



Hanwha Techwin is a leading supplier of advanced video surveillance solutions for IP-video, analog and hybrid systems. Building on the company's history of innovation, Hanwha Techwin is dedicated to providing systems solutions with the highest levels of performance, reliability and cost-efficiency. Hanwha Techwin is committed to the continued development of innovative systems products for professional security applications.

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16 CH 4MP ANALOG REAL-TIME DVR

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

Notes to Specifier:

1. Where several alternative parameters or specifications exist, or where, the specifier has the option of inserting text, such choices are presented in **<bold text>**.
2. Explanatory notes and comments are presented in **colored** text.

Important: See further notes on the following page.

Important Note to Security Systems Specifiers

CSI MasterFormat 2016 incorporates numerous significant changes affecting electronic safety and security. This document is written to provide flexibility in using either format, although adoption of MasterFormat 2016 is encouraged. The following is a guide to the MasterFormat numbers relevant to the product referenced in this specification.

Primary Specification Area:**MasterFormat 2014:**

- 28 23 19 Electronic Surveillance
- 28 23 00 Video Surveillance
- 28 23 19 Digital Video Recorders and Analog Recording Devices

MasterFormat 2016:

- 28 05 00 Common Work Results
- 28 05 xx Storage Appliances for Electronic Safety and Security
- 28 05 xx.xx Network Video Recorders

Related Requirements:**MasterFormat 2014:**

- 27 20 00 Data Communications
- 28 23 13 Video Surveillance Control and Management Systems
- 28 23 16 Video Surveillance Monitoring and Supervisory Interfaces
- 28 23 19 Video Surveillance Remote Devices and Sensors
- 28 23 23 Video Surveillance Systems Infrastructure

MasterFormat 2016

- 27 15 01.xx Video Surveillance Communications Conductors and Cables
- 27 20 00 Data Communications
- 28 05 xx.xx PoE Power Sources for Electronic Safety and Security
- 28 05 xx Cyber Requirements for Electronic Safety and Security
- 28 05 xx Safety and Security Network Communications Equipment
- 28 2x xx IP Cameras
- 28 2x 00 Video Management System

16 CH 4MP ANALOG REAL-TIME DVR

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes a sixteen channel digital video recorder with 4MP resolution recording and live display.
- B. Product - A sixteen channel digital video recorder with maximum internal storage of 64TB and support for AHD, TVI, and CVI formats.
- C. Related Requirements

Refer to MasterFormat notes at the beginning of this document to select requirements specific to the MasterFormat version being used in the specification.

1.02 REFERENCES

- A. Abbreviations
 - 1. ARP - Address Resolution Protocol
 - 2. DHCP - Dynamic Host Configuration Protocol
 - 3. DNR - Digital Noise Reduction
 - 4. DDNS - Dynamic Domain Name Server
 - 5. fps - frames per second
 - 6. GUI - Graphical User Interface
 - 7. HDD - Hard Disk Drive
 - 8. HTTP - Hypertext Transfer Protocol
 - 9. ICMP - Internet Control Message Protocol
 - 10. IGMP - Internet Group Management Protocol
 - 11. IP - Internet Protocol
 - 12. iSCSI – Internet Small Computer System Interface
 - 13. JBOD - Just a Bunch of Disks
 - 14. JPEG - Joint Photographic Experts Group
 - 15. MJPEG - Motion JPEG
 - 16. MP - Megapixel
 - 17. MPEG - Moving Pictures Experts Group
 - 18. NAS - Network Attached Storage
 - 19. NTP - Network Time Protocol
 - 20. POS - Point of Sale
 - 21. PPPoE - Pont to Point Protocol over Ethernet
 - 22. RAID - Redundant Array of Independent Disks (Drives)
 - 23. RTP - Real-Time Transport Protocol
 - 24. RTCP - Real-Time Control Protocol

25. RTSP - Real-Time Streaming Protocol
26. SMTP - Simple Mail Transfer Protocol
27. SNMP - Simple Network Management Protocol
28. SSL - Secure Sockets Layer
29. TCP - Transmission Control Protocol
30. UDP - User Datagram Protocol
31. UPnP - Universal Plug and Play
32. VMS - Video Management System
33. DVR - Digital Video Recorder
34. AHD - Analog High Definition
35. TVI - Transport Video Interface
36. CVI - Composite Video Interface
37. PIP - Picture In Picture

B. Reference Standards

1. Video
 - a. National Television System Committee (NTSC)
 - b. Phase Alternation by Line (PAL)
2. Standard Approvals
 - a. FCC
 - b. CE

C. Definitions

1. Smart Codec – Smart Codec that controls quantization parameter in H.264 to efficiently manage bitrate of the video stream and reduce the storage required while achieving similar quality compared to the one without Smart Codec.
2. Dynamic GOV – Dynamic assignment of GOV length based on the complexity of the scene to efficiently manage bitrate of the video stream and reduce the storage required while achieving similar quality compared to the one without Dynamic GOV.

1.03 SUBMITTALS

A. Product Data

1. Manufacturer's printed or electronic data sheets
2. Manufacturer's installation and operation manuals
3. Warranty documentation

1.04 QUALIFICATIONS

- A. Manufacturer shall have a minimum of five years' experience in producing video equipment.
- B. Installers shall be trained and authorized by the Manufacturer to install, integrate, test, and commission the system.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver the product in the manufacturer's original, unopened, undamaged container with identification labels intact.
- B. Store the product in a temperature and humidity specified in this document, protected from mechanical and environmental conditions as designated by the manufacturer.

1.06 WARRANTY, LICENSING AND SUPPORT

- A. Manufacturer shall provide a limited 3 year warranty for the product to be free of defects in material and workmanship.

END OF SECTION

PART 2 PRODUCTS**2.01 EQUIPMENT**

- A. Manufacturer: Hanwha Techwin
<http://www.hanwha-security.com/>
- B. Model HRD-1642
- C. Alternates: None

2.02 GENERAL DESCRIPTION

- A. The sixteen channel DVR shall record video and audio from maximum of sixteen analog video cameras to internal HDD. The maximum capacity of each HDD shall be up to 8TB and the DVR shall have eight HDD slots. The manufacturer shall guarantee compatibility and reliability for HDD listed in 'HDD Compatible List' found in the home page.
- B. DVR shall enable users to play recorded video and audio with advanced search options. Search options shall include the following.
1. Date/Time Search
 2. Event Search
 3. Backup Search
 4. PoS (Receipt) Search
 5. Motion Search
- C. All search options shall provide previews.
- D. The DVR shall provide monitoring software for video and audio from a remote computer or a smart phone with maximum simultaneous remote access for up to 20 users.
- E. The DVR shall provide maximum transmission bandwidth of 64 mbps to allow streaming of video and audio over network.
- F. The DVR shall provide an installation wizard for easy setup of recording, live, user permission and network.
- G. The DVR shall have an e-SATA interface for external storage.
- H. The DVR shall be able to receive text data from PoS devices and overlay on video.
- I. The DVR shall provide smart codec option which can reduce bit-rate of video and storage required while providing equal or similar video quality.
- J. The DVR shall have the following further general properties:
1. Recording and playback functions:
 - a. Supported recording rate
 - 1.) PAL
 - a.) Max. 200fps@2560 x 1440
 - b.) Max. 400fps@1920 x 1080
 - c.) Max. 400fps@1280 x 720, 928 x 576, 704 x 576, 704 x 288, 352 x 288
 - 2.) NTSC
 - a.) Max. 240fps@2560 x 1440
 - b.) Max. 480fps@1920 x 1080
 - c.) Max. 480fps@1280 x 720, 928 x 480, 704 x 480, 704 x 240, 352 x 240

- b. View status of internal storage hardware
- c. Set recording schedules
- d. Set up triggered recording based on:
 - 1.) motion
 - 2.) video loss detection
 - 3.) alarm inputs
 - 4.) tampering
- e. Available recording settings by channel for standard and event-based recording types:
 - 1.) resolution
 - 2.) images per second
 - 3.) quality
 - 4.) data transfer limit
 - 5.) pre-event and post-event record duration
- f. Available actions upon reaching full HDD storage capacity:
 - 1.) stop recording
 - 2.) overwrite
- 2. Live view:
 - a. Live, remote monitoring using Windows Network Viewer or Manufacturer supplied viewer
 - b. Capture and save snapshot images
 - c. Backup current video in AVI or other secure format.
- 3. Analytics:
 - a. Motion detection (Level 1 ~ 10)
- 4. Remote access:
 - a. Maximum of 20 simultaneous remote users
 - b. Dynamic DNS (DDNS) support
- 5. VGA and High Definition (HDMI) for local monitor outputs including live viewing, playback, & backup functions
- 6. Audio connections: 16 inputs, 1 outputs

2.03 DVR SOFTWARE

- A. The DVR shall have a built-in server which provides access for authorized users to live view of connected cameras, DVR recording and playback functions, and DVR configuration settings.
- B. The DVR software shall provide a monitoring screen which displays live camera video and simultaneously provides same-screen access to the following functions:
 - 1. Screen mode, allowing set up and display of up to eight live video channels in 1, 4, 7, 9, 16, PIP, or sequence configurations.
 - 2. Status displays:
 - a. camera live status
 - b. camera record status
 - c. event status
 - 3. Start/stop recording
 - 4. Search recorded video

5. Play recorded video
 6. Freeze live video
 7. Audio on, off, and mute
 8. Event monitoring
 9. Camera controls
 10. Manual recording
 11. Image (snapshot) capture
- C. The DVR software shall provide setup screens which provide access to the following configuration settings and functions:
1. System
 - a. date and time
 - b. user passwords and permissions
 - c. system information
 - d. software upgrade
 - e. system logs
 - f. event logs
 - g. backup logs
 2. Cameras
 - a. image preview of video
 - b. profile information
 - c. model information
 - d. adjust settings:
 - e. apply settings to groups of cameras
 - f. live streaming settings
 3. Recording
 - a. setup recording schedule by day and time per channel
 - b. record settings per channel
 - c. HDD full capacity options – stop, overwrite
 - d. Event configuration
 - 1.) sensor operation
 - 2.) Camera events, including motion detection and video analytics
 - 3.) video loss detection
 - 4.) alarm output parameters
 4. Storage media and devices
 - a. display working status, including current rate of recording, recording loss rate, and cumulative losses
 - b. storage use and capacity information
 - c. HDD temperature information
 - d. HDD alarm notifications
 5. Monitor
 - a. select VGA or HDMI video output

- b. configure display parameters
- 6. Network
 - a. bandwidth limits
 - b. multicast parameters
 - c. DDNS
 - d. NTP server
 - e. SMTP e-mail settings
 - f. live stream selection
 - g. DHCP server settings
- 7. Output relay settings
- D. The DVR software shall provide Search and Playback functions as follows:
 - 1. Search by:
 - a. date and time
 - b. event
 - c. backup
 - d. PoS
 - e. motion
 - 2. Playback
 - a. play forward and reverse at normal or accelerated speeds, frame by frame, and next record
 - b. go to first and go to last functions
 - c. color-coded timeline with play head scrub bar
 - d. set audio on or off
 - e. initiate backup
- E. The DVR shall have a built in web server which supports browser-based configuration from a PC.
 - 1. Acceptable browsers: Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari
 - 2. The web viewer shall provide a monitoring screen which displays video from cameras and simultaneously provides same-screen access to the following functions:
 - a. display layout configuration: 1, 4, 7, 9, 16, PIP, sequence
 - 3. The web viewer shall provide the same functionality as available when directly connecting to the DVR server with respect to the following:
 - a. system settings
 - b. backup and restoration of configuration settings to a file
 - c. recording
 - d. storage media and devices
 - e. monitor
 - f. network
 - g. events and notifications
 - h. output relay settings
 - i. search and playback
 - 4. Minimum client requirements
 - a. Acceptable Operating Systems:

- 1.) PC : Windows® XP SP3 or higher, Windows® Vista, Windows® 7, Mac OS X® 10.6 or higher
- 2.) Mobile : Optimized for Android Ver4.x, and iOS® 6.1 and v7.0
- b. Acceptable browsers
 - 1.) Microsoft Internet Explorer (Ver. 8, 9, 10), Mozilla Firefox Ver 3.6 or higher, Google Chrome Ver 12 or higher, Safari® 5.0 or higher

2.04 DETAILED SPECIFICATIONS

- A. Video
 1. Inputs 16CH BNC, AHD (4MP), TVI (2MP), CVI (2MP), NTSC / PAL
 2. Resolution 2560 x 1440, 1920 x 1080, 1280 x 720, 960 x 480, 704 x 480, 960 x 576, 704 x 576
- B. Live
 1. Frame rate NTSC: 480fps / PAL: 400fps
 2. Resolution 2560 x 1440, 1920 x 1080, 1280 x 720, 960 x 480, 704 x 480, 960 x 576, 704 x 576
- C. Multi-screen display 1 / 4 / 7 / 9 / 16 / PIP / Sequence
- D. Operating System Linux
- E. Installation Wizard Yes
- F. Recording
 1. Compression H.264
 2. Smart Codec WiseStream
 3. Record rate
 - a. PAL
 - 1.) Max. 200fps@2560 x 1440
 - 2.) Max. 400fps@1920 x 1080
 - 3.) Max. 400fps@1280 x 720, 928 x 576, 704 x 576, 704 x 288, 352 x 288
 - b. NTSC
 - 1.) Max. 240fps@2560 x 1440
 - 2.) Max. 480fps@1920 x 1080
 - 3.) Max. 480fps@1280 x 720, 928 x 480, 704 x 480, 704 x 240, 352 x 240
 4. Mode Manual, Schedule (Continuous/Event), Event (Pre/Post), Time Lapse(1 ~ 30fps (N), 1 ~ 25fps(P))
 5. Event Video loss, Motion (Level 1 ~ 10)
 6. Overwrite modes Off/On
 7. Pre-alarm 5, 10, 20, 30 sec
 8. Post-alarm 5, 10, 20, 30 Sec, 1, 3, 5, 10, 20 Min, 1, 2, 3, 4, 5, 6 Hour
- G. Search and Playback
 1. Search mode Date/Time, Event, Back up, PoS, Motion
 2. Playback function Fast forward / backward (2x, 4x, 8x, 16x, 32x, 64x)
Slow forward / backward (1/2x, 1/4x, 1/8x)

Step forward / backward

- | | |
|--------------------------------|--|
| H. Network (IPv4) | |
| 1. Transmission speed | |
| a. Record Stream | 4M (15fps),
1080p/720p/WD1/4CIF/CIF (NTSC: 30fps, PAL: 25fps) |
| b. Network Stream | WD1/4CIF (12fps)
2CIF/CIF/QVGA/QCUF (NTSC: 30fps, PAL: 25fps) |
| 2. Bandwidth | Up to 64Mbps (selectable for traffic control) |
| 3. Stream | Record Stream and Network Stream Selectable |
| 4. Maximum remote users | Search (3) / Live Unicast (10) / Live Multicast (20) |
| 5. Protocol support | TCP/IP, DHCP, PPPoE, SMTP, NTP, HTTP, DDNS, RTP, RTSP, SNMP |
| 6. Monitoring | SSM, WebViewer, SmartViewer, iPOLiS Mobile Viewer |
| I. Remote Monitoring | |
| 1. PC | Windows® XP SP3 or higher, Windows® Vista, Windows® 7
Mac OS X® 10.6 or higher |
| 2. Mobile | Optimized for Android Ver4.x, and iOS® 6.1 and v7.0 |
| 3. Browsers | Microsoft Internet Explorer (Ver. 8, 9, 10),
Mozilla Firefox Ver 3.6 or higher,
Google Chrome Ver 12 or lower, Safari® 5 or higher |
| J. Storage | |
| 1. Internal HDD | 2 SATA HDD (Each with Max. 8TB) |
| 2. External (e-SATA Interface) | USB for backup |
| 3. File format | BU (for DVR player), SEC (Hanwha Techwin's Secure Format)
AVI |
| K. Security | |
| 1. Password protection | 1 admin, 10 groups, 10 Users per group |
| L. Monitors | |
| 1. VGA | 1920 x 1080, 1280 x 1024, 1280 x 720 |
| 2. HDMI | 4K (3840 x 2160), 2K (2560 x 1440), 1920 x 1080
1280 x 1024, 1280 x 720 |
| M. Audio | |
| 1. Input and output | 16CH Line in, 1CH Line out |
| 2. Compression | G.711 |
| 3. Sampling rate | 8KHz |
| N. Alarm | |
| 1. Input and output | Terminal 16 Inputs (NO/NC) / Terminal 4 Relay Outputs (NO/NC),
Rating: 30V DC/2A, 250V AC/0.25A |
| 2. Remote notification | Notification via e-mail |
| O. Connections | |

GUIDE SPECIFICATION

MasterFormat 2014: Section 28 23 29

MasterFormat 2016: Section 28 2x xx

1. Ethernet	1 RJ-45 1000 Base-T
2. Serial interface	RS-485
3. USB	1 USB 3.0 port (rear), 1 USB 2.0 port (front)
4. Application support	Mouse, Remote controller
5. RS-485 Protocol	Samsung-E/Samsung-T/Pelco-D/Pelco-p/Panasonic/Phillips/AD DIAMOND/ERNA/KALATEL/ VCL TP/VICON/ELMO/GE
6. Coax Protocol	
a. NTSC/PAL	Pelco-C (Coaxitron)
b. AHD	ACP (AHD Coax Protocol)
P. Electrical	
1. Input voltage and current	100 ~ 240 VAC $\pm 10\%$, 50/60 Hz
2. Power consumption	Max. 62W (1 x 2TB HDD)
Q. Environmental	
1. Operating temperature	+0°C ~ +40°C (+32°F ~ +104°F)
2. Operating humidity	20% ~ 85% RH
R. Mechanical	
1. Dimensions (W x H x D)	440.0 x 88.0 x 384.8mm (17.32" x 3.46" x 15.15")
2. Weight (with hard disks)	5.78Kg (12.74 lb.)
S. Language	English, French, German, Spanish, Italian, Russian, Polish, Czech, Turkish, Netherlands, Portuguese, Swedish, Danish, Rumania, Serbia, Croatia, Hungary, Greek, Finnish, Norwegian, Korean, Japanese, Chinese (Traditional), Thai

END OF SECTION

PART 3 EXECUTION

3.01 INSTALLERS

- A. Contractor personnel shall comply with all applicable state and local licensing requirements.

3.02 PREPARATION

- A. The system design and configuration shall be verified for compatibility and performance with the camera(s).
- B. System configuration shall be tested and qualified by the Contractor prior to camera installation.
- C. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation
- D. All firmware found in products shall be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the provider of the Video Management Application (VMA).
- E. All equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.

3.03 INSTALLATION

- A. The Contractor shall carefully follow instructions in documentation provided by the manufacturer to insure all steps have been taken to provide a reliable, easy-to-operate system.
- B. Before permanent installation of the system, the Contractor shall test the system in conditions simulating the final installed environment.

3.04 STORAGE

- A. The hardware shall be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.

END OF SECTION