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Digital Watchdog® is a leading manufacturer of security and surveillance solutions, offering stunning image quality, advanced hardware capabilities, reliable customer support and lowest total cost of deployment to the analog & IP megapixel surveillance markets. Located in Cerritos, CA with manufacturing facilities in Seoul, Korea, Digital Watchdog® is committed to delivering powerful security solutions to its customers worldwide.

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**VMAX® A1 G4™ EMBEDDED UHDOC® DVR**

**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

**28 20 00 Video Surveillance**

**28 23 00 Video Management System**

**28 23 29 Video Surveillance Remote Devices and Sensors**

**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.

3. Include related sections as appropriate if embedded digital video recorder system is integrated to other systems

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

4. MasterFormat 2014 Specification Category:

28 23 29 - Video Surveillance Remote Devices and Sensors

**VMAX® A1 G4™ EMBEDDED UHDOC® DVR**

1. **GENERAL**
	1. **SECTION INCLUDES**
		1. Product – an H.265 and H.264 embedded digital video recording system for video surveillance, including design, supply, installation, and commissioning.

## Related Requirements

* + - 1. Section 26 05 00: Common Work Results for Electrical, for interface and coordination with building electrical systems and distribution.
			2. Section 28 05 13: Conductors and Cables for Electronic Safety and Security, for cabling between system servers, panels, and remote devices.
			3. Section 28 05 28: Pathways for Electronic Safety and Security, for conduit and raceway requirements.
			4. Section 28 23 13: Video Surveillance Control and Management Systems.
			5. Section 28 23 16: Video Surveillance Monitoring and Supervisory Interfaces.
			6. Section 28 23 23: Video Surveillance Systems Infrastructure.
			7. Section 28 23 29: Video Surveillance Remote Devices and Sensors.
	1. **REFERENCES**
		1. Reference Standards: Provide systems that meet or exceed the requirements of the following publications and organizations as applicable to the work of this Section.
			1. Conformity for Europe (CE).
			2. Electronic Industry Association (EIA).
			3. Federal Communications Commission (FCC).
			4. Restriction of the Use of Certain Hazardous Substances (RoHS).
			5. Underwriters Laboratories Inc. (UL)
	2. **SYSTEM DESCRIPTION**
		1. The digital video recording system shall provide an entry-level digital recording and transmission system offering storage and playback of video from 1 to 16 traditional analog or 960H cameras, HD-Analog and HD-TVI cameras up to 4K, recording at up to 4K resolution, simultaneous True HD/VGA and CVBS outputs, and pot monitor out, with two USB ports and an internal 10/100/1000 Gbps network adapter as standard equipment.
		2. The digital video recording system shall use H.265 and H.264 compression, include from 2 TB to 32 TB of hard disk drive internal storage.
	3. **SUBMITTALS**
		1. General: Submittals shall be made in accordance with the conditions of the contract and submittal procedure section.
		2. Manufacturer’s product data: Submit manufacturer’s data sheets indicating systems and components proposed for use, including instruction manuals.
		3. Shop drawings: Submit installation drawings, including connection diagrams for interfacing equipment, a list of connected equipment, and locations for major equipment components. Shop drawings shall indicate surrounding construction as provided for the project.
		4. Project record drawings: Indicate the location of equipment and wiring on project record drawings. Submit an electronic version of the project record drawings not later than the substantial completion of the project.
		5. Operation and maintenance data: Submit manufacturer’s operation and maintenance data customized to the system installed. Include operator manuals.
	4. **QUALITY ASSURANCE**
		1. Qualifications: Manufacturers shall have a minimum of 10 years of full-time experience in manufacturing and maintaining digital video recorder systems. The manufacturer shall provide toll-free technical assistance and support available Monday through Friday, 8:00AM to 8:00PM EST. Installers shall have a minimum of 2 years of experience installing similar systems and shall be acceptable to the manufacturer of the digital video recorder system.
		2. Regulatory Requirements:
			1. Emissions: FCC, Part 15, Class A; CE (EN 55022).
			2. Immunity: CE (EN 50130-4).
			3. Safety: UL/CSA 60950-1; CE (EN 60950-1).
		3. Power Requirements: Input voltage shall be 12 V DC, 4 A.
	5. **DELIVERY, STORAGE, AND HANDLING**
		1. Packing and Shipping: Deliver products in the manufacturer’s labeled packages.
		2. Storage and Protection: Store and handle products in accordance with manufacturer’s requirements in a facility where environmental conditions are within recommended limits.
	6. **PROJECT CONDITIONS**
		1. Environmental Requirements: Comply with environmental requirements and recommendations of the manufacturer for the proper installation of products.
		2. Temperature Criteria: Do not install digital video recorder system unless the temperature is between 32° F (0° C) to 113° F (45° C).
	7. **WARRANTY**
		1. Manufacturer’s Guarantee: two (2) years for labor and two (2) years for parts from the manufacture date code under normal use and service for the digital video recorder system, five (5) years for hard drives.

END OF SECTION

1. **PRODUCTS**
	1. **EQUIPMENT**
		1. Manufacturer: Digital Watchdog, Inc.

 16220 Bloomfield Avenue. Cerritos,

California USA 90703 USA

 Phone: (866) 446-3595

 Web: www.digital-watchdog.com

 E-mail: dw-tech@digital-watchdog.com

* + 1. Models:DW-VA1G416xT
		2. Alternates:

DW- VA1G416 16-channel, no local HDD for recording digital video recorder

DW-VA1G4162T 16-channel, 2TB internal storage

DW-VA1G4164T 16-channel, 4TB internal storage

DW-VA1G4166T 16-channel, 6TB internal storage

DW-VA1G4168T 16-channel, 8TB internal storage

DW-VA1G41610T 16-channel, 10TB internal storage

DW- VA1G41612T 16-channel, 12TB internal storage

DW- VA1G41616T 16-channel, 16TB internal storage

DW- VA1G41620T 16-channel, 20TB internal storage

DW- VA1G41632T 16-channel, 32TB internal storage

* 1. **SYSTEM COMPONENTS**
		1. Specified Product: Universal HD over Coax® series embedded digital video recording system.
		2. The Digital Video Recorder (DVR) system shall function as a standalone unit. It shall not require the use of a personal computer, special monitors, or other peripheral devices for either programming or operation. Live and recorded playback of video images shall display on conventional CCTV monitors.
		3. Cabling: The recorder shall be provided with a built-in power supply to prevent susceptibility to power spikes, surges, harmonics, and other common electrical disturbance phenomena associated with the installation environment.
		4. The DVR shall record video and audio from up to 16 analog to a hard disk and enable playback of video and audio.
		5. The DVR shall be capable of displaying onscreen text and menus in more than one language. This shall be user-selectable via the menu system.
		6. The DVR shall provide easy configuration of mobile and web viewer. The mobile viewer shall be freely available, and connection shall be established by simply scanning QR code from a mobile device.
	2. **OPERATIONAL REQUIREMENTS**
		1. The digital video recorder (DVR) shall meet or exceed the following design and performance specifications:
			1. The DVR shall provide up to sixteen (16) BNC camera inputs.
			2. The DVR shall provide True HD/VGA output at up to 3840 x 2160 resolution.
			3. The DVR shall provide 1920 x 1080 (1080p) real-time recording resolution.
			4. The DVR shall use H.265 and H.264 image compression.
			5. The DVR shall offer the following recording resolutions (NTSC):
				1. 720x480(HD): 480fps
				2. 960x480 (HD): 480fps
				3. 1280x720 (HD): 480fps
				4. 1920x1080 (HD): 480fps
				5. 1920x1536 (3MP): 288fps (18fps per channel)
				6. 2560x1600 (4MP): 240fps (15fps per channel)
				7. 2560x1944 (5MP): 192fps (12fps per channel)
				8. 3840x2160 (4K): 112fps (7fps per channel)
			6. The DVR shall offer the following internal hard disk drive (HDD) storage options:
				1. No HDD, 2TB, 4TB, 6TB, 8TB, 10TB, 12TB, 16TB, 20TB, 32TB.
			7. The DVR shall provide as standard equipment 2 USB ports and an internal 10/100/1000 Gbps network adapter.
			8. The DVR shall support operation using a USB mouse.
			9. The DVR front panel shall include the following items:
				1. A USB port for saving video clips to external storage devices.
				2. Status LEDs

Power: A steady green light indicates the recorder is working correctly.

Record: REC indicator blinks red when data is being read from or written to the HDD. A steady red light indicates an HDD exception or error.

Network status: Flashing indicates a normal network connection. No light indicates that it is not connected to a network.

* + - 1. The DVR rear panel shall include the following items:
				1. 16x BNC video inputs.
				2. 8x RCA audio inputs and 1x audio output.
				3. RS-485 PTZ control interface.
				4. 16x Alarm inputs and 4x relay outputs, NO/NC.
				5. CVBS monitor output.
				6. True HD monitor output.
				7. VGA monitor output.
				8. A USB port for connecting a mouse.
				9. RJ-45 10/100/1000 Base-T Ethernet port.
				10. Low voltage DC power supply jack.
				11. E-SATA output.
			2. The DVR shall be preconfigured with a DHCP-enabled IP address and subnet mask for quick integration within existing IT structures.
			3. The DVR shall support DDNS via dwddns.
			4. The DVR shall include a bandwidth throttle to ensure that images and system messages are delivered as quickly as possible within network bandwidth limits.
			5. The DVR shall display video in full screen or multi-screen format, with the camera number, a user-definable camera name, and the camera’s recording/alarm status displayed for each camera.
			6. The DVR shall support streaming video via RTSP protocol.
			7. The DVR shall have log view screens to show the entire system status at a glance.
			8. The DVR shall support Auto Install to do the following:
				1. Automatically detect loss of video sync, with onscreen indicators. If video loss is detected during recording, the DVR will warn by an onscreen message, sending a message to remote, sounding a buzzer, and switching a relay.
			9. The DVR shall adjust for Daylight Saving Time changes, with no loss of video when the clock advances one hour. When the clock is adjusted backward when Daylight Saving Time ends, the DVR shall record both hours, allowing the user to select which hour to playback.
			10. The DVR shall support continuous, event, and combined continuous/event recording that is user-configurable by channel, and shall support manual recording overrides of the recording schedule.
			11. The DVR shall display status icons on the connected monitors. Camera status icons shall be used for each camera. There shall be an icon for:
				1. Alarm detection by the camera channel
				2. Recording of the camera channel
				3. Motion detection by the camera channel
				4. There will be a message in case of video loss for each channel
			12. The DVR shall include playback controls that allow the user to playback recorded video forward or backward at multiple speeds.
			13. The DVR shall include backup viewer software that allows the user to playback exported video in its proprietary format on a PC.
			14. The DVR shall allow the user to perform index-based searches of recorded video.
			15. The DVR shall support adjustments to the picture resolution, brightness, contrast, color, motion sensitivity, and images per second during recording, and these settings shall be user-configurable by channel.
			16. The DVR shall support adjustment of camera settings, including image enhancement and default settings via coaxial cabling (UTC).
			17. The DVR shall prevent unauthorized program tampering through the use of at least sixteen users and passwords, with settings including:
				1. Local user privileges
				2. Remote user privileges
				3. Local play privileges
				4. Remote play privileges
				5. Remote view privileges
			18. The DVR shall display video in full screen or multi-screen format, with the camera number, a user-definable camera name, and the camera’s recording/alarm status displayed for each camera.
			19. The DVR shall provide remote operation and configuration through remote viewing software, a web client, and mobile device applications (Apple and Android).
			20. The DVR’s remote viewing software shall include, at a minimum, the following functions:
				1. Viewing live video.
				2. Searching recorded video.
				3. Exporting still images (in JPEG format) and video clips (in PSF format).
				4. Controlling PTZ cameras.
			21. The DVR shall provide PTZ dome control—including multiple pan, tilt, zoom, and focus speeds, iris control (including return to auto-focus), programming presets, and viewing presets—through the RS-485 port.
			22. The DVR shall support alarm sensor in and relay out functions, motion detection, and video loss detection, and shall include alarm monitoring software.
			23. The DVR shall include the option of displaying a sensor status bar on the main display screen.
			24. When an alarm event is detected, the DVR shall have the capability of automatically displaying video full screen, initiating recording for a set time, recording at a higher frame rate during the event, streaming video to a client PC, sending email and popup notifications, and activating an alarm beep notification.
		1. Multiscreen
			1. The DVR shall be a multiplex type unit, allowing simultaneous recording, playback, and live multiscreen viewing at the unit, with no need for additional hardware.
			2. The DVR shall provide the following displays in live mode: full screen, sequencing,
			4-way, 6-way, 9-way, 12-way or 16-way.
			3. The DVR shall incorporate the following display options:
				1. Title display enable/disable, per channel
				2. Time/date formatting
				3. Time/date enable/disable, per channel
			4. The DVR shall provide image update rates for live and record modes of up to 30 fps per channel.
				1. The DVR shall have three monitor outputs as follows:

The DVR can use the True HD and VGA outputs independently.

One True HD connector

Shall be able to display all cameras live or in sequence mode

Shall display live, playback, and programming functions

One VGA multiscreen output

Shall display live, playback, and programming functions

Shall be able to display all cameras live or in sequence mode

One analog CVBS multiscreen output

Shall display live, playback, and programming functions

Shall be able to display all cameras live or in sequence mode

* + 1. Video motion detection
			1. The DVR shall support the following video motion detection, with on-screen indications when motion is occurring:
			2. Motion detection, which shall be treated as an event and follow the event encoding settings.
				1. The DVR shall support an onscreen setup scale to determine the optimum sensitivity setting for each camera input.
				2. The DVR shall have 330 zones per camera, arranged in a 22 by 15 grid.
				3. The DVR shall have 50 levels of sensitivity.
		2. Alarms
			1. The DVR shall support up to 16 alarm inputs, programmable as normally open or normally closed from within the menus.
			2. The DVR shall have a fully programmable additional audible device to alert the user to alarms, motion detection, and video loss occurrences or operation failure.
			3. Set up triggered recording based on:
				1. sensor (input) detection
				2. camera event
				3. video loss detection
			4. The DVR shall support alarm latching with two settings, which shall be manually set or programmable from the menus as follows:
				1. Manual acknowledges – When an alarm is activated, the DVR shall be manually acknowledged to reset the COS back to normal condition.
				2. Timed out – the alarm shall automatically reset after a user-defined elapsed time.
			5. The DVR shall have an automatic full screen associated alarm display that shall change as incoming alarms continue to arrive. As additional alarms arrive, the display monitor shall sequence between the cameras in alarm.
			6. The DVR shall provide status relays that shall link to alarms, motion detection, and video loss.
			7. The DVR shall have an alarm history display capable of showing the last 100 alarms received by the system.
			8. The DVR shall be supplied with push-in wire terminal connections to facilitate easy connection of alarms and other input/output signals.
			9. Events and Response Actions
				1. Alarm input
				2. Video loss
				3. Camera event
				4. Sensor
				5. Video Analytics
			10. Response Actions:
				1. email
				2. event push
				3. PTZ preset
				4. Alarm out
				5. Buzzer
				6. Monitor out
		3. The DVR shall include a system log that records and displays information relating to alarm events, reboots, and other system information. The user shall have the ability to export the log information.
		4. The DVR shall be equipped with self-diagnostic functions, including S.M.A.R.T. disk health check.
		5. The DVR shall adjust for Daylight Saving Time changes, with no loss of video when the clock advances forward one hour. When the clock is adjusted backward when Daylight Saving Time ends, the DVR shall record both hours, allowing the user to select which hour to playback.
		6. Ethernet communications
			1. The DVR shall support LAN/WAN Ethernet access.
			2. The DVR shall support Ethernet bandwidths of 100 Mbps or 1000 Mbps.
			3. The DVR shall support simultaneous Ethernet access by not less than 10 workstations connected to the LAN/WAN.
			4. The DVR shall be provided with a Graphical User Interface (GUI) software for remote playback and viewing that shall support the Windows 7, 8, and 10 operating systems and full searching capabilities. It shall be possible to remotely set up the DVR unit using the remote viewing software.
				1. Remote access:

Simultaneous unicast access by up to 10 users

Simultaneous multicast access by up to 20 users

Simultaneous search access by up to 3 users

* + - 1. The DVR shall provide remote operation and configuration through remote viewing software, a web client, and mobile device applications (Apple and Android).
				1. Supported platforms: Android, IOS
				2. Supported remote users:

Live unicast: 10

Live multicast: 20

Playback: 3

* + - 1. The DVR’s remote viewing software shall include, at a minimum, the following functions:
				1. Viewing live video.
				2. Searching recorded video.
				3. Exporting still images (in JPEG format) and video clips (in PSF format).
				4. Controlling PTZ cameras.
			2. The DVR shall not stop recording during any Ethernet access.
			3. The DVR shall allow the user full programming of Ethernet parameters, including the following:
				1. DHCP (enable/disable)
				2. DDNS
				3. IP address
				4. Default gateway
				5. Subnet mask
				6. HTTP port
				7. Main port
		1. Archiving
			1. The DVR shall support the archiving of recorded images through the USB memory stick.
			2. The DVR shall support the archiving of recorded video and audio data through eSATA to an external eSATA HDD.
			3. The DVR shall have an option to select the type of archiving device connected when interfaced with the devices specified or approved equals.
			4. The DVR shall support selective archiving.
			5. The DVR shall have an on-screen progress indicator when selective archiving or restoration operations are accessing the archive device.
			6. The DVR shall have an override mode that may be enabled or disabled, preventing any video that is older than a user-defined period from being viewed or archived, when the unit is used in jurisdictions that mandate a finite storage time.
			7. Available actions upon reaching full HDD storage capacity (with automatic notifications to users):
				1. stop recording
				2. overwrite
				3. auto delete
		2. Recorder hard drives
			1. The DVR shall record video on a hard drive. No videotape or videotape recorders shall be required.
			2. The DVR shall offer the following internal hard disk drive (HDD) storage options:
				1. 2 TB
				2. 4 TB
				3. 6 TB
				4. 8 TB
				5. 10 TB
				6. 12 TB
				7. 16 TB
				8. 20 TB
				9. 32 TB
			3. The utilized hard drives shall support the latest SATA technology including SMART reporting.
			4. The utilized hard drives shall be specially developed for the Digital Video Archiving Industry.
	1. **SYSTEM HARDWARE**
		1. The digital video recorder shall have the following mechanical specifications:
			1. Unit Dimensions (D × W × H):
				1. 15.15” x 12.4” x 1.88” (385 × 315 × 48 mm).
			2. Unit Weight:
				1. 2.64lbs (1.2kg) without HDD drives installed.
			3. Construction:
				1. Housing: Steel chassis.
				2. Finish: Black matte finish.
		2. The digital video recorder shall have the following electrical specifications:
			1. Voltage: DC12V.
			2. Power Consumption:

48W, 4A

* + 1. The digital video recorder shall be designed to meet the following environmental conditions:
			1. Operating Temperature: 32° F (0° C) to 113° F (45° C).
			2. Relative Humidity: 10-90%
	1. **MANUFACTURER SUPPORT**
		1. The manufacturer shall provide customer service, pre-sales application assistance, after-sales technical assistance, access to online technical support, and online training using Web conferencing.
		2. The manufacturer shall provide technical assistance and support by means of a toll-free telephone number at no extra charge Monday through Friday, 8:00AM to 8:00PM EST.

END OF SECTION

1. **EXECUTION**
	1. **INSTALLERS**
		1. Contractor personnel shall comply with all applicable state and local licensing requirements.
	2. **PREPARATION**
		1. The network design and configuration shall be verified for compatibility and performance with the camera(s).
		2. Network configuration shall be tested and qualified by the Contractor prior to camera installation.
	3. **INSTALLATION**
		1. The contractor shall follow all Manufacturer published installation procedures and guidelines.
		2. Before permanent installation of the system, the system shall be factory tested in conditions simulating the final installed environment
			1. A report indicating successful test results shall be produced.
	4. **STORAGE**
		1. The H.264 embedded digital video recorder system shall be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.

END OF SECTION