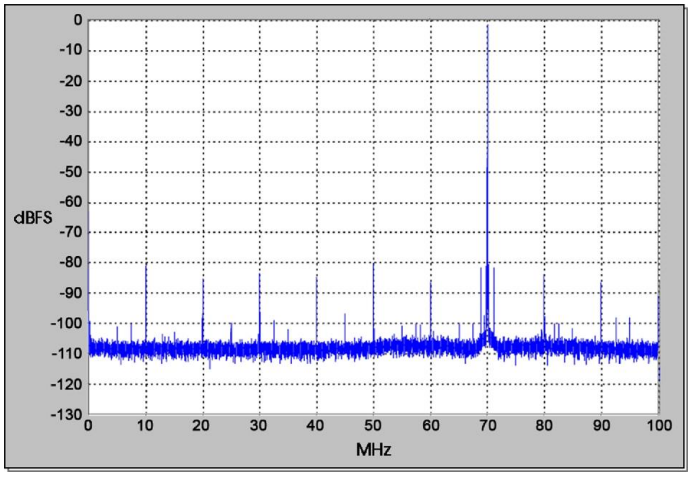
Input Frequency Response



f_s = 200 MHz, Internal Clock

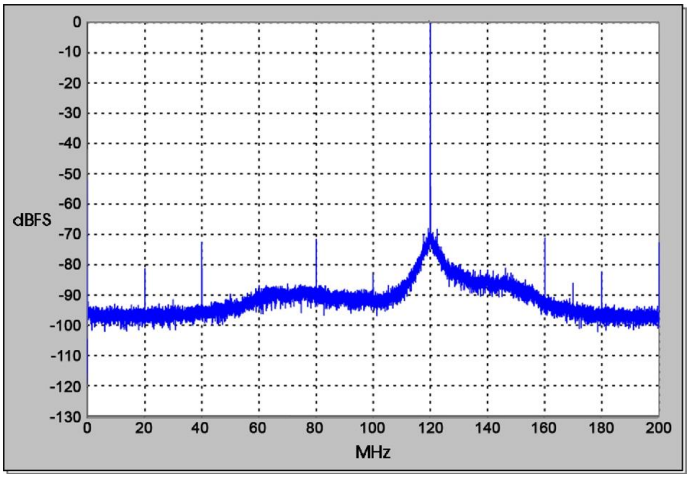
D/A PERFORMANCE

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

Operating System: Windows®

Processor: Intel Core i7 processor or better

Operating System Drive: 256 GB SSD

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

SDRAM: (standard) 8 GB

- Option -309: 16 GB
- Option -310: 32 GB
- Option -311: 64 GB

RAID

- Storage: 7.6, 15.3, 30.7, 61, and 122 TB
- Drive Type: SATA III SSDs
- Supported RAID Levels: (standard) 0
  - Option -285: RAID 5
  - Option -286: RAID 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, Mercury 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 Mercury-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 or external 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.

ORDERING INFORMATION

General Options	
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

RAID Configurations	
Standard	RAID 0 configuration
Option -285	RAID 5 configuration
Option -286	RAID 6 configuration

Memory Options	
Standard	8 GB system memory
Option -309	16 GB system memory
Option -310	32 GB system memory
Option -311	64 GB system memory

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 -460	61 TB SSD storage capacity
Option -485	122 TB 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

Contact Mercury for compatible option combinations. Storage and general options may change, so contact Mercury for the latest information.

LIFETIME SUPPORT FOR TALON PRODUCTS

Mercury offers worldwide customers 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 our 40 years of experience in delivering high-performance radar, communications, SIGINT, EW, and data acquisition MIL-Aero solutions worldwide.

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Learn more

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