Talon RTR 2628

8-channel, 6 GHz RF rugged rackmount recorder

Ideal for SIGNIT, phased-array radars, and beamforming

- Eight-channel phase-coherent RF recording
- Records RF frequencies from 30 MHz to 6 GHz
- Captures 80 MHz of instantaneous bandwidth
- Front panel removable SSD drives

The Talon® RTR 2628 recorder provides eight channels of phase-coherent RF signal recording, ideal for phased-array antenna systems. It is tunable up to 6 GHz and provides up to 80 MHz of real-time capture bandwidth.

Each input channel includes a 250 MHz 16-bit A/D and an FPGA-based digital downconverter with programmable decimations from 2 to 65,536. RF signals up to 6 GHz in frequency can be sampled and streamed to disk in real-time at sustained aggregate recording rates up to 3.2 GB/sec in a 4U rackmount solution. A/D sampling rates, DDC decimations, and trigger settings are among the selectable system parameters, providing a system that is simple to configure and operate.

Designed to operate under conditions of vibration and extended operating temperatures, the RTR 2628 is ideal for military, airborne and field applications that require a rugged system. The hot-swappable solid state storage drives provide the highest level of performance under harsh conditions and allow for quick removal of mission-critical data.

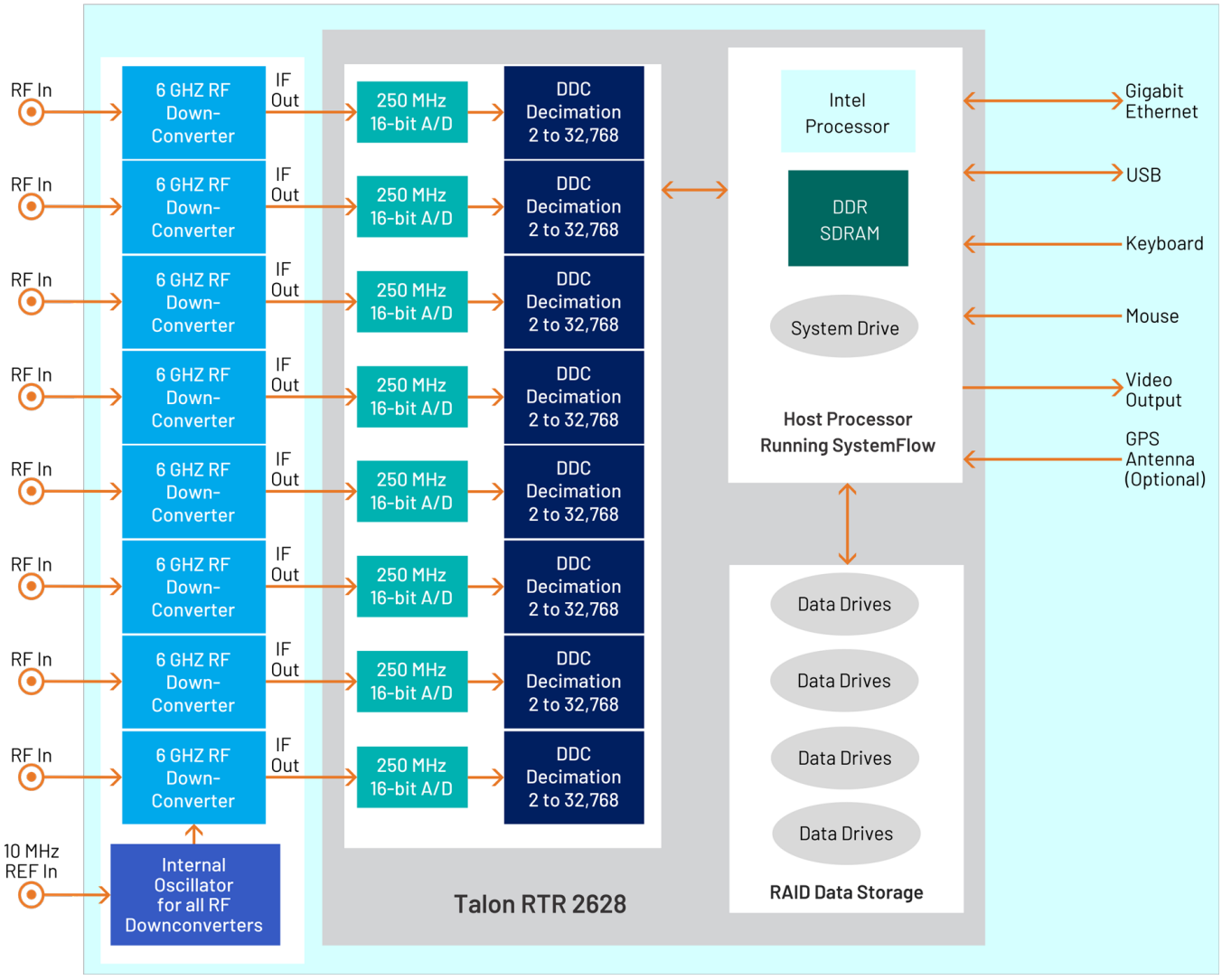
RUGGED AND FLEXIBLE ARCHITECTURE

The RTR 2628 is configured in a 4U 19-inch rack-mountable chassis, with hot-swap data drives, front panel USB ports, and I/O connectors on the rear panel. Systems are scalable to accommodate multiple chassis to increase channel counts and aggregate data rates. All recorder chassis are connected via Ethernet and can be controlled from a single GUI either locally or from a remote PC.

The RTR 2628 includes as many as 32 hot-swappable SSDs to provide flexible storage capacities up to 122 TB. The 2.5-inch SSDs can be easily removed or exchanged during a mission to retrieve recorded data. Multiple RAID levels, including 0, 5, and 6 provide a choice for the required level of redundancy.

FEATURES

- Eight-channel phase-coherent RF recording
- Ideal for signal intelligence, phased-array radars, beamforming, and DF (Direction Finding) systems
- Records RF frequencies from 30 MHz to 6 GHz
- Captures 80 MHz of instantaneous bandwidth
- Eight-channel RF tuner can be set for phase-coherent operation or independent tuning
- Eight 250 MHz 16-bit A/Ds
- Eight DDCs with decimations to 65,536 for selectable bandwidths
- 3.2 GB/s real-time aggregate recording rate
- 4U 19-inch rugged rackmount PC server chassis
- Windows® workstation with high-performance Intel® processor
- Front panel removable SSD drives
- Up to 122 terabytes of storage to NTFS RAID disk array
- SystemFlow® GUI with signal viewer analysis tool
- Optional GPS time and position stamping



SYSTEMFLOW SOFTWARE

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

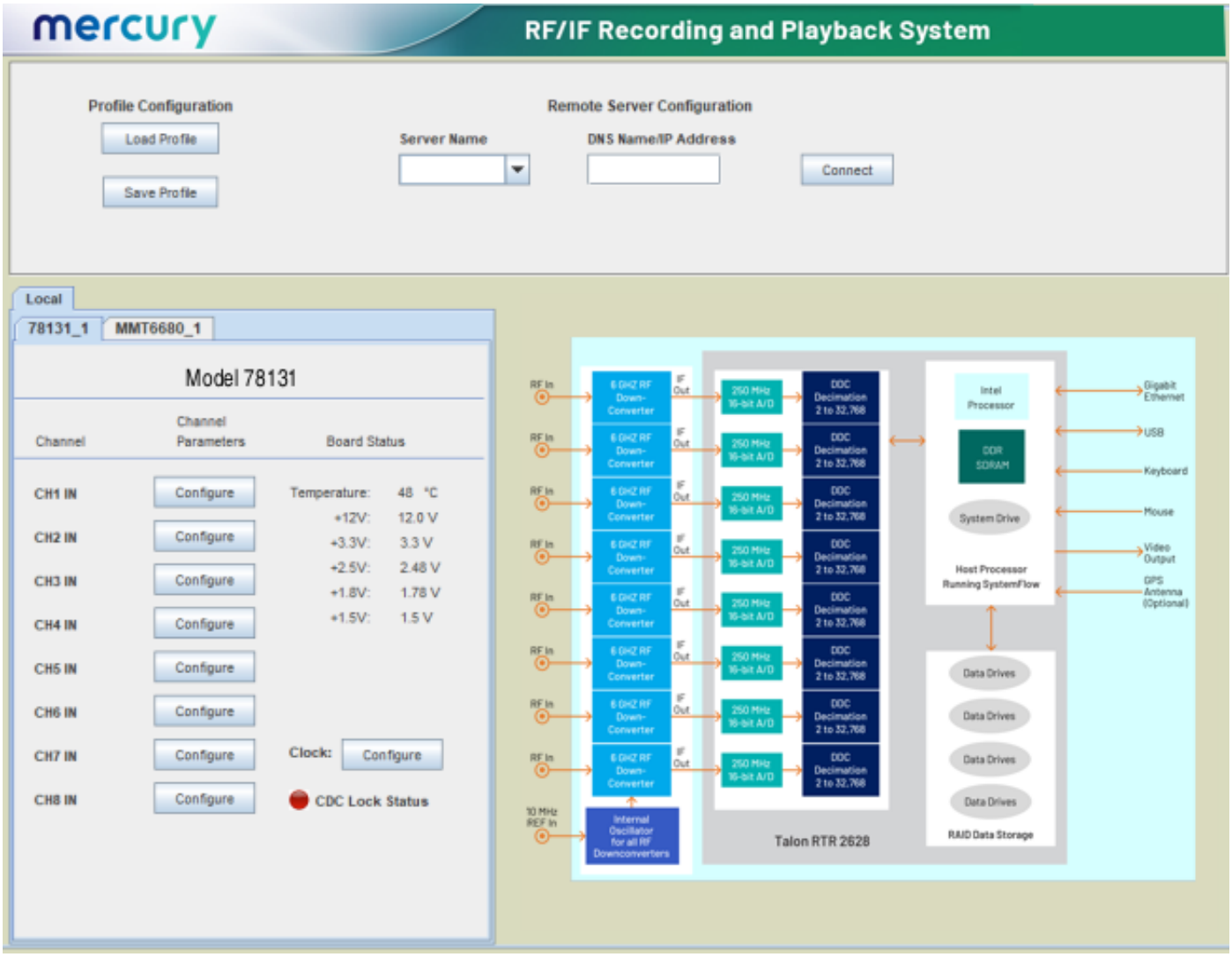
- The SystemFlow GUI provides a point-and-click user interface. It includes Configure, Record, Playback, and Status screens, each with intuitive controls and indicators. The user can easily move between screens to configure parameters, control and monitor a recording, and play back a recorded stream.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

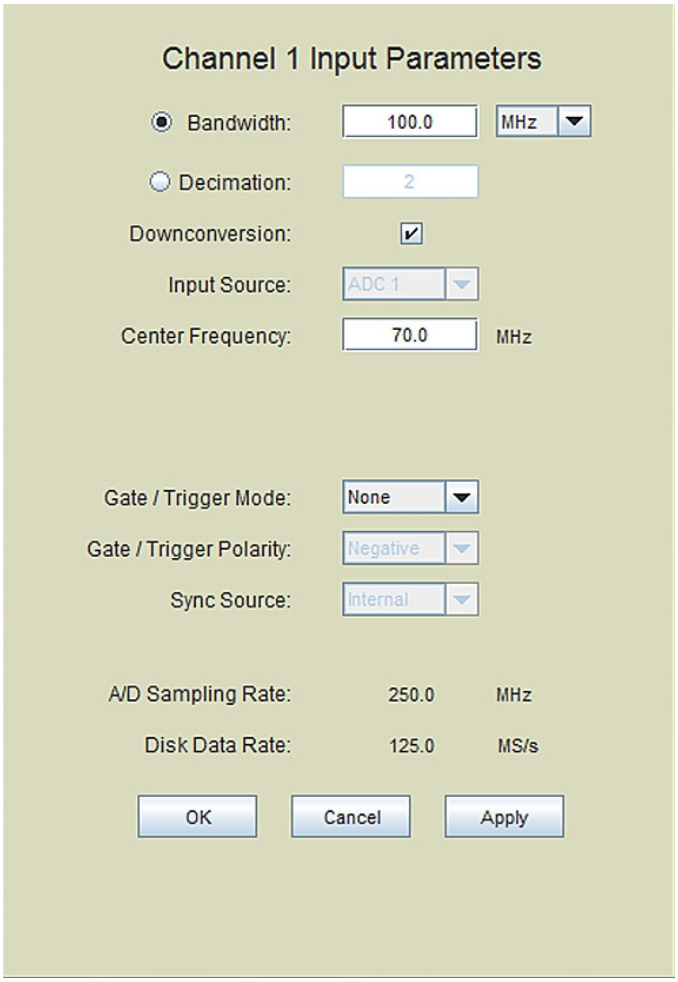
SYSTEMFLOW RECORDER INTERFACE

The RTR 2628 GUI provides the user with a control interface for the recording system. It includes Configuration, Record, 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

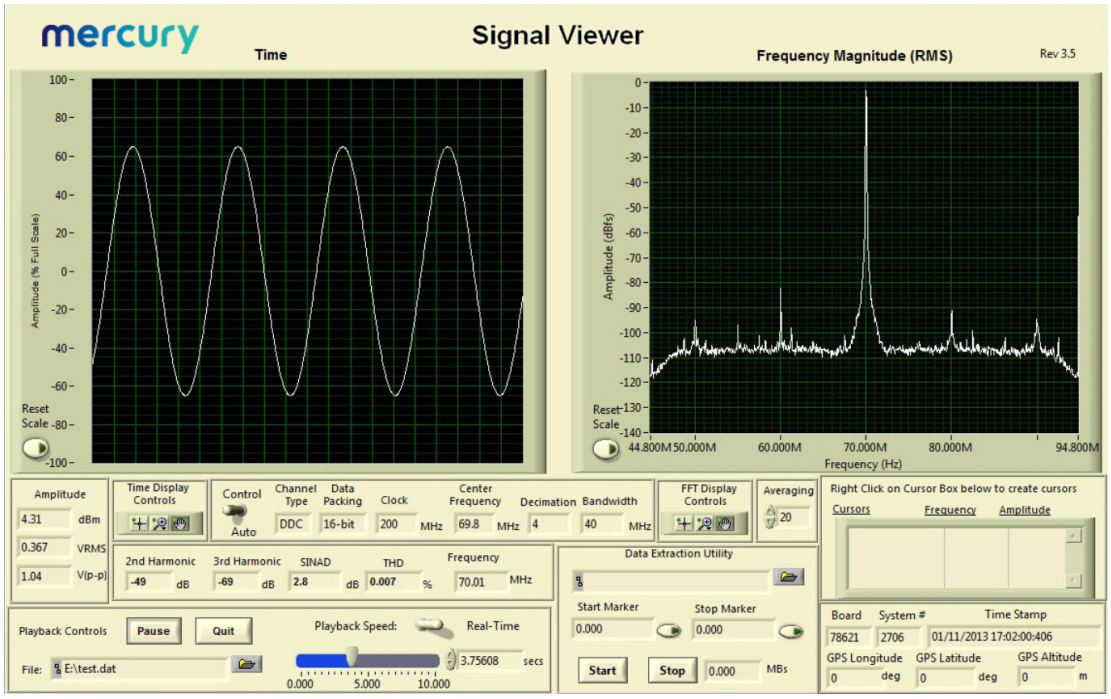
The RTR 2628 Configure screens provide a simple and intuitive means for setting up the system parameters. The ADC/DDC configuration screen, shown below, allows user entries for input source, center frequency, and decimation, as well as gate and trigger information. All parameters contain limit-checking 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 2628 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)
```

SPECIFICATIONS

PC Workstation

Operating System: Windows®

Processor: Intel Core i7 processor or better

SDRAM: (standard) 8 GB

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

RAID

- Storage: 15.3, 30.7, 61.4 or 122.8 TB
- Drive Type: SATA III SSDs
- Supported RAID Levels: (standard) 0
  - Option -285: RAID 5
  - Option -286: RAID 6

Analog Signal Inputs

Connector Type: Rear-panel female SMA connectors

RF Tuner

Frequency Range: 30 to 6000 MHz

Tuning Resolution: 1 kHz steps

Internal Frequency Accuracy: ±1.0 ppm (-20 to +60°C); options available

External Reference Input Frequency: 10 MHz

External Reference Input Level: 0 dBm ± 3 dBm

RF Input: 50Ω nominal

VSWR: 3:1 max, <2.01 typical at tuned frequency

Preselection:

- 20-90 MHz Low Pass Filter
- 90-250 MHz, 250-750 MHz Voltage Tuned Filters
- 750-1200 MHz, 1200-1700 MHz, 1700-2300 MHz Suboctave
- 2300-4000 MHz, 4000-6000 MHz Voltage Tuned Filters

Noise Figure:

- 13 dB typical, 16 dB maximum, (Independent Mode)
- 14 dB typical, 17 dB maximum, (Slave Mode)

Maximum RF Input without Damage: +15 dBm

In-Band input IP3: +3 dBm typical, -3 dBm minimum

Input Second-order Intercept Point: +30 dBm minimum, +36 dBm typical

IF Bandwidth: Nominal 80 MHz bandwidth standard (40 MHz optional)

RF to IF Gain : +60 dB nominal above RF input

Gain Control:

- Manual: 60 dB range (minimum)
- Automatic: ±3 dB of selected output level (0 to -30 dBm)

Image Rejection: 65 dB minimum (>80 dB typical)

IF Rejection: 65 dB minimum (80 dB typical)

LO Level at RF Input: -75 dBm maximum (-90 dBm typical)

Phase Noise at 6000 MHz

- 1 kHz Offset: -75 dBc/Hz typical
- 20 kHz offset: -80 dBc/Hz maximum
- 100 kHz offset: -100 dBc/Hz typical
- 1 MHz offset: -125 dBc/Hz typical

Receiver Tuning Speed: 300 µs typical 800 µs maximum, to within 1 kHz

Internally Generated Spurious: -100 dBm equivalent RF input typical

A/D Converters

Type: Texas Instruments ADS42LB69

Resolution: 16 bits

SNR: 73.2 dBFS

SFDR: 87 dBc (HD2 and HD3)

100 dBc (Non HD2 and HD3)

Digital Downconverters

Type: Mercury DDC IP Core

Decimation (D): User selectable 2 to 65536

DDC Usable Bandwidth: 0.8*f_s/D, factory-supplied DDC coefficient tables

A/D Clock

Clock Sources: Selectable from onboard programmable VCXO or external clock

External Clock

Connector Type: Rear panel female MMCX connector

Input Type: Transformer-coupled

Full-scale Input: 0 to +10 dBm

Trigger

Connector Type: Rear panel female MMCX connector

Input Type: LVTTL

Physical and Environmental

4U Short Chassis: 19" W x 21" D x 7" H

Weight: 50 lb. approx.

Operating Temp: 0° to +50° C

Storage Temp: –40° to +85° C

Relative Humidity: 5 to 95%, non-condensing

Operating Shock: 15 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

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

Bandwidth Options	
Standard	80 MHz maximum bandwidth
Option -040	40 MHz maximum bandwidth

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 -461	61.4 TB SSD storage capacity, 3.84 TB per channel
Option -485	122.8 TB SSD storage capacity

General Options (append to all options)	
Option -261	GPS time and position stamping
Option -264	IRIG-B time stamping

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

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Learn more

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