

Operation and Maintenance of Network Video Recorder [Surveillance]

A. Operations

1. The recorder shall use an easy-to-read, browser-based menu structure.
2. The recorder shall support Digital Zoom in a user defined area.
3. Live view
 - a. The live viewing of the recorder cameras will contain:
 - i) Camera live view with up to 16 cameras simultaneously.
 - ii) Capability to switch between Main stream and Substream on individual cameras and all cameras at once.
 - iii) PTZ functionality with Preset call up.
 - iv) Control the recorder relay outputs.
4. Playback
 - a. The video player shall be a zero-footprint player and exported with the video as an evidence player.
 - b. The user shall be able to play back images smoothly at normal or fast speeds and in forward modes, without distortion.
 - c. The recorder will allow for reverse playback.
 - d. The recorder will allow the user to select which resolution, frame rate, and bandwidth will be streamed to the browser interface when in playback.
5. Search
 - a. During investigations, it shall be possible to search and retrieve stored video data by date, time, camera, and alarm.
 - b. The recorder shall have log view screens to show the entire system status at a glance.
 - c. The unit shall provide full media search capabilities for archiving, restoring, and playback operations. Search capabilities shall include filters for start/stop times, start/stop dates, alarm and event occurrences, inserted text, and camera number.
 - d. The recorder shall have an alarm history display capable of showing the last 100 alarms received by the system. e. The recorder will provide the ability to search based on motion metadata in-screen.
6. Configuration
 - a. The recorder browser pages will contain full configuration capability of the recorder and all of its features.
 - b. The recorder will be configurable using standard available free-of-charge software or through SDK implementation in custom software.
 - c. The recorder shall prevent unauthorized program tampering through the use of at least 16 users and passwords, with settings including:

- i) Local user privileges
 - ii) Remote user privileges
 - iii) Local play privileges
 - iv) Remote play privileges
 - v) Remote view privileges
- d. The system shall be upgraded through flash programming upgrades of software, using either an USB drive or TCP/IP.

Network Video Recorder (NVR)

Hardware:

1. The recorder 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 or LCD monitors.
2. The recorder shall be capable of displaying on-screen text and menus in more than one language. This shall be user-selectable via the menu system.
3. The recorder shall have robust buttons integrated into the front panel of the unit, used for menu navigation, setup, and control of the unit, with no need for an external control device.
4. The recorder shall have robust and illuminated buttons integrated into the front panel of the unit for each camera, display, sequence, monitor A, monitor B, live, playback, pause, alarm, and a multi-function navigation.
 - a. Status LEDs
 - i) Power: A steady green light indicates the recorder is working correctly.
 - ii) Event alarm: A flashing red light indicates that there is a sensor Alarm In or another alarm such as motion or tampering.
 - iii) HDD: HDD indicator blinks red when data is being read from or written to the HDD. A steady red light indicates an HDD exception or error.
 - iv) Tx/Rx: Flashing green indicates a normal network connection. No light indicates that it is not connected to a network.
 - v) Technical Alarm: A steady red light indicates that there is a technical alarm from the recorder. No light indicates that there is no alarm.
5. The comprehensive search function shall be activated by using the search button.
6. The recorder shall support a one-button quick archive, auto detecting the storage media inserted and the maximum storage capacity.
7. The recorder shall have two USB ports at the front panel supporting a mouse or memory sticks for archiving video and audio files for evidence and one USB port on the back panel.
8. The recorder shall provide external keyboard support. All NVR and PTZ control functions shall be supported.

9. The recorder shall use an easy-to-read, onscreen menu system of icons and pop-up selections.
10. The recorder shall use a battery to back up memory that stores the time, date, and all internal programming functions.
11. The recorder shall have log view screens to show the entire system status at a glance.
12. The recorder shall support Auto Install to do the following:
13. The recorder shall prevent unauthorized program tampering through the use of at least sixteen users and passwords, with settings including:
 - a. Local user privileges
 - b. Remote user privileges
 - c. Local play privileges
 - d. Remote play privileges
 - e. Remote view privileges
14. The recorder shall be 1.5/2 units of rack space in height (1.5/2U), depending on the model and capable of being rack mounted (EIA 19-inch standard), with rack mount hardware that was designed by the manufacturer to support the units.
15. The recorder shall support Digital Zoom in a user defined area.
16. The eSATA port shall be configurable either as a Storage Expansion Port or for external video archiving on eSATA media.
17. The video player shall be a zero-footprint player and export video with an evidence player.
18. A Windows Media Player filter shall be available in order to allow the playback of evidence video using the default Windows Player.
19. The recorder shall support an easy-to-use Internet Explorer-based Web browser. The supported features shall be:
 - a. Camera live view with up to 16 cameras simultaneously
 - b. Capability to switch between Main stream and Substream per camera individual and all cameras at once
 - c. PTZ functionality with Preset call up
 - d. Playback of recorded video
 - e. Archiving of recorded video
 - f. Comprehensive remote configuration

Network Video Recorder Features

1. The recorder shall support both H.264 and H.265 encoding. The selection of the desired encoding is possible via the local configuration or via remote configuration (webpage)
2. Live view
 - a. The recorder shall display cameras in live mode via the connected monitors.
 - b. When the recorder powers up, the recorder shall start up in live mode.

- c. The recorder shall display status icons on the connected monitors. Camera status icons shall be used for each camera. There shall be an icon for:
 - i) Alarm detection by the camera channel
 - ii) Recording of the camera channel
 - iii) Motion detection by the camera channel
- d. There will be a message in case of video loss for each channel
- e. There will be an icon that shows the alarm and system events. Clicking on the icon will show all alarms/events in a pop-up window. The icon will be visible when a system event or alarm occurs. The events and alarms for which the icon is visible can be defined.

3. Recording

- a. The recorder shall support user programmable stored video frame rates that can be programmed on a per-camera basis. All cameras shall be programmable to capture images in one of the following operating modes:
 - i) Constant
 - ii) TimeLapse
 - iii) Event
- b. The recorder shall allow the user to select whether the hard drive recording should automatically overwrite data (starting with the oldest data first), or if the user must confirm overwriting before recording will continue when the hard drive is filled.
- c. The recorder shall have image quality settings that are adjustable on a per-camera basis by the end user
- d. The recorder shall support camera bandwidth of up to 80/160/256/320 Mbps for incoming camera connections
- e. The recorder shall support from one to thirty seconds of pre-alarm recording, maintained in a buffer, and shall append this buffer to the beginning of all recorded alarms. The recorder shall continue to record at the alarm rate until the alarm is reset, times out, or is acknowledged as determined by the alarm menu programming.
- f. The recorder shall support from 1-30 seconds of pre-event recording maintained in a buffer, and shall append this buffer to the beginning of all recorded events. The recorder shall continue to record at the event rate until the programmed event duration (from 5 seconds to 10 minutes) expires.
- g. The recorder shall allow the user to manually or automatically customize the record rates per camera for events and motion detection.
- h. The user shall be able to play back images smoothly at normal or fast speeds and in forward modes, without distortion.
- i. The recorder shall provide full media search capabilities for archiving, restoring, and playback operations. Search capabilities shall include filters for start/stop times, start/stop dates, alarm and event occurrences, and camera number.

- j. The recorder shall support the recording of all images with a digital watermark. The verification of watermarked images shall reside solely with the manufacturer.
- 4. Dual Streaming
 - a. The recorder shall allow the installer to setup a sub stream for streaming Video and Audio over Network without affecting the record rate, quality, and resolution of recorded video.
 - b. The recorder shall also have the option to record both the main and the sub stream.
- 1. A&E Specifications
 - c. One/two analog multiscreen output (depending on the model)
 - i) VGA connector
 - ii) Shall display live, playback, and programming functions
 - iii) Shall be able to display all cameras live or in sequence mode
- 5. Video motion detection
 - a. The recorder shall support the following video motion detection, with on-screen indications when motion is occurring:
 - b. Motion detection, which shall be treated as an event and follow the event encoding settings.
- 6. Masking / Privacy Zones
 - a. The recorder shall support video masking.
 - b. The recorder shall have four mask areas per camera.
- 7. Tampering
 - a. The recorder shall support video tampering.
 - b. The recorder shall have three levels of sensitivity.
- 8. Alarms
 - a. The recorder shall support up to 16 alarm inputs, programmable as normally open or normally closed from within the menus.
 - b. The recorder shall support four form-C relays as alarm outputs, and rated for 0.5 A continuous, 1.0 A momentary. Upon alarm, the system shall be able to execute a change of state (COS) to relay number 1, relay number 2, relay number 3, relay number 4 or all.
 - c. The recorder shall have a fully programmable additional audible device to alert the user to alarms, motion detection, and video loss occurrences or operation failure.
 - d. The recorder shall support alarm latching with two settings, which shall be manually set or programmable from the menus as follows:
 - i) Manual acknowledge – When an alarm is activated, the recorder shall be manually acknowledged to reset the COS back to normal condition.
 - ii) Timed out – the alarm shall automatically reset after a user-defined elapsed time.
 - e. The recorder shall have 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. It shall be possible, using the telemetry preset control described

elsewhere in this specification, to utilize presets with associated alarm display to show the alarmed scene and surrounding escape paths during a high level alarm condition.

- f. The recorder shall provide status relays that shall link to alarms, motion detection, and video loss.
- g. The recorder shall have an alarm history display capable of showing the last 100 alarms received by the system.
- h. The recorder shall be supplied with push-in wire terminal connections to facilitate easy connection of alarms and other input/output signals.
- i. The recorder shall support notification on alarm to user accounts. The recorder shall allow the user to program notification in response to any of the following conditions:
 - i) Hard drive full
 - ii) NTSC/PAL mismatch
 - iii) Illegal access
 - iv) IP Address conflict
 - v) Network issues
 - vi) Abnormal recording
 - vii) Hard drive error

9. Ethernet communications

- a. The recorder shall support LAN/WAN Ethernet access.
- b. The recorder shall support Ethernet bandwidths of 10 Mbps or 100 Mbps or 1000 Mbps.
- c. The recorder shall support simultaneous Ethernet access by not less than 16 workstations connected to the LAN/WAN.
- d. The recorder shall have the option to define access filters based on IP addresses.

10. HDD Management and storage

- The recorder shall have the capacity to connect disks (NAS /IP SAN disks), and have a minimum capacity of 50TB, configured at RAID10.
- Supports Self-Monitoring, Analysis and Reporting Technology [S.M.A.R.T.] and bad sector detection.
- Supports HDD standby function.
- redundancy, read-only, read/write (R/W).
- be able to assign different capacity to different channel.

Network Switch [CISCO-made]

- 16 10/100/1000Mbps RJ45 ports
- 2 RJ45/SFP GigE Combo ports
- Auto-MDI/MDI-X and auto-negotiate on each RJ45 port
- IEEE 802.3af/at powered RJ45 ports (except for combo ports)
- PoE power up to 30.8 watts per PoE port support

- Circuit protection preventing power interference between ports
- Easy to view PoE Usage LED meter on front panel
- Powerful PoE management features
- Quality of Service (2 priority queues on all switch ports)
- LAN, up to 32 LAN groups
- IEEE 802.1Q tagging support
- Spanning Tree Protocol (IEEE 802.1d and IEEE 802.1w) support
- Link aggregation (LACP or Cisco Ether-channel) support
- Multicast Support (IGMP Snooping v1 and v2 – excludes IGMP Query)
- Basic Switch Security (MAC address binding, TCP/UDP filtering)
- Management via Web browser or SNMP v1
- Firmware upload/download via HTTP
- 3-year Warranty