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Manufacturers of Rugged Portable & Airborne  
DVR systems w/IRIG-B time stamp

**Studio9000™ DVR IRIG-B**

**Rugged Rack mount Studio9000DVR-IRIG™ & Portable TransPAC-6300VS HDTV series video recorders.  
High Definition Video/Image Recorder system with IRIG-B or GPS frame time-stamp**

Multi-channel, high performance, high-speed Real-time Uncompressed High Definition Digital Video Recorder system for robust professional video broadcast, or scientific image acquisition and analysis. Studio9000© HDTV DVR with optional IRIG-B time stamp and GPS data, Captures and records to hard disk the finest, clearest High Definition broadcast or surveillance video for more detailed Scientific Imaging, professional video broadcast studio or filming applications in the industry. Capture single or multiple video streams or frames directly to disk in raw or AVI format. With optional HD/SD SDI you can even connect to 259 and 292 Mb/s standard definition SDI equipment such as Digital Betacam™, as well as 1.485 Gb/s HD-SDI equipment such as HD Mega-pixel cameras with ease, and this means capturing up to 1920 x 1080, progressive or interlaced and color precision, color space of 4:2:2 YUV /4:4:4 RGB all without changing equipment.

**HD/SD SDI Video Input option**

up to 4 x BNC HD/SD-SDI, 10 bit dual link input 4:4:4 or 4:2:2:4 Video and Key input, 4:2:2 SMPTE 259M YUV component input. Composite input. S-Video input. OR VGA or DVI input connector options expandable to 10 or 12 inputs

**Optional Audio:**

Optional audio channels can be incorporated for synchronized audio/video capture and recording.

**Photo 1:** Portable TransPAC-6300VS version

Blazing performance.. Uncompressed (or compressed) Real-Time video capture and recording system with optional precision IRIG-B time stamping and GPS interface features. Standard composite or component analog video acquisition in color NTSC/PAL, SECAM, RGB, RGB-HV\*\*, RGB YCrCb 4:2:2, YUV 4:2:2, RGB 4:4:4 or in monochrome format CCIR (625 lines) & EIA (525 lines) are supported. Optional HD/SD SDI supported. Up to 240fps (analog), and very high speed digital video up to 2048 x 2048 resolution and 30fps up to 500 fps -1000 fps (digital).

Capture HD Full Frame rate of 1920 x 1080, 1280 x 1024 or Standard 640 x 480, 752 x 480 res @ 30fps (NTSC) or 768 x 576 @25fps PAL for Analog Standard cameras or up to 2048 x 2048 resolution for Digital cameras

**FEATURES:**

Capture continuous real-time video directly to hard disk at up to 1-GB/s; 8-bit, 10-bit, 12-bit, 14-bit, 24-bit mono or color  
Analog RS-170, NTSC/PAL, RGB, and digital LVDS, CameraLINK, USB, FireWire 1394, and RS-644 or RS-422 camera interface and GigE options. New option now includes HDMI port

**New Features Now includes HDTV :**

Analog RGB-HV (RGB with H-Sync and V-Sync input)  
RGB with composite Sync -4 wire  
Analog RGB with Sync-on Green -3 wire  
HD-SDI Support Option

Optional support for SMPTE 259, 274M, 292M framing for formats up to 720P, 1080i and 1080p video. Saves YCrCb 4:2:2 or 24 bit RGB raw data, compliance with HS-SDI 1.485Gbps data rate.

Video resolution: 640 x 480, up to 2048 x 1536 pixels; compressed or uncompressed video formats include: AVI, MJPEG, optional MPEG-4 and component HDTV to 1080p or 1080i

Digital clock circuitry; capture high-speed, high-resolution images from RGB or composite; progressive scan, line scan, and area scan

Optional SDI video I/O (SMPTE 259M, 270 Mbps) with embedded AES/EBU audio

IRIG-B and GPS formats include: Time code generator, IRIG receiver, ANT BNC input connector, and DB-9 pin RS-232 connector

Real-time simultaneous capture of up to four channels; stream video directly to hard drive, memory, or display output

RAID 0 storage with capacity up to 4.8 TB option, and expandable

with CePOINT's optional NAS RAID storage for extended duration of video

External event triggers; up to 4- or 8-channel digital I/O for programmable triggers

External interface ports include: RJ-45 Ethernet, 1 x PS2 keyboard, 1 x PS2 mouse, VGA, DVI, RS-232, or RS-422, USB and IEEE1394a

Support for Region of Interest (ROI) video manipulation, packed and planar; YUV 4:2:2

Rugged MIL-COTS format; lightweight, rugged 19" 2U, 3U, or 4U rack mount, airborne or portable with 24 V or 28 Vdc option

Studio9000DVR-IRIG has more features and options available than any other Scientific high performance professional Image acquisition and video capture/recording system available.

**\*\*RGB-HV (RGB with H-Sync and V-Sync input/output, or Sync- on- Green) and computer screen capture**

**Unlimited multi-cam editing and re-editing of captured video without de-gradation or frame loss. Capture continuous Real-Time video directly to system Hard disk or memory**

High speed image capture and recording direct to system Hard drive. Acquire images from 8-bit, 10-bit, 12-bit, 14-bit and 24-bit digital cameras. Pixel clock up to 120MHz.

### **Continuous or Single Frame Captures & Recording:**

Captures continuous real-time video directly to system hard disk or memory; compact, rugged 2RU, 3RU, 4RU or 5U MIL-COTS format; capture and stream directly to disk at up to 1 GB/s. Capture directly to system hard drive from different video formats and sources supported by Studio9000 DVR. Monochrome or color at 8 bits, 10 bits, 12 bits, 14 bits, and more, including area scan, progressive scan, and line scan. Optional interface features include analogue BNC, Digital LVDS, CameraLINK, USB, 1394a & b FireWire cameras, VGA and DVI input ports. & GigE.

**Multiple optional Interfaces** includes selection from: Digital cameras or Analog BNC, RS-170, CCIR, PAL,NTSC , RGBHV (Sync-on Green), Digital, RS-422, RS-644 (LVDS), CameraLink®, USB camera interface option or Firewire 1394 and GigE, Computer video LVDS digital interface, DVI & DB-15 and HDMI ports Capture images at different resolutions @ rates up to 1000fps ( [Please ask for compatible cameras](#))

Capture and stream direct to disk at up to 1GB/s or more.

### **CAPTURE MULTIPLE VIDEO FORMAT**

Capture direct to system Hard drive from different video formats and sources supported by studio9000 HDTV DVR. Monochrome or color; 8-bits, 10-bits, 12-bits, 16-bits up to 24-bits and more, including area scan, progressive scan and line scan.

**\*\*OPTIONS:** RGB-HV Interface Features subject to change. Please inquire from our engineering sales.

### **APPLICATIONS:**

- Airborne Video Recording
- Object Tracking & Time reference measurement or Radar
- Broadcast Tape Deck Replacement
- Time Lapse Recorder
- Missile Range Testing
- NLE / Linear Edit Source/Recorder
- Endless Video Program Looping
- Security Recorder/Player
- Medical Recorder/Player
- Bullet Explosion Testing
- Industrial Monitoring
- Portable Field Production
- Desktop Video Capture Station
- High Definition Digital Video Archiving
- Military Surveillance Recorder
- Education & Training/Long distance Learning



### **Real-time IRIG time stamp and GPS position data filter**

Studio9000® DVR greatly simplifies the process of time referencing object position and timing measurements by integrating real-time video acquisition, and IRIG-B and GPS interface on frame by frame basis.

### **Airborne Video Recording.**

Studio9000® DVR is common in military and aerospace industry where it is important for precise time referenced captured images, especially for airborne video

Its' robust capability in interfacing with various high speed cameras (including infrared cameras), to the inbuilt- frame grabbers allows continuous real-time video recording for durations up to 3 hours and more, depending on number of simultaneous acquisition/recording and image resolutions, expandable to 8 hours with Cepoint's NAS RAID storage units

Each video frame captured can be non-destructively stamped with IRIG-B time and GPS position data, and other external data feed into it. Live video is displayed in real-time from sources while

directly recording to system memory or internal SCSI Hard drives so as to provide constant verification of what is been recorded.

The GPS and IRIG information or data can be viewed alongside each video frame.

### Archive or Transfer to Tape Back-up or Archive to DVD

Studio9000<sup>®</sup> DVR lets you easily transfer you video from the remove able SCSI or SATA hard drive or via embedded Gigabit NIC to external RAID Storage or tape back-up devices for future retrieval.

**New Optional RGB-HV (H-Sync, V-Sync I/O with sync on green) Functions:** Optional addition of RGB-HV (H-Sync, V-Sync input/output features) to Studio9000DVR-IRIG enables the unit with this option to acquire images and video stream from both standard and non-standard video inputs of up to 200MHz from RGB-HV source. Input resolution up to 2 Mega pixels total area for double buffered acquisition mode. With RGBHV providing H-Sync and V-sync Input/Output, standard VGA video mode can be captured via active RGB loop through 15-Pin D-Shell VGA connector or DVI-5BNC connector adapter cable. These features are also excellent for Radar video applications.

### GPS and IRIG-B time stamp

**OPTIONAL: 17" TFT LCD Display or 8.5" inbuilt Studio9000DVR-IRIG-4RU**  
Right Fig(b): 5U Rugged & Hardened unit w/8.4" TFT LCD Display and keypad control panel

### IRIG or GPS Time-stamp

Studio9000<sup>™</sup> DVR (Digital Video Recorder) with IRIG-B time stamp option provides real-time interactive Uncompressed (or compressed) real-time video recording to system memory or hard disk.

The digital recording process utilizes Modulated IRIG-B time format, with modulation ratio of 3:1.(IRIG versions only).Each video frame data is non-destructively time stamped with IRIG-B time code and other optional external data like GPS data. The systems real-time simultaneous capturing and playing enables constant monitoring and verification of recording operations and activities.

This ensures faultless real-time image processing and analysis.



**Photo 3:** Studio9000DVR-IRIG 19" Rack mount version

#### ADVANTAGES:

- Supports area scan and line scan cameras
- Records to system memory or a hard disk subsystem
- Supports **uncompressed or compressed** video storage
- supported digital camera types: Camera Link, Firewire (IEEE-1394), LVDS, RS-422 & USB
- supported analog camera types: standard and progressive scan analog formats
- live video display on host during recording

- supported pixel types: monochrome 8 to 14 bits, RGB 8:8:8, RGB 5:5:5, RGB 5:6:5, YUV 4:2:2 , YUV 4:2:0
- image decoding for multi-tap formats, Bayer color formats, and custom formats via plug-in conversion modules
- comprehensive controls for record/playback timing, and record/playback stopping conditions
- electronic or keyboard activated triggered acquisition with optional pre-trigger circular buffer
- interactive event marking during recording and playback
- automated recording, playback, and image processing from Python scripts
- playback as frames or as waterfall (for line scan)
- image display at full-screen or in a window with zoom in/out
- thumbnail image display mode
- interactive Output Look Up Tables controls with multiple tables and real-time LUT switching
- image file import and export for AVI, WMV, DPX,TIFF, BMP, JPEG, raw binary, ASCII text file formats
- specialized controls for accessing the unique features of each supported frame grabber
- simultaneous record/playback of additional data streams, e.g. Date/Time, GPS, IRIG-B, data acquisition. card, sound cards...
- interactive image processing on captured image sequences with extensive library of image processing and analysis operations
- real-time image processing using embedded powerful host CPU
- compatible with industry standard cameras from many manufacturers
- Removable hard disk or storage modules for data transport or security
- Network Ethernet Ports and USB ports for data transfer
- supports Microsoft<sup>®</sup> Windows NT<sup>®</sup> 4.0, Windows<sup>®</sup> 2000, Windows<sup>®</sup> XP Pro

## OTHER FEATURES (depends on configuration)

- Fully integrated hardware/software solution
- Full integration with optional IRIG B time stamp or GPS data record
- Real time simultaneous playback of 4 or more video streams & multiple graphics streams
- Embedded dedicated ultra-320 SCSI interface for fast data transfer rate
- Compressed and uncompressed recording and playback
- Mix compressed and uncompressed clips in the same project
- Flexible analog video I/O: composite, component & Y/C
- Balanced & unbalanced stereo analog audio I/O
- Direct support for DV I/O through IEEE-1394 interface
- Accepts optional HD/SD and analog or digital audio I/O
- Full frame 1920 x 1080, 1280 x 1024, or 720 x 486 (NTSC) or 720 x 576 (PAL) resolution
- Dedicated preview channel video output
- Adjustable genlock timing referenced to video input
- Real time 6-channel hardware audio mixing
- Real time parametric audio EQ
- Direct timeline support for DirectShow-compatible audio plug-ins
- Real time 2D and 3D DVE, including picture-in-picture, perspective, warp and rotation
- Real time rolls and crawls
- Real time variable speed changes and reverse playback

**Controls:** Power on/off and system reset

**Indicators:** Power and HDD & alarm/ relay LED's

**System Clock:** Synchronized with optional SMPTE, EBU And IRIG-B or GPS (Option) Time Code for accuracy

**Time stamp/Time tag:** IRIG-B (Option)

**Time Code format:** IRIG A, IRIG B, NASA 36 (Modulated) (Option)

**Time Code translator/generator:** Datum compatible

**IRIG/GPS Data:** (see IRIG/GPS spec)

**Fields/Frame rate:** 240fps or more (per 4 cameras)

**Relay:** 4 Opto-isolated input/4 reed relay output lines

**CAMERA INPUT:** 4 x BNC channel connectors or more OR / LVDS /USB/Firewire1394a /GigE or RGBHV (H-sync, V-sync input/output) /VGA & DVI options

**Fields/Frames:** 60/30fps (NTSC) up to 1000fps (digital) per camera/ 50/25fps (PAL) per camera or up to 1000fps (Digital)

**Video Resolution:** 640 x 480 up to 2048 x 2048

**CAMERA: Remote PTZ Camera control capability**

**Storage Hard Drive :** Min 1.5TB of RAID 0 or 5 video storage. Ext. Firewire 1394 port optional SCSI port. for RAID or Tape back-up interface for unlimited video storage. /500GB x 1 SATA HDD for TransPAC version

**I/O Ports:** 1 x RJ-45 Ethernet, 1 x RS-232, 1x 422/485 1 x PS2 Kybd, 1x Mouse, 1x Parallel port

**Vibration (operating):** 5 ~ 17 Hz, 0.1" double amp. 17 ~ 500 Hz, 1.5G acceleration

**Shock (operating):** 15G @ 15 ~ 20ms / 35G @ 15-20ms (non-operating)

**EMC/Safety:** Meets FCC/VDE Class A, UL/TUV/CB

**Temperature: Operating** 0°C~ 60°C

**Non-Operating temp:** -20°C to 70°C

**Humidity:** 5%~95% non-condensing

- Customizable, key frameable real time 2D transitions (12-bit ultra-smooth anti-aliased wipes with colored and soft-edge borders)
- Customizable, key frameable real time 3D transitions with sub-pixel movement for
- Fully key frameable real time proc amp controls and color correction

### Capture RADAR screen

• Capture VGA or DVI sources

• Capture X-Ray Medical equipment Video

• Add Audio to video /AES audio conforming to SMPTE-272M is supported on the SDI input. Audio may be synchronous or asynchronous with respect to both the SDI video, and system audio sample clock. For audio I/O, balanced AES/EBU (EIAJ CP-340, XLR),

## Hardware SYSTEM SPECIFICATIONS: (General System Specifications) 2/4/5RU ver.

**Material: Rugged** Heavy-duty cold-rolled steel. Inside: zinc-plated with bright chromate. Outside: texture-coated. Rugged MIL COTS chassis.

**Dimension:(Rackmount):**19"(W) x 25"(D) x 3.5"(H)/ 19"W x 21.5"D x 7" H (4U version) or 19" x 5U x 22"D (varies/model). **Portable version:** 17"W x 11"H x 9"D

**Cooling:** 2 x 120mm ball-bearing fans

**Power Supply:** 350W (INPUT: 110V AC OR -28V DC)

**Processor:** Intel Graphic processors.

## IRIG-B and GPS Spec:

### Real Time Clock

Bus Request Resolution 100 nanoseconds

Latency Zero

Major Time Format Binary or BCD

Minor Time Format Binary

### Time Code Translator

Time Code Formats IRIG A, IRIG B\*, NASA 36 (Modulated or DCLS)

Time Accuracy <5 μS (modulated)

<1 μS (DCLS)

Modulation Ratio 3:1 to 6:1

Input Amplitude 500 mV to 5V P-P

Input Impedance >10K., AC coupled

\* See IEEE 1344 Compliance below

### Time Code Generator

Time Code Format IRIG B\*

Modulation Ratio` 3:1

Output Amplitude 4 V P-P (fixed) into 50

DC Level Shift TTL/CMOS

\* See IEEE 1344 Compliance below

### IEEE 1344 Compliance

The translator processes the 27 control function bits of IRIG B time code as set forth in IEEE 1344. The 27 control function bits provided by the input IRIG B time code are output in the generated IRIG B time code one time frame after received. If the input IEEE 1344 bits are not present in the input IRIG B time code, the last two digits of year are placed in bits 1-9 of the control function field of the generated IRIG B time code.

### Timing Functions

Heartbeat Clock (TTL, 50.) Programmable Periodic,

<1 Hz to 250 kHz  
Time Strobe (TTL, 50.) Programmable  
1 µSec through hours  
Event Capture (TTL) 100 nSec resolution, zero latency  
1 PPS Pulse Rate (TTL, 50.) Positive edge on-time

#### **Disciplined Oscillator**

Frequency 10 MHz  
Outputs 1, 5, or 10 MHz (selectable)  
Rate Stability:  
Standard VCXO 5E-8 short term 'tracking'  
5E-7 /day long term 'fly wheeling'  
Optional Oven Osc. 2E-9 short term 'tracking'  
5E-8 /day long term 'fly wheeling'  
Sync Sources GPS, Time Code, 1 PPS,  
10 MHz

#### **GPS Subsystem (if GPS option included)**

Time Accuracy <1 µSecond  
Position Accuracy 10 to 20 meters SEP (SA off)  
Maximum Velocity 300 meters/sec (1,080 KPH)  
Number of Channels 12  
Receiver Frequency 1.575 GHz (L1, C/A code)  
Time to First Fix Worst case: 5 to 15 minutes  
Solution Modes 1, 3, and 4 satellites

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*Specifications are subject to change without notice .Specific applications configuration may vary. Some features described here may be available only on the more advanced Systems, and so may not be available on basic systems. Please contact company Rep for custom configuration .Admax CG pro, Studio9000, Studio9000-DVR, Studio9000 DVR-IRIG© and TransPAC-6300VS are trademarks of Cepoint Networks, LLC. All other trademarks are proprietary rights of their respective owners. ©2002-2009 Cepoint Networks, LLC. All rights reserved no part or parts of this publication may be reproduced without authorization..*

#### **Connector Types**

J1 - GPS ANT BNC connector  
J2 - Module 9-pin I/O RS-232, TTL  
+5V BIAS

#### **Environment**

Temperature: Module Ant/Rcvr  
Operating 0° C to 70° C -40° C to 70° C  
Storage -30° C to 85° C -55° C to 85° C  
Humidity:  
Operating 5% to 95%\* 95%  
\*non-condensing  
Operating Altitude Up to 18,000 meters MSL

#### **Options Include:**

Bullet GPS Antenna\*\*  
Airborne GPS Antenna  
Magnetic GPS Antenna  
Extended Length GPS Antenna Cable  
Isolation Transformer Time Code Input  
'D' Connector (J2) to BNC Adapter  
Drivers: Windows 95/98/2000/XP, Linux,  
NI LabVIEW & DAQ (Data Acquisition) I/O.