Talon RTR 2729A

3.6 GS/sec RF/IF rugged portable recorder

Portability and performance in a compact recorder

- Can operate as a single-channel 3.6 GHz recorder or a two-channel 1.8 GHz recorder
- Up to of 122 TB of SSD storage
- Real-time sustained recording rates of up to 4.8 GB/sec

The Talon® RTR 2729A is a turnkey system that allows users to record very high-bandwidth signals in a lightweight and rugged portable package. Equipped with a 3.6 GHz 12-bit A/D converter and user-programmable DDC (digital downconverter), the RTR 2729A is capable of capturing RF/IF signals with bandwidths as high as 360 MHz continuously for more than four hours.

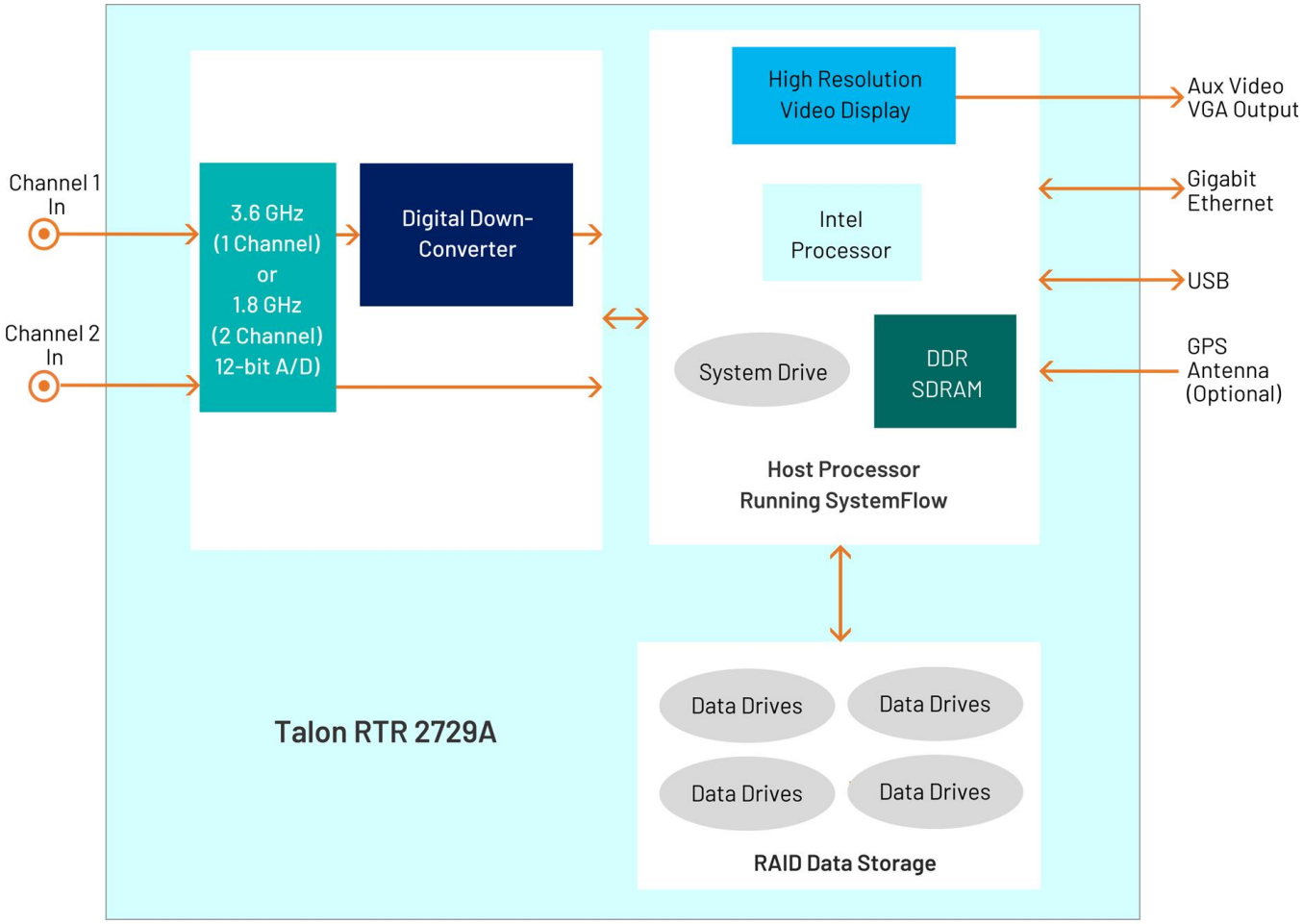
The RTR 2729A is supplied in a small-footprint portable package measuring only 16.9 inches wide, 9.5 inches deep, and 13.4 inches high, and weighing just less than 30 pounds. With measurements similar to a small briefcase, this portable workstation includes an Intel Core i7 processor, a high-resolution 17-inch LCD monitor and up to 122 TB of SSD storage.

The RTR 2729A uses a high-powered Mercury Virtex-7-based Onyx® board that includes a PCIe Gen. 3 engine to provide data streaming for the high-speed A/D converter. Coupled with a high-performance PCIe Gen. 3 SATA III RAID controller, the RTR 2729A is capable of streaming contiguous data to disk in real-time at rates up to 4.8 GB/sec.

The RTR 2729A can operate as a single-channel 3.6 GHz or a two-channel 1.8 GHz recorder. The channel mode operation, sample rate, DDC settings, packing modes and trigger settings are controllable via the built-in SystemFlow GUI (Graphical User Interface). An optional GPS receiver and timing card can be added to the system to provide precise time and position stamping of the recorded data.

FEATURES

- Designed to operate under conditions of shock and vibration
- Portable system: 16" W x 6.9" D x 13" H
- Lightweight: just less than 30 pounds
- Sample rates up to 3.6 GHz in single-channel mode
- Sample rates up to 1.8 GHz in dual-channel mode
- 12-bit A/D, with 16- and 8-bit packing modes
- Capable of recording RF/IF frequencies to 1.75 GHz in single-channel mode
- Capable of recording RF/IF frequencies to 2.8 GHz in dual-channel mode
- Real-time sustained recording rates of up to 4.8 GB/sec
- Windows® workstation with high-performance Intel® processor
- Up to 122 terabytes 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



RUGGED CHASSIS WITH SSD STORAGE

The RTR 2729A 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 provide a choice for the required level of redundancy.

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.

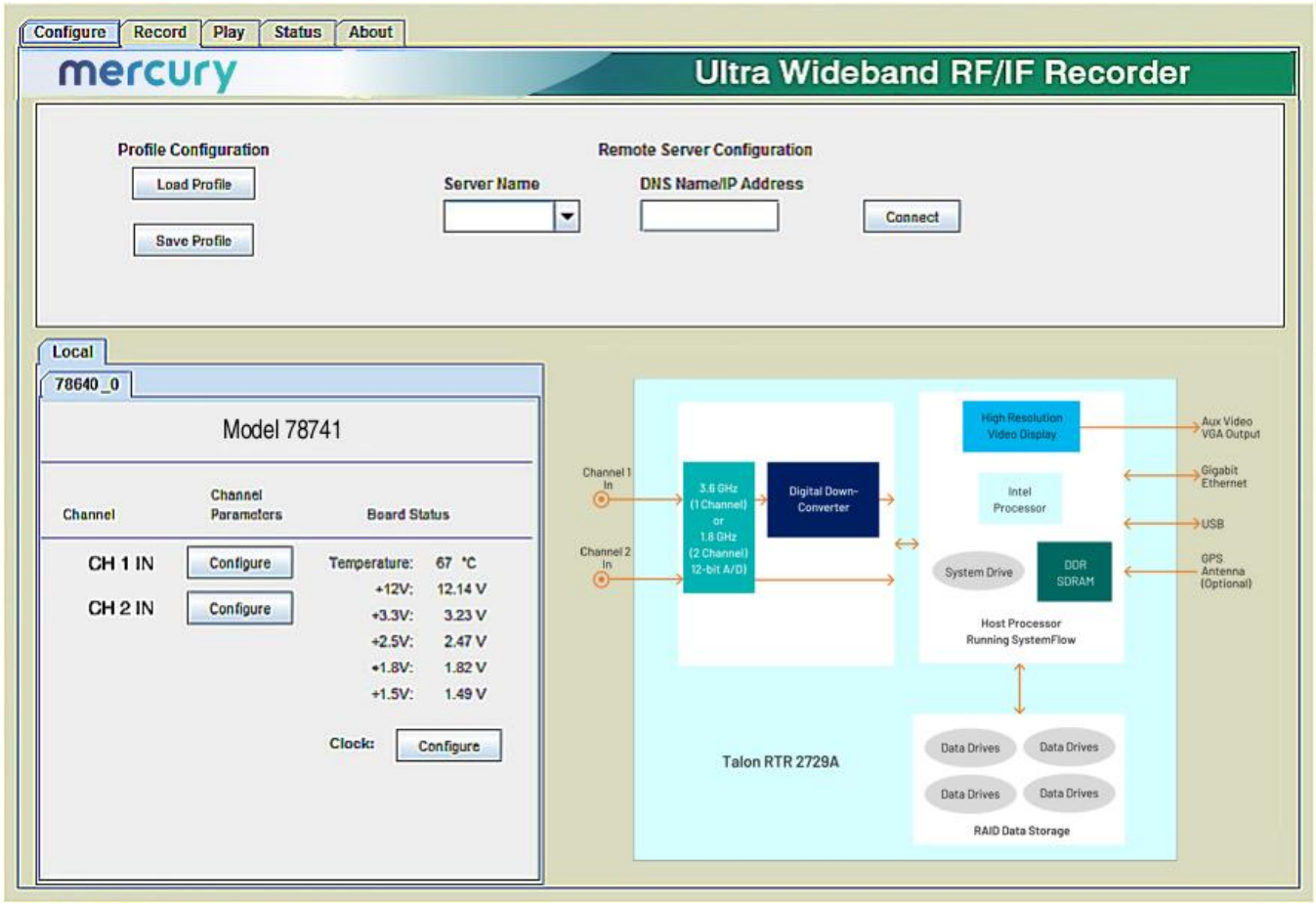
The Simulator can simulate the operating environment of all the different Talon recorder models. The Simulator also demonstrates the SystemFlow Signal Viewer by playing recorded signals to simulate the appearance of live signals being digitized and recorded by a Talon analog signal recorder.

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

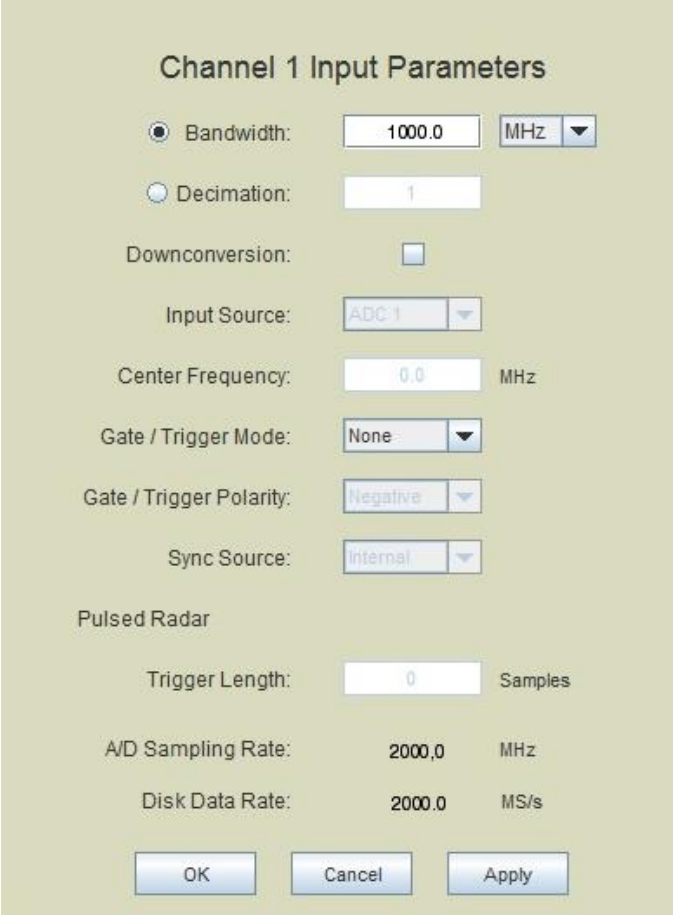
SYSTEMFLOW RECORDER INTERFACE

The RTR 2729A 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

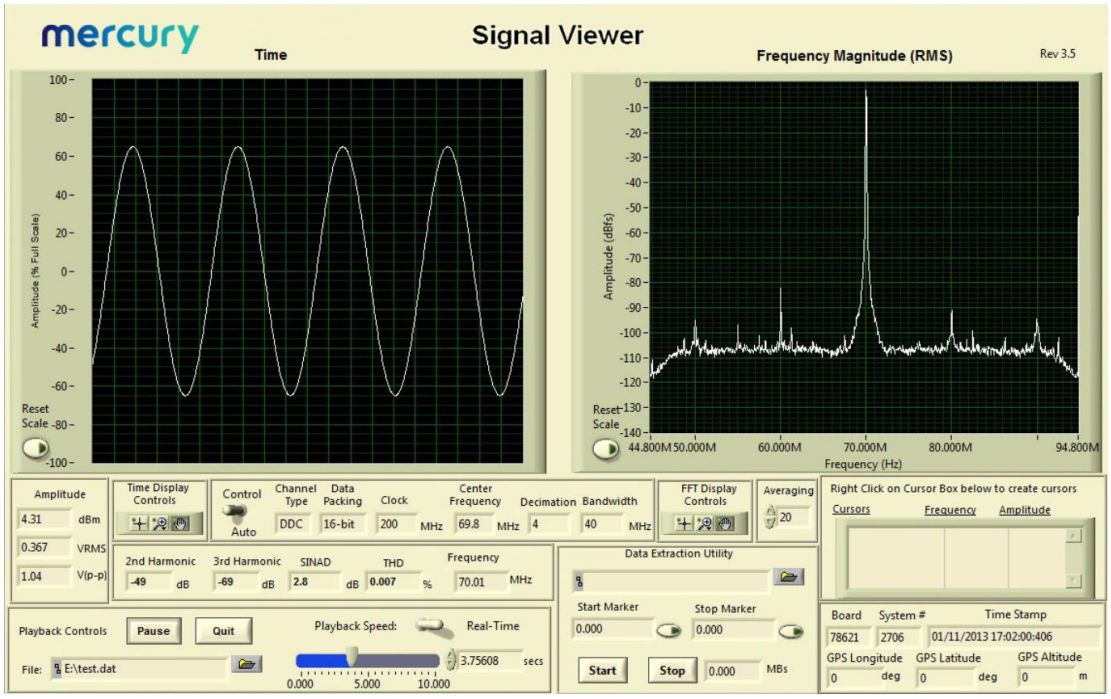
The RTR 2729A Configure screens provide a simple and intuitive means for setting up the system parameters. The configuration screen, shown below, allows user entries for input source, sampling frequency, and gate and trigger information. All parameters contain limit-checking and integrated help.



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 2729A 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

Operating System Drive: 128 GB SSD

Monitor: Built-in 17.3" high-resolution LCD, 1920 x 1080 pixels, 16:9 aspect ratio, anti-glare surface Brightness: 300 cd/m2; Contrast ratio: 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, or 30.7 TB

Drive Type: SATA III SSDs

Drive Bays: Hot-swap, removable, side panel

Supported RAID Levels: (standard) 0

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

Analog Signal Inputs

Connectors: Two side panel SSMC connectors, IN 1 & IN 2

Input Type: Single-ended, non-inverting

Full Scale Input: +4 dBm into 50 ohms

Coupling: Transformer-coupled

Input Transformers

Bandwidth: 4.5 kHz to 3.0 GHz

A/D Converters

Type: Texas Instruments ADC12D1800

Sampling Rate:

Single-channel mode: 500 MHz to 3.6 GHz

Dual-channel mode: 150 MHz to 1.8 GHz

Resolution: 12 bits

Maximum Usable Input Frequency

Single-channel mode: 1.75 GHz

Dual-channel mode: 2.8 GHz

Anti-Aliasing Filters: External, user-supplied

Digital Downconverters

Modes: One or two channels, programmable

Supported Sample Rate (f_s):

One-channel mode: 3.6 GHz

Two-channel mode: 1.8 GHz

Decimation Range (D):

One-channel mode: 8x, 16x, 32x, bypass

Two-channel mode: 4x, 8x, 16x, bypass

Usable Output Bandwidth: $0.8*f_s/D$

Sampling Clock Source

Internal fixed-frequency or programmable oscillator (selectable by option); in single-channel mode, the sample rate is 2x the clock frequency; in dual-channel mode, the sample rate equals the clock frequency

Frequency Reference

Accepts external 10 MHz reference at 0 to +4 dBm to phase-lock the clock oscillator

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: 16.0" W x 6.9" D x 13.0" H

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: 2.06g RMS

Power Requirements: 100 to 240 VAC, 50 to 60 Hz, 500 W max.

ORDERING INFORMATION

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

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

Sample Clock Options

Option -910	**User-Programmable Sample Clock** Dual-channel mode sample clock range 150 MHz – 945 MHz 970 MHz – 1134 MHz 1213 MHz – 1417.5 MHz Single-channel mode sample clock range 500 MHz – 1890 MHz 1940 MHz – 2268 MHz 2426 MHz – 2835 MHz
Option -911	**Fixed-Frequency Clock:** 1.5 / 3.0 GHz sample clock
Option -912	**Fixed-Frequency Clock:** 1.6 / 3.2 GHz sample clock
Option -915	**Fixed-Frequency Clock:** 1.8 / 3.6 GHz sample clock
Sample rates are set up for dual-channel mode first and single-channel mode second: e.g., 1.5 / 3.0 is 1.5 in dual-channel mode and 3.0 in single-channel mode. Custom fixed-frequency sample clocks available upon request.	

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	61.4 TB SSD storage capacity
Option -485	122.8 TB SSD storage capacity

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

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