DP-810
User Manual

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Table of Contents

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Introduction

This manual describes the hardware and operation of the DP-810 product from dPict Imaging. The DP-810 is a low-power Linux-based system module that provides video encoding and transmission of 4K video. It supports the standard HDMI interface or allows for the direct connection to the Data I/O connector on Sony ER and EW series block cameras. Video can be encoded to Ethernet or WiFi in video resolutions up to 4K30p. The DP-810 also provides physical power, USB, and serial/VISCA interfaces for complete camera control. A full list of features and specifications can be found later in this manual.

DP-810 Module Description

The DP-810 system consists of an DP-810 processor board and accompanying I/O boards. The following sections will describe the DP-810 processor board as well as each available I/O board.

DP-810 Module Specifications

- HDMI Video Input Support up to 4K30p Video Acquisition
- Supports Direct Connection to Sony Block Cameras
- 4K HEVC (H.265) and H.264 Video Compression
- 10/100/1000 Ethernet
- RTSP with Authentication
- Serial/VISCA Camera Control Over IP
- HDMI Preview Output
- Integrated 802.11ac WiFi
- Micro-SD Card Interface for Recording
- On-Board Frame Buffer for Robust Video Transmission
- Power, USB, and Serial/VISCA Interface to Camera
- ONVIF Profile S Support
- HTTP Web Setup and Configuration Utility
- Web Services API for OEM Configuration
- Optional Support for Sony Alpha Cameras
- Optional Camera Integration Kit
- Optional Power over Ethernet (PoE)
- Operating temperature: -25°C - 85°C

DP-810 Processor Board

The DP-810 Processor Board carries the main processor unit and circuitry for peripherals and is configured with several connectors. Figure 1 and Table 1 below show the orientation and descriptions of the connectors.

Label	Description
S1	HDMI input connector to Sony Block. KEL USL00-30L.
S2	Micro USB connector for Sony block firmware updates.
J4	Lower I/O board connector. JST 40R-JMCS-GAN-TF.
J5	USB C connector. Reserved for DP-810 module debug.
J6	Upper I/O board connector. JST 60R-JMCS-GAN-TF.

Table 1. DP-810 Processor Board Connector Descriptions

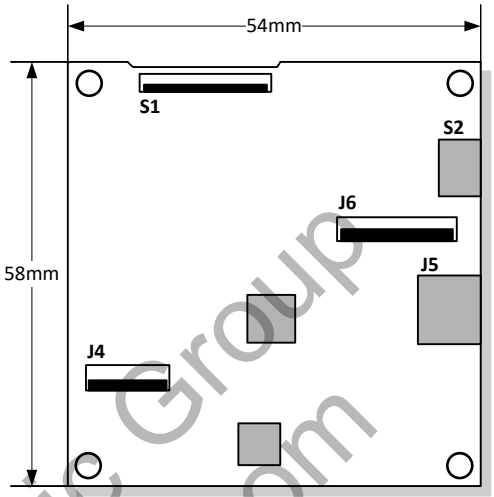

Figure 1. DP-810 Processor Board Front

DP-810 I/O Boards

Two I/O boards are connected to the main processor board through connectors J4 and J6. These I/O boards provide connections to power, serial (VISCA), HDMI out, ethernet, and MicroSD card interface.

Standard Power Version

Label	Description
S1	Serial Connector. Molex 503148-0890
D1	DP-810 Power LED.
J1	Micro SD Card Interface.
P1	Connection to DP-810 Processor Board.
J2	DP-810 Power. Wurth 691322110002

Table 2. Upper I/O Board Connector Descriptions

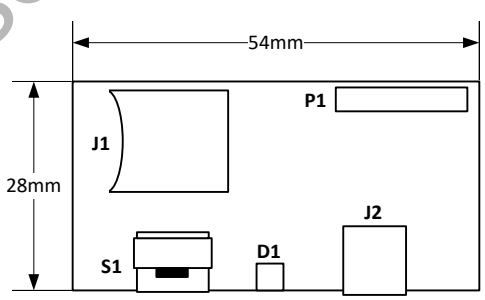

Figure 2. Upper I/O Board

Label	Description
S1	Ethernet Connector
J1	HDMI Output Connector
P1	Connection to DP-810 Processor Board.

Table 3. Lower I/O Board Connector Descriptions

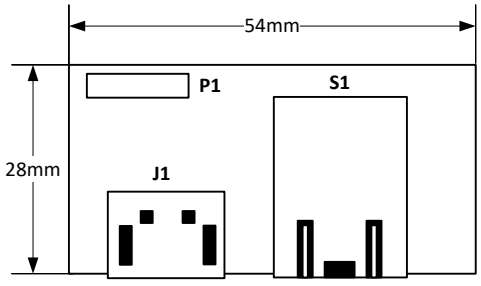

Figure 3. Lower I/O Board

PoE Version

Label	Description
S1	Serial Connector. Molex 503148-0890
D1	DP-810 Power LED.
J1	Micro SD Card Interface.
P1	Connection to DP-810 Processor Board.

Table 4. Upper I/O Board Connector Descriptions (PoE)

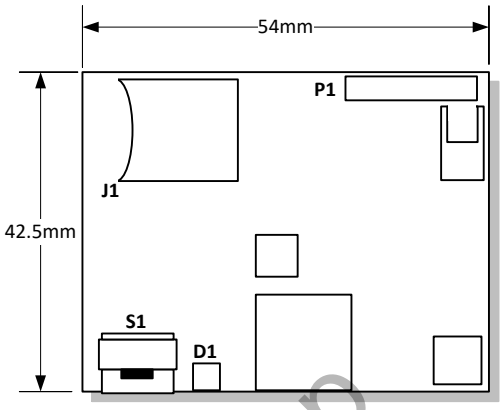

Figure 4. Upper I/O Board (PoE)

Label	Description
S1	Ethernet (PoE) Connector
J1	HDMI Output Connector
P1	Connection to DP-810 Processor Board.

Table 5. Lower I/O Board Connector Descriptions (PoE)

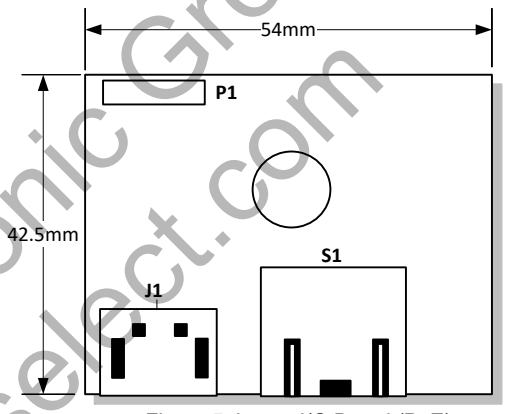

Figure 5. Lower I/O Board (PoE)

DP-810 Module Stack

The DP-810 module board set comes installed in the DP-810 system bracket. The DP-810 system bracket can be used to attach the DP-810 system module to external housings. Figure 6 below shows the DP-810 system bracket and mounting hole descriptions. Figures 7 and 8 shows connector alignment in stack for the standard and PoE versions. Contact dPict Imaging for bracket specifications.

Label	Mounting Hole Description
1	DP-810 Processor Board (4)
2	Mounting DP-810 Bracket to External Housings (2)
3	Fan Mount
4	DP-810 I/O Board Shelf

Table 6. Lower I/O Board Connector Descriptions

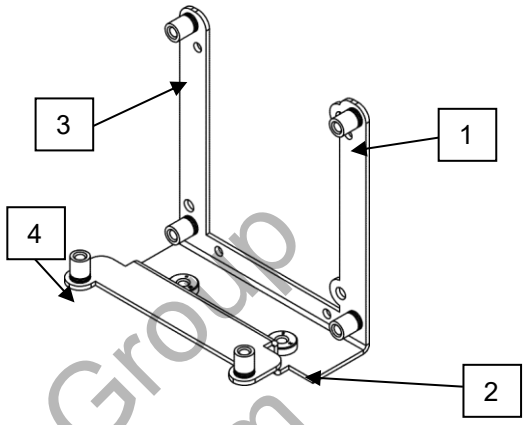

Figure 6. DP-810 System Bracket

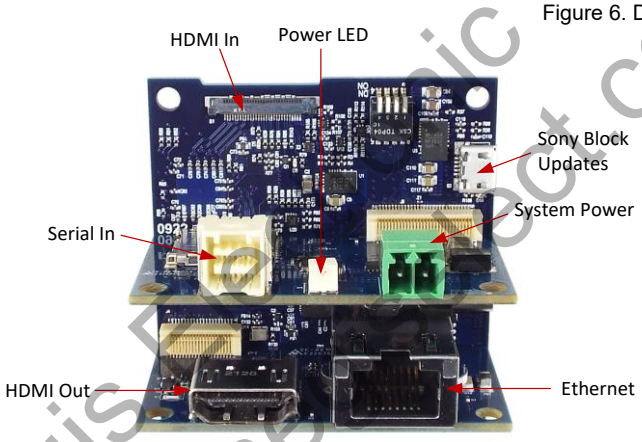

Figure 7. DP-810 Stack Connector Descriptions

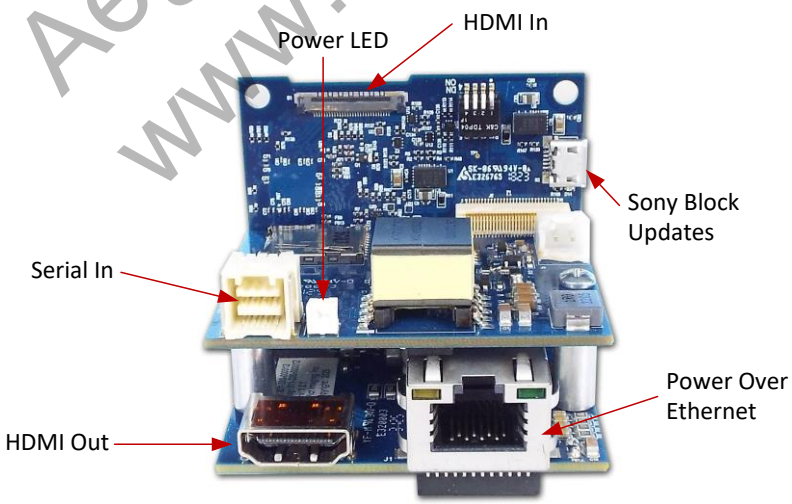

Figure 8. DP-810 Stack Connector Descriptions (PoE)

Getting Started

This section describes the steps necessary to start up the DP-810 module.

Warning: The components of the DP-810 are sensitive to static electricity and power surges. Improper handling and operation can damage the circuitry and therefore result in devices that no longer function. Discharge any static electricity from your body by touching a metal or grounded object before handling electronics.

What You Will Need

For Sony Block Connection

- +12V 2A Power Supply (dPict part #99103) or 802.3at PoE Source (PSE)
- KEL USL20-30SS-011.0-C Cable (dPict part #99025)
- Serial Cable (dPict part #99026)
- CAT5e Ethernet Cable
- Wireless Antenna (Optional)
- HDMI Cable for Monitor (Optional)

For Standard HDMI Connection

- +12V 1A Power Supply or 802.3at PoE Source (PSE)
- dPict Imaging HDMI to KEL Adapter (part #99301)
- CAT5e Ethernet Cable
- Wireless Antenna (Optional)
- HDMI Cable for Monitor (Optional)

Connecting the Block Camera

Connection to the Sony Block camera HDMI video output is accomplished by connecting a KEL USL20-30SS-011.0-C cable to the S1 connector on the DP-810 processor board. The cable must be connected with the gold-plated side up on both the camera and the DP-810 processor board as shown below in Figure 9. The DP-810 receives the video data and provides power and communication (VISCA) to the Sony Block through the KEL cable.

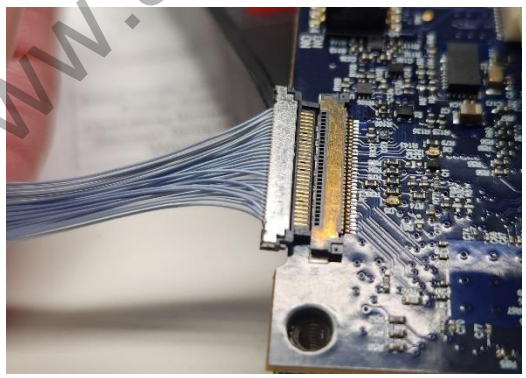

Figure 9. KEL Cable Orientation

Sony Block Cameras Supported

The following is a list of the supported Sony Block Cameras.

- FCB-ES8230 – 4K30p at 12x optical
- FCB-ER8300 – 4K30p at 20x optical
- FCB-ER8530 – 4K30p at 20x optical
- FCB-ER8550 – 4K30p at 20x optical
- FCB-EW9500 – 1080p60 at 30x optical
- FCB-ER9500 – 4K30p at 25x optical

Connecting an HDMI Source

While the DP-810 is designed with the KEL USL00-30L connector for HDMI video input, standard HDMI connector sources can also be used. By using the dPict Imaging HDMI to KEL Adapter (part #99301), video input from a standard HDMI connector is supported. Figure 10 and Figure 11 below show the front and back of the HDMI to KEL Adapter.

Figure 10. HDMI to KEL Adapter Back

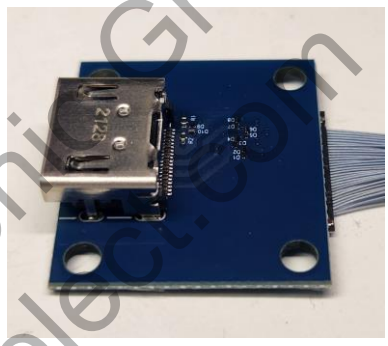

Figure 11. HDMI to KEL Adapter Front

Note: The DP-810 does not support HDCP-encrypted content, such as those from a Blu-Ray player or set-top box.

Connecting Wireless Antenna

Video from the DP-810 module can be accessed via Ethernet or wireless. For wireless access, connect the wireless antenna cable to the antenna connector on the back of the DP-810 as shown in Figure 12 below. The cable will snap into place with gentle pressure.

Note: Ethernet is the default network interface. Wireless must be enabled in the Configuration Manager described later in this document.

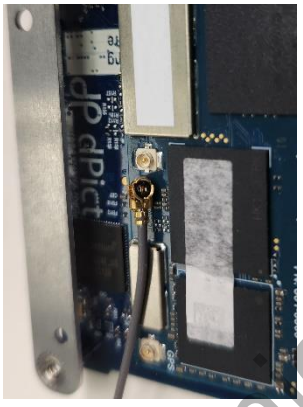

Figure 12. Wireless Antenna Cable Connector

Cooling Considerations

The DP-810 processor board is designed to run at ambient operating conditions (case temperature) from -25°C - 85°C. At higher temperatures, however, the encoding performance will be degraded. Processor temperatures may be read by using the API or on the info tab of the Configuration Manager.

The processor is located on the back of the DP-810 board stack, making it easier to apply thermal management components such as a heat sink or fan. The DP-810 system bracket also comes with mounting holes so that a heat sink or fan can be mounted directly. There is also a fan power connector (Molex 202396-0207) shown in the images below that supplies +5V power.

Pin	Description
1	+5V Power
2	Ground

Table 7. Fan Connector Pin Description

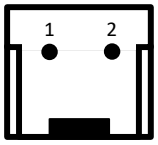

Figure 13. Fan Connector Pinout

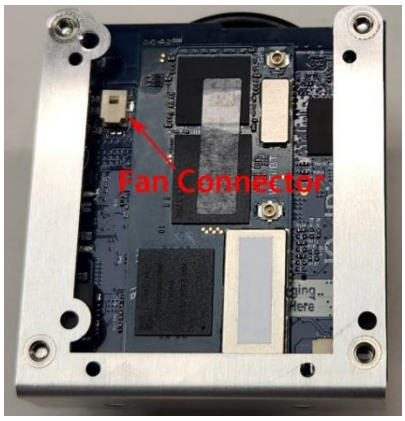

Figure 14. Fan Connector Location

System designers should minimize heat in the system as much as possible for optimum performance. The DP-810 processor is designed to eliminate overheating by throttling performance. If encoding is degrading, the user should check temperature to verify the processor is operating at temperatures under 80°C.

Sony Block cameras typically operate at 0°C - 60°C. If connected to a Sony Block in the same chassis, the heat from the DP-810 processor can cause the camera to shut off until cooled. System designers should verify proper ventilation and air flow in this case. As with the DP-810 processor, the camera temp can be read via the API or in the info page of the Configuration Manager.

dPict Imaging has fans and blowers available with the Molex connector installed for easy deployment. Contact dPict Imaging for more information.

Connecting to Power (Standard Version)

Power is supplied to the DP-810 through the Wurth connector J2 on the upper I/O board. If powering the DP-810 through a power distribution, use Wurth 691361100002 terminal block as the mating connector. The figures below show the pinout of the +12V DC power and ground and the terminal block.

Label	Description
1	Ground
2	+12V DV Power

Table 8. Power Pin Descriptions

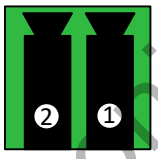

Figure 15. DP-810 Power Connector

Figure 16. Wurth Terminal Block

Note: The power LED on the DP-810 upper I/O board will light RED and the module will not start if the power supplied has the wrong polarity. The LED will light GREEN for normal operating conditions.

At this point, the system is ready to be powered on. Connect the Ethernet and HDMI cable and apply power. The DP-810 system will take about 60 seconds to boot. Once booted, the DP-810 is now ready to be configured.

DP-810 Services

The DP-810 module is a Linux-based system with all the necessary services to acquire, encode, and transfer video over IP as well as provide communication to the Sony block camera. Below are the DP-810 services with descriptions.

Authentication Service
Provides user authentication and encryption for usernames, passwords and login levels.

Configuration Server
Provides and maintains various configuration files for network, info, video settings, ONVIF, etc.

Web Server
Provides HTTP access to the Configuration Manager.

IP Probe Listener
Listens to IP discovery requests and responds with IP address, device name, and device location.

RSTP Server
Provides RTSC video stream.

Upgrade Server
Provides for upgrade package unloading and deployment

VISCA Server
Provides VISCA communication over IP for configuration of Sony Block Cameras.

Video WebSocket Server
Provides H.254/H.265 video display on web browser.

ONVIF Server
Provides access for discovery and configuration for ONVIF compliant applications.

DP-810 Configuration Manager

The DP-810 Configuration Manager is a built-in web interface that will allow for the configuration of the DP-810 system. This section will describe the Configuration Manger as it applies to the DP-810 Processor Module and Sony Block Camera.

IP Discovery Application

Once the DP-810 system has booted, download the dPict Imaging IP Discovery application to your Windows or Mac computer. Once launched, the IP Discovery application will query the network and report any DP-810 device. Device name, IP address, and location information will be reported on the left side menu. The IP Discovery application has a built-in web browser that can be used to access the DP-810 Configuration Manager. A user can also input the DP-810 IP address into a standard web browser to gain access to the Configuration Manger. For best results, Chrome, Firefox, and Edge browsers are recommended.

The default network configuration for the DP-810 is DHCP. Static IP addresses can be assigned later in the Configuration Manager.

Figure 17. IP Discovery Application

Note: The IP address for the DP-810 will follow the segment of the network it is attached to. While this example shows 10.1.0.xxx, it could also be 192.168.x.xxx.

Logging In

Select the DP-810 device to access on the left side of the Configuration Manager. The built-in browser of the Configuration Manager will display the login page of the DP-810 web server. Enter the user name and password to log in. For first time use, the username and password for the DP-810 is *admin* and *admin.*

Manually Entering Cameras

The IP Discovery Application will find all DP-810 devices on the network of the machine it is running on. However, a user can add a device with a known IP address to the listing provided the user is logged into that network. This can be useful for remote viewing of DP-810 devices while on a VPN.

To manually enter the IP address of a desired device, select the Add Device button in the lower left corner. Enter the IP address of the DP-810 and select OK. The newly added device will now be listed on the left side menu.

Configuration Manager Description

The Configuration Manager consists of a video preview section followed by a tabbed-based configuration section. The currently logged in user will be displayed in the pull-down menu on the upper right corner.

Selecting the Video Preview button will show a live video stream from the DP-810.

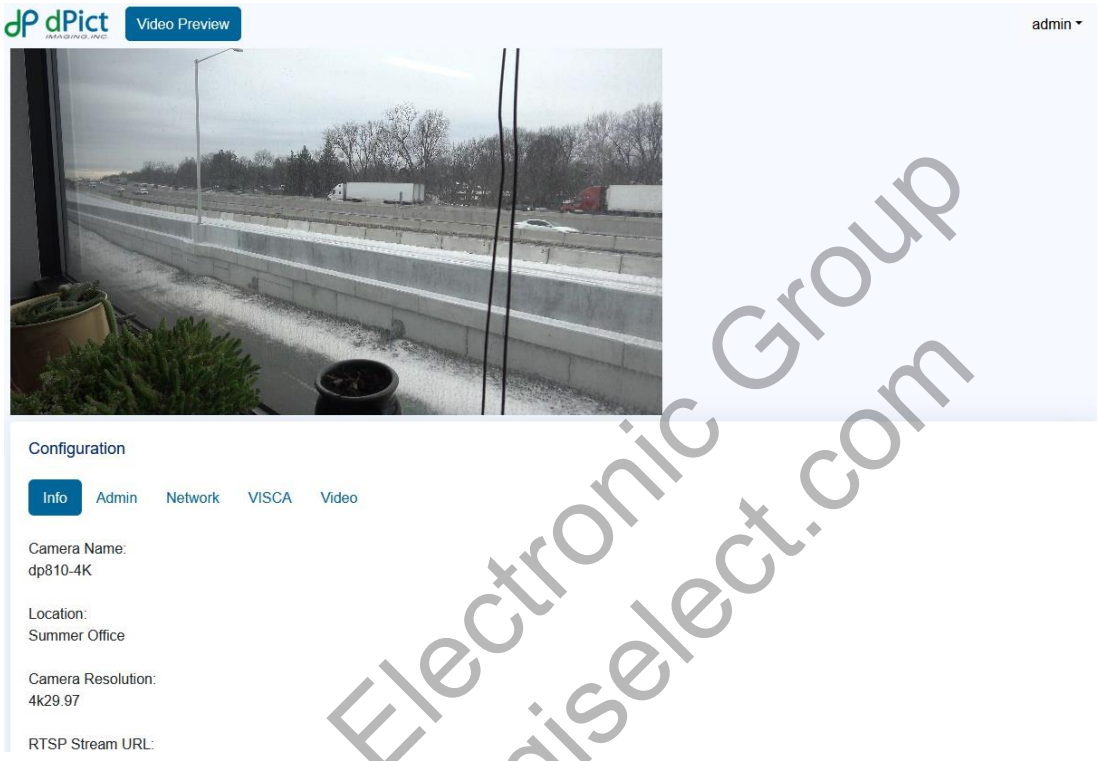

Figure 18. Configuration Manager Video Preview

The tabs include a general info tab as well as configuration tabs for administrative settings, network settings, VISCA control, and video and camera settings. By default, the Configuration Manager will return to the log in page after 15 minutes of inactivity.

Info Tab

The info tab contains general information about the current configuration of the DP-810. This section can be accessed by all users, regardless of log in credentials.

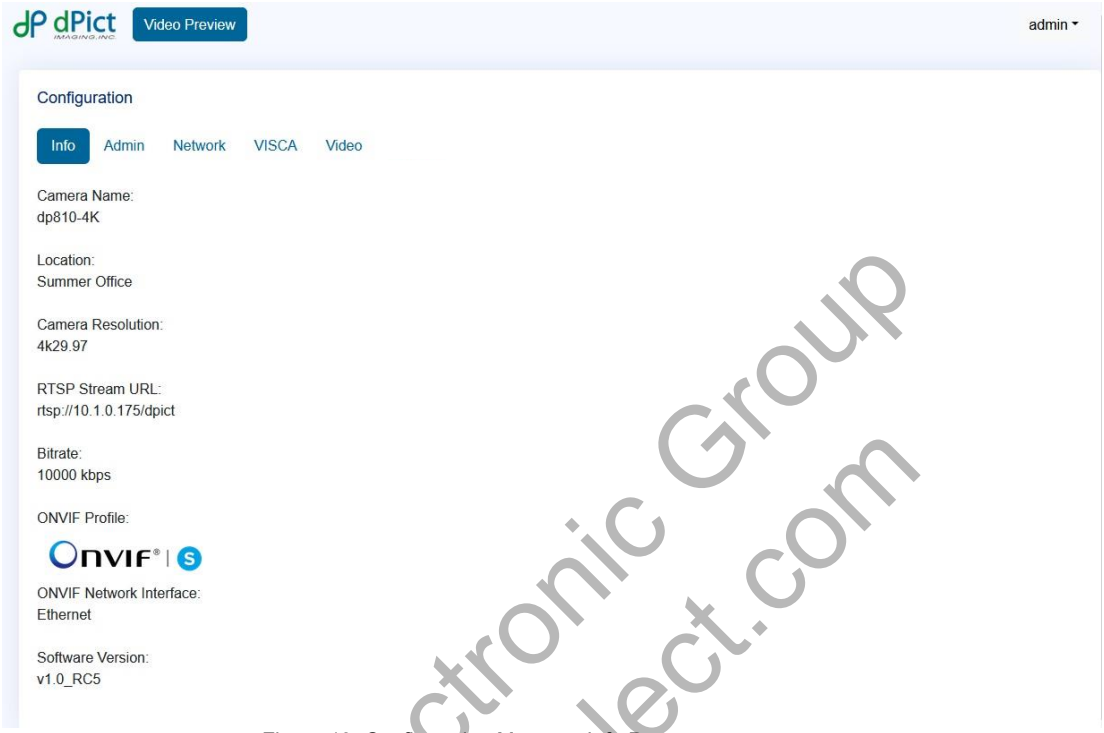

Figure 19. Configuration Manager Info Page

Admin Tab

The Admin Tab allows for configuration of various admin functions as described below. This tab will only be available for users with admin access level.

> **Note:** First time users should be sure to change the default admin password by selecting the pulldown menu on the upper right part of the Configuration Manager and selecting Change Password.

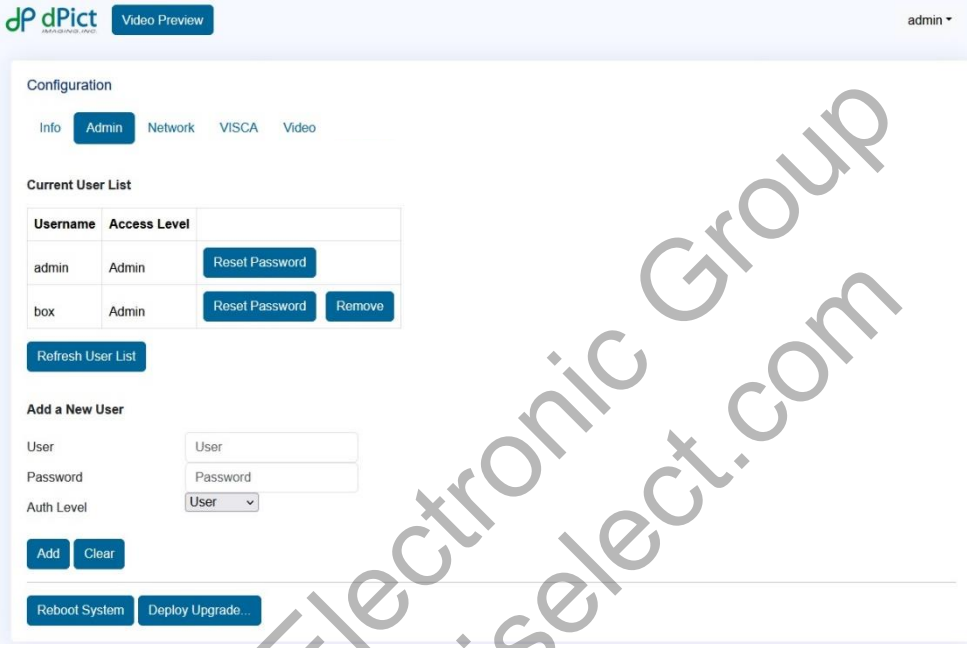

Figure 20. Configuration Manager Admin Page

Resetting Passwords

To reset a current password for an existing user, click the Reset Password button next to the username of the password to reset. A Modify User box will appear. Type and confirm new password and click Submit Changes.

Adding Users

To add a new user, enter the Username, Password and Authentication Level of the new user and press the Add button.

Authentication Levels

There are three Authentication Levels available for DP-810 users, described below.

User – Lowest level access. Only Info tab information and Video Preview allowed.

Operator – In addition to User access, allows access to VISCA, Video, and Camera tabs.

Admin – Access allowed to all Configuration tabs.

Upgrading DP-810

To upgrade the DP-810 system, select the Deploy Upgrade button. Browse to the tar.gz upgrade file and select Open. The DP-810 will deploy the new files and reboot.

Network Tab

The Network Tab allows for configuration of various network settings as described below. This tab will only be available for users with admin access level.

Figure 21. Configuration Manager Network Page

Ethernet Status

This section contains the current network configuration of the DP-810. After changing network settings below, the Submit Changes button must be selected.

Network Settings

ONVIF Interface
This selects the network type configuration of the DP-810 while using ONVIF. Settings can be Ethernet or Wireless.

Hostname
Allows for the changing of the hostname associated with the DP-810.

DHCP
If selected, the DP-810 will be automatically be assigned an IP address by the system. This is the default configuration. Unselecting DHCP will show Static Assignments section for manual input of IP configuration.

Static Assignments
Static IP settings can be assigned to the DP-810 by entering the IP address, Netmask, DNS and Gateway and selecting Submit Changes.

Wireless Enable
Turns on the wireless interface of the DP-810. Users must install the wireless antenna. Default is Ethernet (Wireless OFF).

VISCA Tab

The VISCA Tab allows for sending VISCA commands to Sony Block Cameras. This tab will be available for users with admin or operator access level.

VISCA commands can be entered in the text input area either line by line or continuous string. Selecting Submit will send the VISCA commands to the camera. Camera responses and recent commands are listed below the input window. The Clear button will clear the recent commands list.

VISCA commands can also be entered from a text file. The Load From File button will prompt for the text file. Once selected, the VISCA commands from the file will appear in the VISCA window. Select Submit to send those commands.

Figure 22. Configuration Manager VISCA Page

Video Tab

The Video Tab allows for configuration of various video settings as described below. This tab will be available for users with admin or operator access level.

Figure 23. Configuration Manager Video Page

Resolution

The resolution setting sets the Sony Block Camera resolution. Supported camera resolutions will be available in the resolution pull-down menu depending on the camera attached to the DP-810. After changing camera resolution, select the Submit and Reboot button.

Encoding

Encoding type for the DP-810 can be selected between H.264 and H.265. The default value is H.264.

RTSP: Require Login

Selecting RTSP Require Login will require third-party RTSP applications to ask for login credentials.

Bitrate

Bitrate values for the DP-810 encoder can be adjusted by using the arrow or manually entering value and selecting Save. The default value is 10Mb.

Viewing Video in 3rd Party Applications

Video streaming can be viewed using any application that supports RTSP or ONVIF protocols. This section will provide basic information for using some of the most common applications.

Viewing RTSP

VLC

VLC is a free and open-source cross-platform application from VideoLAN that supports RTSP video streaming. To view video using the DP-810, launch the application and do the following.

- From the Media Menu, select **Open Network Stream**.
- Select the Network tab and enter the DP-810 URL as "rtsp://{IP address}/dpict", where IP address is the address of the DP-810 that was presented in the IP Discovery Tool or the address assigned if static. Select **Play**.

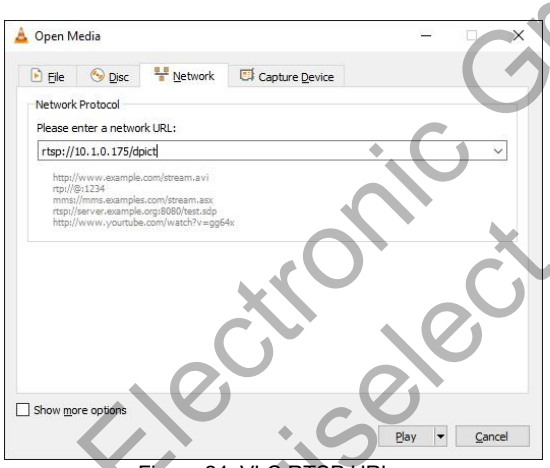

Figure 24. VLC RTSP URL

- If RSTP Authentication is set, enter the password of the DP-810 and select **OK**.

Figure 25. VLC Login

The live video window will appear. The DP-810 URL will be seen for a few seconds at the bottom of the image before disappearing.

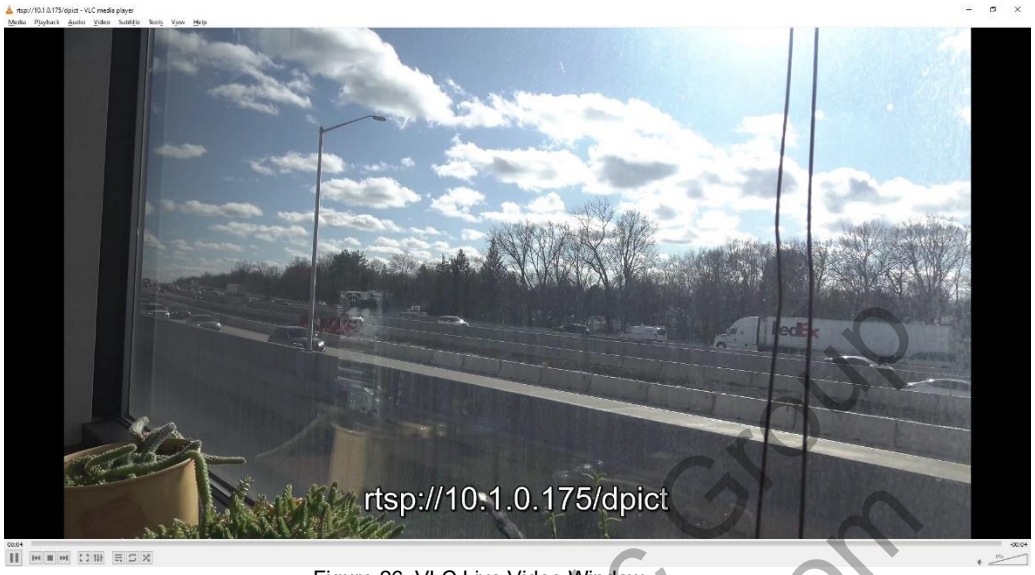

Figure 26. VLC Live Video Window

OBS Studio

OBS Studio is a free and open-source application for video streaming and recording. To view RTSP video in OBS Studio, launch the application and do the following.

- In the Source Dock, select the **+** to add a source. Scroll up and select **Media Source** from the menu. Name the source and select **OK**. The Properties window will appear.
- In the Properties window, deselect **Local File** and add the URL of the DP-810 as "rtsp://{IP address}/dpict", where IP address is the address of the DP-810 that was presented in the IP Discovery Tool or the address assigned if static. Select **OK**. If RTSP Authentication is used, the URL will be "rtsp://{user}:{password}@{IP Address}/dpict".

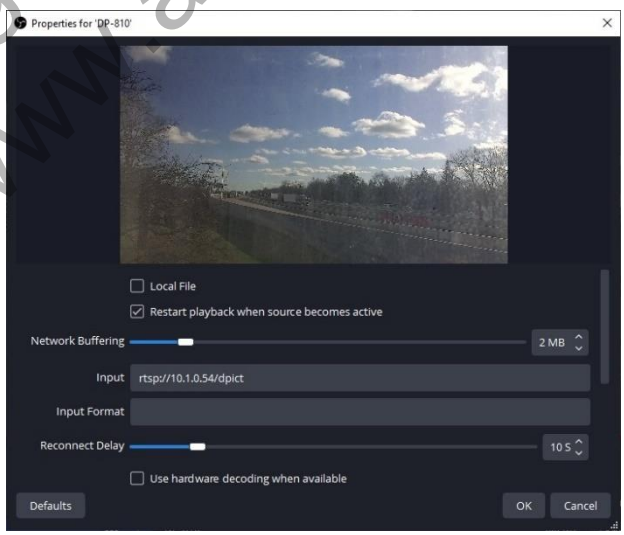

Figure 27. OBS RTSP URL

ONVIF

ONVIF is a global and open industry forum with the goal of facilitating the development and use of a global open standard for the interface of physical IP-based security products. dPict Imaging, Inc. is a User member of the ONVIF forum, and the DP-810 has been ONVIF certified.

Applications that have ONVIF conformance will support the DP-810 and other ONVIF certified dPict Imaging products. While many ONVIF applications will have some DP-810 configuration ability, many are limited to basic functions. It is recommended that users configure the DP-810 using the dPict Imaging Configuration Manager or ONVIF Device Manager before using an ONVIF application.

ONVIF Device Manager

ONVIF Device Manager is an open-source application designed to manage ONVIF compliant video network devices such as the DP-810. This section will describe the ONVIF Device Manager as it applies to the supported features of the DP-810. Figure 28 below shows the ONVIF Device Manager application.

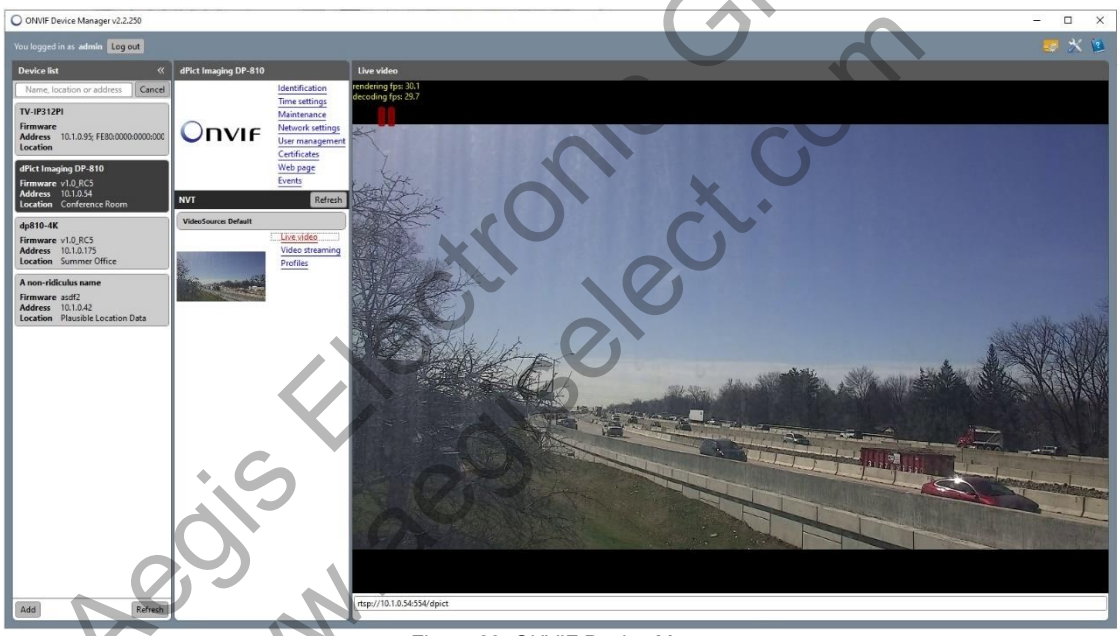

Figure 28. ONVIF Device Manager

Discovery
Just like the dPict IP Discovery Application, ONVIF Device Manager will discover all ONVIF compatible devices on the network and list them on the left side of the interface. To access a device, log in at the top of the application and select the appropriate device in the device list.

Identification
Allows user to change device name and location settings.

Time Settings
Allows user to change device time settings and time zone.

Maintenance
Allows user to reboot or factory reset device.

Network Settings
Allows user to change various network settings.

Live Video
Allows for viewing of the RTSP video stream from the device.

Customer Support

Contact Information

The dPict Imaging Customer Support Team can be contacted using the following methods:

- Email: dpictsupport@dpictimaging.com
- Website support form: http://dpictimaging.com/Support/TechSupport.html

Additional Support

The dPict Imaging website, located at http://www.dpictimaging.com, has a wide variety of resources to assist you in using our products. They include:

- Descriptions of the entire product line
- Software/driver installers for all dPict Imaging products
- Specification sheets
- Cable diagrams
- Connector diagrams