Air Pollution Control Division

Technical Services Program

Appendix GM9

Standard Operating Procedure for the Remote High-Resolution Digital Camera System
(NetCamXL 1.1.78)

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1 SCOPE AND APPLICABILITY

This Standard Operating Procedure covers use and operation of the high resolution camera located at DESCI.

1.1 Introduction

The high resolution camera is intended to provide the public with a real-time view of the air quality (at least in terms of visibility) in the Denver Metro area. It is also used by forecasters within the Air Pollution Control Division (APCD) as a tool to determine trending for future air quality.

1.2 Method Overview

This measurement collects high-resolution digital images of visibility conditions via a digital camera system – StarDot Technologies NetCamXL 1.1.78 herein called the camera (Stardot-Tech). The frequency and resolution of the images are variable but typically the system is operated to capture a minimum of at least one picture per minute. At any time external users can access the most recent picture taken by the camera at www.colorado.gov/airquality/live_image.aspx. Pictures are stored at regular intervals and are used to create time-lapsed windows media video files.

1.3 Format and Purpose

The sequence of topics covered in visibility camera follows 2007 EPA guidance on preparing standard operating procedures (SOPs). This method was also written to help field operators understand why (not just how) key procedures are performed (US EPA, 2007).

2 APPARATUS AND MATERIALS

2.1 Monitoring Equipment

The camera consists of four major components:

- A high-resolution digital camera with zoom lens
- A modem with internet service and a dedicated static Internet Protocol address
- A power support system
- A lockable environmental enclosure

The camera requires a computer connection to view the image, make adjustment to the image quality, or capture an image for storage. The camera has limited on-board memory.

2.1.1 Instrument Shelter

The camera is housed in a Pelco EH5700 Series enclosure. Please refer to the Installation/Operation Manual. Figure 1 below shows a diagram of the shelter enclosure.

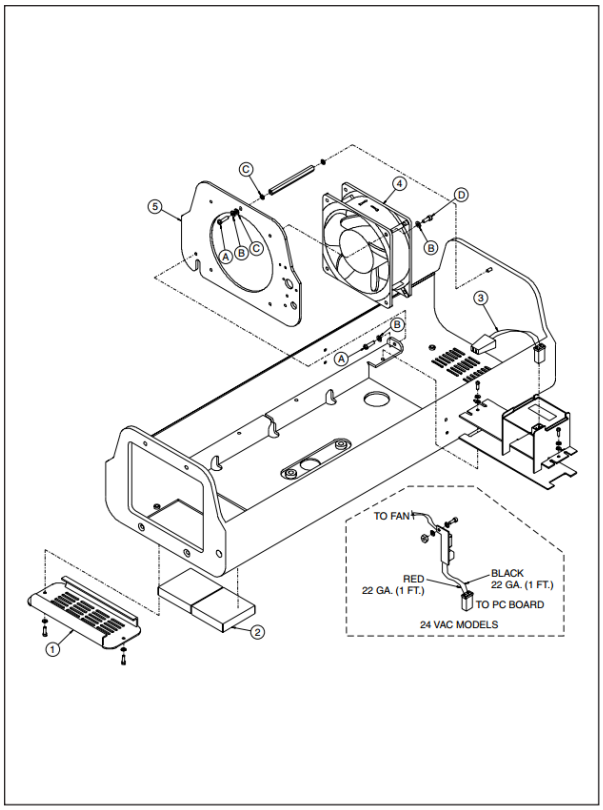


Figure 1. Enclosure

2.1.2 Data Acquisition System

The camera is connected directly via CAT5 or higher cable to the modem inside the building. The camera produces a picture file whenever requested via an HTTP interface. Pictures are displayed, compiled, and archived at APCD. See Section 6 for more details.

2.1.3 Wiring

Please refer to the StarDot support website at http://www.stardot-tech.com/support.html for wiring and general operation of the camera.

Please refer to the Installation/Operation Manual for the Pelco EH5700 Series enclosure for connections between the camera and the enclosure (Pelco). Figure 2 below shows a schematic for the Pelco Input Wiring.

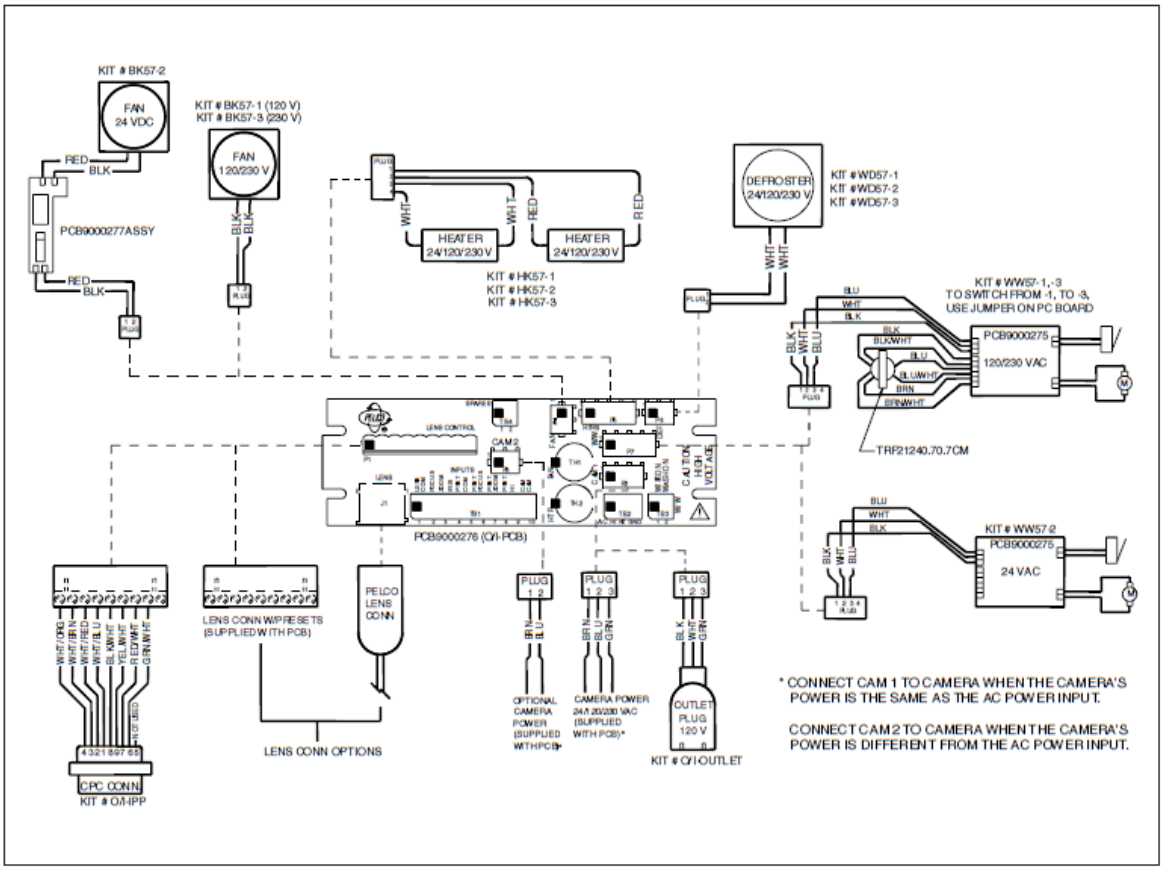


Figure 2. Enclosure Wiring Diagram

2.1.4 Spare Parts and Incidental Supplies

Lint free cloths and window cleaner are used to clean the outer window on the enclosure.

No other spare parts or incidental supplies are required.

3 CALIBRATION

Comparison of the visual boundaries and focus between the current picture and a historical picture that is known to be appropriate is the only calibration necessary.

4 OPERATION AND MAINTENANCE

4.1 Routine Operation and Maintenance

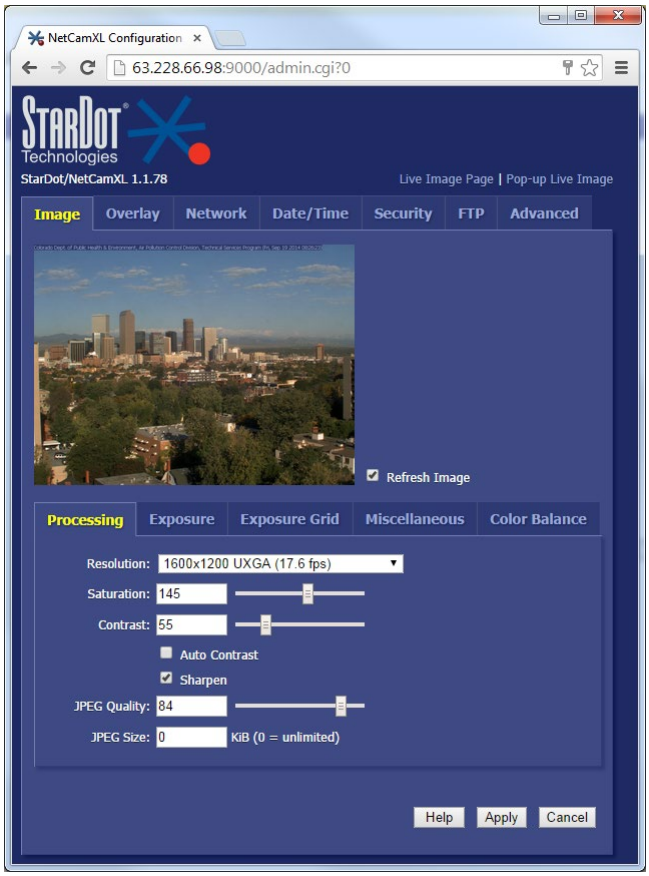
On each site visit clean the window on the outside of the enclosure.

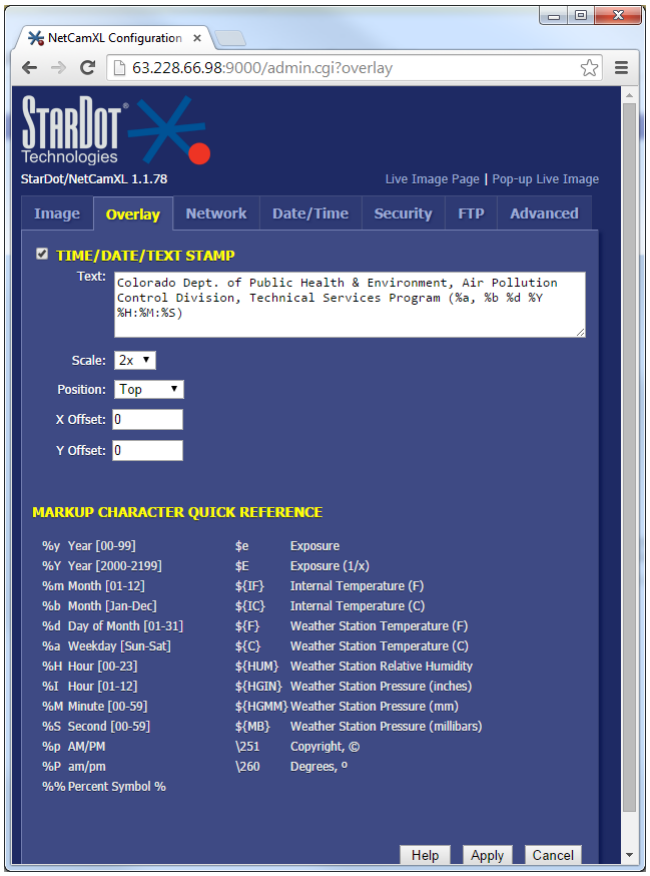
Routinely verify the camera is functioning by viewing www.colorado.gov/airquality/live_image.aspx and checking the time stamp in the top of the frame.

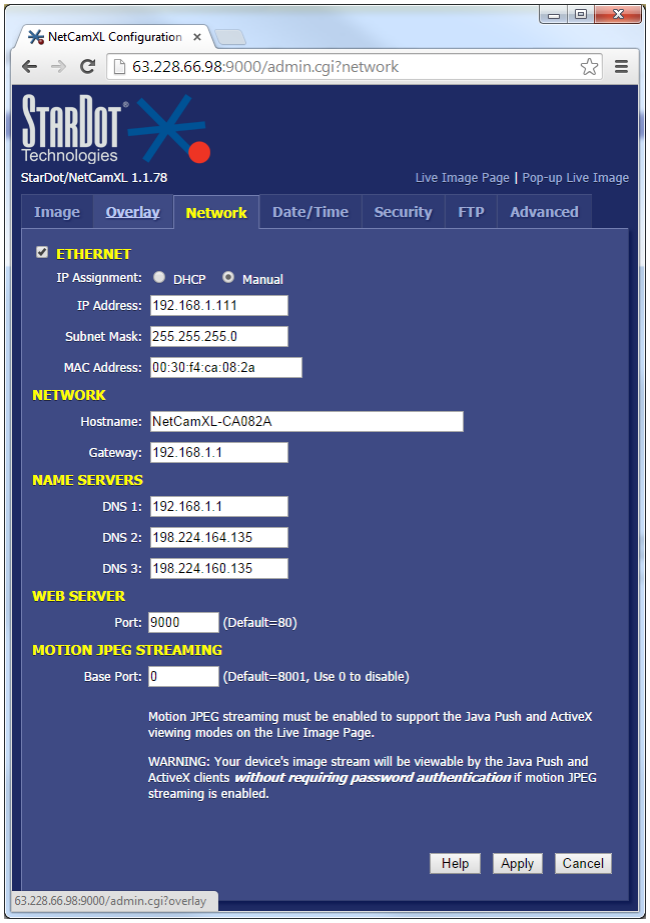
5 TROUBLESHOOTING

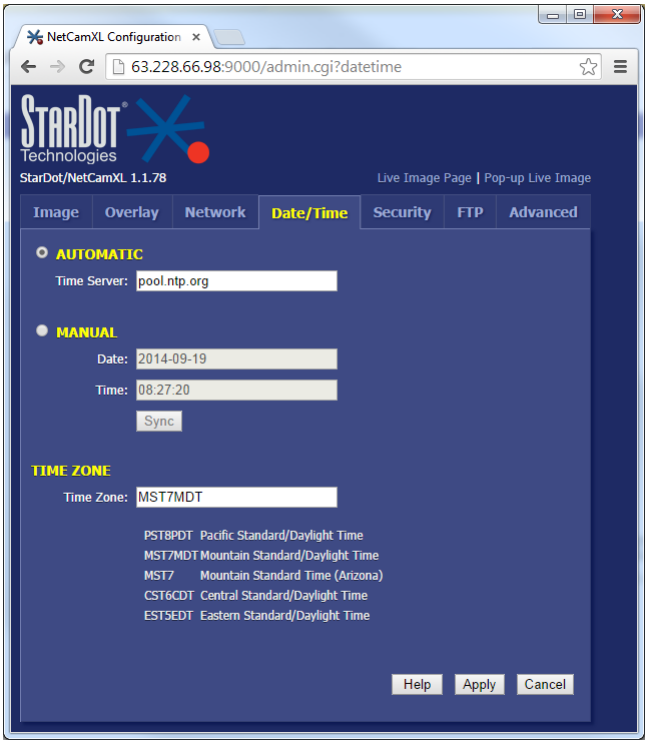
The camera is largely an autonomous entity that requires little intervention. However, settings in the software have become corrupt in the past, and if the camera itself is faulting a replacement is likely the best approach. Against this, settings for the current camera are shown in the screen shots below.

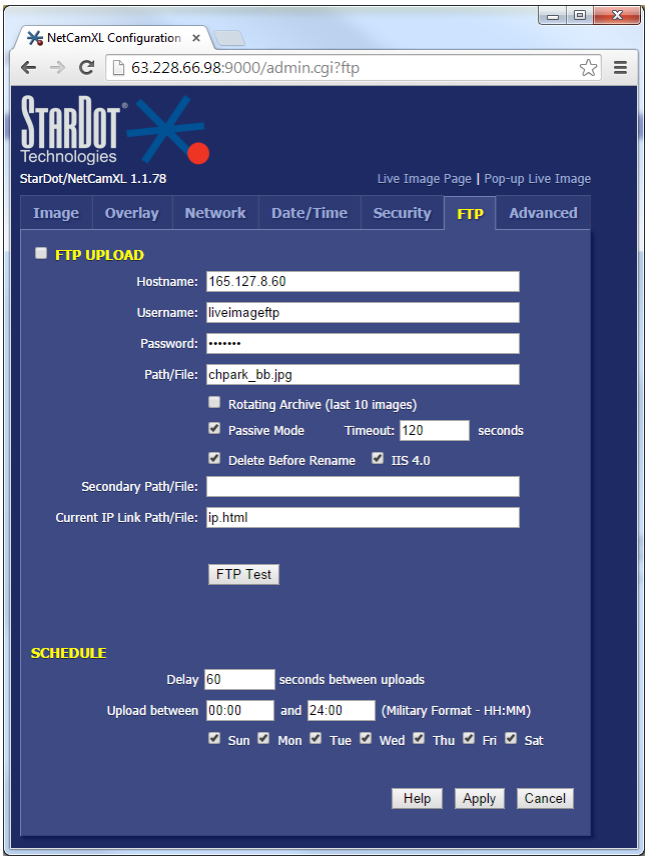
Access to the camera can be obtained in any web browser at 63.228.66.98:9000. The user name and password are both "admin".






NetCamXL Configuration
63.228.66.98:9000/admin.cgi?network
StarDot Technologies
StarDot/NetCamXL 1.1.78
Live Image Page | Pop-up Live Image
Image Overlay Network Date/Time Security FTP Advanced
ETHERNET
IP Assignment: DHCP Manual
IP Address: 192.168.1.111
Subnet Mask: 255.255.255.0
MAC Address: 00:30:f4:ca:08:2a
NETWORK
Hostname: NetCamXL-CA082A
Gateway: 192.168.1.1
NAME SERVERS
DNS 1: 192.168.1.1
DNS 2: 198.224.164.135
DNS 3: 198.224.160.135
WEB SERVER
Port: 9000 (Default=80)
MOTION JPEG STREAMING
Base Port: 0 (Default=8001, Use 0 to disable)
Motion JPEG streaming must be enabled to support the Java Push and ActiveX viewing modes on the Live Image Page.
WARNING: Your device's image stream will be viewable by the Java Push and ActiveX clients without requiring password authentication if motion JPEG streaming is enabled.
Help Apply Cancel
63.228.66.98:9000/admin.cgi?overlay


NetCamXL Configuration
63.228.66.98:9000/admin.cgi?datetime
StarDot Technologies
StarDot/NetCamXL 1.1.78
Live Image Page | Pop-up Live Image
Image Overlay Network Date/Time Security FTP Advanced
AUTOMATIC
Time Server: pool.ntp.org
MANUAL
Date: 2014-09-19
Time: 08:27:20
Sync
TIME ZONE
Time Zone: MST7MDT
PST8PDT Pacific Standard/Daylight Time
MST7MDT Mountain Standard/Daylight Time
MST7 Mountain Standard Time (Arizona)
CST6CDT Central Standard/Daylight Time
EST5EDT Eastern Standard/Daylight Time
Help Apply Cancel


NetCamXL Configuration
63.228.66.98:9000/admin.cgi?ftp
StarDot Technologies
StarDot/NetCamXL 1.1.78
Live Image Page | Pop-up Live Image
Image Overlay Network Date/Time Security FTP Advanced
FTP UPLOAD
Hostname: 165.127.8.60
Username: liveimageftp
Password: •••••••
Path/File: chpark_bb.jpg
Rotating Archive (last 10 images)
Passive Mode Timeout: 120 seconds
Delete Before Rename IIS 4.0
Secondary Path/File:
Current IP Link Path/File: ip.html
FTP Test
SCHEDULE
Delay 60 seconds between uploads
Upload between 00:00 and 24:00 (Military Format - HH:MM)
Sun Mon Tue Wed Thu Fri Sat
Help Apply Cancel

6 DATA ACQUISITION

The camera is connected to a modem with third-party service to the internet with a dedicated static IP address. Data is captured by the APCD every two to three minutes by a script over HTTP, as part of the configuration in Section 5.

Every hour pictures are compiled or updated into a time lapse video available at http://www.colorado.gov/airquality/live_image_tl.aspx. Pictures gathered at the top of the hour (one per hour) are archived and available at http://www.colorado.gov/airquality/live_image.aspx by changing the Date/Time: property below the picture.

7 WORKS CITED

Pelco. (n.d.). *Pelco Camera Solutions - EH5700 - Documents.* Retrieved 11 05, 2014, from Pelco: http://www.pelco.com/sites/global/en/products/camera-solutions/range-presentation.page?c_filepath=/templatedata/Offer_Presentation/3_Range_Datasheet/data/en/shared/cameras/eh5700.xml#

Stardot-Tech. (n.d.). *StarDot Knowledge Base - Netcam XL User Manual.* Retrieved 11 5, 2014, from Stardot-Tech: http://www.stardot-tech.com/kb/index.php?View=download&EntryID=50

US EPA. (2007). *Guidance for Preparing Standard Operating Procedures.* Research Triangle Park, NC: US EPA OAQPS AQAD.