GUIDE SPECIFICATION

MasterFormat 2014: Section 28 23 29

MasterFormat 2016: Section 28 2x xx

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.

For additional information, visit www.hanwha-security.com/

8 CHANNEL NETWORK VIDEO RECORDER WITH POE SWITCH

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

8 CHANNEL NETWORK VIDEO RECORDER WITH POE SWITCH

PART 1 GENERAL

1.01 SUMMARY

A. Section includes an eight channel network video recorder with a built-in PoE switch.

B. Product - An eight channel network video recorder which is ONVIF compliant, with support for H.265, H.264, and MJPEG compression and recording bandwidth of 100 Mbps.

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. PoS – Point of Sales
34. VA – Video Analytics
35. PnP – Plug and Play
36. ARB – Auto Recovery Backup

B. Reference Standards
   1. Network - IEEE
      a. 802.3 Ethernet Standards
      b. 802.1x Port-based Network Access Control
   2. Video
      a. ISO / IEC 23008-2:2013, MPEG-H Part2 (ITU H.265, HEVC)
      b. ISO / IEC 14496–10, MPEG-4 Part 10 (ITU H.264)
      c. ISO / IEC 10918 – JPEG
      d. ONVIF – Profiles S
   3. Emissions
      a. FCC-47 CFR Part 15 Subpart B Class A
      b. EN 55022:2010, Class A
   4. Immunity
      a. EN 50130-4:2011
      b. EN 61000-3-2:2006+A2:2010
      c. EN 61000-3-3:2008
   5. Safety
      a. UL listed
      b. CE EN 50581:2012 (hazardous substances)

C. Definitions
   1. JBOD - a collection of hard disks that have *not* been configured to act as a redundant array of independent disks (RAID) array.
   2. GOV (Group of Video object planes) - A set of video frames for H.264 and H.265 compression, indicating a collection of frames from the initial I-Frame (key frame) to the next I-Frame. GOV consists of 2 kinds of frames: I-Frame and P-Frame.
   3. WiseStream – Smart Codec that controls quantization parameter in H.265 and H.264 to efficiently manage bitrate of the video stream and reduce the storage required.

4. 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.
5. Dynamic fps - Dynamic assignment of frames per second based on the complexity of the scene to efficiently manage bitrate of the video stream and reduce the storage required.
6. ARB (Auto Recovery Backup) – Automatic backup mechanism that enables WiseNet cameras to store videos on to SD card during failures and stream it to the storage device after recovery.

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 IP 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 environment specified in section 2.04 Detailed Specification, 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 XRN-810S

C. Alternates: None

2.02 GENERAL DESCRIPTION

A. The eight channel Network Video Recorder (“NVR”) shall record video and audio from up to eight network video cameras to an array of 1 - 2 HDD’s and enable playback of video and audio.

B. The manufacturer shall be responsible for rigorous testing of NVR’s reliability. The manufacturer shall provide a list of compatible hard disks that have been tested to guarantee reliable recording. The list shall be available in the manufacturer’s home page.

C. The NVR shall provide auto recovery backup (ARB) to transfer video that is recorded on network camera’s SD cards during failures to the hard disk drive. The NVR shall allow users to set transfer speed or bandwidth dedicated for ARB in three levels; low, middle, high. If the bit-rate of video to be transferred exceeds the set bandwidth, then the NVR shall transfer video in the order of channel number until all transfer is finished or the video becomes more than 24 hours old based on NVR’s current time. The NVR with ARB shall be able to handle the following failures.

1. Network disconnection between cameras and NVR
2. Unexpected shutdown of NVR

D. The eight channel NVR shall receive text data from external devices and overlay it on live as well as recorded video. It shall also provide search for text data and list all video with previews that is relevant to the search queries. The text shall include but not limited to the following.

1. Text from PoS devices, namely the texts printed on the receipt of transactions
2. Text from automatic number plate recognition software
3. Text from automated teller machines (ATM)

E. The NVR shall provide a remote monitoring environment for video and audio over the network using a remote computer. The remote monitoring software shall allow users to receive live streams, search for recoded videos, and configure devices.

F. P2P Service: The NVR shall provide easy configuration of mobile viewer. The mobile viewer shall be freely available and connection shall be established by simply scanning QR code from a mobile device.

G. The NVR shall have the following further general properties:

1. Camera search and discovery: The NVR shall have the capability to search the network for connected compatible cameras.
   a. If eight or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) will be displayed.
   b. If more than eight cameras are searched or discovered, the NVR shall provide the ability to selectively register up to eight cameras.
2. The NVR shall support WiseStream and Dynamic GOV, a smart codec used by WiseNet IP cameras. The smart codec shall produce visually equal video quality while reducing storage required.

3. The NVR shall support dual monitor out from both VGA and HDMI ports. The NVR shall provide users options to choose display mode of each monitors. The options shall include:
    a. Expand mode: The monitor from VGA port and HDMI port shall display two independent video. VGA port shall support resolutions up to 1080p and HDMI up to 4K.
    b. Clone mode: The both monitors from VGA and HDMI shall display identical video.
4. The NVR shall have a built-in PoE switch and support PnP mode. The NVR in PnP mode shall be able to supply power to connected cameras and finish configuration without any necessary actions required from users.
5. Recording and playback functions:
    a. Support recording from 352 x 288 (CIF) up to 3264 X 2448 (8 MP) per channel
    b. 100 Mbps network camera recording throughput
    c. Simultaneous playback capability up to eight video channels
    d. H.265, H.264, and MJPEG compression support
    e. View status of connected storage hardware
    f. Set recording schedules
    g. Set up triggered recording based on:
        1.) sensor (input) detection
        2.) camera event (sensor, motion detection, video analytics, defocus)
        3.) video loss detection
    h. Available recording settings by channel for standard and event-based recording types:
        1.) compression type
        2.) resolution
        3.) images per second
        4.) quality
        5.) data transfer limit
        6.) pre-event and post-event record duration
        7.) I-frame and full frame recording
    i. Available actions upon reaching full HDD storage capacity (with automatic notifications to users):
        1.) stop recording
        2.) overwrite
    j. Search recorded data by time, event, text, ARB events, or smart search. Smart search shall include search options for:
        1.) Virtual line (in/out/both)
        2.) Enter/exit
6. Storage
    a. Up to 2, 6TB HDDs in JBOD configuration.
    b. USB connection for memory/storage device for video clip backup and settings export
7. Live view:
    a. Live, remote monitoring using Windows Network Viewer or Manufacturer supplied viewer
    b. Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick

c. Capture and save snapshot images
d. Record current video in AVI format

8. Remote access:
   a. Multicast or unicast
      1.) Simultaneous unicast access by up to 10 users
      2.) Simultaneous multicast access by up to 20 users
   b. Mobile device:
      1.) Supported platforms: Android, IOS
      2.) Supported remote users:
         a.) Live unicast: 10
         b.) Live multicast: 20
         c.) Playback: 3
   c. Dynamic DNS (DDNS) support
9. VGA and High Definition (HDMI) local monitor outputs for live viewing, playback, & backup functions
10. ONVIF Profile S compliance
11. Alarm connections: 4 inputs, 3 outputs. The NVR shall allow users to select contact states of sensor inputs. Available options are the following.
    a. NC (Normally Closed)
    b. NO (Normally Open)

2.03 NVR SOFTWARE

A. The NVR shall have a built in server which provides access for authorized users to live view of connected cameras, NVR recording and playback functions, and NVR configuration settings.

B. The NVR 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 live video channels in various layouts or sequence configurations.
   2. Hallway view mode for hallway view cameras.
   3. Status displays:
      a. camera live status
         1.) model
         2.) connection status
         3.) IP address
         4.) compression
         5.) resolution
         6.) frame rate
         7.) quality
      b. camera record status
         1.) bit rate
            a.) record bit rate
            b.) input bit rate

c.) bit rate limits
2.) configured video profile
3.) input/record frames per second

4. Start/stop recording
5. Search recorded video
6. Play recorded video
7. Freeze live video
8. Audio on, off, and mute
9. Event monitoring
10. Digital zoom
11. Camera PTZ controls
12. Manual recording
13. Image (snapshot) capture

C. The NVR 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. compression information
      d. protocol information
      e. model information
      f. IP address
      g. connection status
      h. total amount of data received by channel
      i. auto or manual search and register
      j. select and setup ONVIF protocol operation
      k. add, delete, and edit camera profile
      l. adjust settings:
         1.) camera name
         2.) resolution
         3.) frame rate
         4.) quality
         5.) bit rate

6.) brightness
7.) backlight
8.) exposure
9.) day/night
10.) defog
11.) focus
12.) mirror and flip
13.) motion detection

m. apply settings to groups of cameras
n. live streaming settings

3. Recording
   a. setup recording schedule by day and time per channel
   b. record settings per channel
      1.) all frames, key frames, or no record
      2.) data limit per channel
      3.) pre and post event recording times
      4.) include audio
   c. set recording profile per channel:
      1.) compression
      2.) resolution
      3.) frame rate
      4.) quality
   d. HDD full capacity options – stop, overwrite
   e. 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. Text device
   a. channel allocation
   b. encoding type and delimiting characters
   c. network port

d. event configuration
    1.) keyword entry
    2.) dollar value trigger

7. Network
    a. address settings per physical port
    b. bandwidth limits
    c. software ports and protocol
    d. multicast parameters
    e. DDNS
    f. UPnP
    g. security:
        1.) IP filtering
        2.) SSL encryption and certificates
        3.) 802.1x parameters
    h. NTP server
    i. SMTP e-mail settings
    j. SNMP settings
    k. live stream selection
    l. DHCP server settings
8. Notifications
    a. event types
    b. intervals
    c. recipients
9. Output relay settings

D. The NVR software shall provide Search and Playback functions as follows:
    1. Search by:
        a. time
        b. event
        c. text
        d. backup device
    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 NVR 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 registered cameras and simultaneously provides same-screen access to the following functions:
        a. display layout configuration

b. additional display functions as available with direct connection to the NVR server

3. The web viewer shall provide the same functionality as available when directly connecting to the NVR server with respect to the following:
   a. system settings
   b. backup and restoration of configuration settings to a file
   c. camera configuration settings and functions
   d. recording
   e. storage media and devices
   f. monitor
   g. text device
   h. network
   i. events and notifications
   j. output relay settings
   k. search and playback
4. Minimum client requirements
   a. Acceptable Operating Systems:

      Windows XP, Vista, 7, 8, 10, Mac OS X (10.8, 10.9, 10.10, 10.11)

   b. Acceptable browsers:

      Microsoft Internet Explorer, Microsoft Edge, Mozilla Firefox, Google Chrome, Apple Safari

2.04 DETAILED SPECIFICATIONS

A. Video
   1. Compression: H.265, H.264, MJPEG, WiseStream for H.265 and H.264

B. Recording
   1. Channel capability: 8
   2. Recording bandwidth: Up to 100 Mbps
   3. Resolution range: 352 x 288 (CIF) up to 3264 X 2448 (8 MP)

C. Events and Response Actions
   1. Triggers:
      a. alarm (NO or NC contact) input
      b. video loss
      c. event defined by camera
      d. VA event
   2. Response Actions:
      a. record
      b. e-mail
      c. activate PTZ preset
      d. alarm (NO or NC contact) output
      e. beep output
      f. monitor out

D. Playback
   1. Number of simultaneous channels: 8
   2. Bandwidth: 32 Mbps

E. Storage
   1. Internal
      a. Number of HDD's: 1 – 2
      b. Capacity per HDD: 1 – 6 TB
   2. External
      a. Acceptable types:
         1.) USB HDD/Flash drive for backup of video clips, firmware update, settings backup/restore, log export

F. Network
   1. Connectivity: 1000 Base-T Ethernet, 4 x RJ-45 connectors
   2. Protocols supported:
      a. Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP)
      b. Configuration: Dynamic Host Configuration Protocol (DHCP)
      c. Web services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS)
      d. Network services: Address Resolution Protocol (ARP), Domain Name System (DNS), Internet Control Message Protocol (ICMP), Network Time Protocol (NTP), Simple Network Management Protocol (SNMP v1/2c/3 – MIB-2), Universal Plug and Play (UPnP)
      e. Media: Real-Time Transport Protocol (RTP), Real-Time Control Protocol, Real-Time Streaming Protocol (RTSP)
      f. Multicast: Internet Group Management Protocol (IGMP)
      g. Notifications: Simple Mail Transfer Protocol (SMTP)
      h. Remote Access: Point-to-Point Protocol over Ethernet (PPPoE)
   3. DDNS – The NVR shall support DDNS services offered by the Manufacturer and other publicly available service offerings.
   4. Security features:
      a. user password protection with group restrictions
      b. IP address filtering - list of allowed or blocked IP addresses
      c. HTTPS(SSL) login authentication
      d. User access log
      e. 802.1x authentication
      f. Restriction of all network access/web viewer access
   5. Discovery - Manufacturer shall offer a discovery program to identify all devices of his manufacture on the network, as well as ONVIF Profile S conformant devices.
   6. Transmission bandwidth: 128Mbps

G. Alarm/sensor interface:
   1. Input (4) : NO or NC, selectable
   2. Output (3) : NO or NC, selectable

H. Audio

1. Direction: Bi-directional
2. Channel capability: 8 channels
3. Compression: AAC (16/48KHz), G.711 u-law, G.726 selectable
4. Output: Line level (RCA)

I. Electrical

1. Input Voltage 100 – 240 VAC
2. PoE/PoE+ budget 100 W maximum
3. Power Consumption: 19 W maximum (134 BTU, 2TB HDD x 1ea)

J. Mechanical And Environmental

1. Dimensions (W x H x D): 370.0 mm x 44.0 mm x 320.0 mm (14.57 in. x 1.73 in. x 12.6 in.)
2. Weight 3.36Kg (7.41 lb.) (2TB HDD)
3. Temperature:
   a. Operating 0° C to 40° C (32° F to 104° F)
4. Humidity: 20 - 85%, non-condensing

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 network design and configuration shall be verified for compatibility and performance with the camera(s).

B. Network 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