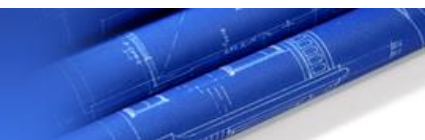


Model: CR1600ET

Architectural and
Engineering Specifications

Version 1.0



PART 2 - PRODCUTS

Division 28 – Electric Safety and Security

Section 28.23.19 – Video Surveillance – Digital Video Recorder and Analog Recording Devices

Section 28.23.12 - Video Surveillance – System Infrastructure

2.1.0 Manufacturer

1. Costar Video Systems
101 Wrangler Drive, Suite 201
Coppell, Texas 75019
Tel: 469-635-6800
Fax: 469-635-6822

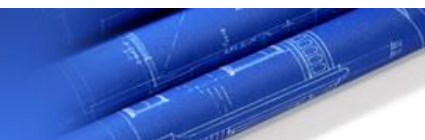
2.2.0 General

2.2.1 Product Description

CR1600ET (HD-TVI DVR) is a HD over Coaxial Recording System designed and manufactured by Costar Video Systems. CR1600ET utilizes existing coaxial cable to leverage analog infrastructure for seamless upgrade to 1080P surveillance solution. The CR1600ET is a hybrid system which supports 1080P and backward compatible with 960H and analog. The CR1600ET is a 16 Channel unit and supports up to 480ips (images per second) HD real-time with H.264 compression. The CR1600ET is equipped with 16 Channel BNC ports, 4 internal HDD ports and 1 eSATA port. The CR1600ET is an integrated security system, capable of time division multiplexing and real time recording of multiple cameras and storing their digitized and compressed images on embedded hard disk drives for fast search and retrieval either locally at the unit, or from a remote workstation using a Graphical User Interface (GUI). The CR1600ET is equipped with technology that allows legacy coaxial cable to work up to 1500ft with advanced camera OSD control. The CR1600ET is fully compatible with Costar Video System products across different platforms such as DirectNET solution and StarNET VMS.

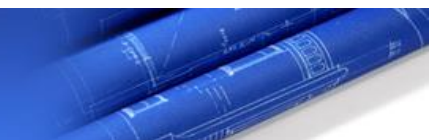
2.2.2 General Specification

1. The CR1600ET shall be a Linux embedded unit with 16 Channel BNC (Analog and HD-TVI) video recording capability.
2. The CR1600ET shall be equipped with 1 Gigabit network port, 16 BNC ports.
3. The CR1600ET shall have 4 internal SATA ports and 1 eSATA port.
4. The CR1600ET shall have 1 HDMI output and 1 VGA output, 1 BNC (Spot) output.
5. The CR1600ET shall have 16 alarm inputs, 2 alarm relay outputs, 1 alarm reset in.
6. The CR1600ET shall have 4 RCA audio inputs, 1 RCA audio output, 1 HDMI audio output.
7. The CR1600ET shall have 2 USB 2.0 ports



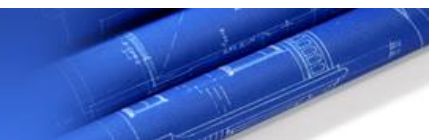
8. The CR1600ET shall have 1 RS-232, 1 RS-485 terminal block.
9. The CR1600ET shall have 1 internal buzzer.
10. The CR1600ET shall support up to live 480 ips (Image per Second).
11. The CR1600ET shall support simultaneous live view, record, play back, data transmission in real time.
12. The CR1600ET shall support recording frame rate: 480 ips@720p, 240 ips@1080p.
13. The CR1600ET shall support H.264 compression.
14. The CR1600ET shall provide Graphical User Interface (GUI) with multi lingual support.
15. The CR1600ET shall support 2X – 12X digital zoom in live view mode & playback mode.
16. The CR1600ET shall provide time lapse, event, time lapse + event, pre/post-event, panic recording schedule.
17. The CR1600ET shall adjust Analog camera's configuration.
18. The CR1600ET shall support alarm, audio, motion, video loss, video blind, text-in, system event triggering, face detection, fan error, record failure, storage related alerts and alarm in error.
19. The CR1600ET shall support email (attach clip (.cbf)), callback to remote s/w, push notification (Costar Mobile), SNS (Twitter), and NetFS (FTP) notification.
20. The CR1600ET shall provide Time-lapse, Event log, Motion, Text-in search options.
21. The CR1600ET shall support 4 channels 720p synchronous playback.
22. The CR1600ET shall be equipped with Chained-Fingerprint™, SSL, Password encryption options.
23. The CR1600ET shall support FEN service (A name resolution service equivalent to DDNS), Bonjour, DNS-SD (DNS Service Directory).
24. The CR1600ET shall be compatible with StarNET VMS, INEX VMS, Costar Mobile and Web Client.
25. The CR1600ET shall be compatible with network accessory: network keyboard, network switch, etc.
26. The CR1600ET shall be controlled by network keyboard with USB mouse support and remote control.

2.3.0 Technical Specification



2.3.1 Video Specification

1. Analog Video Inputs: up to 16 Analog cameras
 - A. Built-in 16 channel BNC Switch
2. Supported Camera type: 720P25, 720P30, 1080P25, 1080P30, and CVBS (NTSC / PAL).
3. Video Outputs: 1 HDMI, 1 VGA, 1 BNC (Spot) OUT
 - A. The CR1600ET shows live video through VGA, HDMI, and CVBS Spot monitor. It supports various camera display formats; Full-screen, Quad (2x2), 3x3, 4x4, 1+5, 1+7, PIP.
4. Display Resolution:
 - A. HDMI / VGA: 1920 x 1080, 1440 x 900, 1280 x 1024,
 - B. Composite: 720 x 480 (NTSC), 720 x 576 (PAL).
5. Maximum Live Display Speed: Up to 480 ips
6. Live Digital Zoom: x2 ~ x12
7. PTZ Control and Setup
 - A. The CR1600ET shall allow control of PTZ cameras to authorized users and be used to maneuver a PTZ camera using Built-in GUI PTZ control; Pan, Tilt and Zoom, Focus Near / Far, Set / Move to Preset, Advanced PTZ capabilities. When PTZ capable camera is connected, this function shall be enabled automatically.
 - B. Network Keyboard shall be supported with USB mouse.
8. Image Authentication: Chained Finger Print
9. Additional Information
 - A. The CR1600ET shall support the following features: Sequence Monitoring, Screen Freeze, Convert cameras, Privacy Mask, Color Control (Brightness, Contrast, Saturation, Hue), event monitoring.
 - B. The CR1600ET shall display camera ID, recording status and recording mode information on the screen.

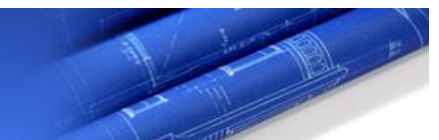


2.3.2 Audio Specifications

1. Audio Input: (line level)
 - A. CR1600ET: 4 RCA
 - B. The CR1600ET shall support recording and re-broadcasting of audio inputs from audio equipped cameras and audio input connected.
 - C. The CR1600ET shall stream live and recorded audio to connected local speaker / amplifier and remote clients such as StarNET VMS, Windows / MAC Workstations and Mobile Devices.
2. Audio Output
 - A. CR1600ET: 1 RCA + 1 HDMI
 - B. Audio signal can be transferred to the audio output devices such as a speaker via RCA or HDMI port.
3. Audio Codec Format: G.726
4. Audio Data Size: 128 Kbps (per channel)
5. Two-way (Bidirectional) Audio:
 - A. Audio equipped camera, audio device and StarNET VMS, iNEX VMS
 - B. Audio equipped camera, audio device and CR1600ET

2.3.3 Recording Specifications

1. Maximum Recording throughput
 - A. The CR1600ET shall support up to 480 ips @720P, 240 ips @1080P recording.
2. Recording Resolution: Up to 1080P (Camera specific)
3. Recording Resolution: 1920x1080, 1280x720, 960x480, 720x480, 960x240, 720x240 480x240, 360x240
4. Video Compression: H.264
5. Recording Schedule
 - A. The CR1600ET shall allow camera-by-camera configuration of the following recording modes:
 - i. Time Lapse Recording (Continuous), Event-Based Recording, Time Lapse with Event-based Recording, Panic Recording, Pre / Post Event Recording
 - B. The CR1600ET shall allow the user to create and edit video recording schedules for each connected camera
 - i. Basic Schedule
 - ii. Advanced Schedule which includes different profiles and dwell timer per each occurred event
 - C. The CR1600ET shall include the ability for Pre-Event recording, which records video for a specified time before an event or alarm has occurred. The allowed time Pre-Event recording is from 5 seconds to 30 minutes.



6. Additional Information

- A. The CR1600ET shall support individual camera Recording Profile Setup.
- B. The factory default resolution is set at the maximum of the camera's resolution. This is adjustable parameter according to custom configuration.

2.3.4 Playback Specifications

1. Performance

- A. The CR1600ET shall support 4 channels 720p synchronous playback.

2. Display Format

- A. The CR1600ET shall offer multi-screen playback (single-screen, quad or multiple layouts), series display (displaying images from one camera image by image), and full-screen display.

3. Search Mode: Time-lapse, Event log, Motion, Text-in.

- A. The CR1600ET shall provide various search filters for fast retrieval; Calendar Search, Go To Search, Record table search, Search by Event, Motion, Text-in, Bookmark Search.

4. Playback Digital Zoom: x2 ~ x12

2.3.5 Storage Specifications

1. HDD: Internal SATA x4, eSATA x1,(Up to 4TB capacity for each disk)

2. Total Capacity: 32TB = 4TB x (4 Internal + 1x4 eSATA option)

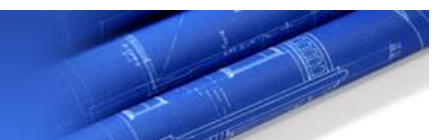
- A. The CR1600ET shall support increased recording storage capability if direct attached storage device such as eSATA storage unit is connected

3. Data Export

- A. Device: USB Storage Device (USB HDD, USB Memory, etc.)
- B. Data Export with Audio: Supported
- C. Multichannel Data Export: Supported
- D. The CR1600ET shall have the ability to save the current images to Bitmap, JPEG and video clip as an ".exe" (Clip Player) file. The Clip Player is a self-executable file (Single / Multi Channel with compressed video and audio), which requires no additional program to play back on any compatible Windows PCs. The exported file can be saved using USB thumb drives.

4. Additional Information

- A. The CR1600ET shall be equipped with Self-Monitoring Analysis and Reporting Technology (S.M.A.R.T.), incorporating a suite of advanced diagnostics that monitor the internal operation of hard drives and provide early warning for many types of potential problems.



2.3.6 Network Specifications

1. Network Connection: Gigabit Ethernet(Client) x 1 port
 - A. Network connection is used for connecting the remote client software in LAN or WAN environment
 - B. Remote Data Throughput: 3Mbps to 12Mbps (depending on quality and resolution configuration)
2. Remote Data Export: Clip Player, AVI, JPG
 - A. The still or moving images can be captured using remote client software as a JPG, AVI, CBF or EXE file format. (dynamic remote application)
 - B. File Printer Interface: PDF file printer
3. Remote Client Viewer application: StarNET VMS, iNEX VMS, Costar Mobile, Webguard
 - A. StarNET VMS: Windows and Mac OS (Note: MGuard for Mac OS is limited in functionality)
 - i. StarNET VMS (for Windows only) supports simultaneous firmware upgrade on multiple CR1600ETs
 - B. iNEX VMS: Windows OS
 - C. Costar Mobile: iOS, Android and Windows Mobile platform
 - D. Webguard works with CR1600ET's embedded web server using a Web Browser with ActiveX plug-in.
4. Maximum Client Connections
 - A. Remote connection: 10 (Search: 2)

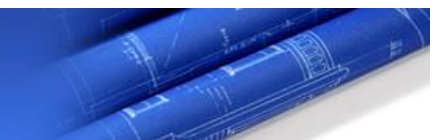
2.3.7 Alarm and Event Specifications

1. Alarm Input / Output (terminal block)
 - A. 16 In / 2 Relay Out
 - B. Alarm Input Type: 16 TTL, NC / NO Programmable, 2.4V(NC) or 0.3V(NO) threshold, 5V DC
 - C. Alarm Output Type: 2 relay output, 2A@125V AC, 1A@30V DC
2. Alarm Reset Input: 1
 - A. Input Type: 1 TTL, terminal block
3. Internal Buzzer: Yes (75dB for 10cm)
4. Trigger Events: Alarm in, Audio detection, Motion detection, Trip-zone, Video loss, Text-in, and System events
 - A. The CR1600ET shall support alarm sensor trigger in and relay out functions in such event of motion detection, video loss detection, video obscuring, and abnormal system reboot.
 - B. Maximum Channels of Text Input: 16
5. Event Notification: Email, notification Remote S/W, Push notification (Costar Mobile), SNS (Twitter), and NetFS (FTP).

- A. The CR1600ET shall support e-mail notification when events occur: sensor, motion, video loss, camera obscuration, Text-in and / or stop recording
- B. SNS and Mobile device push notification: Twitter is supported and users can receive push notification on their phone when an event is triggered.
- C. The CR1600ET shall include a system log report support that records and displays information relating to alarm events, reboots, and other system information. The user shall receive event notification.

2.3.8 External Interface Specifications

- 1. Serial Interface: RS232, RS485 (Terminal Block)
- 2. User Control Interface: Mouse, IR Remote Control, Front Buttons, Network Remote Keyboard,
- 3. USB Interface: USB 2.0 x 2



2.4.0 Mechanical Specifications

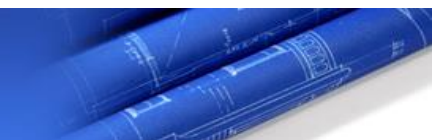
1. Operating System: Embedded Linux
2. Unit Dimensions (W x H x D): 430 mm x 88 mm x 413 mm (16.9" x 3.5" x 16.3")
3. Unit Weight: 6.0 kg (13.2 lb) (with 1 HDD)

2.5.0 Environmental Specifications

1. Working Temperature: 5°C to 40°C (41°F ~ 104°F)
2. Operating Humidity: 0% ~ 90%

2.6.0 Electrical Specifications

1. Power Input: AC 100-240V, 50 / 60Hz, 1.6 ~ 0.8A
2. Power Consumption: 80W
3. Regulatory Approvals:
 - A. Electrical: FCC, CE, CB, UL, PSE



Version History

Version	Writer	Revision Date	Remarks
1.0	Tech	May 21, 2016	Initial release

