Video Surveillance System
Installation Procedure

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Introduction

This procedure has been developed as a guide to assist the technician in installing Video Surveillance System. These procedures are only a guideline and are not all encompassing.

Please note that it is assumed that the technician has the qualifications to install and run low voltage power and video cabling through floors, walls, ceilings, etc.

This procedure covers the following installation and configuration areas.

- System Installation – The physical cabling and connections to install the system
- System Configuration – Configuring DVR and router to meet the customer’s requirements
- Special Camera – Installing PTZ and/or IDN cameras
- External TV Monitor – Setting up remote TV monitoring of a single camera or the DVR
System Installation

Cable Connections and Assembly
The first step in installing the video surveillance system is running the Siamese cable between the various camera locations and the DVR. Please ensure that you have allowed enough cable at each end (camera and DVR) to allow for possible last minute changes.

The following procedure gives you step by step instructions on how to terminate the Siamese cable for both the video portion (RG59 coaxial cable with BNC connectors) and the power portion (18 AWG Black and Red or Black and White pair).

Assemble tools and connectors

Tools Required
- RG-59 Crimp Tool
- Diagonal Cutters
- Knife
- BNC Connectors & Sleeves (2 per camera)
  - 1 at camera location & 1 at DVR location

Split the power (black & white or black & red) pair away from the RG59 coaxial cable for about 6 inches at the camera location.

At the DVR location the split will need to be enough to connect the RG59 coaxial cable to the DVR and the power pair to the Power Distribution Unit.

Insert the metal sleeve over the RG59 coaxial cable.
Cut approximately 1 inch of the outer shell from the cable exposing the copper shield.

Please NOTE: The narrow/smaller end of the sleeve needs to be inserted over the RG59 cable FIRST!
Use the diagonal cutters to cut and trim back the shield until you have about 3/8 inch. Fold this back on the outer jacket.

Use the knife to carefully trim back the inner insulator around the copper center wire. You should leave about 1/16 to 1/8 inch insulator beyond the shield.

The inner copper wire should be about 1/2 inch long.

Carefully insert the BNC connector over the inner copper wire sliding it firmly back towards the shield portion until it is in place and the shield is touching the sleeve portion of the connector.

Pull the copper shield wire over the rear portion of the BNC connector.
Slide the metal sleeve up OVER the copper shield. Ensure that you are securely holding the BNC connector against the RG59 cable.

Often when you slide up the sleeve you will push the connector away from the inner core wire unless you are holding it securely.

Crimp the metal sleeve onto the BNC connector using the larger (inner die) of your crimp tool.

Now crimp the narrow end of the sleeve over the RG59 cable using the smaller (outer die) of your crimp tool.

The completed BNC assembly should look like the picture.

Power wire preparation.

Remove about two inches of the outer shield from the power portion of the Siamese cable.

Remove about 3/8 inch insulation from each of the wires.
Power Connections
Before we start with power connections we need to add a little information about camera types &
groups. There are two basic camera groups that are used with video surveillance systems and each
has it’s own unique cabling and power issues.

The first camera group is modular cameras. The modular cameras are the most versatile because
you have many different options to chose from starting with the basic camera body (12 VDC, 24 VAC,
color or black and white), then you can select a lens (auto Iris, manual Iris, telephoto, standard, etc.),
and the mounting bracket (indoor, outdoor, color, etc.). This is the more common option because the
customer can build a camera to meet his requirements for any camera location.

The second group of cameras is the All-in-One (AIO) versions. These cameras are normally 12 VDC
but may also be found with the 24 VAC option. The cameras that fall into this group are domes
cameras, bullet cameras, day/night color/infrared, covert cameras and most of the pan/tilt/zoom
(cameras. The lens, power connections and mount are included as part of the basic camera and does
not normally require any assembly when they are installed.

Connections for the modular cameras will look similar
to the various connections shown at the right. These
cameras are powered either by 12 VDC or 24 VAC.

If the camera is a 12 VDC camera it is imperative that
the power cables be connected to the proper
terminals.

The BLACK power lead is always connected to the
Negative (-) terminal of the camera and the WHITE
(or RED) power lead to the Positive (+) terminal of
the camera.

Although it is not required, the same process is
recommended for 24 VAC cameras to ensure
continuity when connecting up the system.

Connections for the all-in-one (AIO) cameras will look
similar to the various connections shown at the right.
These cameras are normally powered by 12 VDC.

These cameras will normally have a receptacle for
power input and the center pin of the receptacle is
Positive.

The cameras can be powered by a single brick with
the proper plug or an adapter cable with the correct
plug will be shipped with the camera to enable
connection the power wires of the Siamese cable.
If the camera requires 12 VDC, the power source MUST be connected to the proper terminals.

The BLACK power lead is always connected to the Negative (-) terminal of the camera and the WHITE (or RED) power lead to the Positive (+) terminal of the camera.

Although it is not required, the same process is recommended for 24 VAC cameras to ensure continuity when connecting up the system.

Connections for the all-in-one (AIO) cameras will look similar to the various connections shown at the right. These cameras are normally powered by 12 VDC.

These cameras will normally have a receptacle for power input and the center pin of the receptacle is Positive.

The cameras can be powered by a single brick with the proper plug or an adapter cable with the correct plug that is shipped with the camera to enable connection the power wires of the Siamese cable.

There are two options for power connections at the DVR end of the cable.

A Power Distribution Unit (PDU) or a single power source (commonly called a brick) for each camera. Both type of power sources come in 12 VDC and 24 VAC version.

A 24VAC version of the PDU is shown. All connections are identical for both versions. Black wires are connected to the Negative or Common connection and the White (or Red) wire to the Positive connection.
Camera Assembly (Modular Cameras) and Installation
The next step is to assemble the modular cameras and then install the cameras in the locations indicated by the customer. Modular cameras will require assembly of a lens and mounting bracket prior to installation. The all-in-one cameras are completely assembled during manufacturing and will require only installation and connection to the DVR and power.

Most modular cameras are similar to the 12 VDC camera used for this example. If you have any questions about any assembly instructions for the version of camera that you have received, please called VS Technical Support for assistance.

Remove camera from box and install the bracket mount on the top or bottom of the camera.

Install the bracket mount on the top for cameras that will be hanging from ceiling brackets or from wall mounted brackets.

The picture shows the bracket mount installed on the top of the camera.

Some cameras will have a larger silver ring to mount “C” type camera lenses. Look at the camera documentation to determine if the “C” mounting ring has been included with the camera. This ring is rarely used and is not required for the lenses shipped for this installation. If this ring has been included it must be removed before installing the lens.

Insert the lens into the mounting bracket on the camera. Rotate the lens until it has been screwed in completely and snugly.

Ensure the lens is inserted tightly but DO NOT over tighten as you could strip the lens threads.

Insert the auto-iris cable into the back of the camera.
This is an example of a camera mounted with an indoor mounting assembly.

After the camera has been mounted connect the power wires to the camera.

Connect the Black (common/negative) wire to the Negative ( - ) terminal on the camera. Connect the Red or White (hot/positive) wire to the Positive ( + ) terminal on the back of the camera.

If you are using a single power source or “Brick” that has been shipped to you, one of the wires on the brick will be labeled as positive to indicate which wire is connected to each terminal.

Connect the video cable to the camera.

Camera installed.

After all the cameras have been installed we go to the DVR to complete the power and video connections.
KVM Installation and Connections (Optional)
Now that the cameras have been assembled, mounted and connected, the next portion of the installation will be the cabling and setup of the digital video recorder or DVR.

To begin with the DVR is similar to a personal computer and will require a keyboard, mouse and a monitor to operate. Most customers have a keyboard, mouse and monitor that they are using with their current point-of-sale (POS) system or they already have a PC that they are working with. Due to space restrictions, we normally install a KVM (Keyboard, Video, Mouse) switch that will allow the customer to switch from the DVR to his POS/PC system and use his current keyboard, mouse and monitor to control and operate both the DVR and his POS/PC system.

The following explains how the systems are connected using the KVM switch.

Open the KVM Switch package and ensure you have the following items available.
- KVM Switch
- 2 Connection Cables
- Power Supply

Select one of the KVM Cables and connect the Keyboard (purple PS-2 type connector), Video (blue DB15 connector) and Mouse (green PS-2 connector) to the appropriate ports on the PC2 side of the KVM switch.

Connect the other end of the SAME cable to the appropriate ports on the back of the DVR as shown at the right.

NOTE: Ensure the Video (DB15 connector) is plugged into the Video port on the DVR motherboard NOT one of the video ports on the video card.
Connect the other KVM Cable to the appropriate ports on the PC1 side of the KVM switch.

Connect the other end of the SAME cable to the appropriate ports on the back of the second computer (POS system, PC system etc.) at the customer location.

Connect to monitor cable to the Monitor port on the top edge of the KVM switch.

Connect the mouse and keyboard to the appropriate ports on the bottom edge of the KVM switch.

Connect the power supply to the power port on the bottom edge of the KVM switch.

With the KVM switch installed, you should be able to hit the button on the top of the KVM switch which will switch you from one system to the other, and use his current keyboard, mouse and monitor to control and operate both the DVR and his POS/PC system.
DVR Network Configuration
This section is for Geovision DVRs, port numbers will be different for other brand of DVRs

Now that the DVR is up and operational, the next step is to setup and configure the network for remote access to the DVR. This is accomplished by connecting the DVR to the cable/DSL modem directly as shown in Option 1 or through a router that has been connected to the to the cable/DSL modem as shown in Option 2.

When connecting to the cable/DSL modem there are several things that we determine prior to connecting the DVR to the network. This information should have been provided to the customer by the telecommunications company that is providing the internet connection.

The following listing show what information is required to continue the installation based on the configuration of the customers network.

- When the customer is using a cable modem and DHCP, connecting the DVR or the router directly to the Cable Modem with some minor configuration changes to either device is all that will be required.

- When the Customer is using PPPoE and a DSL Modem, the following information will be required.
  - Dynamic PPPoE
    - Username
    - Password
  - Static PPPoE
    - IP Address
    - Subnet Mask
    - Default Gateway IP
    - DNS Server IPs

- If the customer has been setup for Static IP we need the following information in order to proceed.
  - IP Address
  - Subnet Mask
  - Default Gateway IP
  - DNS Server IPs

Please note also that the customer needs to have the following ports opened if the customers internal network is protected by a firewall. Port 80, 4550, 5550, 6550, 7631 and 7632 are required to provide the remote access to the surveillance system.

Port 80 (TCP) is used to provide the DVR specific and proprietary HTTP server that allows direct access to the DVR for the HTML pages. These are the pages displayed when the customer accesses the DVR directly by IP.

Ports 4550 and 5550 are the command and data ports that are required to provide the outgoing streaming data for the video.

Port 6550 is the audio port required to provide the outgoing audio stream.

Two additional ports are required when the customer needs remote access for troubleshooting, maintenance and operation of the DVR. Those ports at 7631 & 7632 and are designated as the PC Anywhere access ports.

The ports must be opened and PC Anywhere Host service must be installed and running in the background on the DVR for the customer to receive the Extended Warranty services.
Option 1: Cable/DSL Modem connected straight to DVR.
With only one computer utilizing the network connection though the cable or DSL modem we can connect the DVR directly to the modem utilizing the Ethernet cable.

DVR network access configuration

1. Click on **START**, then **Settings**, then **Control Panel**
2. Select **Network and Dial-Up Connections**
3. Double click on **Local Area Connection**
4. Click on **Properties**
5. Select **Internet Protocol (TCP/IP)** and then **Properties**.

If the customer has DHCP for his internet connection, complete the following steps.

1. Select **Obtain IP address automatically**
2. Select **Obtain DNS server address automatically**
3. Select OK twice and close the window.
4. This completes the DVR network Configuration for the LAN interface.

If the customer has a static IP address for his internet connection, complete the following steps.

1. Select **Use the following IP address** and enter the information obtained from the customer.
   a. IP Address
   b. Subnet Mask
   c. Default Gateway
2. Select **Use the following DNS server addresses** and enter the DNS server information obtained from the customer.
3. Select OK twice and close the window.
4. This completes the DVR network Configuration for the LAN interface.
Option 2: Cable/DSL Modem connected through a router to the DVR.
With multiple computers utilizing the network connection through the cable or DSL modem we must use a router to connect the DVR into the network. Each device on the network must have its own IP to gain access to the network. DHCP may be used for most computers on the network, BUT the DVR must have a dedicated or static IP to enable the remote access.

The DVR uses several ports to provide remote access. Port 80 (TCP) is a 2-way port used to provide the DVR proprietary HTTP server that allows direct access to the DVR for the HTML pages. These are the pages displayed when the customer accesses the DVR directly by IP. Reasons for the static IP behind the router are

The following process utilizes the D-Link DI-604 Ethernet Broadband Router. The same process can be applied to other routers.

Connect a Cat5/RJ45/Ethernet cable from the LAN port on the DSL/cable modem to the WAN port on the router.

Connect a Cat5/RJ45/Ethernet cable from any port on the router to the LAN connection on the DVR.

To configure the DI-604 router we will have to configure the DVR to allow access to the router.

Open Network Connections, then Local Area Network configuration window.

Select Internet Protocol (TCP/IP) and then Properties.

Select Use the following IP address
IP Address: 192.168.0.10
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.0.1.

Select Use the following DNS server addresses and enter the DNS server information obtained from the customer.

Select OK twice and close the window.
Open Internet Explorer and in the location block enter **http://192.168.0.1** and hit enter.

You should get the Enter Network Password window as shown at the right.

Enter **admin** for the User Name and leave the Password blank.

Click on the **OK** button.

Click on the **Advanced** tab on the top menu.
Configure the router to show the following ports opened. Remember to check the Enabled radio button as you enter each to the port configurations. Click on the Apply button after you have entered each port setup in the list below.

<table>
<thead>
<tr>
<th>Name</th>
<th>Private IP</th>
<th>Protocol</th>
<th>Private Port</th>
<th>Public Port</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVR_HTTP</td>
<td>192.168.0.10</td>
<td>TCP</td>
<td>80</td>
<td>80</td>
<td>Always</td>
</tr>
<tr>
<td>DVR_4550</td>
<td>192.168.0.10</td>
<td>TCP</td>
<td>4550</td>
<td>4550</td>
<td>Always</td>
</tr>
<tr>
<td>DVR_5550</td>
<td>192.168.0.10</td>
<td>TCP</td>
<td>5550</td>
<td>5550</td>
<td>Always</td>
</tr>
<tr>
<td>PCAW_7631</td>
<td>192.168.0.10</td>
<td>TCP</td>
<td>7631</td>
<td>7631</td>
<td>Always</td>
</tr>
<tr>
<td>PCAW_7632</td>
<td>192.168.0.10</td>
<td>TCP</td>
<td>7632</td>
<td>7632</td>
<td>Always</td>
</tr>
</tbody>
</table>

If all has been entered properly they will be displayed in the Advanced page listing as shown below.

The next area that we must configure is the router's access to the network through the Cable/DSL modem. Click on the Home tab on the top menu, and then click on the WAN button on the left menu. The following page is displayed. Select the WAN option that will apply to the customer network.