M12 Network Camera

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1. GENERAL

A. General Requirements

1. The camera shall be of the manufacturer's official product line, designed for commercial/industrial 24/7/365 use.
2. The camera shall be based upon standard components and proven technology using open and published protocols.

B. Quality Assurance

1. All camera installation, configuration, setup, program and related work shall be performed by technicians certified by the manufacturer in the installation and service of equipment provided.
2. All equipment provided shall be backed by a minimum of 2 years manufacturer warranty.

C. Certificates and Standards

1. The camera shall carry the following approvals & certificates:
    a. VDE Statement of Approval
    b. FCC Part 15
2. Networking and Power Supply
    a. IEEE 802.3af (Power over Ethernet)
    b. IEEE 802.1X (Authentication)
    c. IPv4 (RFC 791)

2. PRODUCTS

A. General

1. The camera shall:
    a. Be designed to provide MJPEG or other streaming method video, and support resolutions up to 2048 x 1536 without upscaling (true sensor resolution).
    b. Be designed to provide Motion JPEG video at the following frame rates:
        i. 25 fps in PDA, QCIF, CIF, VGA, 4CIF, D-1 PAL
        ii. 12 fps in Megapixel (1280x960)
        iii. 4 fps in 3Megapixel (2048x1536)
    c. Operate on a secure linux based platform, including a built-in web server.

B. Hardware

1. The cameras shall:
    a. Use a high quality, 1/2" CMOS sensor:
        i. For day cameras, use a native colour CMOS sensor with capability to produce images at 1 Lux at 1/60 exposure and at 0.05 Lux at 1/1 exposure.

ii. For night cameras, use a native black and white, IR sensitive CMOS sensor with capability to produces images at 0.1 Lux at 1/60 exposure and at 0.005 Lux at 1/1 exposure.

b. For Day/Night cameras, have two independent image sensors, comprising both a native colour (for day) and a native black and white (for night) configuration

c. Have no mechanical moving parts (e.g. filter arms, iris control, etc.).

d. Be fitted with a high-quality, manufacturer supplied lens, operating at F2.0.

C. Processor Functionality:

1. The camera shall:

a. Perform all video compression in software and without the aid of a dedicated compression chip for easy upgrade and extended life span.

b. Be able to switch automatically between two internal sensors at a specified lighting level without the need for external interaction.

c. Provide minimum 64MB onboard memory for pre- and post-alarm images as well as a further minimum of 64MB for storage of events. This memory must provide minimum storage of:

i. 800 images in Megapixel pixel resolution

ii. 2500 images in VGA resolution

iii. 4000 images in CIF resolution

d. Onboard storage of events must be able to re-synchronise with the server upon connectivity restoration. Any event lost within this time should be logged in the camera.

e. Be able to operate a full stream of network video, including lip-synchronised audio, at a maximum of 5MBit/s on the network port per stream of video.

D. Video

1. Resolution

a. The camera shall be able to deliver high-quality video resolutions up to 2048x1536 over IP networks.

b. Supported video resolutions shall include:

i. 160x120 (PDA)

ii. 320x240 (CIF)

iii. 640x480 (VGA)

iv. 768x576 (D-1 PAL)

v. 800x600 (SXVGA)

vi. 1024x768 (XGA)

vii. 1280x960 (Megapixel)

viii. 2048x1536 (3Megapixel)

ix. Custom resolutions as determined by the user in the camera software, at any ratio.[1]

[1] Any ratio means that a camera installed in a fuel station can have the footage of the sky and the pavement removed, leaving only the required image (e.g 2048 wide by only 480 lines high) to be transferred and recorded, reducing bandwidth and storage amounts.

c. Each frame of the recorded footage shall contain a fingerprint listing the status of each sensor at the time of capture as well as any embedded text. This fingerprint must contain a security feature that can be certified by the manufacturer and admitted to court to prove authenticity and tamper control.

2. Transmission Speed

a. The camera shall allow for the transition of images at up to 25fps for resolutions up to VGA, 12 fps for resolutions up to Megapixel and 4fps for resolutions up to 3Megapixel, using standard Motion JPEG format.

3. Compression

a. The camera shall provide a codec that:

i. Is designed for security applications

ii. Can natively support resolutions up to 2048x1536 in a single stream.

iii. Provide lip synchronous audio.

iv. Can support multiple resolutions and frame rates in a single stream.[2]

v. Does not create blur on single frames to simulate faster playback.[3]

b. The camera shall provide at least 9 different levels of compression, expressed as a percentage.

c. The camera shall be capable of producing bit rates between a minimum of 1kbps and a maximum of 5Mbps per video stream - that is 1.3 Megapixel at 12 frames per second or 3 Megapixel at 4 frames per second.

4. Image Control

a. The camera shall incorporate Automatic and Manual Contrast Control, Automatic and Manual White Balance, Backlight Compensation, Brightness Control and be able to operate at exposure times of between 1/1 second and 1/8000 of a second.

5. Functionality

a. Web Server

i. The camera shall contain a built-in web server

ii. The camera shall contain a built-in web server making video and configuration available in a standard web browser environment using HTTP and/or HTTPS, without the need for additional software or hardware.

iii. When accessed from a browser, the built-in web server will provide users with online, context-sensitive help from all windows and pages.

iv. The camera shall not require any additional software to operate in both a viewing and recording manner, and shall support full functionality when operating in the following environment:

- Operating System: Windows 2000, XP, Vista.
- Browser: Internet Explorer 6.x and higher.

v. The camera shall provide limited functionality when operating in the following environments:

- Operating System: Windows 2000, XP, Vista, Macintosh OS X, UNIX with a graphical interface installed, Linux with a graphical interface installed.

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[2] That is, the codec shall be capable of recording at one resolution (e.g. VGA) and frame rate (e.g. 1fps) but also be capable of changing that resolution within the single stream, for example - on event switching to Megapixel resolution at full frame rate.

[3] Some codecs create a blur on moving objects that enables the live stream to appear as though it is running at a higher frame rate than it really is. This is not acceptable in a security application as it causing loss of detail on still frames.

- Browsers: Mozilla Firefox, Opera 8+ or Apple Safari.

vi. Components such as Active X controls downloaded from the camera shall be signed by the manufacturer or by an organisation providing digital trust services such as Verisign Inc.

vii. The camera shall support simultaneous viewing by up to 30 clients from the web server or viewing software.

viii. the cameras internal web server shall provide support for assigning user names, group access controls and passwords for a minimum of 5 different users and 5 different group access control levels.

ix. The built-in web server shall provide IP level access control, allowing for both blocked and allowed IP address definitions.

b. IP addresses

i. The camera shall support both fixed IP addresses and IP addresses dynamically assigned by a Dynamic Host Control Protocol (DHCP) server.

ii. The camera shall allow for automatic detection of the camera based on Ping response or Bonjour when using a PC with an operating system supporting this feature.

iii. The camera shall provide support for IPv4.

c. Bandwidth Management

i. The camera shall provide the capability to limit the frame rate per viewer to a selected value without affecting the recorded stream.

ii. The camera shall be able to automatically limit frame rates in low bandwidth and heavy load conditions, without affecting the recorded stream.

d. Event Functionality

i. The camera shall be equipped with an integrated event detection functionality, which can be triggered by:

- External inputs.
- Video Motional Detection (detecting motion in multiple zones).
- Temperate.
- Thermal Movement (Passive Infrared).
- Raw TCP/IP packets with ability to respond to only specified strings.
- Lighting level as determined by the camera.
- Volume detection.
- Time controlled events (such as time tasks, periodic events, random events, schedules, etc.).
- Button press.
- Event Logic (combination of any 2 of the above mentioned or integrated sensors).
- Event counter (an event is only triggered after a predetermined number of events have passed).

ii. Response to triggers shall include:

- Notification, using TCP/IP, SMTP, SIP, ISDN and/or HTTP.
- Image uploading, using FTP, SMTP and/or ISDN.
- Activate external output.

- Begin event recording.

iii. Video motion shall:

- Be able to be specified in an unlimited number of zones in the image area.
- Be able to detect movement based on a percentage of change and degree of colour change in these areas, with the ability to have different weightings for each specified area.

iv. Event functions shall be configurable via the web interface, API and control room software.

e. Video Management

i. Long Term Storage

- The camera shall be able to record directly to any storage device and shall not require server side or licensed software (e.g. can record directly to Server Side Storage).
- The camera shall be able to rebuild the image database without obstructing recording and without the use of any additional software.

ii. NVR (Network Video Recorder) capabilities shall not incur licensing costs - this includes recording/storage server and remote clients.

iii. Perform all decision making functions (Video Motion Detection, Thermal Movement Detection, etc.) in a distributed manner, at the head of the camera unit and not rely on any server side software or hardware to operate.

iv. The camera shall provide support for USB and CF Card local storage at any capacity, however no less than 8GB minimum.

v. There shall be support for an unlimited number of storage servers, viewing clients and cameras.

f. Protocol Support

i. The camera shall provide support for the at least TCP/IP, IPv4 HTTP, HTTPS, SSL, SMTP, FTP, SIP, ISDN, DHCP, RFC, NTP, DNS, DynDNS, NTP and Bonjour.

g. Text Overlay

i. The camera shall:

- Provide embedded on-screen text in the video, with support for date & time, custom text, event and notification symbols and scrolling serial data of at least 5 lines of ASCII characters. To ensure accuracy, the camera shall accept external time synchronisation from an RCP or NTP time server.
- The camera shall have the ability to record embedded text as text within the image file so as to be searched upon at a later date.
- Provide an ability to apply a privacy mask to one or more areas of the screen permanently or on a time table rotation in either a solid, selectable colour, mosaic or crossed area configuration.
- Provide an ability to overlay a graphical image of any size up to the current image resolution, such as a logo, on the image at full opacity or at any of 9 levels of transparency. The camera shall provide ability to dynamically update this image from an FTP server or from an internal cache.

h. Security

i. The camera shall support the use of HTTPS and SSL providing the ability to upload signed certificates to encrypt and secure authentication and communication of administration data.

ii. Authentication shall be possible using the IEEE 802.1X standard.

iii. The camera shall provide user level authentication with the ability to assign a user a limited set of rights to select sections of the cameras interface, including live view, guest view, player view and menu structures.

iv. The camera shall provide IP address level filtering, allowing only specified IP's to access the camera and/or banning specified IP's.

v. The camera shall be able to automatically detect brute force attacks (attempts to log into the camera repeatedly failing) and automatically add the offending IP to the banned IP list.

i. API Support

i. The camera shall be fully supported by an open and published API (Application Programmers Interface), which shall provide necessary information for integration of functionality into third party applications as well as be able to be used by the user to set camera parameters.

j. Maintenance

i. The camera shall:

- Be supplied with Windows-based management software, capable of the assigning IP addresses, upgrading firmware and the upload and download of configuration files from the camera to the local computer.
- Allow updates of the software over the network using HTTP and/or HTTPS.
- Customer-specific settings, such as IP, Phone, FTP, and E-mail profiles, event settings, recording settings, user and group access lists, time tables, network settings, certificate settings and graphics shall be stored in non-volatile memory and shall not be lost on a power outage or soft reset.

k. Camera Diagnostics

i. The camera shall:

- Be equipped with a minimum of 6 LEDs, capable of providing visual status information. LEDs shall indicate the cameras operational status, network status and power status by default and must be able to be changed by the user, including the ability to completely disable the LEDs.
- Be equipped with a built-in temperate sensor, which measures the internal temperature of the camera. This reading shall be stored in a log inside the camera for reference and also capable of being displayed in the custom text on the video stream. The sensor must be able to trigger an event at a determined level.
- Be capable of being monitored by a heartbeat application, which will automatically alert operators of a camera fault. This application must also monitor the current status of the camera, providing feedback that will allow multiple guard/viewing stations to see which cameras are currently being monitored.

l. Interfaces

i. Serial Interface

- The camera shall be equipped with one serial port capable of receiving data at standard RS232 and RS485/422.

ii. Signal Inputs and Outputs

- The cameras shall be equipped with 4 signal inputs and 1 signal output. These signal I/O's shall be a solid state relay, accessible via a HD15 connector. The signal I/O's must be capable of responding to Normally Open (NO), Normally Closed (NC) and falling, rising, change circuit types.

iii. Network Interface

- The camera shall be equipped with one 10/100baseT Fast Ethernet-port, using a standard RJ-45 socket and shall support auto sensing of network speed.

m.Power requirements

i. Power over Ethernet according to IEEE 802.3af Class-0.

ii. 6-12VDC, at maximum 3W using the backup power connector.

iii. 24-48VDC at maximum 3W using pins 7 and 8 of the ethernet connector.

n. Environment

i. The camera shall:

- Be IP-65 rated.
- Be manufactured of PBT-30GF (Polybutyleneterephtalate with 30% fibrerglass) high durability, non corrosive plastic with stainless steel fastening nuts and screws.
- Operate and be warranted in a temperature range of -30°C to +60°C (-22°F to +140°F) without the use of any additional housing or climate control hardware.
- Operate in a humidity range of up to 90%, non-condensing.
- Have an intrinsically sealed circuit board.

o. Manufactured Units

i. The camera shall be a MOBOTIX M12 Network Camera.
[REMOVE THIS ARTICLE IF THIS IS TO BE A PERFORMANCE BASED SPECIFICATION]

3. **EXECUTION**

A. Installation

1. The Contractor shall carefully follow instructions in documentation provided by the manufacturer to ensure all steps have been taken to provide a reliable, easy-to-use system.
2. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.
3. All firmware found in products shall be the latest and most up-to-date version provided by the manufacturer.
4. All equipment requiring users to log on using a password shall be configured with user/site-specific password(s). No system/product default passwords shall be allowed.

B. Viewing/Guard Stations

1. The viewing software used on all viewing/guard stations shall be license free and able to be installed on an unlimited number of guard/viewing stations.
2. The viewing software shall be able to communicate camera status to allow all stations to see which cameras are being viewed by use of colour indicators on-screen.

a. Green to indicate a camera being viewed in live mode anywhere on the network.

b. Amber/Yellow to indicate a camera that is not currently being viewing, but does not have a network problem.

c. Red to indicate a camera that is not responding to a heartbeat check.

3. The viewing software shall allow the use of background images, such as floor plans, with camera locations layered on top.
4. The viewing software shall provide a search feature that will allow the user to search as far back as there is recorded footage on the long term storage server.
5. The viewing software shall allow export from stored footage into a format playable in a standard media player without having to install any additional software or plug-ins..

6. The viewing software shall also allow export of each frame as single JPEG images.