Talon RTR 2613

3 GHz RF/IF portable rugged recorder with Sentinel intelligent signal scanner

Intelligent signal scanning in a rugged portable recorder

- Selectable threshold-triggered or manual record modes
- Captures RF signals up to 3 GHz
- Capture and scan bandwidths up to 40 MHz
- Storage capacities to 61.4 TB

The Talon® RTR 2613 combines Mercury's Sentinel Intelligent Signal Scanning software with real-time recording in a lightweight, portable and rugged package. Using the RTR 2613, SIGINT engineers can 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 data collected during a span of days.

HARDWARE FEATURES

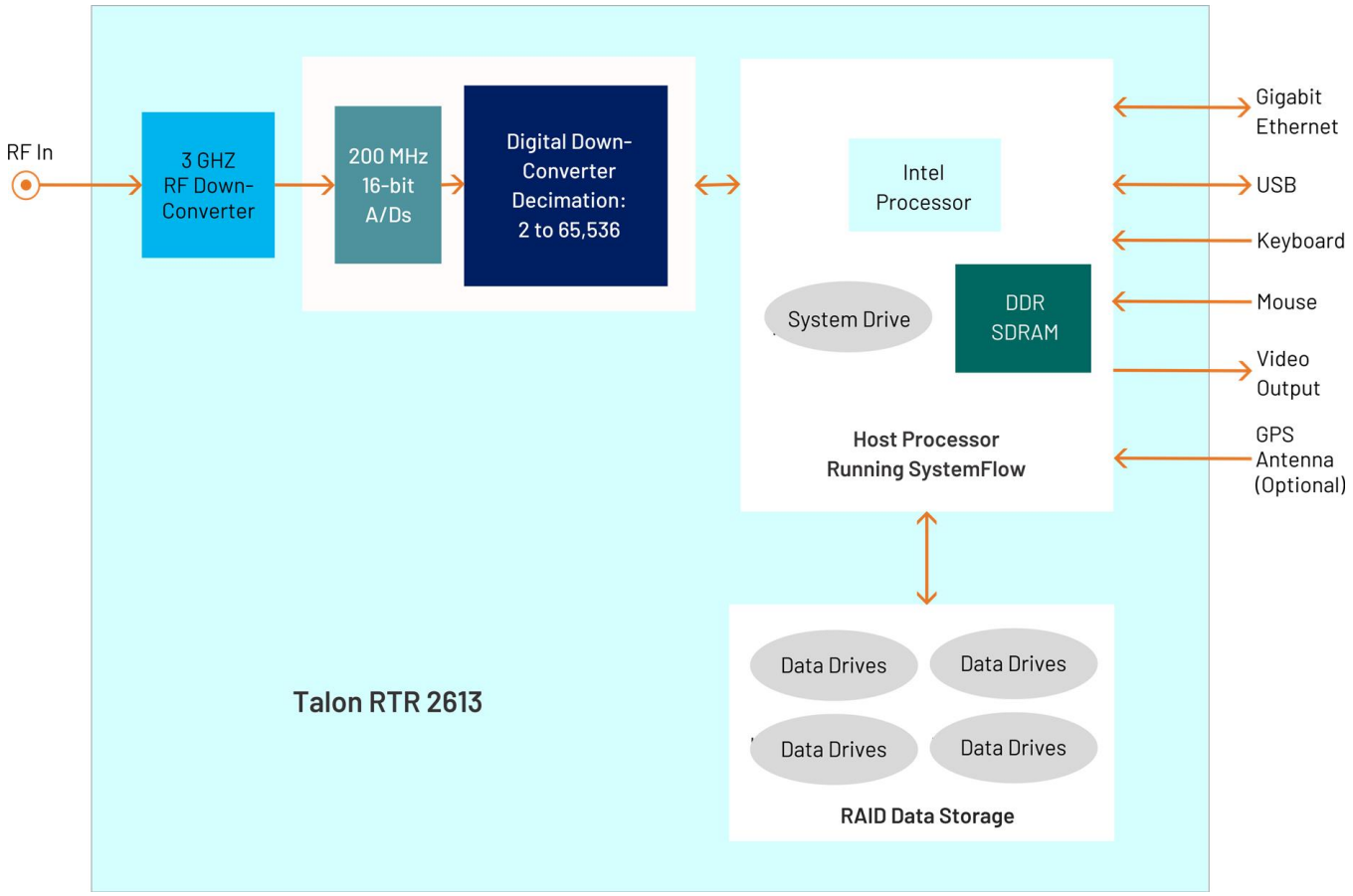
Mercury's Cobalt® 78621 board transceiver serves as the engine of the RTR 2613 and is coupled with a 3 GHz tuner to provide excellent dynamic range across the entire spectrum. The 200 MHz 16-bit A/D board provides 86 dB of spurious-free dynamic range and 75 dB of SNR. The FPGA-based DDC with selectable 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" W x 6.9" D x 13" 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-inch 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.

FEATURES

- Search and capture system using Mercury'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: 2 to 65,536
- Portable system: 16" W x 6.9" D x 13" H
- Lightweight: just less than 30 pounds
- Storage capacities to 61.4 TB
- RAID levels 0, 5, and 6
- Windows® workstation with high-performance Intel® processor
- Optional RF upconversion
- SystemFlow® GUI with virtual oscilloscope, spectrum analyzer and spectrogram displays



SENTINEL FEATURES

Mercury'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.

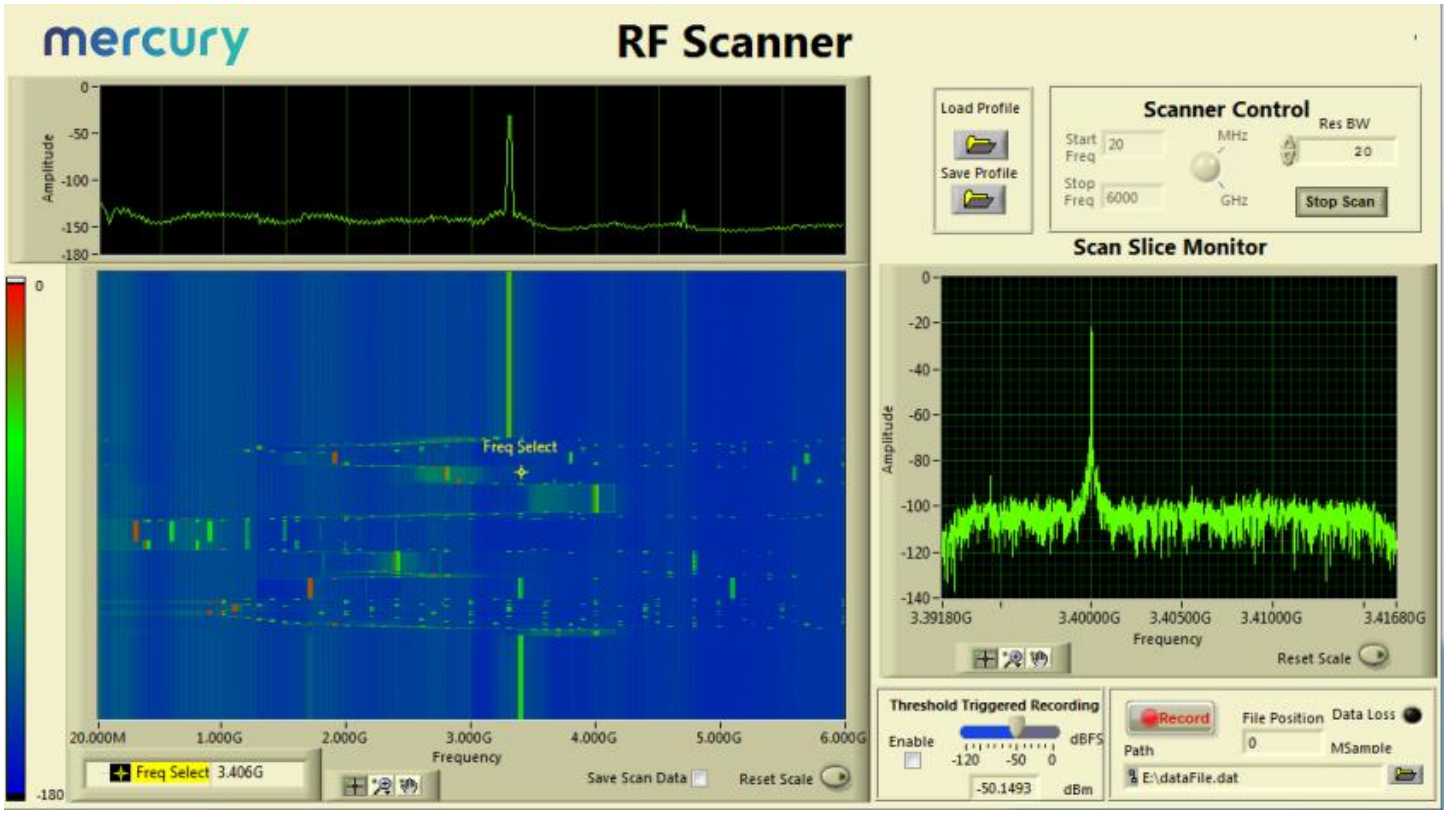
RF energy in each band of the scan is detected and presented in a waterfall display. Any RF band can be selected for real-time monitoring or recording. In addition to manually selecting a band for recording, a recording can be automatically started by configuring signal strength threshold levels to trigger 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 complement the Sentinel hardware resources.

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 SOFTWARE

All Talon recorders include the Mercury SystemFlow® recording software. SystemFlow software enables users to configure and control a Talon recorder:

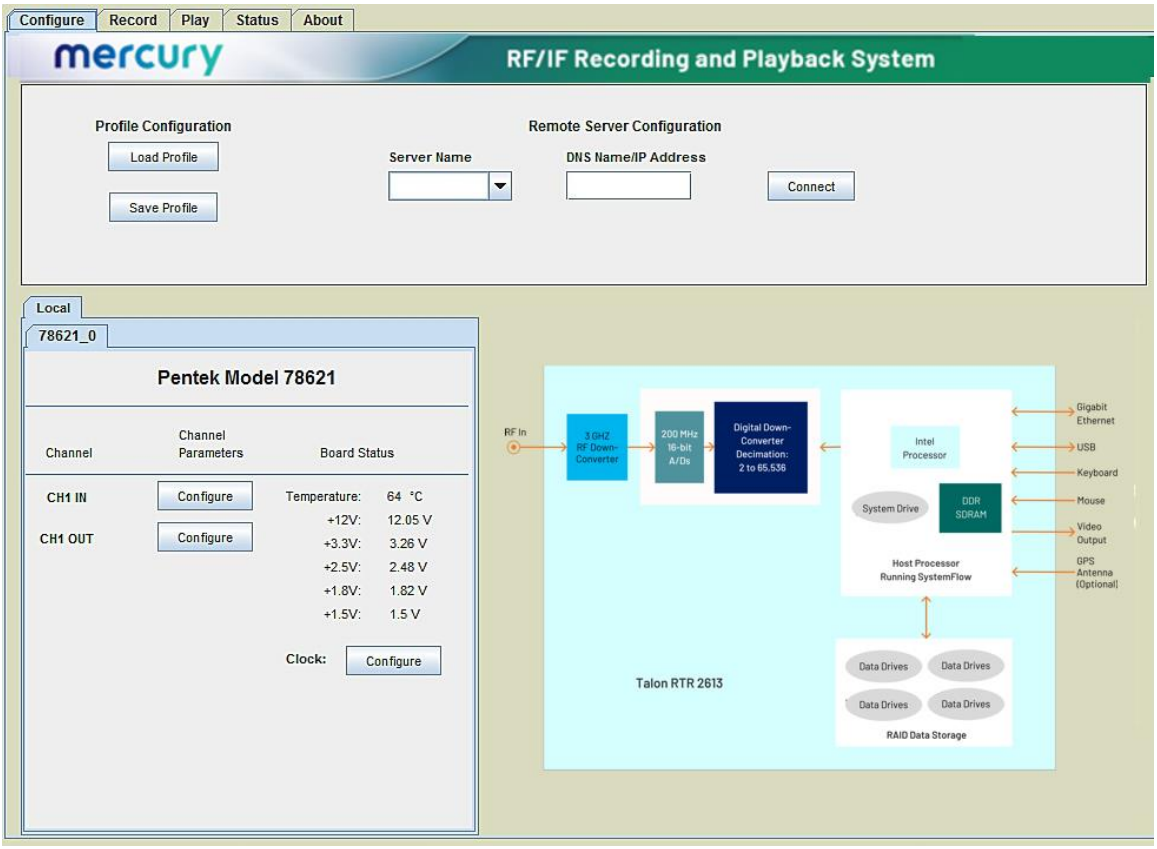
- The SystemFlow GUI provides a point-and-click user interface. It includes Configure, Record, Playback, and Status screens, each with intuitive controls and indicators. The user can easily move between screens to configure parameters, control and monitor a recording, and play back a recorded stream.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

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 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.

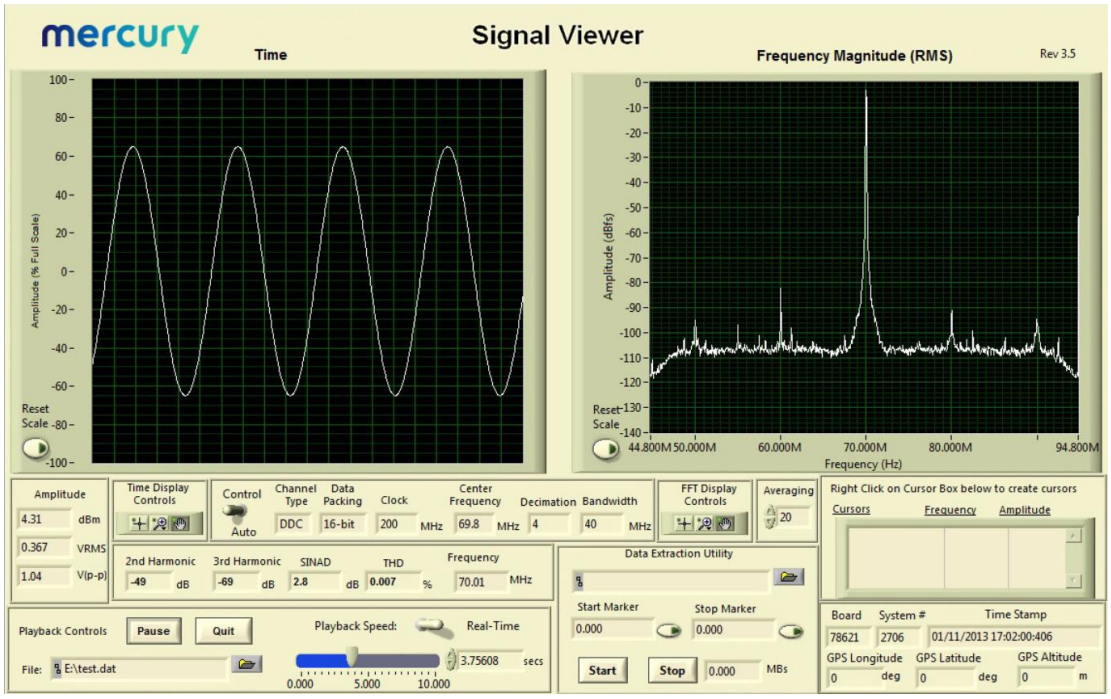
High-level C-language function calls and the supporting device drivers allow users to incorporate the RTR 2613 as a high-performance server front end to a larger system. This is supported using a socket interface through the Ethernet port, either to a local host or through an internet link for remote, 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)
```

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.



SPECIFICATIONS

RF Tuner

RF Tuner Frequency Range: 30 to 3000 MH

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

PC Workstation

Operating System: Windows®

Processor: Intel Core i7 processor or better

SDRAM: 8 GB or better

RAID

Total Storage: 3.8 TB – 61.4 TB

Supported RAID Levels: (standard) 0

- Option -285: RAID 5
- Option -286: RAID 6

A/D Converter

Type: Texas Instruments ADS5485

Sampling Rate: 10 MHz to 200 MHz

Resolution: 16 bits

SNR: 75 dBf_s typical at 70 MHz

SFDR: 86 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

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: 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

Dimensions

- 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

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
Option -625	Removable OS drive
Option -681	18 to 36 VDC power supply

Storage Options	
Option -415	7.6 TB SSD storage capacity
Option -420	15.3 TB SSD storage capacity
Option -430	30.7 SSD storage capacity
Option -460	61.4 TB SSD storage capacity
Option -485	122.8 TB SSD

Other Options	
Option -261	GPS time and position stamping
Option -264	IRIG-B time stamping
Option -267	Dual 10 GbE offload
Option -268	40 GbE offload
Option -269	100 GbE offload

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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