

Rugged Video High Definition Recorders

The Rugged Video line of HD video recorders are designed for aerospace and defense applications.

Commander Recorder

- 1080p HD Video
- Records to Four USB's
- Built-in 2.4" Display
- Logo Overlay & Pre-Roll
- GPS Integration
- Expandable with Modules

Crusader Recorder

- One, Two, Three or Four Channel Recording
- 1080p60 HD Video
- Accepts 3G-SDI, HD-SDI, SD-SDI, HDMI/DVI, or NTSC/PAL
- GPS Automation & Integration
- Built-in Audio Mixing
- WiFi Streaming
- Internal Battery Backup

TourMaster Recorder

- Four Channel Switching
- 1080p60 HD Video
- GPS Automation & Integration
- MP3 Soundtracks & Narrations
- Built-in Audio Mixing
- WiFi Streaming
- Internal Battery Backup

▶ HD Recorders



RUGGED
VIDEO

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Rugged Video, LLC
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USA

Recorder Comparison

COMMANDER



CRUSADER



TOURMASTER



RV-ONE, RV-SFOUR (LEGACY)



Recorder	Commander	Crusader	TourMaster
Applications	Flight Training Flight Testing Aerial Patrol Airborne Law Enforcement Flight Tours	Aerial Patrol Airborne Law Enforcement Flight Testing	Flight Tours
Video Channels	Single Expandable to: 2-4 Switching 2-4 Multiplexed 2-4 Linked Units	Single Expandable to: 2-4 Switching 2-4 Multiplexed 2-4 Linked Units	1-4 Switching
Automation (Trigger On: Time, GPS Speed, Direction, Way- points)	Optional with Switcher	Built-in Option: MP3 Audio (Narrations/Soundtracks) Camera Switching Recording Snapshots Text Overlay	
Media Support	Video: 4 x USB 3.0 Up to 2TB Snap/Reroll: 1 x SD (SDHC)	Video: 1 x USB 2.0/3.0 Up to 2TB Automation: 1 x SD (SDHC)	
GPS Integration	Overlay: Speed Altitude Coordinates Heading G-Force X,Y,Z (current, min, max) Data Files: KML, GPX	Overlay: Speed Altitude Coordinates Heading Data Files: KML, GPX	
Expansion Modules	Switcher Multiplexer MultiLink Stacking CoPilot Control Narrator PTT GPS RF Remote	Switcher Multiplexer MultiLink Stacking CoPilot Control Narrator PTT WiFi GPS RF Remote	Multiplexer MultiLink Stacking CoPilot Control Narrator PTT WiFi GPS RF Remote
Triggers	Built-in & Remote: Record Snapshot Waypoint	Built-in & Remote: Record Snapshot Waypoint	Built-in & Remote: Camera Select Record Snapshot Waypoint
Power	DC 5-36V (10V Required for Camera Power) 4.5W	DC 10-36V 4.25W	DC 10-36V 6.25W
Dimensions/Weight	4.37" x 3.04" x 1.67" 15.9oz	5.00" x 5.00" x 1.85" 22.5 oz	5.00" x 5.00" x 3.34" 31.4 oz

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▶ Commander Recorder

RV-CMMD-BASE Single Channel

The Rugged Video Commander was designed as a multi-purpose Airborne Recorder.

Features

- 1080p HD Video
- Records to 4 USB Drives
- 2.4" Chroma LCD
- Full Color Logo Overlay
- Pre-Roll Video Intros
- GPS Integration for Overlay and Data File Recording
- Internal Battery

Applications

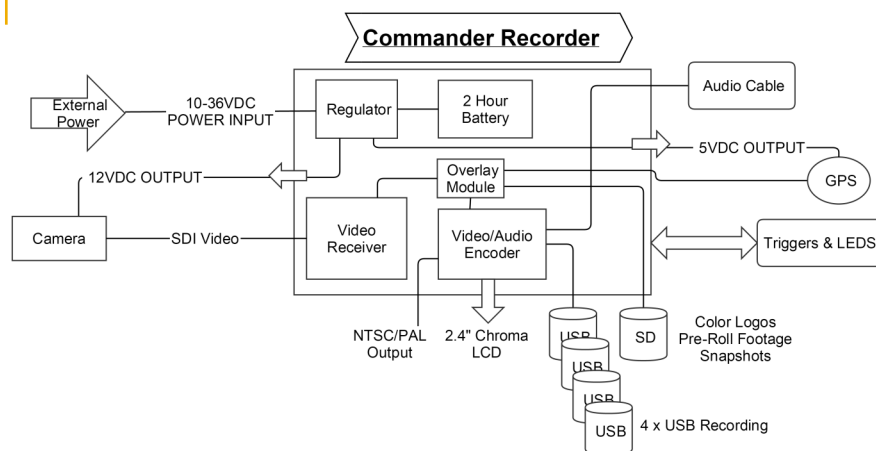
- Flight Training
- Flight Tours
- Aerial Patrol/Mapping
- Flight Testing
- Airborne Law Enforcement
- Mission Recording/Debriefing

Add-on Modules

- Four Channel Switcher
- Four Channel Multiplexer
- MultiLink up to Four Units
- CoPilot Control Module
- Narrator PTT Module



▶ FUNCTIONAL DIAGRAM



TOP VIEW



FRONT VIEW



SIDE VIEW



REAR VIEW



Specifications

Video

SDI Input	HD-SDI—SMPTE 292M (1080i60, 1080i50, 1080p30, 1080p25, 1080p24, 720p60, 720p50, 720p30, 720p25, 720p24)
	SD-SDI—SMPTE 259M (576i, 480i)
Resolutions	1080p30, 1080p25, 1080i60, 1080i50, 720p60, 720p50, 720p30, 720p25, 480i30, 576i25
Compression/Bitrate	H.264 (AVC, MPEG-4 Part 10) Main Profile 500Kb/s to 12.5Mb/s
	MPEG-4 500Mb/s to 5Mb/s
Output	Composite/Analog NTSC/PAL

Audio

Input/Sources	External: Analog Stereo, Line Level up to 8V P-P General Aviation, Helicopter (UI74), Bose 6-Pin Microphone, AUX Jack Input, RCA Input, 1/4" Input, XLR input
Compression	AAC at 64Kb/s (16KHz)

Triggers/Indicators

Triggers	Top Panel: Power On/Off, Record, Snapshot, Waypoint, Menu Navigation
	Rear Connector (Remote Mounting): Record, Snapshot, Waypoint
	RF Remote: Record, Snapshot, Waypoint (Optional)
Indicators	On Screen: Live Video, Record Status & Duration, Time, Disk Space, Battery Level.
	Top Panel: Power, Record, Fault, GPS
	Rear Connector (Remote Mounting): Record, Fault, GPS

Display

Properties	2.4" Chroma LCD 400 cd/m ² (nit) Anti-Glare/UV Coating
Onscreen Elements	Live View & Playback
	Status: Time/Date, Disk Space, Record Time, Battery Level, Audio Gain, Video Source, Resolution, Encoding
	Settings Menu: Video, Audio, OSD, Playback, Settings, Record

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SINGLE CHANNEL



4 CHANNEL SWITCHER



4 CHANNEL MULTIPLEXER



MULTICHANNEL STACKING



Specifications

GPS/Data	
Input	RS-232 Baud 2400 to 115200 Garmin 18x LVC, 5Hz, Garmin Aviation NAV Standard NMEA 0183
Sample Rate	Overlay: 20Hz KML/GPX: 1Hz or 5Hz Accelerometer: 20Hz
Sentences	GPS: GPRMC, GPGGA, GPGSA, GPVTG CUSTOM: \$ASCII, TEXT 1, TEXT 2, TEXT 3<CR><LF>
Overlay Data	Coordinates (Degrees, Degrees Minutes, Degrees, Minutes, Seconds) Speed (KT, MPH, KPH) Altitude (Meters, Feet) Heading (Degrees) *VTG only Time/Date Custom (Three Lines) G-Force X, Y, Z (Min, Max, Current)
GPS Companion Files	KML & GPX - Synced with Video GPS Supports Waypoints
Media	
SD	SD, SDHC, SDXC (For Snapshots & Pre-Roll Video)
USB	USB 3.0 (SanDisk CZ80 or Better) up to 2TB *Must be extreme performance drive for HD Video & Multiple USB Recording.
Power	
Input	DC 5-36V (10V Required for Camera Power) 4.5W Compatible with 12V, 14V, 24V, and 28V Aircraft Power Systems
Physical	
Temperature Range	Operation: -40°C to +85°C (-40°F to 185°F) Storage: -55°C to +105°C (-67°F to 221°F)
Dimensions L, W, H	4.37" x 3.04" x 1.67" 111mm x 77mm x 42mm
Weight	15.9oz 450g

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RV-CRUS-X1 Single Channel
RV-CRUS-X2 Dual Channel
RV-CRUS-X3 Three Channel
RV-CRUS-X4 Four Channel

The Rugged Video Crusader was designed as video recording solution for professional aerospace applications.

Features

- One, Two, Three or Four Channel Recording
- 1080p60 HD Video
- Accepts 3G-SDI, HD-SDI, SD-SDI, HDMI/DVI, or NTSC/PAL
- Built-in GPS Automation
- GPS Integration for Overlay and Data File Recording
- Built-in Audio Mixing
- WiFi Streaming
- Internal Battery Backup

Applications

- Aerial Patrol/Mapping
- Flight Testing
- Airborne Law Enforcement
- Mission Recording/Debriefing

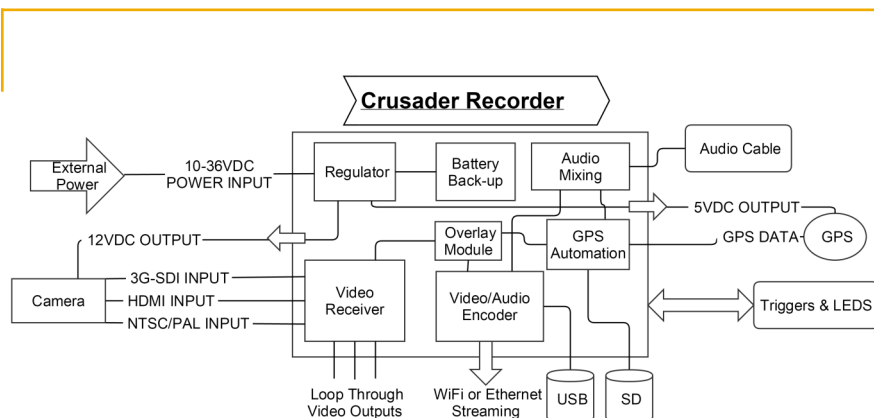
Add-on Modules

- Four Channel Switcher
- Four Channel Multiplexer
- CoPilot Control Module
- Narrator PTT Module

▶ Crusader Recorder



▶ FUNCTIONAL DIAGRAM



SYSTEM



FRONT



REAR



ISOMETRIC



Specifications

Video

SDI Input

3G-SDI—SMPTE 424M (1080p60, 1080p59.94, 1080p50)
 HD-SDI—SMPTE 292M (1080i60, 1080i59.94, 1080i50, 1080p30, 1080p29.97, 1080p25, 720p60, 720p50, 720p30)
 SD-SDI—SMPTE 259M (576i, 480i)

HDMI/DVI Single Link (DVI-D) Input

1920x1200p60, 1920x1200p50, 1440x900p60
 1280x1024p60, 1280x1024p30, 1280x960p60, 1280x960p30
 1280x960p60, 1280x960p30, 1024x768p60, 1024x768p30
 800x600p60, 1080p60, 1080p50, 1080p30, 1080p25
 1080i60, 1080i59.94, 1080i50, 720p60, 720p50, 720p30, 720p25
 480p60, 480p30, 576p50

CVBS Input

Composite/Analog
 NTSC, PAL, SECAM
 75ohm 1V p-p

Resolution/ Framerate

Resolutions: 1920x1200, 1920x1080, 1680x1050, 1600x900, 1440x900
 1280x1024, 1280x920, 1280x720, 1024x768, 800x600
 640x480, 640x360, 352x288, 352x576, 352x240, 352x480
 720x240, 720x288, 720x480, 720x576
 Framerates: (60,50,30,25,20,15,10,8,6,5,4,3,2,1)

Compression/ Bitrate

H.264 (AVC, MPEG-4 Part 10)
 Baseline, Main, and High Profile
 32Kb/s to 16.5Mb/s CBR or VBR
 MJPEG
 2Mb/s to 55Mb/s VBR

Audio

Input/ Sources

External: Analog Stereo, Line Level up to 8V P-P
 General Aviation, Helicopter (UI74), Bose 6-Pin
 Microphone, AUX Jack Input, RCA Input, 1/4" Input, XLR input
 Internal: MP3 (Automator SD Card)
 Soundtracks, Narrations, Safety Messages, Background Music
 Embedded: SDI, or HDMI

Output/ Destination

Output to Headset(s)/Audio Panel
 MP3 Narrations, Soundtracks, etc. via Automator and/or
 Mixed Automator Audio & AUX Input (iPod, etc.)

Audio Mixing

External/Internal Source Mixing
 Independent Level Adjust 0 to 10x Volume
 2 x Master Gain

Compression

AAC at 64Kb/s or 128Kb/s (32KHz, 44.1KHz, 48KHz)
 G.711 at 64Kb/s

Triggers/Indicators

Triggers

Front Panel: Power On/Off, Record
 Rear Connector (Remote Mounting): Record, Snapshot, Waypoint
 RF Remote: Record, Snapshot, Waypoint (Optional)

Indicators

Front Panel: Power, Record, Fault, GPS
 Rear Connector (Remote Mounting): Record, Fault, GPS

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NARRATOR PTT



COPILOT



MULTIPLEXER



UNIT STACKING



Specifications

Automation

Event Triggering	Time, Speed, Direction, Waypoint, Waypoint & Direction
Trigger Action	Start/Stop Recording Take Snapshot(s) Play MP3 (Soundtrack, Narration, etc.) Overlay Custom Text on Video (Three Positions)

GPS/Data

Input	RS-232 Baud 2400 to 115200 Garmin 18x LVC, 5Hz, Garmin Aviation NAV Standard NMEA 0183
Sample Rate	Overlay: 20Hz KML/GPX: 1Hz or 5Hz
Sentences	GPS: GPRMC, GPGGA, GPGSA, GPVTG CUSTOM: \$ASCII, TEXT 1, TEXT 2, TEXT 3<CR><LF>
Overlay Data	Coordinates (Degrees, Degrees Minutes, Degrees, Minutes, Seconds) Speed (KT, MPH, KPH) Altitude (Meters, Feet) Heading (Degrees) *VTG only Time/Date Custom (Three Lines)
GPS Companion Files	KML & GPX - Synced with Video GPS Supports Waypoints

Media

SD	SD, SDHC, SDXC (For MP3 & Automation Information)
USB	USB 2.0/3.0 (6MB/s write speed or better) up to 2TB Supports Most USB 3.0 Drives

Power

Input	10 to 36VDC 4.25W Compatible with 12V, 14V, 24V, and 28V Aircraft Power Systems
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Physical

Temperature Range	Operation: -40°C to +85°C (-40°F to 185°F) Storage: -55°C to +105°C (-67°F to 221°F)
Dimensions L, W, H	5.00" x 5.00" x 1.85" / 127mm x 127mm x 47mm
Weight	22.5oz / 638g

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TourMaster Recorder/Switcher

RV-TOURMASTER

Four Channel Switcher/Recorder

The Rugged Video TourMaster was created specifically to meet the needs of professional air tour operators.

Features

- Seamless Four Camera Switching
- GPS Automation
- Commander Upload Software
- 1080p60 HD Recording
- Professional Audio Mixing
- WiFi Streaming to iPad/Tablet
- Internal Battery Backup

GPS Automation

- Automatic Operation
 - Camera Switching
 - Soundtracks
 - Narrations
 - Recording
 - Labels & Credits

Upload Software

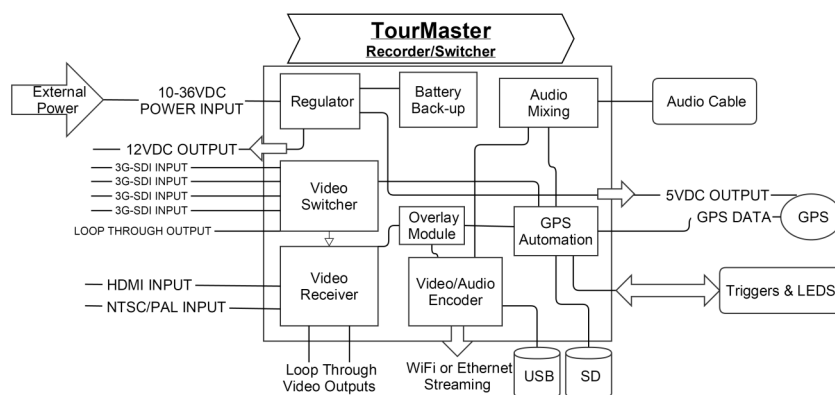
- Digital Delivery
- Automatic Upload
- Ultra-Fast USB Duplication
- Increased Marketing
- Increased Sell Through

Applications

- Helicopter Tours
- Flightseeing



FUNCTIONAL DIAGRAM



SYSTEM



FRONT



REAR



ISOMETRIC



Specifications

Video

4 x SDI

3G-SDI—SMPTE 424M (1080p60, 1080p59.94, 1080p50)

HD-SDI—SMPTE 292M (1080i60, 1080i59.94, 1080i50, 1080p30, 1080p29.97, 1080p25, 720p60, 720p50, 720p30)

SD-SDI—SMPTE 259M (576i, 480i)

1 x HDMI/DVI Single Link (DVI-D)

1920x1200p60, 1920x1200p50, 1440x900p60
1280x1024p60, 1280x1024p30, 1280x960p60, 1280x960p30
1280x960p60, 1280x960p30, 1024x768p60, 1024x768p30
800x600p60, 1080p60, 1080p50, 1080p30, 1080p25
1080i60, 1080i59.94, 1080i50, 720p60, 720p50, 720p30, 720p25
480p60, 480p30, 576p50

1 x CVBS

Composite/Analog
NTSC, PAL, SECAM
75ohm 1V p-p

Resolution/ Framerate

Resolutions: 1920x1200, 1920x1080, 1680x1050, 1600x900, 1440x900
1280x1024, 1280x920, 1280x720, 1024x768, 800x600
640x480, 640x360, 352x288, 352x576, 352x240, 352x480
720x240, 720x288, 720x480, 720x576

Framerates: (60,50,30,25,20,15,10,8,6,5,4,3,2,1)

Compression/ Bitrate

H.264 (AVC, MPEG-4 Part 10)
Baseline, Main, and High Profile
32Kb/s to 16.5Mb/s CBR or VBR

MJPEG
2Mb/s to 55Mb/s VBR

Audio

Input/ Sources

External: Analog Stereo, Line Level up to 8V P-P
General Aviation, Helicopter (U174), Bose 6-Pin
Microphone, AUX Jack Input, RCA Input, 1/4" Input, XLR input

Internal: MP3 (Automator SD Card)
Soundtracks, Narrations, Safety Messages, Background Music

Embedded: SDI, or HDMI

Output/ Destination

Output to Headset(s)/Audio Panel
MP3 Narrations, Soundtracks, etc. via Automator and/or
Mixed Automator Audio & AUX Input (iPod, etc.)

Audio Mixing

External/Internal Source Mixing
Independent Level Adjust 0 to 10x Volume
2 x Master Gain

Compression

AAC at 64Kb/s or 128Kb/s (32KHz, 44.1KHz, 48KHz)
G.711 at 64Kb/s

Triggers/Indicators

Triggers

Front Panel: Power On/Off, Record, Automation, Camera Select

Rear Connector (Remote Mounting): Record, Snapshot, Waypoint, Camera Select

RF Remote: Record, Snapshot, Waypoint (Optional)

Indicators

Front Panel: Power, Rec, Error, GPS, Camera Sel., Automation Status

Rear Connector (Remote Mounting): Record, Fault, GPS, Camera Sel.

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Rugged Video, LLC

HD19 CAMERA



HDX CAMERA



HD29 CAMERA



GPS ANTENNA



Specifications

Automation

Event Triggering

Time, Speed, Direction, Waypoint, Waypoint & Direction, Camera Sel.

Trigger Action

Start/Stop Recording
Camera Switching
Take Snapshot(s)
Play MP3 (Soundtrack, Narration, etc.)
Overlay Custom Text on Video (Three Positions)

GPS/Data

Input

RS-232 Baud 2400 to 115200
Garmin 18x LVC, 5Hz,
Garmin Aviation NAV
Standard NMEA 0183

Sample Rate

Overlay: 20Hz
KML/GPX: 1Hz or 5Hz

Sentences

GPS: GPRMC, GPGGA, GPGSA, GPVTG
CUSTOM: \$ASCII, TEXT 1, TEXT 2, TEXT 3<CR><LF>

Overlay Data

Coordinates (Degrees, Degrees Minutes, Degrees, Minutes, Seconds)
Speed (KT, MPH, KPH)
Altitude (Meters, Feet)
Heading (Degrees) *VTG only
Time/Date
Custom (Three Lines)

GPS Companion Files

KML & GPX - Synced with Video
GPS Supports Waypoints

Media

SD

SD, SDHC, SDXC (For MP3 & Automation Information)

USB

USB 2.0/3.0 (6MB/s write speed or better) up to 2TB
Supports Most USB 3.0 Drives

Power

Input

10 to 36VDC 4.25W
Compatible with 12V, 14V, 24V, and 28V Aircraft Power Systems

Physical

Temperature Range

Operation: -40°C to +85°C (-40°F to 185°F)
Storage: -55°C to +105°C (-67°F to 221°F)

Dimensions L, W, H

5.00" x 5.00" x 1.85" /
127mm x 127mm x 47mm

Weight

22.5oz /
638g

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