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.

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
- 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

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
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 degradation 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.

**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 / Lapse 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® DVR lets you easily transfer your video from the removable 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™ 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.

**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® Windows NT® 4.0, Windows® 2000, Windows® XP Pro

Photo 3: Studio9000DVR-IRIG 19” Rack mount version
**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 un compressed recording and playback
- Mix compressed and un compressed 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
- IEEE-1394 interface
- Balanced & unbalanced stereo analog audio I/O
- Flexible analog video I/O: composite, component & Y/C
- Hardware SYSTEM SPECIFICATIONS: (General System Specifications) 2/4/5RU ver.


**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

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

**Environment**
Temperature: Module Ant/Rcvr
Operating 0º C to 70º C -40º C to 70º C
Storage -30º C to 85º C -55º C to 85º 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.