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 CHANNEL PENTABRID 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 20 00 Electronic Surveillance

28 23 00 Video Surveillance

 28 23 29 Video Surveillance Remote Devices and Sensors

MasterFormat 2016:

 28 20 00 Video Surveillance

 28 2x xx Surveillance Cameras

 28 2x xx IP Cameras

**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 Digital Video Recorders and Analog Recording Devices

 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 Storage Appliances for Electronic Safety and Security

 28 05 xx.xx Network Video Recorders

 28 05 xx Cyber Requirements for Electronic Safety and Security

 28 05 xx Safety and Security Network Communications Equipment

 28 2x 00 Video Management System

**16 CHANNEL PENTABRID DVR**

1. **GENERAL**
	1. **SUMMARY**
		1. Section includes a sixteen channel digital video recorder with 8MP resolution recording and live display.
		2. Product - A sixteen channel digital video recorder with maximum internal storage of 48TB and support for AHD, TVI, and CVI formats and IP format.

## 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. **REFERENCES**
		1. 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
		2. Reference Standards
			1. Video
				1. National Television System Committee (NTSC)
				2. Phase Alternation by Line (PAL)
			2. Standard Approvals
				1. FCC
				2. CE
		3. 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.
			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. ARB (Auto Recovery Backup) – Automatic backup mechanism that enables WiseNet cameras to store videos on to SD card during the network failure and stream it to the storage device after the network is recovered.
	2. **SUBMITTALS**
		1. Product Data
			1. Manufacturer’s printed or electronic data sheets
			2. Manufacturer’s installation and operation manuals
			3. Warranty documentation
	3. **QUALIFICATIONS**
		1. Manufacturer shall have a minimum of five years’ experience in producing video equipment.
		2. Installers shall be trained and authorized by the Manufacturer to install, integrate, test, and commission the system.
	4. **DELIVERY, STORAGE AND HANDLING**
		1. Deliver the product in the manufacturer’s original, unopened, undamaged container with identification labels intact.
		2. Store the product in a temperature and humidity specified in this document, protected from mechanical and environmental conditions as designated by the manufacturer.
	5. **WARRANTY, LICENSING AND SUPPORT**
		1. Manufacturer shall provide a limited 3 year warranty for the product to be free of defects in material and workmanship.

END OF SECTION

1. **PRODUCTS**
	1. **EQUIPMENT**
		1. Manufacturer: Hanwha Techwin

http://www.hanwha-security.com/

* + 1. Model HRX-1621
		2. Alternates: None
	1. **GENERAL DESCRIPTION**
		1. The 16 channel Pentabrid DVR(“DVR”) shall record video and audio from maximum of 16ea analog video cameras(Maximum 18ea with IP camera combination) to a hard disk array of 1-8 HDD’s and enable playback of video and audio from the hard disk array. The manufacturer shall guarantee compatibility and reliability for HDD listed in ‘HDD Compatible List’ found in the home page.
		2. The DVR shall provide a remote monitoring environment for video and audio over the network using a remote computer.
			1. The DVR shall support WiseStream and Dynamic GOV, a smart codec used by WiseNet IP cameras.
			2. The DVR shall support dual monitor out.
			3. The DVR shall support ARB.
			4. Recording and playback functions:
				1. Support recording from 720 x 480 (SD) up to 3840 X 2160 (8 MP) per channel
				2. Support dual track recording for monitoring multi channel from local monitor and Wisenet Mobile app.
				3. 70 Mbps analog camera recording bandwidth

51Mbps network camera recording bandwidth

* + - * 1. Simultaneous playback capability up to 18 video channels
				2. H.265, H.264, and MJPEG compression support
				3. View status of internal connected storage hardware
				4. Set recording schedules
				5. Set up triggered recording based on:

sensor (input) detection

camera event

video loss detection

* + - * 1. Available recording settings by channel for standard and event-based recording types:

compression type

resolution

images per second

quality

data transfer limit

pre-event and post-event record duration

I-frame and full frame recording

* + - * 1. Available actions upon reaching full HDD storage capacity:

stop recording

overwrite

* + - * 1. Search recorded data by time, event
			1. Storage
				1. Up to 8, 6TB HDDs in JBOD configuration.
				2. USB connection for memory/storage device for video clip backup and settings export
			2. Live view:
				1. Live, remote monitoring using Windows Network Viewer or Manufacturer supplied viewer
				2. Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick
				3. Capture and save snapshot images
				4. Support various layout up to 20 split mode
				5. Support auto sequence mode with up to 9 split mode
				6. Record current video in AVI format
			3. Remote access:
				1. Multicast or unicast

Simultaneous unicast access by up to 10 users

Simultaneous multicast access by up to 20 users

* + - * 1. Mobile device:

Supported platforms: Android, IOS

Supported remote users:

Live unicast: 10

Live multicast: 20

Playback: 3

* + - * 1. Dynamic DNS (DDNS) support
			1. VGA and High Definition (HDMI) local monitor outputs for live viewing, playback, & backup functions
			2. ONVIF Profile S compliance
			3. Alarm connections: 16 inputs; 4 outputs
	1. **DVR SOFTWARE**
		1. 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.
		2. The DVR software shall provide a monitoring screen which displays live camera video and simultaneously provides same-screen access to the following functions:
			1. Layout mode, allowing set up and display of up to 18ea live video channels in 1, 2, 3, 4, 6, 8, 9, 13, 16, 20, and sequence configurations.
			2. Status displays:
				1. CH Info
				2. Camera connection
				3. camera live status
				4. camera record status
				5. Network status
			3. Audio on, off and mute
			4. Freeze live video
			5. Stop alarm output
			6. Stop recording
			7. Play recorded video
			8. Search recorded video
			9. Backup recorded video
		3. The DVR software shall provide setup screens which provide access to the following configuration settings and functions:
			1. System
				1. Date, time and language
				2. user management, passwords and permissions
				3. system information
				4. software upgrade
				5. system logs
				6. event logs
				7. backup logs
			2. Cameras
				1. image preview of video
				2. profile information
				3. compression information
				4. protocol information
				5. model information
				6. IP address
				7. connection status
				8. total amount of data received by channel
				9. auto or manual search and register
				10. select and setup ONVIF protocol operation
				11. add, delete, and edit camera profile
				12. adjust settings:

camera name

resolution

frame rate

quality

bit rate

brightness

backlight

exposure

day/night

defog

focus

mirror and flip

motion detection

* + - * 1. apply settings to groups of cameras
				2. live streaming settings
			1. Recording
				1. setup recording schedule by day and time per channel
				2. record settings per channel

all frames, key frames, or no record

data limit per channel

pre and post event recording times

include audio

* + - * 1. set recording profile per channel:

compression

resolution

frame rate

quality

* + - * 1. HDD full capacity options – stop, overwrite
				2. Event configuration

sensor operation

Camera events, including motion detection and video analytics

video loss detection

alarm output parameters

* + - 1. Storage media and devices
				1. display working status, including current rate of recording, recording loss rate, and cumulative losses
				2. storage use and capacity information
				3. HDD temperature information
				4. HDD alarm notifications
			2. Monitor
				1. select VGA or HDMI video output
				2. configure display parameters
			3. Text device (including PoS devices and number plate recognition)
				1. channel allocation
				2. encoding type and delimiting characters
				3. network port
				4. event configuration

keyword entry

dollar value trigger

* + - 1. Network
				1. address settings per physical port
				2. bandwidth limits
				3. software ports and protocol
				4. multicast parameters
				5. DDNS
				6. UPnP
				7. security:

IP filtering

SSL encryption and certificates

802.1x parameters

* + - * 1. NTP server
				2. SMTP e-mail settings
				3. SNMP settings
				4. live stream selection
				5. DHCP server settings
			1. Notifications
				1. event types
				2. intervals
				3. recipients
			2. Output relay settings
		1. The DVR software shall provide Search and Playback functions as follows:
			- 1. time
				2. event
				3. text (including PoS and number plate recognition)
				4. backup device
			1. Playback
				1. play forward and reverse at normal or accelerated speeds, frame by frame, and next record
				2. go to first and go to last functions
				3. color-coded timeline with play head scrub bar
				4. set audio on or off
				5. initiate backup
		2. 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:
				1. display layout configuration: 1, 4, 9, 16, sequence
				2. 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:
				1. system settings
				2. backup and restoration of configuration settings to a file
				3. camera configuration settings and functions
				4. recording
				5. storage media and devices
				6. monitor
				7. text device (including PoS devices and number plate recognition)
				8. network
				9. events and notifications
				10. output relay settings
				11. search and playback
			4. Minimum client requirements
				1. Acceptable Operating Systems:

 Windows XP, Vista, 7, 8, 10, Mac OS X (10.7 or above)

* + - * 1. Acceptable browsers:

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

* 1. **DETAILED SPECIFICATIONS**
		1. Video
			1. Analog Camera
				1. Inputs 16 channel(1Vp-p 75 ohm, BNC)
				2. Signal Type AHD (8MP, 5MP, 4MP, 1080P, 720P)

HDTVI (8MP, 5MP, 4MP, 1080P, 720P)

HDCVI (5MP, 4MP, 1080P, 720P)

CVBS (NTSC / PAL)

* + - 1. Network Camera
				1. Inputs Max. 18CH
				2. Resolution 8MP ~ CIF
				3. Protocol SUNAPI(Wisenet), ONVIF
		1. Live
			1. Local Display HDMI x 1, VGA x 1 (Dual Monitor)
			2. Resolution
				1. Analog camera 8MP(15/12fps), 5MP(20/12fps), 4MP(30/25fps), 2MP(30/25fps),

1MP(30/25fps), 960H(or 720H)(30/25fps) \* per CH

* + - * 1. Network camera Typ. 2MP(480fps/16CH)
		1. Recording
			1. Compression H.265, H.264, MJPEG
			2. Record rate
				1. Analog(NTSC/PAL)

Main Stream 8MP(8fps/8fps), 5MP(12fps/12fps), 4MP(15fps/12fps),

2MP(30fps/25fps), 720p(30fps/25fps), SD(30fps/25fps)

(\* This framerate is per CH)

Sub Stream 20p or higher : 640x360 full fps/CH, SD sugnal : upto SD full

* + - 1. Mode Manual, Schedule (Continuous/Event), Event (Pre/

Post), Dual Track

* + - 1. Event Trigger
				1. Set Alarm input
				2. Analog Camera Video loss, Motion Detection, Tampering,
				3. Network Camera Sensor in, MD, Tampering, Enter/Exit, Line Crossing, Virtual line,

 Appear/Disappear, Face Detection, Audio Detection, Defocus

* + - 1. Event Action Email, PTZ preset, Alarm out, Buzzer, Monitor out
		1. Search and Playback
			1. Playback bandwidth Max. 32Mbps (18CH simultaneously)
			2. User Max. 4 users (Set 1, Remote 3)
			3. Simultaneous Playback 18CH(Local Monitor)

4CH(CMS, Wisenet Mobile), 1CH(Web)

* + - 1. Fisheye Dewarping WEB / CMS
		1. Storage
			1. Internal HDD Up to 8 SATA HDDs (Each with Max. 6TB)
			2. External USB for backup
		2. Backup
			1. File backup BU (for DVR player), EXE (Include Player)

AVI (Webviewer only)

* + - 1. Function Max. 16CH play, Date-time/title display
		1. Redundancy ARB
		2. Network
			1. Transmission speed
				1. Analog Camera

Main Stream 8MP(15/12fps), 5MP(20/12fps), 4MP(30/25fps), 2MP(30/25fps),

1MP(30/25fps), 960H(or 720H)(30/25fps) \* per CH

Sub Stream 20p or higher : 640x360 full fps/CH, SD sugnal : upto SD full

* + - 1. Transmission Bandwidth Up to 30Mbps (selectable for traffic control)
			2. Maximum remote users Search (3) / Live Unicast (10) / Live Multicast (20)
			3. Protocol support TCP/IP, UDP/IP, RTP(UDP), RTSP, NTP, HTTP,

DHCP(Server, Client), PPPoE, SMTP, ICMP, IGMP, ARP

uPnP, HTTPS, SNMP, ONVIF(Profile-S), SUNAPI(Server,Client)

* + - 1. Monitoring SSM, WebViewer, SmartViewer, Wisenet Mobile Viewer

Support SDK/CGI(SUNAPI) for integration to 3rd party VMS

* + 1. Security IP addressing filtering, User access log, 802.1x Authentication,

Encryption(ID/PW, Recording, Transmission, Backup)

Device Certificate(Hanwha Techwin Root CA)

* + 1. Monitors
			1. VGA 1 VGA (1920 x 1080, 1280 x 1024, 1280 x 720)
			2. HDMI 1 HDMI (4K (3840 x 2160), 2K (2560 x 1440), 1920 x 1080

1280 x 1024, 1280 x 720)

* + - 1. Spot Composite BNC (1CH) ※ Include OSD on screen, Multimode support
		1. Audio
			1. Input and output 16CH Line in

(Built in 4CH, Optional 12CH: Audio extension Cable)

1CH Line out

* + - 1. Compression
				1. Analog camera G.711
				2. Network camera G.711, G.726
			2. Communication 2-Way
		1. Alarm
			1. Input and output 16 Inputs (NO/NC) / 4 Relay Outputs (NO/NC 1ea, NO 3ea),

Rating: Max. 18V DC/2A, Typical 12V DC/2A

* + 1. Connections
			1. Ethernet 1 x RJ-45 10/100/1000 Base-T
			2. Serial interface RS-485/422 (Full duplex) for PTZ
			3. USB 1 x USB 3.0 port (rear), 1 x USB 2.0 port (front)
			4. Application support Mouse, Remote controller

Webviewer

System Controller (SPC-7000, SPC-6000, SPC-2000)

* + - 1. RS-485 Protocol Samsung-T/Pelco-D/Pelco-P
			2. Coax Protocol
				1. NTSC/PAL Pelco-C (Coaxitron)
				2. AHD ACP (AHD Coax Protocol)

TVI/CVI Coax Protocol

* + 1. 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

* + 1. Electrical
			1. Input voltage and current 100~240V AC ±10%, 50/60Hz
			2. Power consumption Max. 180W (8EA, 6TB/HDD)
		2. Environmental
			1. Operating temperature +0°C ~ +40°C (+32°F ~ +104°F)
			2. Operating humidity 20% ~ 85% RH
		3. Mechanical
			1. Color / Material Black / Metal
			2. Dimensions (W x H x D) 440.0 x 88.0 x 384.8mm (17.32" x 3.46" x 15.15")
			3. Weight Approx. 5.6Kg (12.4 lb. with 1 HDD)

END OF SECTION

1. **EXECUTION**
	1. **INSTALLERS**
		1. Contractor personnel shall comply with all applicable state and local licensing requirements.
	2. **PREPARATION**
		1. The system design and configuration shall be verified for compatibility and performance with the camera(s).
		2. System configuration shall be tested and qualified by the Contractor prior to camera installation.
		3. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation
		4. 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).
		5. 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. **INSTALLATION**
		1. 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.
		2. Before permanent installation of the system, the Contractor shall test the system in conditions simulating the final installed environment.
	4. **STORAGE**
		1. The hardware shall be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.

END OF SECTION