Express 6

www.stardot-tech.com

StarDot
Technologies

Table of Contents

Chapter 1   Configuration

Congratulations on your purchase of the Express 6 Video Server. The Express 6 provides the highest quality streaming images from up to six video sources. With proper usage, the Express 6 will provide many years of quality remote imaging. We recommend that you read this manual carefully to completely understand the Express 6's capabilities.

1.1   Before You Start

This manual guides you through the basic setup procedure for the Express 6 and provides a detailed resource for the server's advanced options and capabilities.

Setting up the Express 6 consists of three steps. The first step is to configure the Express 6's network or dial-out settings. The second step is to configure the Express 6 to upload images to a web server (this step is optional). The third step is the actual physical installation of the server and the cameras at their final location.

1.2   What's Included and What's Required

The Express 6 package includes the Express 6 Video Server, a power supply, a network cable (CAT5), a null modem serial cable (for configuration via the Setup Wizard) and the StarDot Tools software. The Dial-Out package also includes an external modem and modem cable. In order to use the Express 6, you will need the following:

- Power source
- A computer (with Java-enabled web browser) for viewing the Express 6 images and configuring the Express 6

> **Note:** *A computer is not necessary for the Express 6 server's operation, a computer is required only to configure it and view images.*

- Network connectivity (LAN, cable modem, DSL, Dial-Up Internet Account, etc.)
- Web server space (only required when configured as Dial-Out ISP server)
- At least one video source, usually a video camera

1.3   Parts of the Express 6 Video Server

S0 (Modem)
External Modem Connection
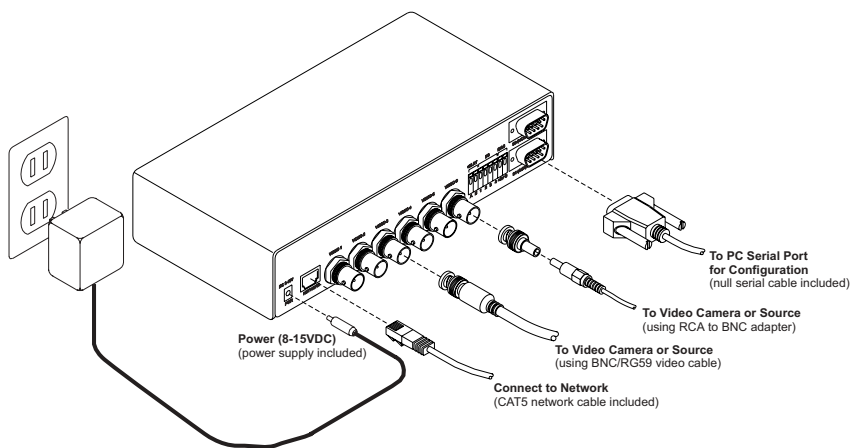For Internet ISP Dial-Out

S1 (Aux)
Configuration via PC Serial Port,
Auxilliary Device Control

I/O Ports
4 x digital I/O and 1 x relay, used
for alarm/event triggering

NETWORK (Ethernet Port)
Used to Connect the
Express 6 to a Network

Video Inputs
6 x NTSC/PAL/SECAM video
inputs, BNC type jack

PWR (DC Power Jack)
8-15VDC, (500mA @ 12V)
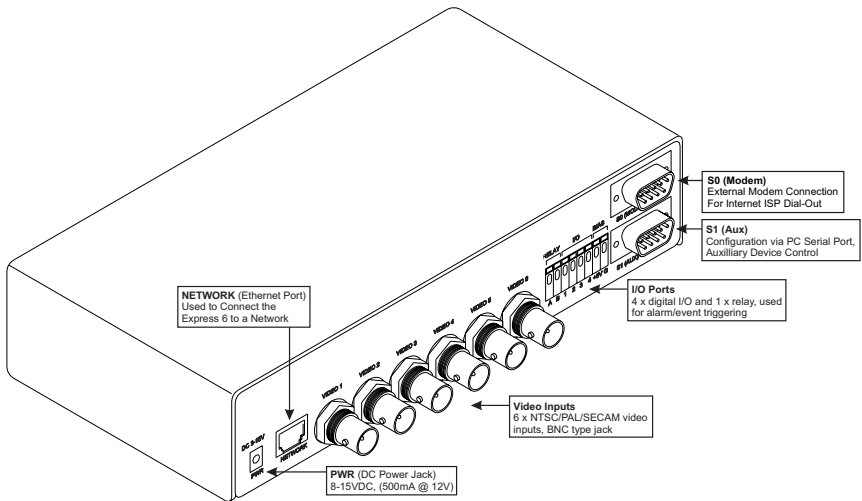
1.4   Connecting the Express 6 to a Network

The StarDot Tools software is the easiest way to configure the
Express 6. To configure the Express 6 using the StarDot Tools software,
do the following:

❶   Install the StarDot Tools software by inserting the included disk and
running setup.exe.

❷   Connect one end of the null model serial cable to the **S1** port of the
Express 6 and the other end into an available serial port on your PC.

❸   Connect the Express 6 into a network hub or switch with a standard
CAT 5 network cable (included).

❹   Run the StarDot Tools software and click on the Setup Wizard
button.

❺   Follow the steps in the Setup Wizard. If you're unsure of some of the
answers or you'd like more information on connecting the Express 6
to the Internet or your private network, read "An Overview of
Network Connectivity".

To PC Serial Port
for Configuration
(null serial cable included)

To Video Camera or Source
(using RCA to BNC adapter)

To Video Camera or Source
(using BNC/RG59 video cable)

Power (8-15VDC)
(power supply included)

Connect to Network
(CAT5 network cable included)

1.5   An Overview of Network Connectivity

A LAN or network connection is the simplest configuration for the Express 6. The Express 6 simply needs an IP address (and other networking parameters) to make the live images and configuration menus accessible from any web browser on the network. There are two ways the Express 6 can be assigned an IP address: automatically or manually.

Automatic IP Assignment (DHCP)

The Express 6 is shipped in an automatic IP assignment mode called DHCP (Dynamic Host Configuration Protocol). If your network has a DHCP server (most routers act as DHCP servers), it will automatically assign the necessary network parameters to the Express 6. Before you can access the camera, you will need to know what IP address was assigned to the Express 6. Use the StarDot Tools software to find all StarDot servers on your local network.

Manual IP Assignment

If you want to assign the Express 6 a permanent IP address, you will need the following information:

- IP Address (example: `192.168.1.5`)
- Subnet Mask (example: `255.255.255.0`)
- Gateway (example: `192.168.1.1`)
- DNS Servers (example: `24.1.179.1, 24.1.179.2`)

If you are installing the Express 6 on a company network, you will probably want to get this information from your system administrator.

The easiest way to configure the Express 6 manually is to connect it to a serial port on your computer. Plug one end of the null modem serial cable into the **S1** port on the back of the Express 6 and the other end into an available 9-pin serial port on the back of your computer (if your PC or laptop does not have a 9-pin serial port, you can purchase a USB-to-serial converter). Use the included StarDot Tools software to configure the Express 6.

If you don't have a serial port or are using a non-Windows machine, you can assign the Express 6 a temporary IP address. This gives you access to the Network menu with a web browser, where permanent network settings can be made. To assign the Express 6 a temporary IP address, you will first need to know the the Express 6 ID, located on the bottom of the Express 6. Next, open an MS-DOS/Command Prompt window under Windows (Click Start, Run, type `command` and click OK) or a terminal under Unix/Linux and use the **arp** command (Macintosh users: consult your help file to determine how to set an IP address using arp):

```
arp -s <ip-address> <camera-id>
ping <ip-address>
```

Windows example:

```
arp -s 192.168.1.5 00-30-F4-00-10-AB
ping 192.168.1.5
```

UNIX/Linux example:

```
arp -s 192.168.1.5 00:30:F4:00:10:AB
ping 192.168.1.5
```
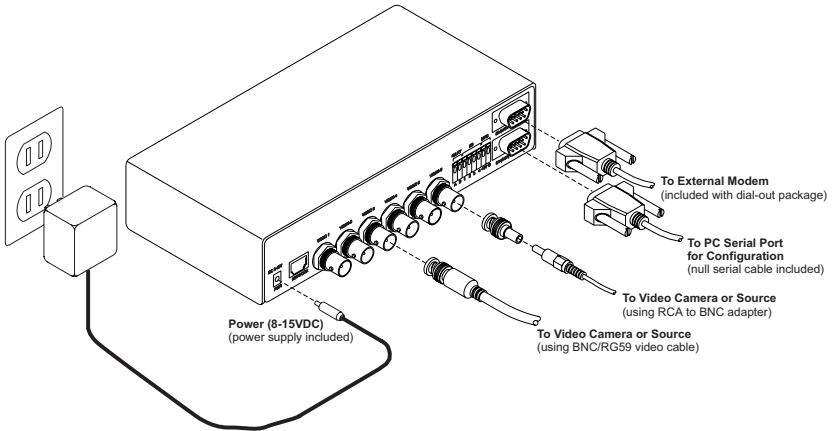
The Express 6 should respond to the pings after a few attempts. If it does, skip to the next paragraph. If it does not, double check that you are assigning a valid IP address for your network, delete the current arp entry (by typing `arp -d <ip-address>`) and restart the arp assignment process over. If the Express 6 is still not responding to the pings, use a Windows system with an available serial port and use the StarDot Tools software.

Once the Express 6 successfully responds to the ping request, you can enter its IP address in a web browser (`http://192.168.1.5`). You will initially see the live page. Click on the Configuration link under the left side of any of the images, and after the Image Properties page comes up, click on the Network tab. Enter the permanent IP address assignment and network information and click the Apply button.

1.6 Connecting the Express 6 to a Modem

In order to use the Express 6 with an analog phone line, you will need the Dial-Out Express 6 package (VID-SRVx2, which includes an external modem and cable), a dial-up ISP account and an analog phone line.

❶ Install the StarDot Tools software by inserting the included disk and running `setup.exe`.

❷ Connect one end of the null model serial cable to the **S1** port of the Express 6 and the other end into an available serial port on your PC.

❸ Connect the round end of the modem cable into the external modem and plug the DB9 end of the modem cable into the **S0** port of the Express 6.

❹ Run the StarDot Tools software and click on the Setup Wizard button.

❺ Follow the steps in the Setup Wizard. When asked for modem type, select StarDot 3J.

❻ **Test your configuration locally first.** Once successful, you can place the Express 6 and the modem remotely and it will automatically dial out to the Internet and upload images according to the set schedule.

To External Modem
(included with dial-out package)

To PC Serial Port
for Configuration
(null serial cable included)

To Video Camera or Source
(using RCA to BNC adapter)

To Video Camera or Source
(using BNC/RG59 video cable)

Power (8-15VDC)
(power supply included)

Chapter 2   Installation

Before installing the Express 6 in its final location, it is important to configure and test it first (see Chapter 1).

2.1   Ethernet Connection

If the Express 6 will be connected directly to an Ethernet network, measure the distance from the Express 6 to the nearest Ethernet hub or switch. This distance should not exceed 325 feet. If you wish to extend the distance further than 325 feet, you can add an Ethernet hub or switch.

Running Separate Ethernet and Power

Run standard CAT 5 or better Ethernet cable from the hub/switch to the **NET** jack on the back of the Express 6. Plug the included power supply into the back of the Express 6.

Running Combined Ethernet and Power

To save the hassle of running both power and network cables (or having to have a 110V or 220V power supply at the the Express 6 location), StarDot offers combo Ethernet/power cables in lengths of 50, 100, 200 and 300 ft. Contact StarDot for more information (www.stardot-tech.com)

2.1   Analog Modem Connection

If the Express 6's connection to the Internet will be a dial-out ISP connection, an external modem and modem cable are required (these are provided with the Dial-Out the Express 6 package).

Connect the external modem's power supply into an AC wall outlet. Connect the external modem into a phone jack using a standard telephone cable.

Using the included DB9 Female to round connecter cable, connect the external modem into the **S0** port on the back of the Express 6.

It is important that the Express 6 be pre-configured for a dial-out modem connection before placing the the Express 6 in its final installation location (see Chapter 1.6).

Chapter 3   Accessing the Express 6

3.1   Viewing the Images

Any Java-enabled browser can be used to view the live images. Type the Express 6's IP address in your browser's address bar (example: `http://192.168.1.5`). The initial page is a 4-camera view. You can toggle cameras on/off, resize the images and the number of columns showing. If you have a particular viewing page you prefer (example: only cameras 1 & 2), make the changes using the control panel at the top and then bookmark the page.

To view only one video source, you can click on the "Camera" link under the image.

3.2   Accessing the Configuration Menus

Virtually any web browser can be used to access the Express 6's configuration menus. To access these menus, type the Express 6's IP address in your browser's address bar (example: `http://192.168.1.5`). This will bring up the live image page. Click on the Configuration link for the video source you wish to configure. You will be prompted for a User Name and Password. Use `admin` for both.

Tip: *We highly recommend that you change the default password. To do so, see Chapter 3.10.*

3.3   Image Properties

All image-related configuration options are located on the Image Properties page. After making changes, click the Apply button to save new settings for the video source you selected (change video sources by clicking the video source number in the upper right).
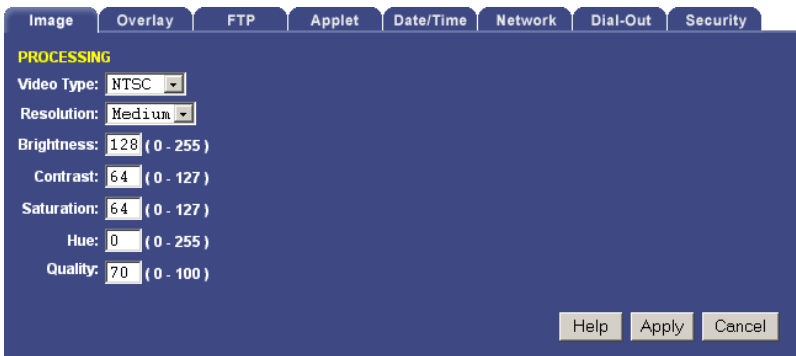
PROCESSING

Video Type

Select the video modulation standard for the type of video source connected into the Express 6. If you're unsure, the following list shows the three standards and in what parts of the world they're generally used.

- **NTSC** - This is the video standard for the Unites States and much of Asia.
- **PAL** - This is the video standard for most of Europe.
- **SECAM** - This is the video standard for France and some countries in the Middle East.

Resolution

Resolution is the dimensional size of the image, measured in pixels.

NTSC
Full - 704 x 480
Medium - 352 x 240
Low - 176 x 112

PAL/SECAM
Full - 704 x 576
Medium - 352 x 288
Low - 176 x 144

Brightness

This value determines the brightness of the image. Most video cameras have automatic exposure compensation so you'll rarely need to adjust the brightness.

Default: 128

Contrast

This value determines the amount of contrast in the image. The higher the value, the larger the difference between dark and light areas will be. Conversely, low contrast produces a hazy image with little difference between the dark and light areas. In most cases, this value should be left at its default value.

Default: 64

Saturation

Saturation determines the amount of color in the image. The higher the value, the more saturated the colors become. Conversely, low satura-

tion produces an image with little color information. A value of 0 will produce a grayscale (black & white) image.

Default: 64

Hue

Hue determines the color balance of the image. You will rarely need to change this value.
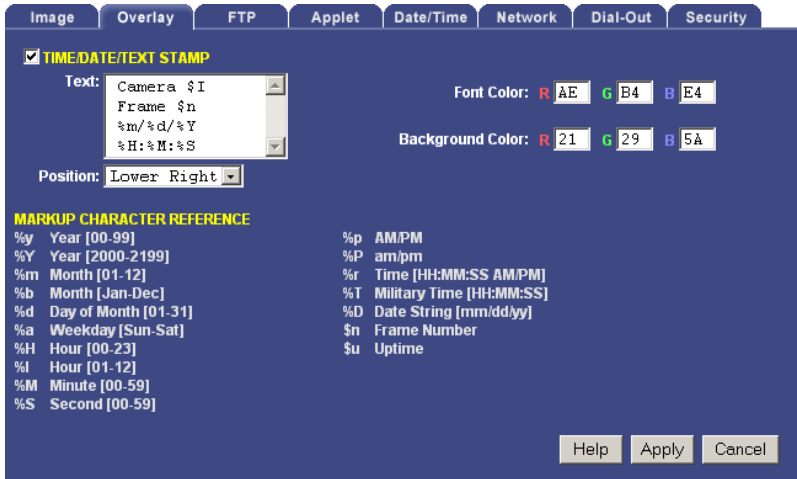
Default: 0

Quality

Quality represents the amount of JPEG compression performed on the image. A high value produces the highest quality image at the expense of file size (and transfer speed). A low value produces a small file size (and hence, quicker transfer speed) at the expense of image quality. A compromised value in the range of 40-70 is recommended.

Default: 70

3.4   Overlay Properties

The Overlay Properties allow you to edit what text is displayed on the image. After making changes, click the Apply button to save the settings in the Express 6.

| Image | Overlay | FTP | Applet | Date/Time | Network | Dial-Out | Security |

☑ **TIME/DATE/TEXT STAMP**

Text:
```
Camera $I
Frame $n
%m/%d/%Y
%H:%M:%S
```

Position: Lower Right

Font Color: R AE G B4 B E4

Background Color: R 21 G 29 B 5A

MARKUP CHARACTER REFERENCE

%y	Year [00-99]	%p	AM/PM
%Y	Year [2000-2199]	%P	am/pm
%m	Month [01-12]	%r	Time [HH:MM:SS AM/PM]
%b	Month [Jan-Dec]	%T	Military Time [HH:MM:SS]
%d	Day of Month [01-31]	%D	Date String [mm/dd/yy]
%a	Weekday [Sun-Sat]	$n	Frame Number
%H	Hour [00-23]	$u	Uptime
%I	Hour [01-12]		
%M	Minute [00-59]		
%S	Second [00-59]		

Help   Apply   Cancel

TIME/DATE/TEXT STAMP

Text

Any text entered into this field will be stamped onto the live image. In addition to static text, the current date and time can also become part of the text on the live image. This is handled through markup characters. For instance, %d inserts the current day on the live image. There is a complete list of markup characters below and a mini reference on the Overlay Properties page itself.

Default: Camera $I
              Frame $n
              %H:%M:%S UTC

Font Color

The text color can be modified by adjusting the red, green and blue values. Valid ranges are in hexadecimal and range from 00-FF.

Default: R: AE G: B4 B: E4

Background Color

The text background color can be modified by adjusting the red, green & blue values. Valid ranges are in hexadecimal and range from 00-FF.

Default: R: `21` G: `29` B: `5A`

Markup Character Reference

All of the following markup characters can be used in the text overlay. Additionally, any date/time markups (preceded by the `%` character) can be used to compose the filenames in the FTP Properties Page, which is very useful for archiving images with unique filenames (based on the current date and time, for instance). Note: Do not use date/time markup as FTP placeholders if they contain characters such as : or /.

Date & Time Shortcut Markups

`%r`   Time String [HH:MM:SS AM/PM]

`%T`   Time String, Military [HH:MM:SS]

Date Markups

`%Y`   Year, Four-Digit [2000-2199]

`%y`   Year, Two-Digit [00-99]

`%m`   Month, Numerical [01-12]

`%B`   Month, Full [January-December]

`%b`   Month, Abbreviated [Jan-Dec]

`%U`   Week of Year (Starting with Sunday) [00-53]

`%W`   Week of Year (Starting with Monday) [00-53]

`%d`   Day of Month [01-31]

`%w`   Day of Week, Numerical (Sunday=0) [0-6]

`%u`   Day of Week, Numerical (Monday=1) [1-7]

`%A`   Day of Week, Full [Sunday-Saturday]

`%a`   Day of Week, Abbreviated [Sun-Sat]

`%j`   Day of Year (Julian Day) [001-366]

`%p`   AM/PM, Uppercase

Time Markups

`%H`   Hour, Military [00-23]

`%I`   Hour, Standard [00-12]

`%M`	Minute [00-59]		
`%S`	Second [00-59]		
`$[`	Milliseconds [000-999]		

Symbol Markups

`%%`	Percentage Character, %

Camera Markups

`$I`	Camera Number (Video Input Number)
`$n`	Frame Number
`$u`	Camera Uptime

Sample Colors Chart

R	G	B	
FF	00	00	Red
00	FF	00	Green
00	00	FF	Blue
FF	FF	00	Yellow
00	FF	FF	Cyan
FF	00	FF	Purple
FF	FF	FF	White
7F	7F	7F	Gray
00	00	00	Black

3.5 FTP Properties

The FTP Properties instruct the Express 6 to upload images to a remote server. After making changes, click the Apply button to save the settings in the video server. Note that each video source has its own independent FTP settings.

FTP Upload

FTP stands for File Transfer Protocol, one of the most popular methods for transferring files over the Internet. In addition to the Express 6 serving images from its internal web server, the Express 6 can also upload images to an external web server. This is useful if you plan on having a large number of visitors viewing the live images or if you'd like to archive images from the Express 6. To enable image uploads, check FTP Upload on and fill out the options below.

Required Fields

Hostname

The hostname is the name of the server where you'd like the Express 6 to upload images to. It can be a machine name or IP address. Do not include the http:// or ftp:// header or a path.

Example: myserver.com or ftp.myserver.com

Username

This is the username or login name assigned to you by your hosting provider.

Password

This is the password assigned to you by your hosting provider.

Path/File

This field combines two elements, the image filename, preceded by an optional path or directory. Consult with your hosting provider to determine if you need to specify a path. If you don't, you simply put the desired name of the image file here.

Example Without Path: `camera0.jpg`

Example With Path: `/html/images/camera0.jpg`

Advanced Fields

Rotating Archive

If enabled, the Express 6 will use a renaming scheme to store the current 10 images on your server. A hyphen, followed by the archive number (0-9) is automatically appended to the end of the filenames.

Default: Off

Passive Mode

If the Express 6 is behind a proxy server, enable passive mode. If you are unsure if you need passive mode, it is usually safe to enable it anyway.

Default: On

Timeout

If the FTP process hasn't completed within the time specified here, the Express 6 will attempt to restart the process.

Default: `120`

Delete Before Rename

The Express 6 employs a file renaming scheme, which greatly reduces the possibility of file collisions between the Express 6 uploading an image and viewers downloading the image. The image is uploaded with a `.tmp` extension. Once uploaded the tmp file is renamed without the `.tmp` extension. Certain FTP/Web servers do not allow a file to be renamed to a filename that already exists. To get around this problem, enable Delete Before Rename.

Default: Off

IIS 4.0/5.0

Certain Microsoft-based FTP/Web servers have a bug that affects uploading images with the same filename. If you have problems seeing your image update on a Microsoft-based server, enable the IIS 4.0 option. This option is only valid if Delete Before Rename (above) is also enabled.

Default: Off

Secondary Path/File

The Express 6 can optionally upload the image with a separate path and/or filename from the Path/File above. This provides a very convenient way of archiving images on your server while still maintaining a statically named live image. One way to do this is to include date/time markup characters as part of the filename. The current upload time of the image will become the filename.

For example, the filename `%Y-%m%d-%H%M%S.jpg` automatically translates to `2002-11-18-153015.jpg` if the date and time of the upload is November 18, 2001 at 3:30:15 PM.

Tip: *For a complete list of Date/Time markup characters, see the Overlay help page.*

Only the characters beginning with the percentage symbol (`%`) are valid. It not advisable to use date/time characters that insert / \ : or space characters, as this can confuse the FTP/Web server.

Example Without Path:

```
camera0-%Y-%m%d-%H%M%S.jpg
```

Example With Path:

```
/var/html/camera0-%Y-%m%d-%H%M%S.jpg
```

Current IP Link Path/File

If the Express 6 is using an external modem to dial out to an ISP, the Express 6 will most likely be assigned a different IP address every time it connects. This makes it next to impossible to access the camera directly from a browser since its IP address is not known. To eliminate this problem, the Express 6 uploads a small web page every time an image is uploaded. The web page contains the current IP address of the Express 6 so you can configure the camera remotely. Clear this field if you don't want this file to be uploaded.

Default: `ip.html`

Schedule

Scheduling tells the Express 6 when and how often to FTP images to your server.

Delay

This tells the Express 6 to delay a specified number of seconds between FTP image uploads. The speed at which the Express 6 can upload varies on the image resolution, amount of JPEG compression, Internet connection and network congestion.

Keep in mind that the overhead of FTP and the Internet doesn't allow for the same update rates that you see when accessing the Express 6 directly with a browser. It is safe to say that FTP restricts 352x240 uploads to once every 3-6 seconds, even on a DSL or cable connection. 704x480 images will probably not upload faster than once every 10-15 seconds.

Default: 30

Upload Window

The Express 6 can upload images 24 hours a day, seven days a week, or you can set whatever time window and days of the week you like. Use military time for the beginning and ending window times.

Example: You can configure the Express 6 to only upload Between 07:30 and 18:30 only on Mon, Tue, Wed, Thu and Fri

3.6 Applet Properties

The Applet/Web Properties page contains information for customizing the the Express 6 image-viewing Java applet. After making changes, click the Apply button to save the settings in the Express 6.

IMAGE VIEWER JAVA APPLET

The live images on the main Express 6 web page are presented with the aid of a Java applet called Capture Client. This allows for smooth transitions between image frames. Options include the ability to add a countdown status bar and the ability to change the click URL.

Size

If the image is 352x240 and the size is 100%, the applet will display the image at its original size, in this case 352x240. If the size is 50%, the image will display at half size, in this case 176x120. If the size is 200%, the image display at double size, in this case 704x480. Keep in mind that the JPEG image is still the size specified in the Image Properties page; the applet resize option simply reduces or stretches the original image. In most cases, you would leave it at 100% (no resize).

Default: `100%`

Delay

The Java applet will delay for this amount of time before attempting to fetch another live image. The time is measured in milliseconds (1000 ms = 1 second).

Image-Click URL

When a viewer clicks on the live image, their browser will go to the URL contained here.

Status Bar

The applet contains an optional status bar displayed in the browser status bar or at the bottom of the applet.

Status Text

This is the text that is displayed in the applet status bar (if enabled).

Default String: `Reload in %s seconds`

Status Text Color

This is the color of the text that is displayed in the applet status bar (if applet status bar is enabled). The color is defined in the HTML standard of 3 numbers for RGB. Format: RRGGBB (RR=red, GG=green, BB=blue, all values hexadecimal 00-FF).

Default: `ffffff`

Status Bar Color

This is the color of the background that is displayed in the applet status bar (if applet status bar is enabled). The color is defined in the HTML standard of 3 numbers for RGB. Format: RRGGBB (RR=red, GG=green, BB=green, all values hexadecimal 00-FF).

Default: `000000`

3.7   Date/Time Properties

The Date/Time Properties allow you to set the date and time in the Express 6. After making changes, click the Apply button to save the settings in the camera.
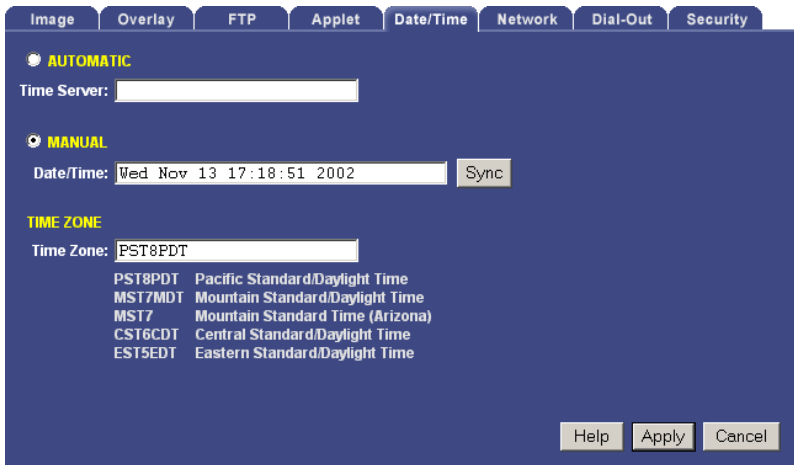
Setting the Date and Time

Automatic vs. Manual - For the most accurate date & time, having the Express 6 automatically synchronize with a network time server is recommended.

Automatic Time Set

When Automatic time synchronization is enabled, the Express 6 will query a network time server and synchronize the camera's date and time, usually accurate to within a second or less. This will happen every time the camera is powered on or rebooted, provided the Express 6 is connected to the Internet or a network with a time server.

• **Time Server** - The name (or IP address) of a time server is entered here. Some popular ones include:

```
tick.usno.navy.mil    (192.5.41.40)

tock.usno.navy.mil    (192.5.41.41)

ns.arc.nasa.gov       (128.102.16.2)
```

Note: *While these time servers have proved reliable over the years, there is no guarantee that they will always be available to the public.*

Manual Time Set

If you don't have access to a time server, you can manually set the Express 6's clock. You can do this in one of two ways. Using the Sync button, you can synchronize the Express 6's clock to your PC's clock. You may also manually modify the time and date in the Date/Time box. In either case, be sure to hit the Apply button after you've set the time.

Note: *When using Internet Explorer, the Date/Time page may disappear after clicking the Apply button. If this happens, click the refresh button twice.*

TIME ZONE

The Express 6 integrates your current time zone into the time/date string and can even automatically adjust for daylight savings time. Type in the time zone code from the list on the page. If your time zone is not listed, enter your abbreviated time zone followed by the number of hours you are behind GMT (if you're ahead of GMT, add the "-" character before the value). *Example: HST10 = Hawaiian Standard Time*

3.8   Network Properties

The Network Properties page contains all the IP configuration information for setting up the Express 6 on a network. After making changes, click the Apply button to save the settings in the Express 6.

Ethernet

If your network is Ethernet-based (LAN, cable modem, DSL), use the **NET** port on the back of the Express 6 to access the server. The first step

to network access is assigning the Express 6 an IP address. There are two ways in which this can be done: automatically (DHCP) or manually (static).

IP Assignment

DHCP

By default, the Express 6 comes up in DHCP mode, meaning that it probes the network for a DHCP server. If there is a DHCP server on the network, the Express 6 is automatically assigned an IP address, subnet mask, gateway, and name servers. No manual configuration is needed. One negative of DHCP mode is not knowing what IP address the Express 6 was given. Use the StarDot Tools software to find DHCP-assigned StarDot servers on your local network.

Manual

If you'd like to manually assign the Express 6 a static IP address, set the Express 6 to Manual IP Assignment and provide the following information:

- **IP Address** - The IP address you'd like to assign to the Express 6. Consult your network administrator to determine what IP address is OK to use. If you are setting up the Express 6 behind a residential gateway or cable/DSL router, your IP address will be something similar to `192.168.1.5`.
- **Subnet Mask** - Find out your netmask from your network administrator. If you're on a private network, your netmask will almost always be 255.255.255.0.
- **MAC Address** - This is the factory-set Ethernet address of the Express 6. It also serves as the Server Serial ID. It cannot be changed from the web menu.

Network

Hostname

Alphanumeric name of the Express 6 that can get linked to the Express 6's IP address. This is disabled if DHCP is enabled.

Default: `express6`

Gateway

In most cases, this is a machine name or IP address that serves as a gateway to the Internet. If the Express 6 is on a private network behind a router/gateway, you would enter the IP address of the router/gateway. This is disabled if DHCP is enabled.

Name Servers

DNS

This is the domain name server's IP address. This is critical if your FTP server and/or time server is entered as a domain name and not an IP address. Check with your ISP to determine your name servers (you can list up to three). This is disabled if DHCP is enabled.

Web Server

The Express 6 has a built-in web server which is used to serve both the live image and configuration pages.

Web Server Port

In most situations you will want to leave the web server port at its default value of 80. The only situation that calls for changing the port number is if you're hosting one or more Express 6 servers behind a residential router/gateway that supports port forwarding. This allows you to access multiple Express 6 Servers behind a single public IP address (most DSL and Cable Modem accounts provide only one public IP address). Some residential gateways can be configured to forward unique port numbers to individual IP addresses on the private network side of the gateway.

Example: *Assign the Express 6 a web server port of 8085. In your residential gateway, under the port forwarding section, route port 8085 to the Express 6's IP address.*

Use caution when changing the web server port number. If it's anything but 80, you will not be able to access it normally through a browser. You will always need to add <:port number> to the end of the IP address (Example: `http://192.168.1.5:8085` from the local network or `http://208.146.196.41:8085` on the Internet).

Default: 80

3.9   Dial-Out Properties

The Dial-Out Properties page contains all the ISP dial-up configuration information for setting up the Express 6 connected to an analog modem. After making changes, click the Apply button to save the settings in the Express 6.

INTERNET DIAL-OUT CONNECTION (PPP)

If the Express 6's primary connection to the Internet will be a dial-up modem connection to the Internet, enter your ISP (Internet Service Provider) account information here.

Check this option on if you'd like the Express 6 to use an external analog modem to dial the Internet.

Baud Rate

This represents the speed or baud rate at which the Express 6 will communicate with the external analog modem. For most dial-up accounts, a baud rate of 38400 or 19200 works best.

Initialization String

This is a string that configures the analog modem before dialing the Internet. The default string works fine in most cases.

Default: AT&F (when used with StarDot 3J modem)

Phone Number

The phone number of the ISP (Internet Service Provider). You can embed special characters in the phone number.

, = pause one second

\# = same as \# button on phone

* = same as * button on phone

Timeout

The Express 6 will attempt to dial up the ISP for the specified number of seconds. If the Express 6 is unable to connect during this time period, it will stop and start over again.

Default: 180

Username

The username or login assigned to you by your ISP.

Password

The password assigned to you by your ISP.

Default Connection

Enabling this option makes the ISP dial-out connection the Express 6's default connection to the Internet.

Default: On

Always Up

If enabled, the Express 6 will attempt to stay continuously connected to the Internet. If disconnected, it will automatically attempt to reconnect. If the Express 6 is configured to upload images to a server via FTP, it is not necessary to enable this option; the Express 6 will automatically attempt to dial into the Internet when an image is scheduled to upload if dial-out is enabled.

Default: Off

Send CR After Login

This advanced ISP option tells the Express 6 to send a CR (Carriage Return) after logging in. Most ISP's don't require this, but some do.
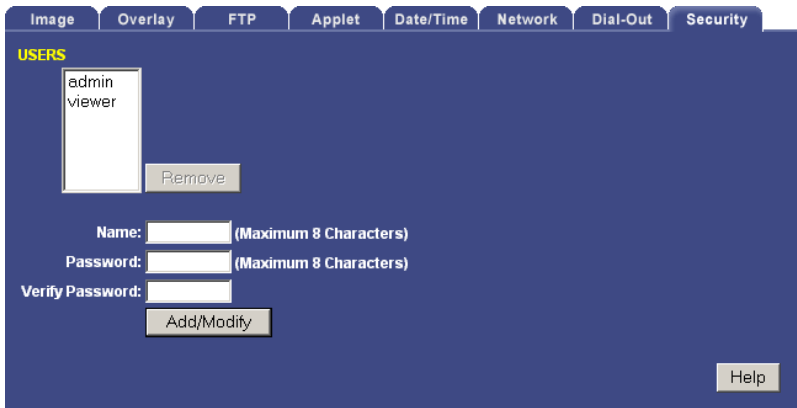
Default: Off

Shell Login

This advanced ISP option tells the Express 6 to perform a shell login. Most ISP's don't require this, but some do.

Default: Off

3.10 Security Properties

The Security properties page contains user/password information for securing the Express 6 from unwanted visitors.

Express 6 Users

The Express 6 has its own multi-user capable, password protected operating system. By default, the live images can be viewed by anyone and only the configuration pages are password protected. However, these options can be changed.

admin - The *admin* user has configuration and viewing rights. It is strongly recommended that you change the default password (initially "admin") to something else. This will prevent anonymous users from logging into the camera and making changes. It is important to choose your password carefully. Pick something that cannot easily be guessed. The password can be a combination of alpha and numeric characters, upper and lowercase (maximum 8 characters).

> **Tip:** *Do not use the same password you use on another system or anything that can be easily guessed. At the same time, do nor forget or lose your password or you will not be able to access the Express 6 configuration menus without resetting the unit to its default settings.*

viewer - The *viewer* user only has viewing rights (this user cannot access the configuration menus). By default, the *viewer* user has no password. This allows anyone to view the images on the camera without being prompted for a password. If you want to block public access to the live image, you will need to change the password for the *viewer* user.

To modify the password of an existing user, click on the user name and then type in a new password in the password field (retype it in the verify password field). Then click the Add/Modify button.

Adding a New User

To add a user to the Users list, type in the desired username in the Name field. Type and retype a password in the Password fields. Click the Add/Modify button. New users will only have viewing rights; only the *admin* user can make configuration changes in the Express 6.

Deleting a User

To remove a user from the Users list, click on the desired username and click on the Remove button. Note: The default users, *admin* and *viewer*, cannot be removed.

3.11 Trigger Properties

The trigger menu allows you set up the video server to capture and upload a series of images based on a triggered event using the input ports on the back of the video server.

Trigger

☑ **ENABLED**

VIDEO SOURCE

Input Sources: ☑ Camera 1 ☐ Camera 2 ☐ Camera 3 ☐ Camera 4 ☐ Camera 5 ☐ Camera 6

TRIGGER

I/O Port: ○ 1 ◉ 2 ○ 3 ○ 4

I/O Level: ◉ Low ○ High

☑ **SCHEDULE**

Upload between `00:00` and `24:00` (Military Format - HH:MM)

☑ Sun ☑ Mon ☑ Tue ☑ Wed ☑ Thu ☑ Fri ☑ Sat

☐ **PRE-BUFFER**

Delay: `250` ms

Count: `8` images

☑ **POST-BUFFER**

Delay: `0` ms

Count: `30` images

◉ **UPLOAD VIA FTP**

Hostname: `wincam.com`

Username: `vance`

Password: `*******`

Path: `/www/vance/trigger`

☐ Passive Mode

Timeout: `120` seconds

◉ **UPLOAD VIA SMTP (EMAIL)**

Mail To: `user@example.com`

Mail From: `user@example.com`

[Help] [Apply] [Cancel]

Trigger Overview

By connecting an alarm system, motion detector or other type of sensor to the back of the Express 6, it is possible to gather a series of images when the sensor "triggers" the video server. Wiring examples can be found at the end of this chapter.

VIDEO SOURCE

Select which video sources you'd like to store/upload images from.

TRIGGER

I/O Port

Select with I/O port your trigger source is connected to.

I/O Level

Select the state of your trigger source's output.

SCHEDULE

The Express 6 can wait in trigger-capture/upload mode 24 hours a day, seven days a week, or you can set whatever time window and days of the week you like. Use military time for the beginning and ending window times.

Example: You can configure the Express 6 to only upload Between 07:30 and 18:30 only on Mon, Tue, Wed, Thu and Fri

PRE-BUFFER

Pre-buffered images are images that are stored before the event trigger occurs. For example, if you connect a door sensor to the Express 6 with 10 image pre-buffering enabled, 10 frames of video that occured before the door was opened will be captured/uploaded.

If pre-buffering is enabled, the Express 6 will continuously buffer images in a rotating loop. This will affect the video speed of the Express 6 if you'd like to view live streams at the same time. Most applications don't require pre-buffering. Only enable this option if you require video frames before the actual trigger takes place.

Delay

The number of milliseconds to delay between image captures. For the fastest possible frame rate, set this to 0. Viewing other video sources during the triggered capture will affect the recording speed. Assuming no other video sources are being viewed/uploaded, here are some example frames rates for a single triggered video source:

0 ms = Max Speed (10 frames per second)
250 ms = 4 FPS
500 ms = 2 FPS
1000 ms = 1 FPS

Count

The number of pre-buffer images to store. There is a finite amount of memory in which to store images. Keep the total number of pre and post-buffer medium resolution images to below 100, even less for full size images.

POST-BUFFER

Post-buffered images are images that are recorded after a triggered event occurs. For example, if you connect a door sensor to the Express 6 with 20 image post-buffering enabled, 20 images will be captured/ uploaded after the door opened.

Delay

The number of milliseconds to delay between image captures. For the fastest possible frame rate, set this to 0. Viewing other video sources during the triggered capture will affect the recording speed. Assuming no other video sources are being viewed/uploaded, here are some example frames rates for a single triggered video source:

0 ms = Max Speed
250 ms = 4 FPS (frames per second)
500 ms = 2 FPS
1000 ms = 1 FPS

Count

The number of post-buffer images to store. There is a finite amount of memory in which to store images. Keep the total number of pre and post-buffer medium resolution images to below 100, even less for full size images.

UPLOAD VIA FTP

If you'd like the event-triggered image captures to be uploaded to an FTP server, select this option. The "Upload via FTP" parameters are independent of the regular image FTP parameters (see Chapter 3.5).

Hostname

The hostname is the name of the server where you'd like the Express 6 to upload images to. It can be a machine name or an IP address. Do not include the `http://` or `ftp://` header or a path.

Example: `myserver.com` or `ftp.myserver.com`

Username

This is the username or login name assigned to you by your hosting provider.

Password

This is the password assigned to you by your hosting provider

Path

Specify the path on your FTP server where you'd like the images stored. There is no need to specify a filenmae. The Express 6 automati-

cally creates sequential filenames (image0-000.jpg, image0-001.jpg, image0-002.jpg, where image0 means images from the first video input).

Passive Mode

If the Express 6 is behind a proxy server, enable passive mode. If you are unsure if you need passive mode, it is usually safe to enable it anyway.

Default: On

Timeout

If the FTP process hasn't completed within the time specified here, the Express 6 will attempt to restart the process.

Default: `120`

UPLOAD VIA SMTP (EMAIL)

If you'd like the event-triggered image captures to be e-mailed, select this option. If you've enabled a large number of images, this can add up to a large e-mail attachment.

Mail To

Specify the e-mail address you'd the Express 6 to send the images to.

Mail From

Specify a "from" e-mail address. This can be made up.

3.12 Trigger Sensor Connection

To connect a simple sensor (i.e. a door contact switch), connect one lead into the appropriate port (1 or 2), and the other lead into the G (ground) connector. When the sensor makes a contact closure, the Express 6 will detect it (check with the manufacturer to see if the your switch is normally open or closed and set the I/O level in the Express 6 appropriately). To use port 3 or 4, you will need to add a 1K bias resistor between +5 and the server side of the closure.
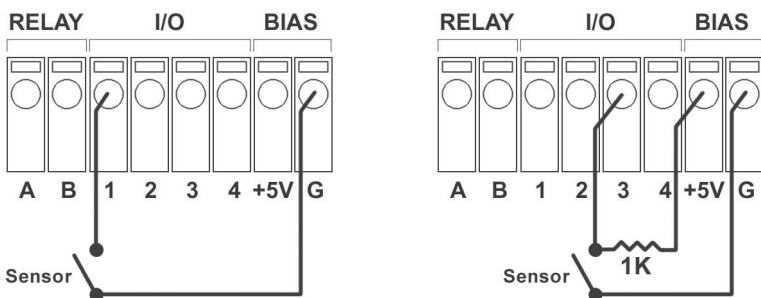
Chapter 4   Imaging Tips

As is the case with any camera, whether digital or film-based, steps can be taken that will great improve image quality. Cameras that you plug into the Express 6 are no exception to this rule. The following tips will help you achieve the best possible images with your cameras.

4.1   Lighting

Lighting is the single most important factor in quality photography. Proper lighting makes the difference between amateur-looking video and professional-looking video. Lighting can divided into two categories: outdoor and indoor.

Outdoor Lighting

In most outdoor imaging situations, you do not have much control over the lighting since most of your lighting obviously comes from the sun. However, you do have control over the lens settings and the positioning of the camera.

The Iris

The first thing to consider with outdoor lighting is the lens iris. If your camera is outfitted with an auto iris lens, you can ignore this section. If your camera lens has a manual iris, read on. The iris is an adjustable ring that controls the size of an aperture inside the lens barrel. The smaller the iris, the less light that reaches the CCD sensor. The bigger the iris, the more light that reaches the CCD sensor. It is important that the camera's lens iris is adjusted down to the size of a pinhole when pointing the camera outdoors. The reason for this is twofold -- it provides much better image quality and it prevents permanent damage to the CCD sensor.

Many video cameras have auto iris lenses. The iris on these lenses automatically opens or closes based on the amount of light hitting the imaging sensor. For auto iris lenses, you don't usually have to make any adjustments.

If your camera has a manual iris lens, adjust the iris to $f16$ or $f22$ (the larger the f-stop, the smaller the iris). If your lens does not have numerical iris markings, look into the lens and visually watch the aperture change size as you turn the iris ring. You want to adjust the aperture until it is literally the size of a pinhole.

Your camera may have a fixed iris (usually wide open for maxium light sensitivity). Some cameras (like those with CMOS sensors) can be pointed outdoors with an open iris without a problem. Most quality cameras use a higher quality CCD sensor (instead of CMOS). Nearly all

CCD sensors require a stepped down iris when pointed outdoors in daylight.

The Sun

If possible, aim the camera so that it never points directly into the sun. The best direction is north or south. If you must point the camera in a westernly or easternly direction, try to get as little sky as possible in the image. What you want to avoid is direct sunlight -- as with any camera, or your eyes for that matter, looking into the sun produces some of the worst images. It can also damage the CCD sensor over time, even with the iris set to a pinhole size.

There are certain imaging factors that are not controllable. Depending on where the sun travels in relation to the camera, you may find that images look better in the morning than the afternoon or vice versa. This is just the reality of lighting and is normal.

The Sky, Backlighting and Dynamic Range

One thing you can do to control the quality of your images is to reduce the likelihood of backlighting. Backlighting occurs when the background of an image is significantly brighter than the foreground. One example is a group of buildings in front of a bright sky. Depending on the difference in brightness between the buildings and the sky, the buildings can become a dark silhouette against the sky. Some cameras have built-in backlight compensation which helps reduce, but not eliminate, the problem.

Here are a few suggestions for reducing backlighting:

- Point the camera so little or no sky is visible in the image.
- If you want sky in the image, point the camera to the north (or south)

Indoor Lighting

The biggest advantage that indoor lighting offers is control. Unlike outdoor lighting, there is no need to worry about a travelling light source or a strongly backlit sky. However, that doesn't mean indoor lighting doesn't have its challenges. Here are some suggestions for improving indoor imaging.

- If light is limited, open the lens iris all the way.
- Avoid pointing the camera at regions with white walls in the background as this may produce an undesired backlighting effect.
- Avoid pointing the camera toward a window.

• If possible, avoid mixed light sources. For example, a room with both fluorescent and halogen lights will illuminate the room with different color temperatures, which will be visible in the images.

4.2   Image Processing Options

The images produced by the Express 6 are processed and compressed inside the Express 6. Many options that affect the quality of the image are configurable from the Image Properties Page -- the important ones are listed here (for a complete list, see Chapter 3.1).

Brightness - This controls how the bright the captured images will be processed. If your images are coming out dark, increase this value.

Saturation - This value represents the amount of color in the image. The higher the number, the more the saturated the colors become. The default value works well in most cases. If you do want more color saturation, increasing the number from its default of 64 to 70 should do the trick. Anything higher may start to produce undesired color effects.

JPEG Quality - The default value of 70 works well in most cases. The compression artifacts are minimal and the file size small. While increasing the quality will result in a slightly clearer image (less JPEG compression artifacts), the significantly increased file size hardly makes it worthwhile, especially when the quality is set to 90 or higher. Conversely, if you'd like images to download/upload faster for viewers with dial-up Internet connections, you can reduce the JPEG quality which decreases the file size. A value of 50 still results in good looking images at a very small file size.

Troubleshooting Guide

The StarDot Tools software doesn't list the Express 6 on my local network and/or is not accessible via its IP address.

1. Double check all cable connections and make sure the Express 6's network cable is plugged into an active Ethernet hub. Make sure the Express 6's power LED is on.

2. Connect the Express 6 to a PC's serial port with the included null modem cable to verify network settings with the StarDot Tools software.

The Express 6 is slow to respond on a web browser.

1. If you have dial-up Internet connection, this may be normal.

2. Set the JPEG quality to 70 or below. The higher the JPEG quality, the bigger the image file size, with very little improvement in image quality.

Images are not uploading to FTP server.

1. Double check all settings including hostname, username, password and path by using third party FTP client software (the command prompt FTP in Windows is a good test).

2. Try using an IP address in the hostname, or double check your DNS settings. For a dial-up Express 6, do not use an IP address for the hostname.

3. Try turning on the advanced FTP options "Delete Before Rename" and "IIS 4.0"

4. Telnet into the Express 6 type `ftpscript ftp0.scr` and press Enter. Watch the results for errors. (Note: To telnet from windows, click on Start, Run and type telnet <express6_IP_address> and click OK.

Technical Support

Technical support for StarDot customers is available directly from StarDot Technologies. Answers to most questions can be found at our web site at http://www.stardot-tech.com.

Technical Support and Software/Firmware Downloads
http://www.stardot-tech.com/care.html

Technical Support via E-mail
help@stardot-tech.com

Technical Support via Phone
(714) 228-9282, 8AM - 5PM PST, Monday-Friday

Specifications

Compression	JPEG, MPEG-1
Frame Rate	JPEG 10 FPS, MPEG 30 FPS
Video Inputs	6 x BNC composite video singnals w/ 75 ohm termination (selectable), NTSC, PAL or SECAM
Pre/Post Alarm Buffer	Up to 1.8MB available for pre and post alarm buffer image storage
Network Connection	1 x 10-baseT Ethernet
Network Protocols Supported	TCP/IP, HTTP, FTP, ARP, Telnet, Daytime, NTP
Serial Connection	2 x RS-232 Ports, DB9, up to 115.2Kb/sec
I/O Connectors	4 x Digital Alarm Inputs 　or 4 x 5V Swing Output Pins 1 x Fully Isolated Relay, 2A, 28VDC or 0.5A 1 x 5V Regulated Power Supply of 50mA
Operating System	uClinux
Security	Separate password-protected user accounts for administering the server and viewing the images, additional user accounts can be added
Operating Temperature Range	-40 F to +120 F (-40 to +49 C)
Dimensions	9.1" W (231.1mm) x 1.8" H (45.7mm) x 6.63" L (168.4mm)
EMI Approval	FCC Class A, CE (EN55024/1998, EN55022/1998)
Power Requirements	8VDC - 15VDC, (500mA@12V)

FCC STATEMENT OF COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

STARDOT

Technologies