VIDEOLOGY®
IMAGING SOLUTIONS INC.
Original Equipment Manufacturer

User Manual

60SVM1 / 60SVM1-E

Dual Channel Audio/Video IP Network Server
With 8-bit (BT656 or BT601) HD Camera Interface Board

60SVM1 shown
Server and I/O board

60SVM shown
Server board

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For technical assistance with this product, please contact the supplier from whom the product was purchased.

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Table of Contents

1. Introduction

The 60SVM1 is a single channel, audio/video, H.264/MJPEG encoder designed around the Maxim MG3500 codec.

The 60SVM1-E is the engineering development version of the 60SVM1, and also includes analog video out and debug ports.

The encoder is a compact design consisting of a CPU board and interface board sandwiched together. The interface board provides all the necessary connectors to support the numerous video and audio inputs/outputs together with communications and GPIO lines.

The main features and capabilities of the 60SVM1 server board include:

- High definition (H.264/MJPEG) dual streaming video up to 60fps
- Ultra small 42mm x 42mm server board set
- Video motion detection
- Line in audio can be synchronized to video
- 32GB of SD recording (no frame loss) with overwrite option
- 10 second pre-alarm buffer
- 4 GPIOs
- GPS, LCD and other peripheral device interfaces (engineering evaluation boards available 60SVM1-E)
- SDK will be PSIA compatible

2. Document History

Revision	Issue Date	Author	Reason	CN#
A	01/05/2012	R.M., A.V.	Initial release of 60SVM1	13-0029
B	12/05/2013	RH	Updated for dual channel specs	13-0081

3. Hardware

3.1. Block Diagram

The block diagram of the audio video encoder is shown in Figure 1.

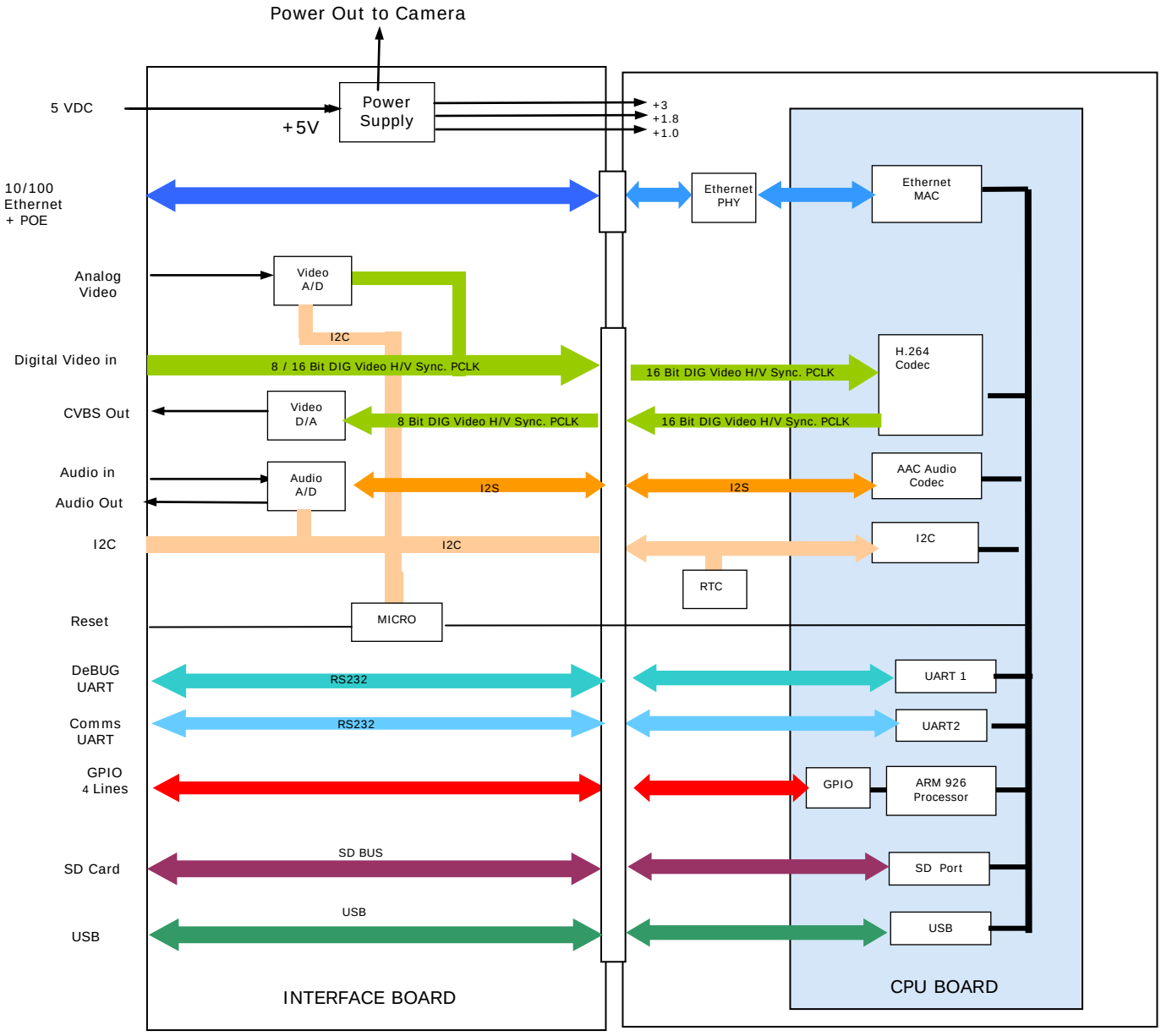


Figure 1: Block Diagram of Audio Video Encoder

4. Inputs/Output

4.1. Video Inputs

The encoder has two video inputs, one analog and one digital. The analog input can accept either CVBS or YC.

The digital video input can accept BT.656 or BT.601 8-bit. Each video input can only be used independently. For maximum resolution and frame rates, refer to section 5.

4.2. Video Output

There is a single video output, providing standard composite video.
FUTURE - The video output can be used for the purpose of camera alignment during installation, or for connection to a local composite video monitor (60SVM1-E only).

4.3. Audio Input

The encoder has a single line level (1 V pp) audio input.

4.4. Audio Output

FUTURE - The encoder has a single channel audio output.

4.5. GPIO Lines

The encoder has 4 TTL level GPIO lines. These lines may be used for alarm inputs (outputs are in development).

4.6. RS-232

The encoder includes two RS-232 ports, one for debug and one as a general purpose UART (60SVM1-E only).

4.7. I2C

The encoder provides an I2C output for direct control of camera functions such as shutter speed, white balance, etc (60SVM1-E only).

4.8. SD Card Interface

The encoder includes a single SD card interface, for storage of video and or audio onto a local SD card. The board will support Class 6 or Class 10 SD cards with a capacity up to 32GB (64GB in progress).

Refer to GUI software manual for detailed information on recording features.

4.9. Network Interface

10/100 BaseT Ethernet

4.10. Programming Interface

There is an on-board microcontroller which is used for system initialization. This connector is not intended for customer use.

4.11. Power Supply

The board is powered by 5 V DC with a total power consumption of 2.1 W.

5. A/V Encoder Performance

5.1. Video Codec Capabilities:

- Supports H.264 base, main and high profiles.
- Supports MJPEG encoding/decoding.
- Variable or constant bit rate.
- Encoding or decoding up to 1080i at 30 FPS or 1080p at 15 FPS.
- Programmable resolutions and frame rates.
- Video bit rates: 64 kB/s – 62.5 MB/s.

The encoder can support multiple resolutions and frame rate combinations (depending of course on the video sensor being used).

The following table lists some of the standard formats supported. The listed resolutions are for NTSC standard, although both NTSC and PAL are supported.

Format	Resolution H and V	Max Frame Rate	Scan Format
1080p	1920 x 1080	15	Progressive
1080i	1920 x 1080	30	Interlaced
720p	1280 x 720	45	Progressive
D1	720x 486	60	Interlaced / Progressive
VGA	640 x 480	60	Interlaced / Progressive
CIF	352 x 288	60	Interlaced
SCIF	320 x 240	60	Interlaced
QCIF	176 x 144	60	Interlaced
1.3M	1280 x 1024	15	Progressive

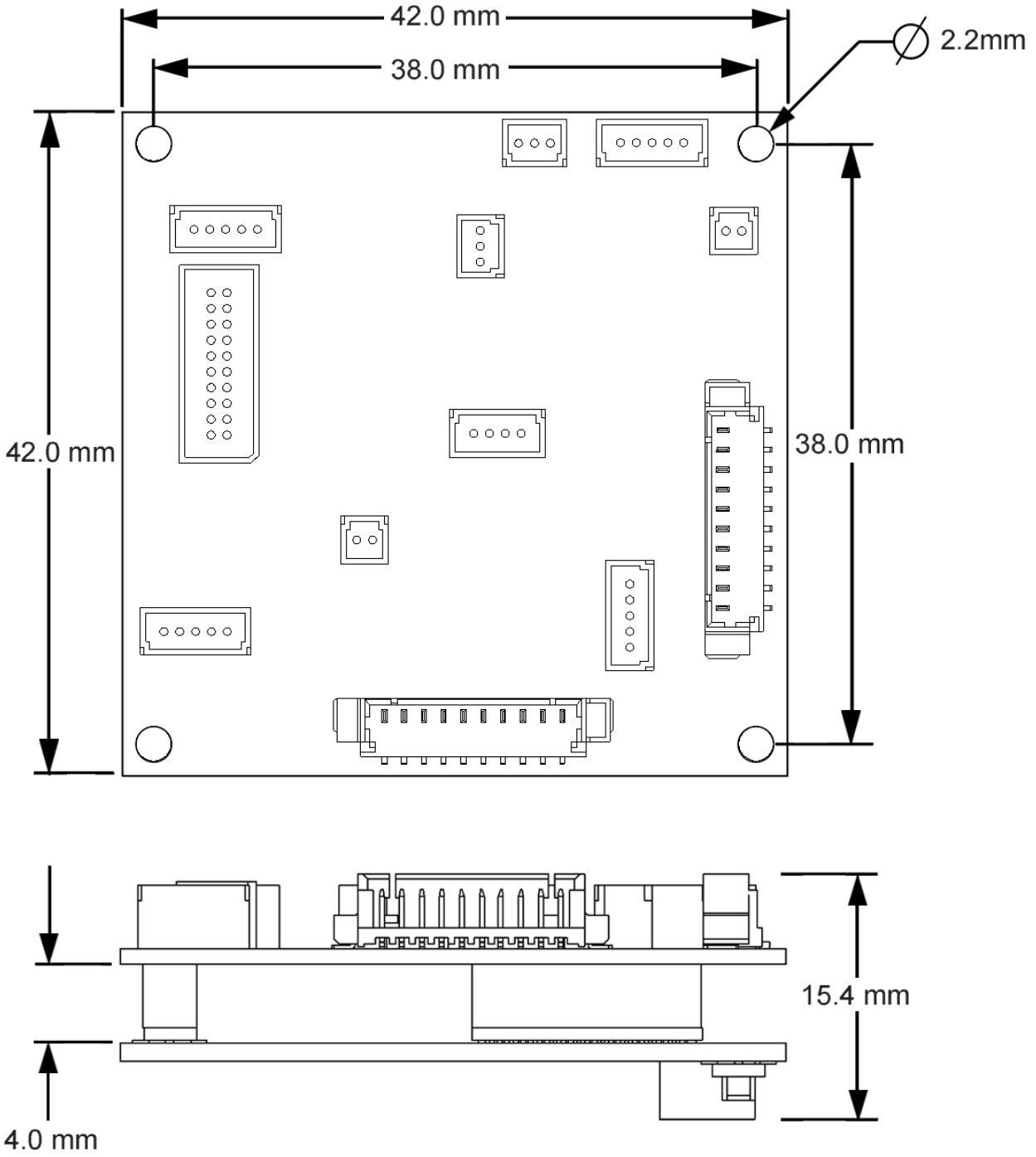
- Note that for 1080i, the image consists of two interlaced fields and thus produces a full frame every 1/30 second.
- 1.3M format is specific to Videology's 1.3 MP digital camera (24C1.3X-DIG).
- Multiple simultaneous streams can be supported, the exact combinations available will depend upon resolution and frame rate, bit rate etc. But as a rough guide, four simultaneous D1 streams at 30 FPS can be supported.
- By utilizing the scaling feature within the video pre-processor, any picture size and aspect ratio can be created.

5.2. Audio Encoder Capabilities

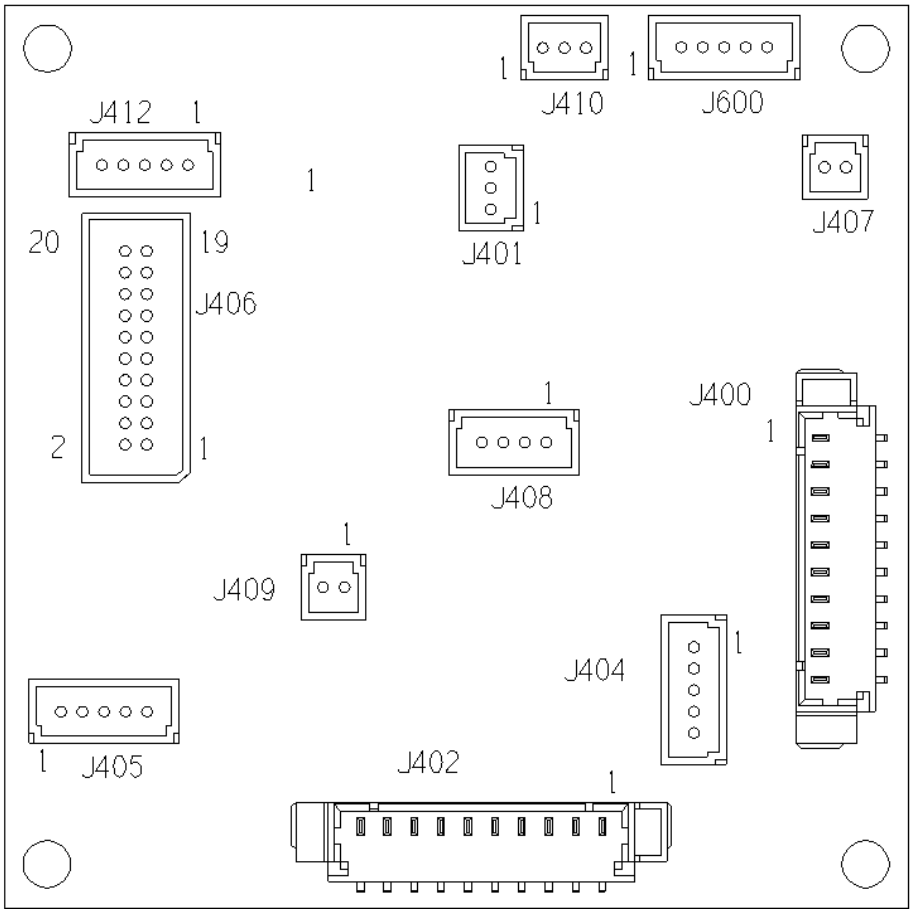
- Single channel I2S audio input. Output (60SVM1-E only).
- High-fidelity, 2-channel AAC-LC codec (Default).
- G.711 codec.
- Flexible bit rates and sample rates.

6. Mechanical

6.1. Dimensions



7. Top Side Connectors (Rev 7 I/O Board)



Top Side

7.1. J400 10 Pin Header

MOLEX 53398-10
Ethernet Connection

Pin #	Function	Label
1	Digital Ground	Digital GND
2	Transmit +	TX +
3	Transmit -	TX -
4	Receive +	RX +
5	Receive -	RX -
6	Center Tap	C T
7	No Connection	NC
8	Phy Power	3.3V DC
9	LED Link Indicator	LED LINK
10	LED Speed Indicator	LED LINK

7.2. J401 3 Pin Header

JST-BM03B-SRSS-TB
Audio

Pin #	Function	Label
1	Audio Line In	DS_LIN_CH1
2	Analog Ground	GND
3	Audio Line Out	DS_LOUT_CH1

7.3. J402 10 Pin Header

Type Molex-53398-10
SD Card Interface

Pin #	Function	Label
10	SD Card Data 2	SD D2
9	SD Card Data 3	SD D3
8	Command	SD CMD
7	3.3V Power	3.3V
6	GROUND	GND
5	SD Card Clock	SD CLK
4	SD Card Data 0	SD D0
3	SD Card Data 1	SD D1
2	SD Card Detect	SDCD
1	Write Protect	SD WP

7.4. J404 5 Pin Header

JST-BM05B_SRSS-TB
Debug UART

Pin #	Function	Label
1	Port 1 Receive Data Input	MG_RX_DBG
2	Port 1 Receive Data Output	MG_TX_DBG
3	GROUND	DGND
4	Port 2 Receive Data Input	DS_RX_DBG
5	Port 2 Receive Data Output	DS_TX_DBG

7.5. J405 5 Pin Header

JST type JST-BM05B-SRSS-TB
SPI Ports

Pin #	Function	Label
1	SPI Data Out	MISO
2	SPI Port Clock	MCLK
3	SPI Port Chip Select	SSI
4	SPI Port Data Out	MOSI
5	Digital Ground	DIG GND

7.6. J406 20 Pin Header

JST –BM20B-SRDS-G-TF
Digital Camera In/Out

Pin #	Function	Label
1	Ground	GND
2	Ground	GND
3	Pix CLK	MG VID1 PIX CLK
4	V Sync	MG VID1 V SYNC
5	H Sync	MG VID1 H SYNC
6	Ground	GND
7	Ground	GND
8	D0	MG VID0 D8
9	D1	MG VID0 D9
10	D2	MG VID0 D10
11	D3	MG VID0 D11
12	D4	MG VID0 D12
13	D5	MG VID0 D13
14	D6	MG VID0 D14
15	D7	MG VID0 D15
16	Ground	GND
17	Ground	GND
18	Sensor Reset	Sensor_RST_N
19	Iris Out	Iris
20	5 V	+5 V

7.7. J407 2 Pin Header

JST type CON-JST-BM02B-SRSS-TB
Power In

Pin #	Function	Label
1	+5 V In	+5 V
2	Ground	GND

7.8. J408 4 Pin Header

JST-BM04B_SRSS-TB
Video In

Pin #	Function	Label
1	Video C In	DS-VIDC-IN
2	Video Y In*	DS-VIDY-IN
3	Ground	GND
4	+5V	+5V

*The Y input is used for CVBS input, with appropriate software changes.

7.9. J409 2 Pin Header

JST type CON-JST-BM02B-SRSS-TB
Video Out

Pin #	Function	Label
1	CVBS_OUT	DS_CVBS_OUT
2	Ground	GND

7.10. J410 3 Pin Header

JST-BM03B-SRSS-TB
I2C

Pin #	Function	Label
1	I2C Data	TW_SDAT
2	I2C Clock	TW_SCLK
3	I2C Ground	DGROUND

7.11. J412 5 Pin Header

JST-BM05B_SRSS-TB
GPIO

Pin #	Function	Label
1	GPIO2	MG_GPIO_2
2	GPIO0	MG_GPIO_0
3	GPIO1	MG_GPIO_1
4	GPIO3	MG_GPIO_3
5	Ground	GND

7.12. J600 5 Pin Header

JST-BM05B-SRSS-TB
U Controller Programming

Pin #	Function	Label
1	Power In	3V3
2	Microprocessor Reset	RESET
3	Data	DATA
4	Clock	CLOCK
5	GROUND	GND

8. 60SVM1 I/O Board Cable Diagram

60C1152
Audio in/out (RCA)

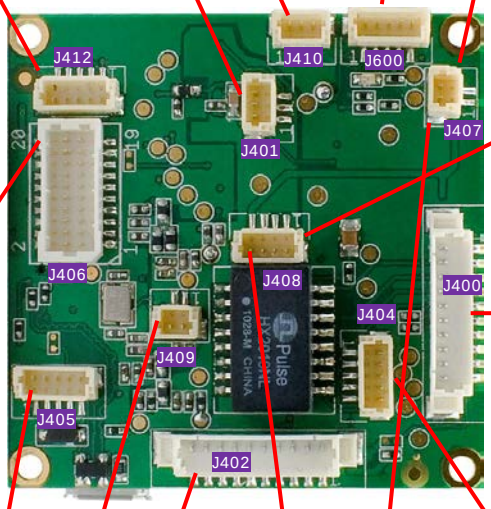
I²C Controller
(3pin to flying leads)

Micro Controller

(production
use only)

60C1158 5VDC Power In

60C1151 (GPIO 5pin
top JST to flying leads)



60C1154
(S-Video Y/C video IN)

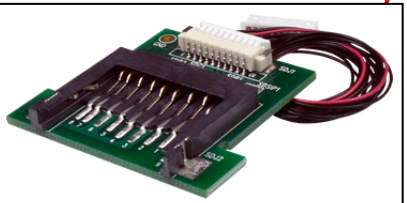
24C1.3XDIG-01
Videology digital
camera with cable and
interface board

60C1094 Ethernet (RJ-45)

60C1151 (SPI 5pin top
JST to flying leads)

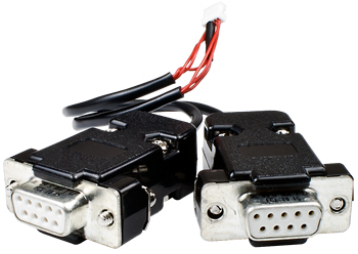
60C1145 Debug RS232
(recommended)

Analog BNC video out
(Future)



60C1100
SD cardholder with cable

60C1153
Analog Video IN (J408) &
5VDC Power IN (J407



60C1145-1
(Optional for 60SVM1-E)

RS232 debug & user serial
(requires SDK)

9. Web-Based Graphical User Interface

The web-based server provides a graphical user interface to the Videology 60SVM1 single channel audio/video encoder, enabling the user to access the server over the internet, to view live camera images and to make changes to the encoder configuration and other configuration settings.

10. System Prerequisites and Setup

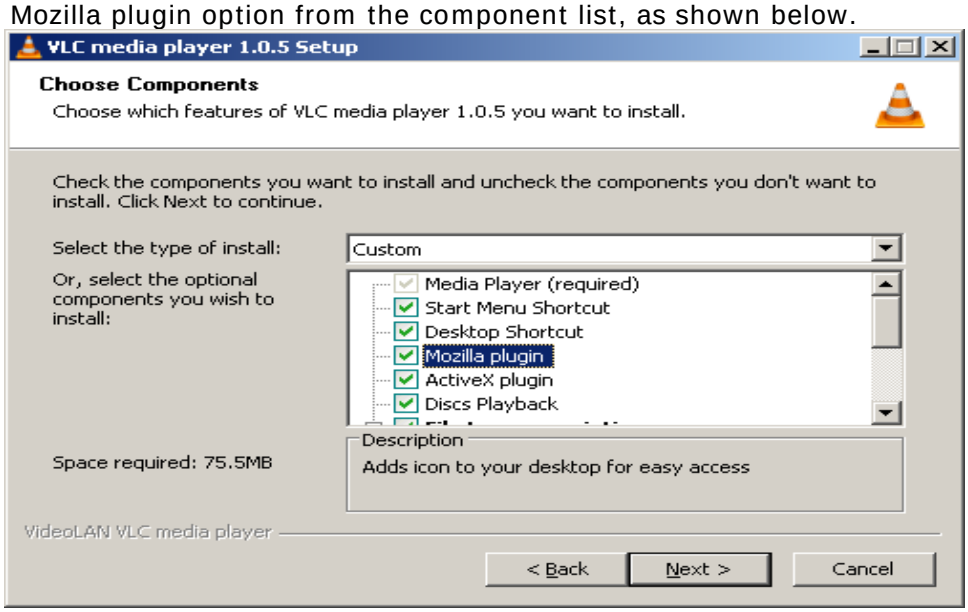
The web-based server GUI, runs directly from the encoder and no software has to be loaded onto the PC other than a suitable video viewing application.

10.1. Video Viewer

To view streaming video and uploaded video files, you will need to load VLC version 1.0.5 or higher. This can be obtained from the web site below.

http://www.videolan.org/vlc/download-windows.html

During installation of VLC you will be prompted to configure the VLC viewer. It is important that you select the Mozilla plugin option from the component list, as shown below.



10.2. SMTP and FTP Servers

In order to send email alerts and upload video files to a remote FTP site, both an SMTP server and FTP server must be setup as described in 10.12.

In the case of the SMTP server, if this is a remote server then authentication may be needed, otherwise emails may be blocked.

10.3. Accessing the DVR Remotely

The network server should be accessed through Internet Explorer.

To access the server from a remote PC, simply enter the IP address of the unit into the Internet Explorer address bar. You will be prompted for a user name and password. These are factory set as:

User Name: admin
Password: admin

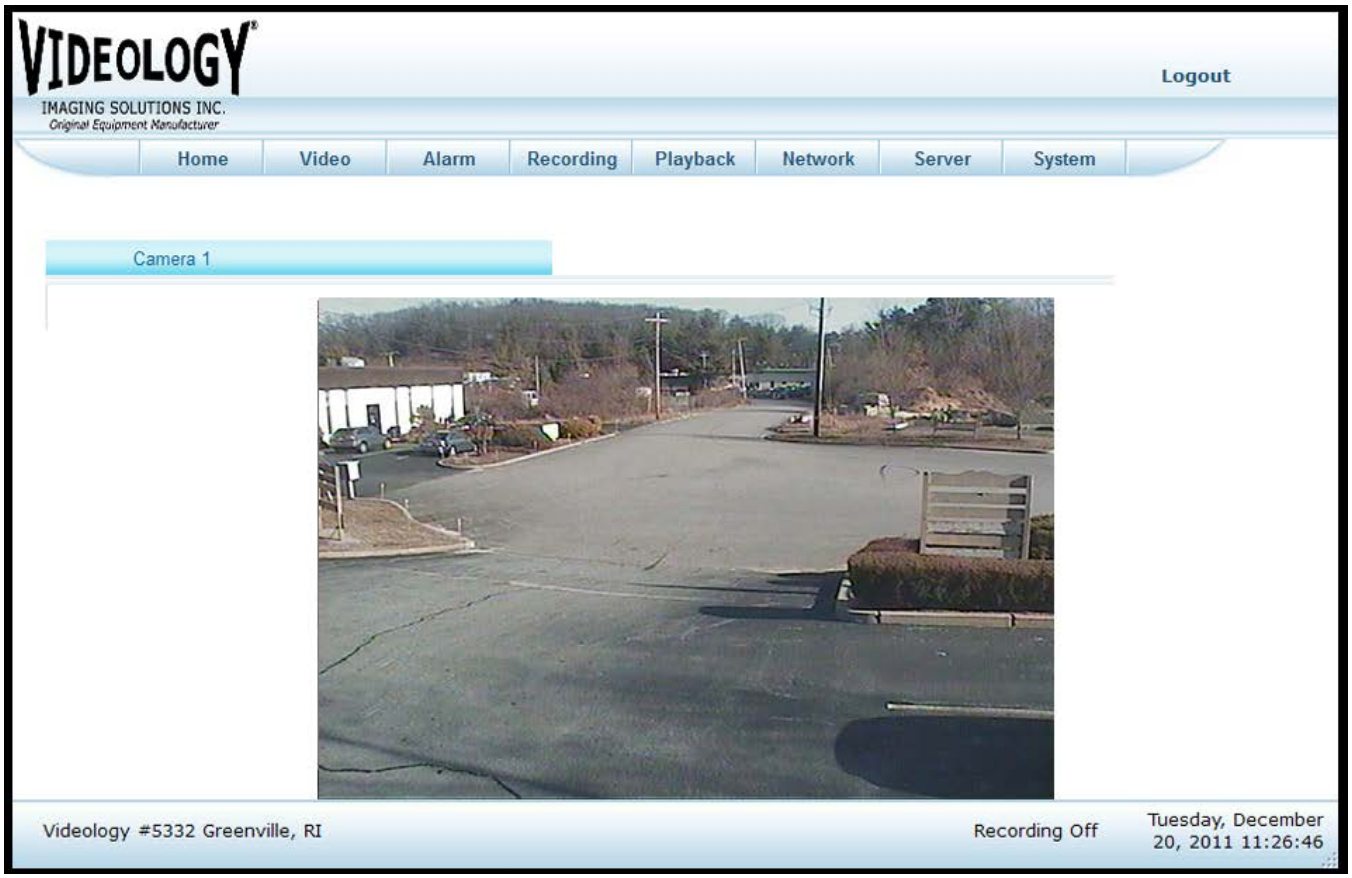
Both of these are case sensitive.

10.4. Structure

The web-based server is comprised of a set of seven pages. The layout and operation of each page is described below.

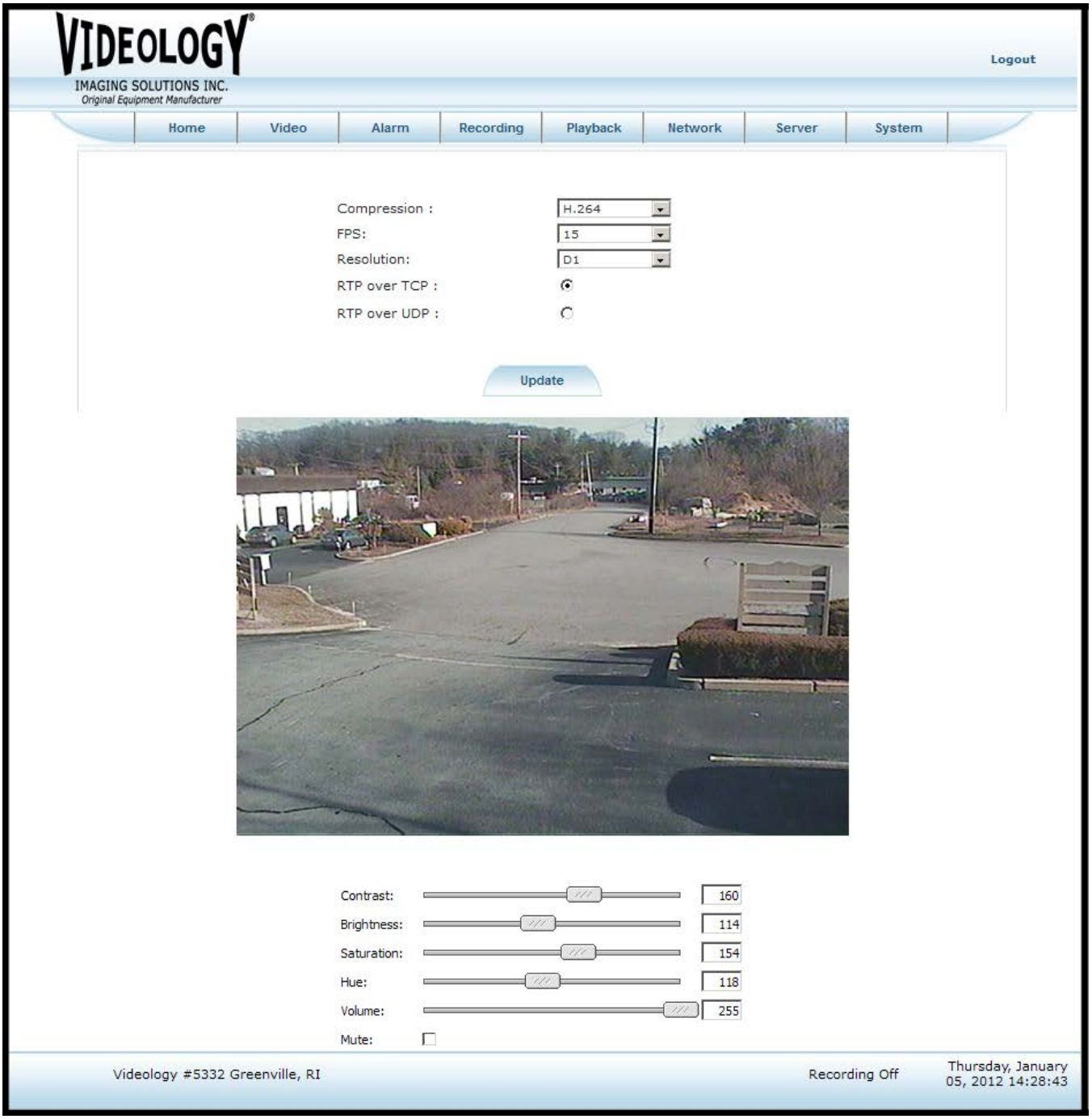
10.5. Home Page

The Home page is simply a live video stream form the camera connected to the server.



10.6. Video Page

The Video page contains a live video image from the camera and controls for changing the codec and image settings.



10.6.1. Codec Settings

At the top of the page are the controls for setting the video encoder parameters.
These include:

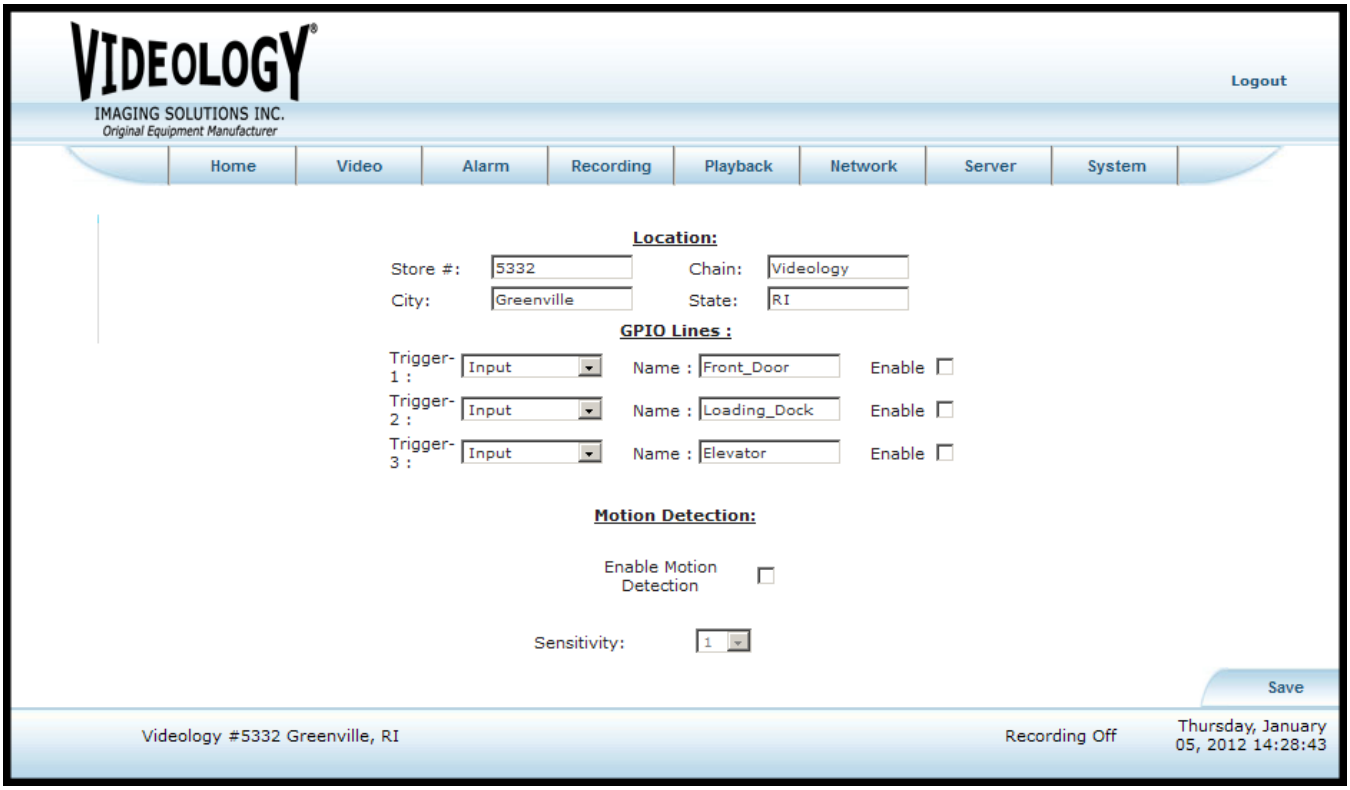
- Video Channel: (Channel 2 available on Dual channel DVR only; model 60SVM2)
- Compression: The compression method is currently set at H.264 or MJPEG. Please note that MJPEG compression does not contain an audio stream.
- Frame Rate: The frame rate of the streaming video can be adjusted from 1 to 30 FPS (60 FPS future).
- Resolution: The resolution for Analog cameras can be selected from the following options: D1, VGA, CIF and QCIF.
- The resolution for digital cameras is fixed at 1280 x 1024.

10.6.2. Image and Audio Settings

The image controls are located in the lower part of the screen. These allow the user to modify the contrast, brightness, hue and saturation of the image.
The audio controls allow the user to modify volume level and to mute the audio channel.

10.7. Alarm Page

The Alarm page is illustrated below and provides options for configuring alarms and defining trigger events.

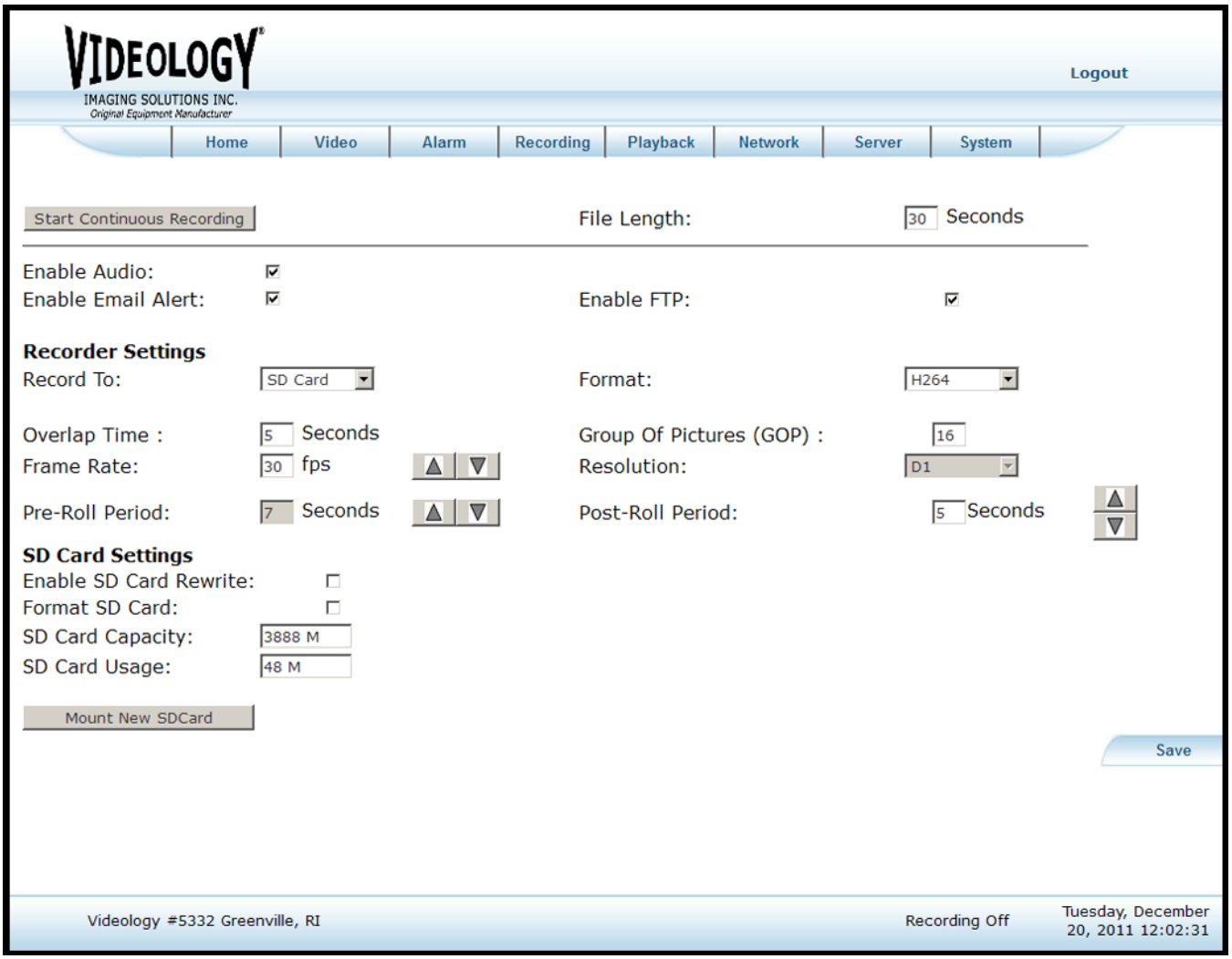


Within the Alarm page the user can perform the following tasks:

- Define the three GPIO lines as either input or output, and assign a logical name to each (e.g. back door, EAS, etc). This name will then be included in the email alert that is sent out in the event of an alarm.
- Enable or disable the three GPIO lines.
- Enable motion detection and select the sensitivity (1=least sensitive).
- Note: Location fields are limited to 24 characters maximum, spaces allowed.
- Note: GPIO Lines fields are limited to 24 characters max, no spaces allowed.

10.8. Recording Page

The Recording page is used to define the format and duration of the video files recorded onto the SD card, and to enable or disable email alerts. Note: Pre-Roll Period is fixed at 7 seconds.



10.8.1. Recorder Settings

The Recording page allows the user to define the format and duration of recorded video files. The page contains the following controls:

- Continuous Recording: When pressed, the system will start to record video continuously onto the internal SD card. The recorded video can be broken into short files of a duration specified by the user, in the File Length option. The maximum length of a single recording is 1800 seconds.
- Enable Email Alert: When email alert is selected, an email will automatically be sent to the address entered in the SMTP Settings page. The button must be checked if the user wants to be notified via email when an event is taking place – See server ➔ SMTP settings for details
- Record To: SD card or a centralized network storage service.
- Format: Video file compression format (H.264 or MJPEG).
- Frame Rate: The frame rate can be set to any value between 1 and 30 FPS (60 FPS future).
- Resolution: D1, VGA, CIF, QCIF.
- Pre-Roll Period: The pre-roll period is the length of the recording PRIOR to the trigger event (this is currently fixed at 7 seconds).
- Post-Roll Period: The post-roll is the duration of the recording AFTER the trigger event. The post-roll can be set to between 1 - 1800 seconds.

10.8.2. SD Card Settings

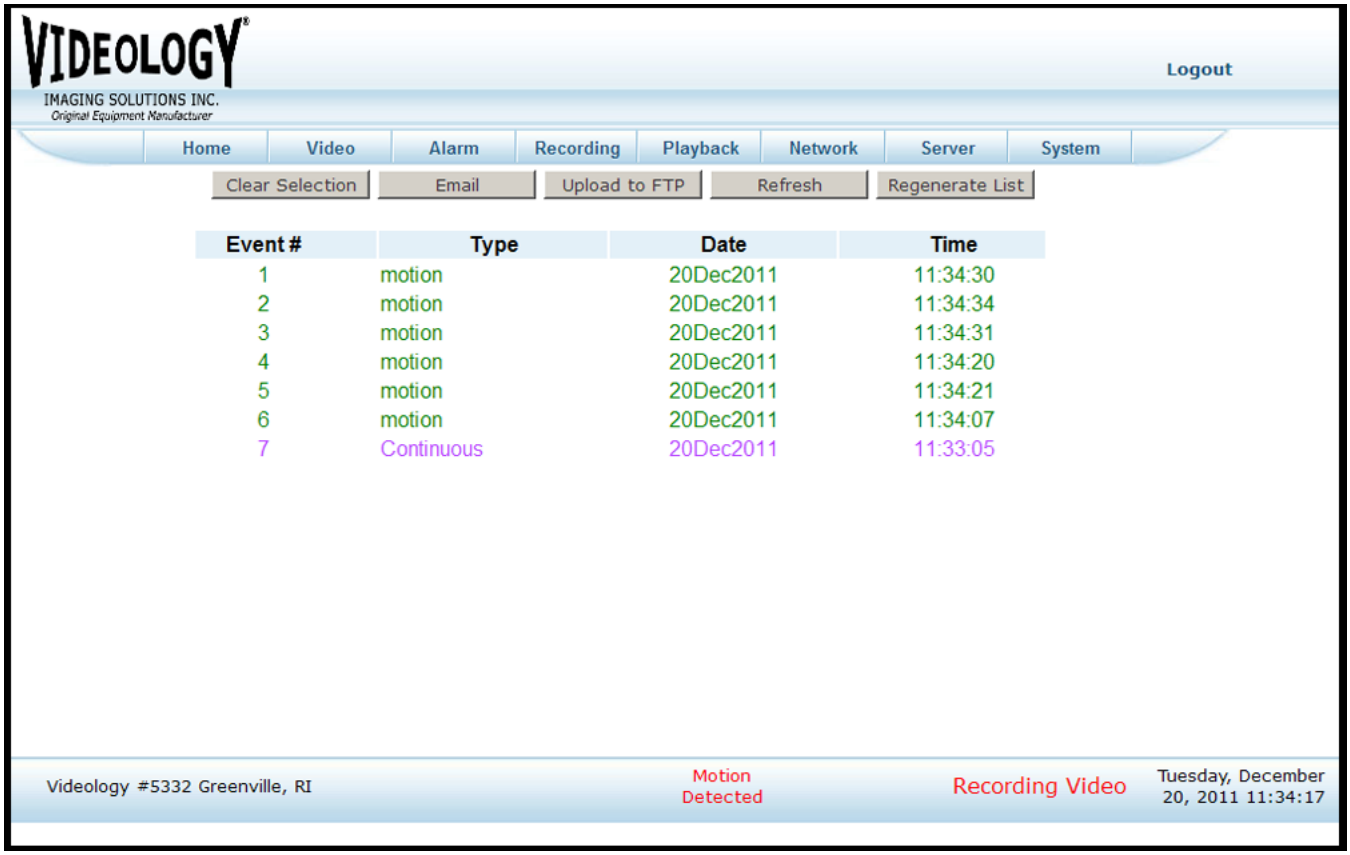
- Enable SD Card Rewrite: If checked, files will be stored onto the SD card in a continuous loop fashion, with the oldest files being overwritten by the newest when the card becomes 80% full.
- Format SD Card: **Checking this button and saving the settings will erase the entire content of the SD card and reformat it.**
- SD CARD Capacity: Shows total capacity of the SD card.
- SD Card Usage: Shows how much size of the SD card has been already used for file storage.
- Mount New SD Card: If the card was removed from the system while the system was operating, a new card can be inserted. After insertion, press this selection.

To take effect, any change on this page must be completed by clicking on save button.

10.9. Playback Page

The Playback page contains a list of all recorded events. Each file in the table contains a descriptor, defining the source of the alarm (this is the logical name assigned to the alarm line in the Alarm page, and the time and date of the event.

Each of the events is color-coded by event type, i.e. motion detect, alarm line 1 etc.



The user can view any of the listed files simply by double-clicking on file appropriate line.

Additionally, one or more files may be selected and marked for emailing or uploading to the FTP site (as defined in the Server page).
Selected files can be deselected simply by hitting the Clear Selection button.

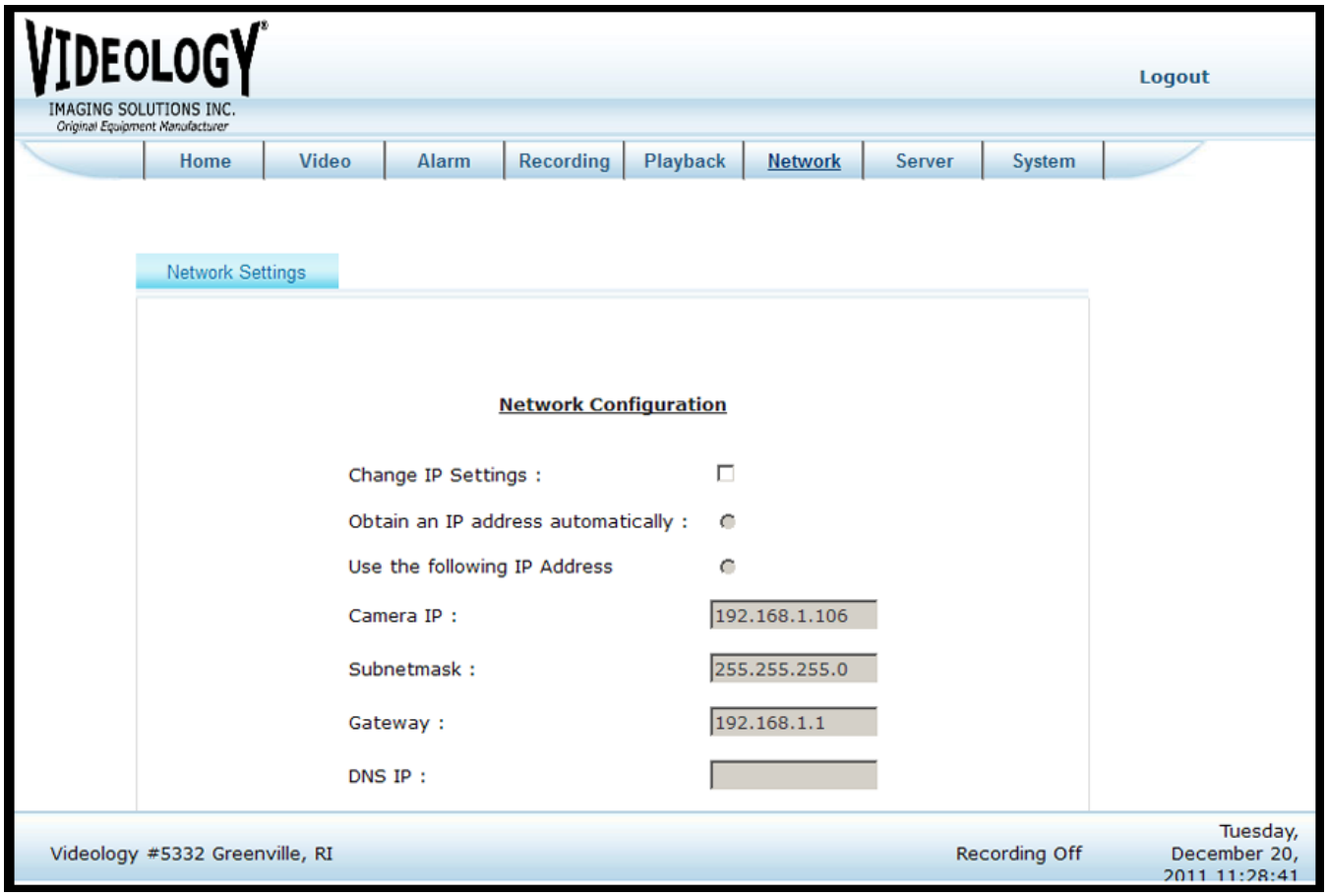
When selecting to Email any file, the entire file is transmitted; this may take several minutes if the file is large.

The Refresh button can be used to speed up the updating of the file listing

The Regenerate List button is used when a new SD card has been placed in the system. It will access the SD card file system and compile a new list of files.

10.10. Network Page

Within the Network page, the users can define the method of establishing an IP address.



The IP address can be either statically assigned or dynamically acquired; this is done by selecting the Change IP Settings button and then selecting either Obtain an IP Address Automatically or Use the Following IP address button.

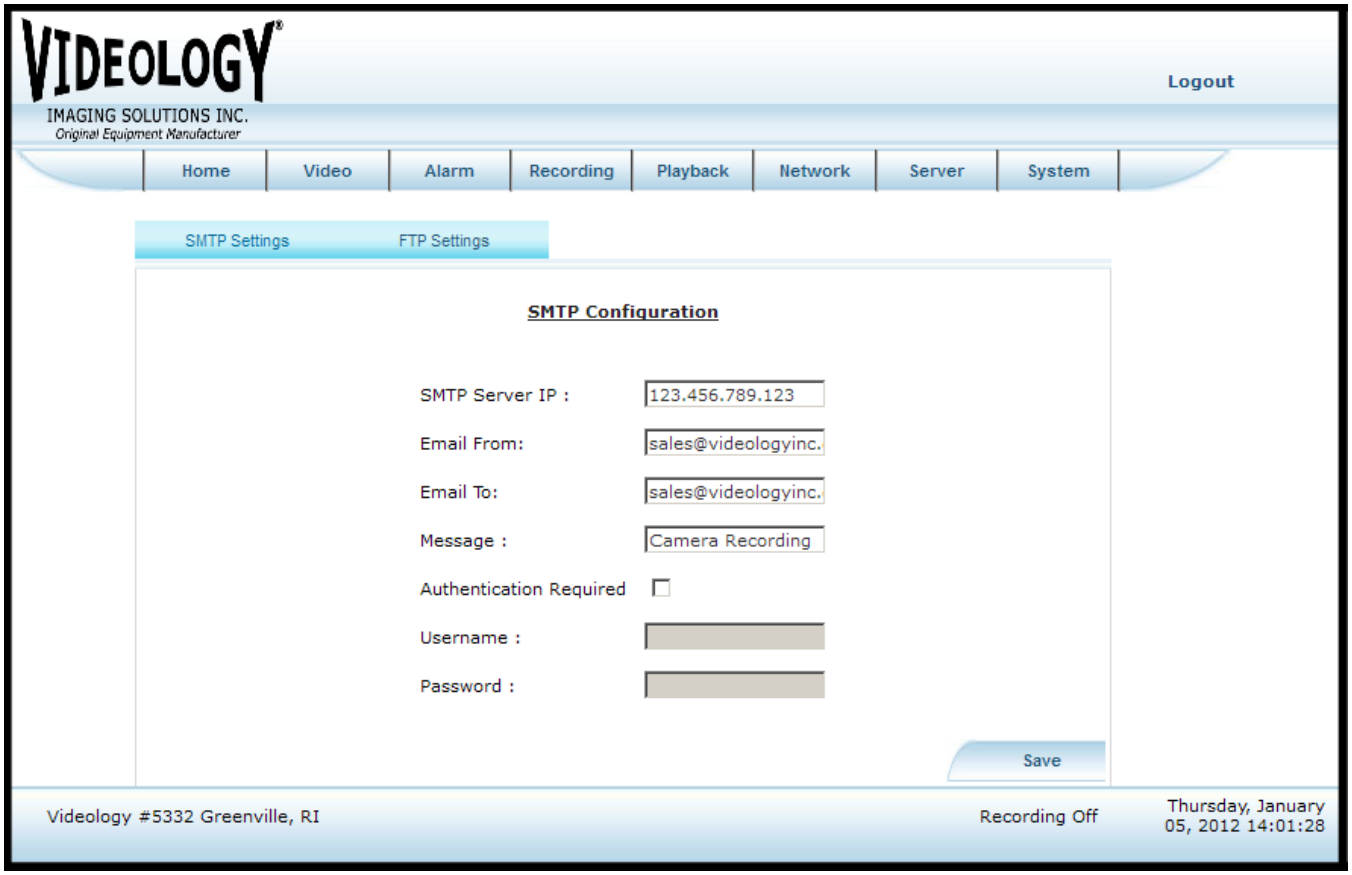
The options to select the camera IP address, Subnet mask, Gateway and DNS Server are given if the latter was selected.

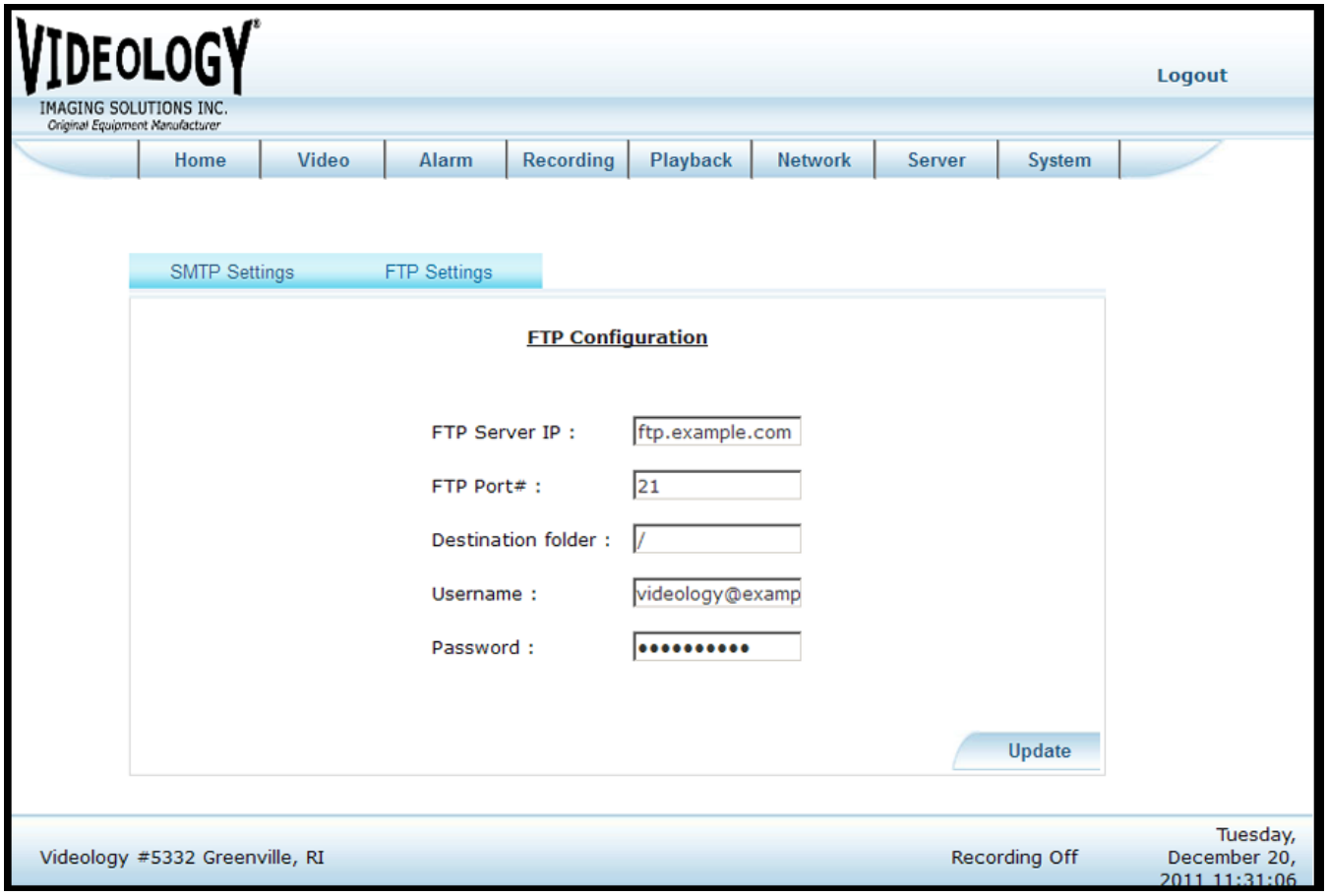
The Save button must be clicked to complete the configuration process.

10.11. Server Page

Within the Server page, the user can setup both an FTP server and SMTP server. The FTP server is used to upload video files stored on the internal SD card.

The SMTP server contains the email address to which email alerts are sent in the event of an alarm.





When populating the FTP Server IP field with a hostname (e.g. ftp.example.com) a DNS server address must be specified on the Network Configuration page. If the FTP server's IP is numeric (e.g. 74.125.227.116), no DNS server address needs to be specified.

To take effect, any change on this page must be completed by clicking on the Save or Update button in the bottom right hand corner.

10.12. System Page

Note: Any changes to parameters made to or within this page will affect the system functionality. Modifications to the system settings are limited to an administrator.

There are four tabs within the System window. The first tab, System Settings provides a means of setting the current time or configuring an NTP server.

The second tab, User Settings is used to create new users, assign passwords and access levels.

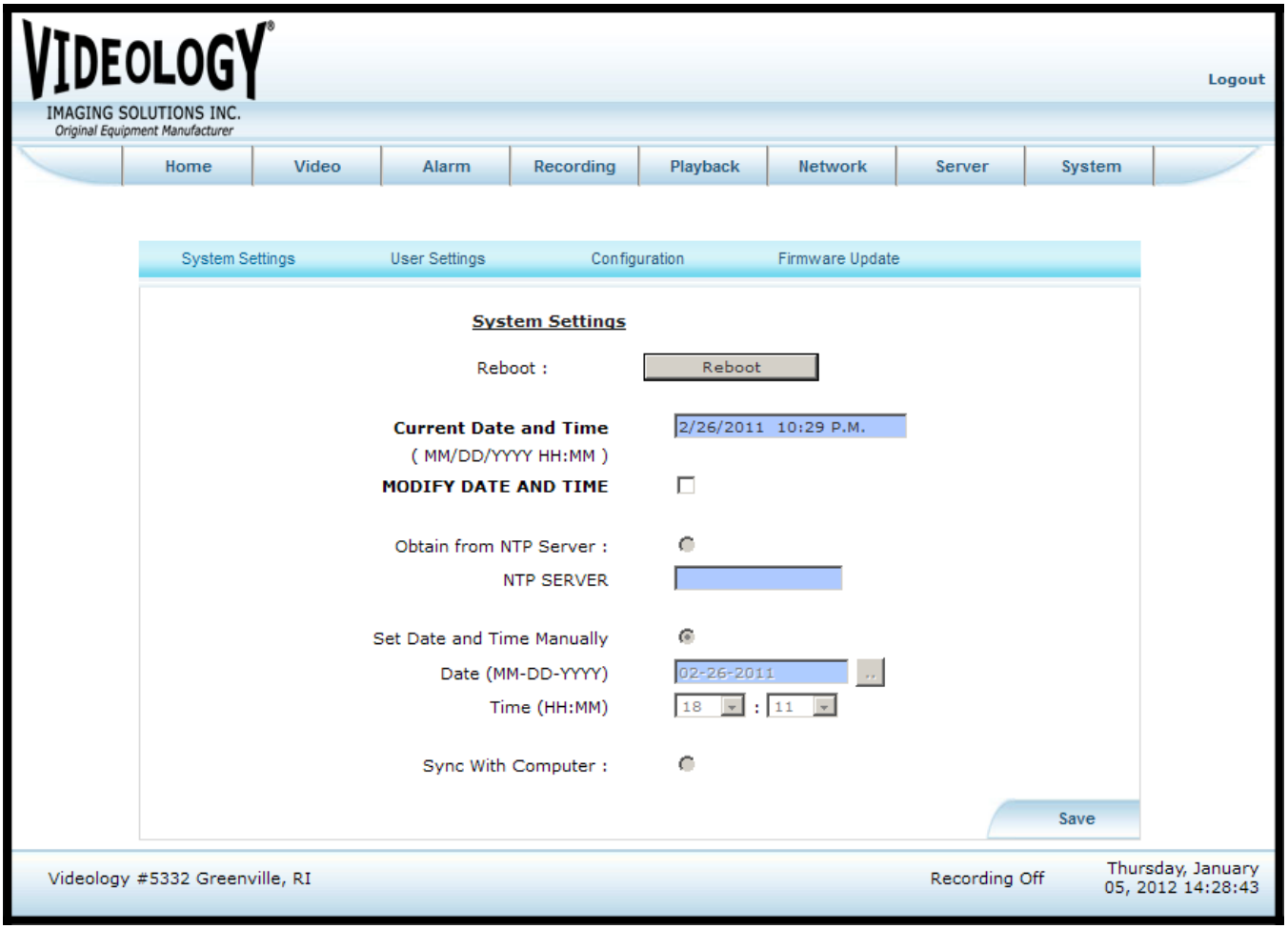
The third tab, Configuration is used to select support for the Videology 1.3MP pixel digital camera.

The fourth tab, Firmware Update downloads the latest version of the firmware, then reboots the system.

10.12.1. System Settings

On this page, you can:

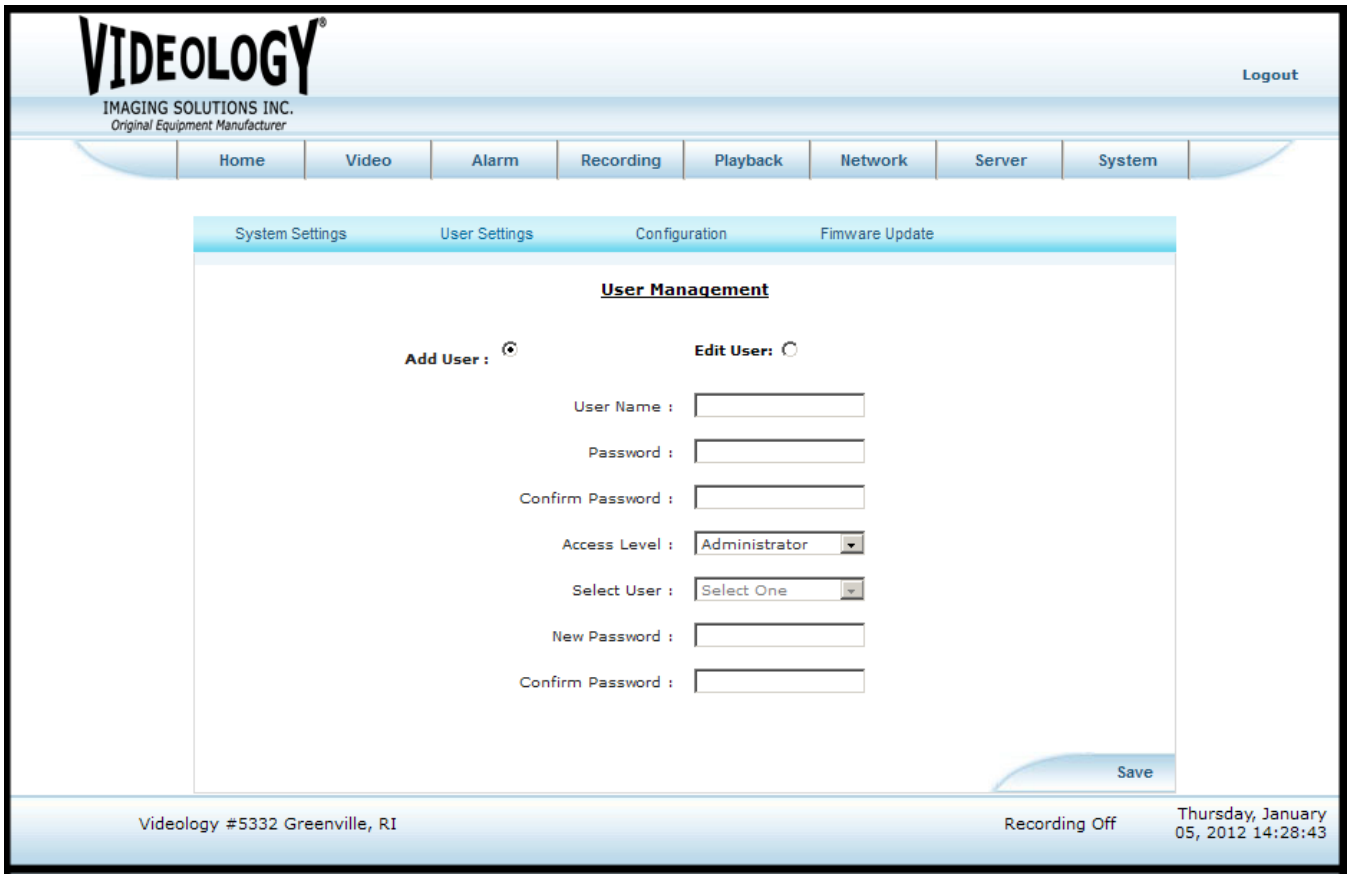
- Reboot the system if needed
- Set the correct time and date for the system. To set the time and date, select the Modify Date and Time box. You can then pick from one of three options:
    - Obtain from NTP server – enter the IP address for an internet NTP server. The system will then obtain the current time from the selected server.
    - Set Date and Time Manually – the user enters the date and time.
    - Sync with Computer – The time and date are obtained from the user's computer.



10.12.2. User Settings

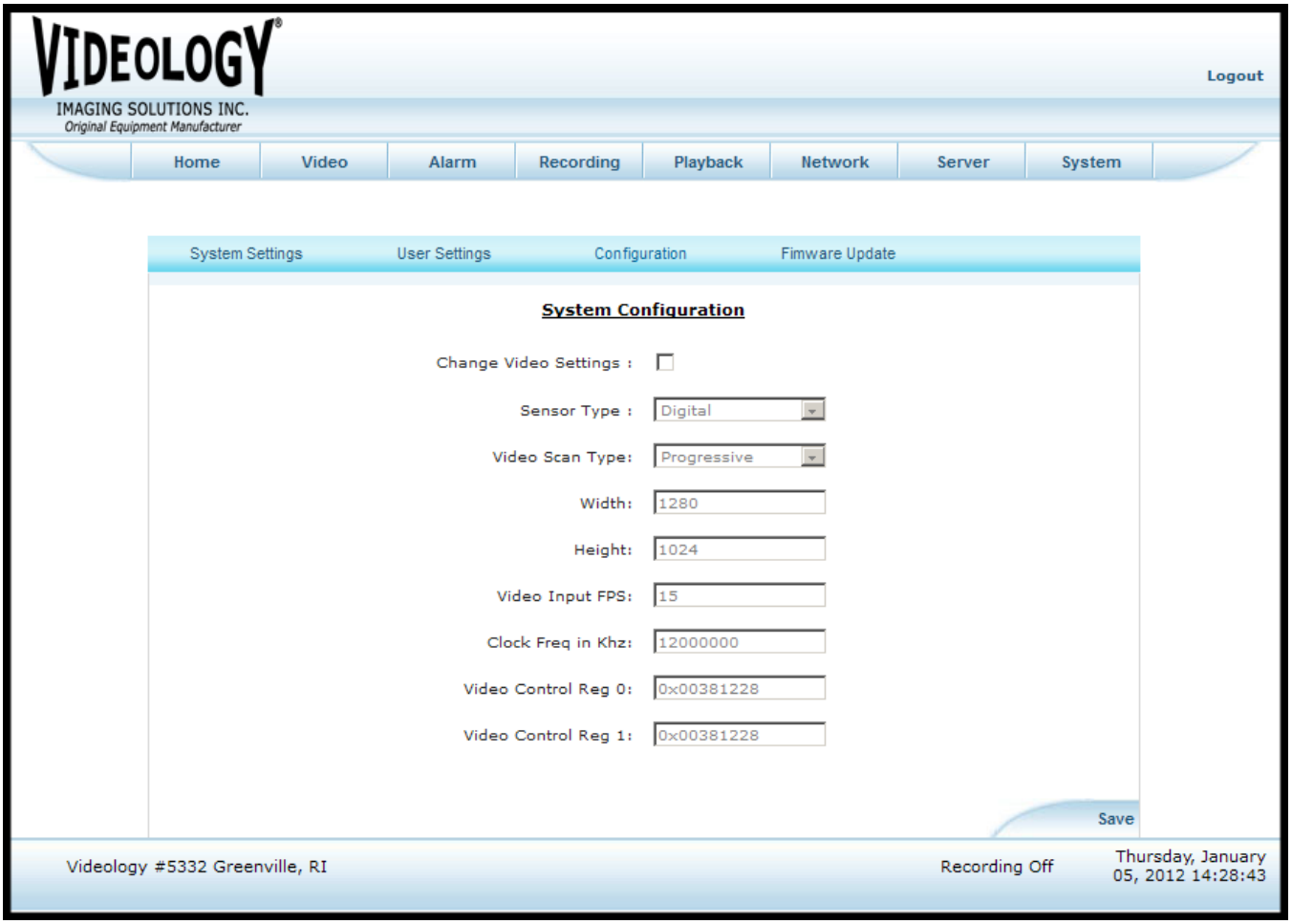
On this tab, the administrator can create and modify user accounts. The system supports three levels of user:

User – the most basic level. A user can only see live video from the Home page.
Operator – this level of user can do all the functions with the exception of adding/changing users.
Administrator – full access to all functions.



10.12.3. Configuration

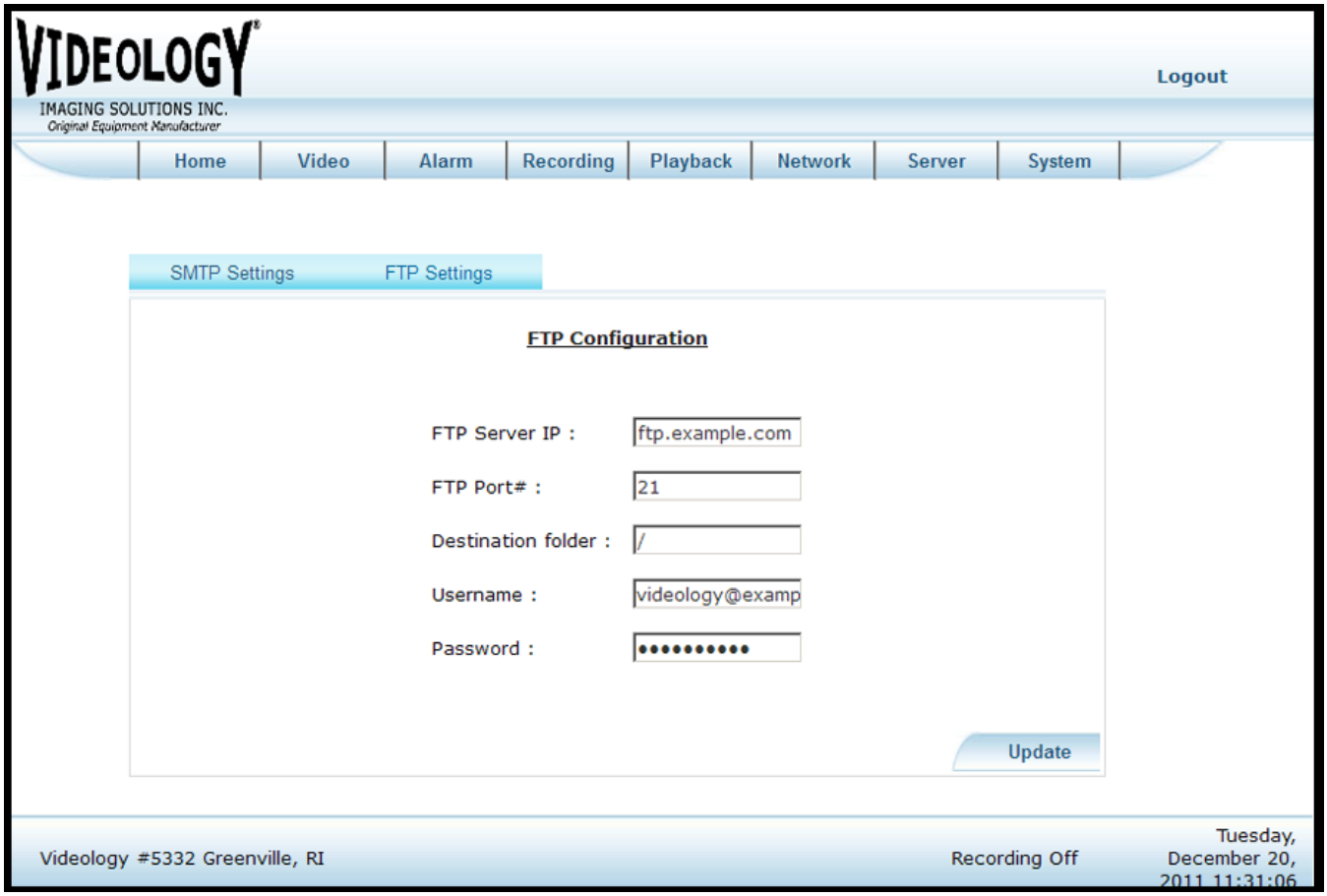
On this tab, the type of video input is selected. Choose Analog for analog cameras and Digital for the 1.3MP for the Videology Imaging Solutions 1.3MP digital camera.



Clock Frequency and Video Control Registers 0 and 1 should only be changed after contacting Videology customer service.

As with other settings, for any changes to take effect, the SAVE button in the lower right corner of the screen must be clicked.

10.12.4. Firmware Update



Firmware should only be updated under the direction of Videology customer service.

11. Contact Information

For technical assistance with this product, please contact the supplier from whom the product was purchased.

For OEM inquiries, contact Videology® Imaging Solutions:

Americas, Middle East, Far East & Australia:
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VIDEOLOGY IMAGING SOLUTIONS is an ISO 9001 registered video camera developer and manufacturer serving industrial, machine vision, biometric, security, and specialty OEM markets. Videology designs, develops, manufactures, and distributes video, image acquisition, and display technologies and products to OEMs worldwide.