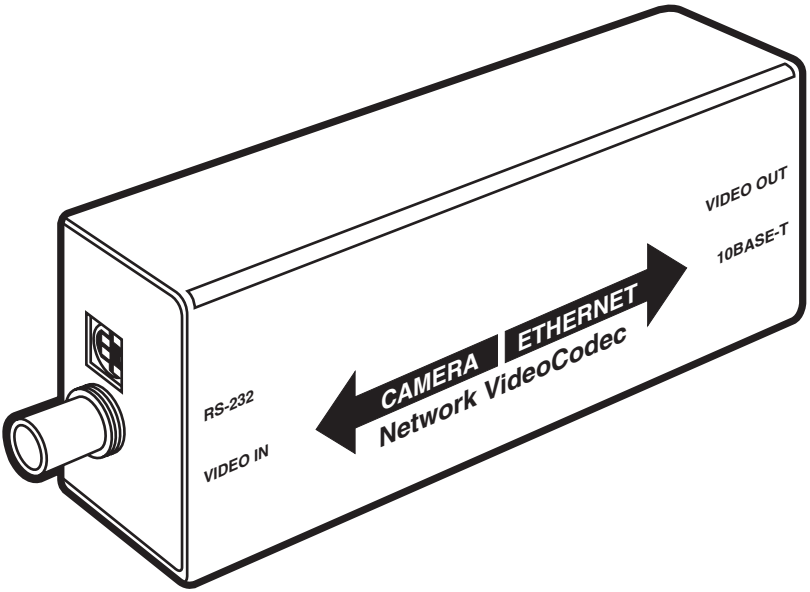
BLACK BOX®
NETWORK SERVICES

FEBRUARY 2001
AC700A

Network Video Codec



CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S. 24 hours, 7 A.M. Monday to midnight Friday: **877-877-BBOX**
FREE technical support, 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
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FEDERAL COMMUNICATIONS COMMISSION
AND
INDUSTRY CANADA
RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

CE

The Network Video Codec is CE certified.

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

TRADEMARKS

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1. Specifications

Video — 75 Ω, BNC connector loop through connector to other equipment

Frame Rate — 20 fps at high quality setting

Resolution — 352 x 288 pixels (CIF)

Networking — 10BASE-T, RJ-45 socket, implements TCP/IP protocols, unicast and multicast capable protocols

Compliance — FCC Class A, CE

Temperature — *Operating:* 32 to 122°F (0 to 50°C); *Storage:* -4 to +158°F (-20 to +70°C)

Power — 6 W (5 VDC @ 1.2 A); Mains adapter: 100–250 VAC

Size — 6.3"H x 2.4"W x 1.8"D (16 x 6 x 4.5 cm)

Weight — 1 lb. (2.2 kg)

2. Introduction

2.1 Overview

With the Network Video Codec, you can connect composite cameras directly to your network. The Codec can then send video from these cameras anywhere across the network. Multicast networking technology keeps network traffic from the cameras to a minimum.

The Network Video Codec is completely web-based. If you have used a Web browser before, you can quickly learn how to use the Codec. This kit includes standard Web pages for:

- Connecting the cameras
- Viewing and recording live video
- Managing video clips

NOTE

The Network Video Codec does NOT support audio.

2.2 Features

The Network Video Codec offers these features:

- Zero impact on any existing CCTV system.
- Uses existing network infrastructure.
- Boosts the capability of existing video systems by allowing networked access.
- Codec configuration data includes IP properties and video quality. (IP properties are IP address, IP subnet, and IP gateway address.)
- Video quality has three settings: basic, standard, and high.
- Each Codec can be configured across an intranet as well as a serial port.
- Uses browser plug-in software.
- Connect up to 20 Codecs at standard quality on a typical intranet.

2.3 What the Package Includes

The Network Video Codec includes the following items:

- Network Video Codec
- Universal Power Supply Unit (PSU) with standard EIC socket
- Standard IEC mains cable
- BNC cable, 6.6 ft. (2 m)
- (2) phono to BNC adapters
- 8-pin mini-DIN male to DB9 female cable, 6 ft. (1.8 m)
- RJ-45 patch lead, 6.6 ft. (2 m)
- CD labeled "Black Box Network Video Codec"

If anything is missing or damaged, please contact Black Box immediately at 724-746-5500.

2.4 System Requirements

The system requirements for viewing video using the Codec are:

- Operating system: Windows 95, Windows 98, or Windows NT V4.0 (with service pack 3 or later)
- Web browser: Microsoft Internet Explorer 4.0 or later
- Memory: Recommended 64 MB
- Processor: Pentium 266 or faster
- PAL or NTSC video cameras
- Network socket for each camera

3. Connecting Cameras

To connect a camera, you need to:

- Configure the Network Video Codec
- Hook up the camera to the network
- Name the camera

If you want to use the Codec to send video across different LAN segments or across WANs, you also need to add LAN/WAN settings.

For information on how the Codec affects network traffic, see **Section 3.5**, **Network Notes**.

3.1 Configuring a Network Video Codec

Before you can connect a camera to the network, you need to configure the Codec so that it has an IP address and a subnet mask. To distinguish between different Codecs on your network, you should also give each Codec a name and identify its location.

If you want to send video across routers or gateways, the Codec also needs a default gateway. The person in your organization who maintains the network will be able to assign an IP address for the Codec, and give you the subnet mask and default gateway.

The following step-by-step instructions explain how to configure a Codec.

NOTE

In order to configure a Codec, you must have installed the Setup Web pages when the software was installed on your PC (these are installed by default).

1. Connect one end of the 8-pin mini-DIN to DB9 female adapter cable to the Codec's RS-232 connector. Connect the other end to serial port 1 or serial port 2 on your PC. For more information on your PC's serial ports, refer to your PC manufacturer's documentation.

2. Connect the power supply unit to the Codec. The power socket is next to the "Video Out" connector on the right-hand side of the Codec.

3. Power on the Codec. The green LED on the side of the Codec should light.

4. Select the Setup web page and then the Serial web page.

5. If you connected the 8-pin mini-DIN to DB9 female adapter cable to serial port 1 (COM1) on your PC, select COM1 in the Serial Comm Port box. If you connected it to serial port 2 (COM2), select COM2.

6. Enter the name for the Codec in the Name box. The Codec name can include any characters except "<," ">," "?," "/," "\," "*," ":," and "."

7. Enter the name for the Codec location in the Location box.

8. Assign an IP address to the Codec, and enter this address in the IP Address box.

9. Enter the subnet mask for the Codec in the Subnet Mask box.

10. Enter a default gateway in the Default Gateway box, if you want to send video across routers or gateways.

11. Select the video quality that the Codec uses for the LAN and the WAN. By default, the video quality is "High" for LAN and "Basic" for WAN.

12. Select the protocol that the Codec uses over the LAN and WAN. By default, the protocol is set to "UDP multicast" for LAN and "TCP" for WAN.

13. Click on the Submit button. The Codec is now configured with the values you have entered. When configuration has finished, the message "Configuration has completed" is displayed.

14. When configuration has finished, remove the serial cable and adapter from the Codec.

3.2 Hooking Up a Camera

To hook up a camera to the network you need:

- An NTSC or PAL video camera
- A configured Network Video Codec
- A spare network port
- An RJ-45 patch cable

These step-by-step instructions explain how to hook up a camera to the network.

1. Attach one end of the BNC cable to the camera's video-out connector. Attach the other end of the lead to the connector on the Codec labeled "Video In."

2. Connect one end of an RJ-45 patch cable connector on the Codec labeled "10BASE-T." Connect the other end of the cable to a network port on a hub.

3. Connect the power supply unit to the Codec. The power socket is next to the "Video Out" connector on the right-hand side of the Codec.

4. Power on the Codec. The green LED on the side of the Codec lights when the Codec is powered on.

5. Select the Setup Web page followed by the Network Web page. This shows a list of cameras connected to the network.

6. Check that the Codec's IP address appears in the list of camera entries (you can sort the list by clicking on the column title).

3.3 Changing the Codec Configuration

You can change the configuration of a Codec at any time. For example, you may want to change the Codec name, or give the Codec a different IP address. These step-by-step instructions tell you how to change the configuration of a Codec after the Codec has been connected to the network.

NOTE

In order to configure a Codec, you must have installed the Setup Web pages when the software was installed on your PC (these are installed by default).

1. Select the Setup Web page followed by the Network Web page. This shows a list of the cameras connected to the network. Each camera has a channel, name, location, IP address, application, and version.

NOTE

The channel number is assigned automatically by each PC and is not stored by the Codec.

2. Search the list for an item that matches the camera. Click on the list item. The list item should now be highlighted, and details for the Codec should appear in the edit boxes below.

3. Edit the Codec configuration.

4. Click on Submit.

3.4 LAN/WAN Settings

To allow you to view video from Codecs connected to other network segments, you need to tell the system about those networks.

To do this, you need to know the following information about the other networks.

- Network IP Address. This needs to include the Network Number and, if using subnets, then the Subnet Number (that is, everything excluding the Host Number). The Network IP Address does not need to be the actual IP address of a Codec on the network, but any valid Codec IP address will suffice, since it will contain both the Network Number and Subnet Number.
- Network Subnet Mask

These step-by-step instructions explain how to add up to four additional network segments.

1. Select the Setup Web page and then select the LAN/WAN Web page.
2. Enter the IP Address and Subnet Mask for each network in the corresponding boxes.
3. Enter a time in seconds in the Maximum Network Response Time box. This time is used to tell the system how long to scan for Codecs. The default time is 3 seconds. This value should always be the minimum possible, since it is not possible to view video until the scan is complete.
4. Upon leaving this page, the information will be stored.

NOTE

When the networks you want to scan are further away from your local network, you may need to increase the maximum network response time.

3.5 Network Notes

The Black Box Network Video Codec uses UDP (User Datagram Protocol) or TCP (Transmission Control Protocol) to send video across the network. If UDP Multicast is selected as the transmission protocol, then the same network bandwidth is used regardless of the number of PCs receiving the video. If UDP Unicast or TCP is selected, then only one user can view the video from that particular Network Video Codec at any one time. When no one is viewing the video, the Codec stops transmitting.

NOTE

UDP, unlike TCP, does not retransmit lost network packets. If the required network bandwidth is not available, the quality of the video deteriorates.

4. Operation

4.1 Viewing and Recording Video

You can view video from the camera using the Video Web page. This Web page shows a picture of a TV and a TV/Video control. The TV/Video control lets you switch channels between different cameras, and record and play back video, just as you would with your TV and home video recorder.

Using the Video Web page, you can:

- View live video
- Record live video
- Play back video
- Assign a specific TV channel to a camera
- Reset TV channels

4.1.1 Viewing Live Video

To view video from a camera, select the Video Web page. When the web page is selected, it scans the network for Network Video Codecs. During this time, "S" is shown on the LED display on the bottom right of the TV frame and "Scanning…" is displayed on the browser's status bar (if the status bar is visible). When scanning is complete, the LED display changes to "OK" and the status bar to "Standby." Then simply use the TV/Video control to select the channel that the camera is assigned to. The name and location of the currently selected channel are shown on the browser's status bar.

To find out which channel a camera is assigned to, click on the "?" button. This displays a list of camera entries for all the cameras currently on the network. For each camera, a channel number is displayed.

To select a channel, click on the button that corresponds to the channel number. If the channel number has two digits, first click on the double-digit button, then select the channel, one digit at a time (the channel number is shown on the LED display on the TV as you type it).

You can flick through channels by clicking on the "+" (select next channel) and "-" (select previous channel) buttons. To stop viewing video, click on the ⏸ (standby) button.

4.1.2 Recording Live Video

You can record video using the TV/Video control on the Video web page. To record video, click on the ⏺ (record) button on the TV/Video control. This records live video from the camera that you are currently viewing on the TV monitor. While recording, the LED display at the bottom right of the TV frame continually changes between the current channel number and "R" to remind you that recording is taking place. To stop recording, click on the ⏹ (stop) button.

Recorded video is saved to a file on disk. To record one minute of video, you need about 3 MB of disk space when "High" video quality is used, and about 1 MB of disk space when "Basic" video quality is used. The name of the file is made from the time and date that the recording started, and the camera name. For example, the following clip was recorded from the "carpark" camera at 12:43 on April 3, 1999.

```
carpark_03Apr99_124310.iav
```

The file is stored in a video library. By default, the current video library is in C:\VideoLibrary.

4.1.3 Playing Back Video

You can play back video using the TV/Video control on the Video Web page. To select the video clip that you want to play back, click on the (select clip) button. The television screen should now show a list of all the video clips in the video library. During playback, "P" is shown on the LED display at the bottom right of the TV frame to indicate that you are playing back a pre-recorded file rather than watching live video.

Select one of the video clips by clicking on it. As soon as it is selected, the video clip starts replaying. You can control how the video clips are replayed using control buttons similar to those on your home video recorder:

Use This Button…	To Do This…
>	Play
o	Stop
||	Pause
>>	Forward frame by frame at 10 s intervals
<<	Rewind frame by frame at 10 s intervals
|<	Replay from beginning
>|	Play end
o-o	Select another clip

4.1.4 Assigning a TV Channel

The Codec automatically assigns a different TV channel to each camera on the network. You can, however, decide yourself how you want to assign the channels.

These step-by-step instructions show you how to assign a specific TV channel to a camera.

1. Select the Video Web page.
2. Click on the "?" button on the TV/Video control. This displays a list of camera entries for all the cameras currently on the network. For each camera, a channel number is displayed.

NOTE

A camera entry is displayed only if the camera's Codec is powered on.

3. Click on the entry for the camera that you want to assign. The camera entry is highlighted.
4. Click again on the camera entry. This time, only the channel number is highlighted.
5. Edit the channel number, which can be any number between 1 and 99. If the same channel has previously been assigned to a different camera, the new assignment takes precedence and the Codec reassigns the other camera to an unused channel.

4.1.5 Resetting TV Channels

Resetting TV channels allows the Codec to reassign all the TV channels to cameras on the network, including any channels you have assigned yourself. The Codec assigns channels in numerical order of channel, starting with channel 1.

These step-by-step instructions show you how to reset TV channels.

1. Select the Video Web page.
2. Click on the "?" button on the TV/Video control. This displays a list of camera entries for all the cameras currently on the network. For each camera, a channel number is displayed.

NOTE

A camera entry is displayed only if the camera's Codec is powered on.

3. Click on the "?" button again. This displays a box asking whether you want to reset all channel assignments.
4. Click on OK. A new list of camera entries is displayed, starting with the camera assigned to channel 1.

4.2 Maintaining the Video Library

Recorded video is stored in a video library on disk. By default, the video library is in C:\VideoLibrary. Using the Video Library Web page, you can:

- Change video library
- Delete video clips

4.2.1 Changing Video Library

A video library is simply a folder used to store video clips. Whenever you record a video clip, a new file is created and stored in the video library. By default, the video library is in C:\VideoLibrary. You can, however, use any folder for a video library.

These step-by-step instructions show you how to change the video library to a different folder

NOTE

When you change video library, any existing video clips are left where they are.

1. Decide where you want the video library. Create a new folder for the video library, or choose a folder that already exists.
2. Select the Video Library Web page.
3. Enter the name of the new folder in the Video Library box.
4. Click on the Scan button. This displays a list of any existing video clips in the new video library.

4.2.2 Deleting Video Clips

From time to time, you should delete any unwanted video clips, so that you don't waste space on your PC. These step-by-step instructions show you how to delete clips from a video library.

1. Select the Video Library Web page.
2. In the Video Library box, enter the video library location that you want to delete clips from.
3. Click on the video clip that you want to delete.
4. Click on the Delete box.

5. Troubleshooting

Problem: I can't program the Codec.

Check that:

1. The cable between your PC's serial port and the Codec's RS-232 connector is securely connected.
2. The Codec is powered on.
3. The serial port number in the Serial Comm Port box matches the serial port you are using.

Problem: The Codec is connected to the network, but the camera details don't appear on the Network Web page or in the list of channels.

Check that:

1. The Codec is powered on.
2. Other PCs on the network are visible from your PC. If not, inform the person in your organization who is responsible for maintaining the network.
3. The Codec's IP address, subnet mask, and default gateway are appropriate for the Codec's location. If you are not sure, ask the person in your organization who is responsible for maintaining the network.
4. The RJ-45 patch cable is securely connected to the Codec and to the network socket.

Problem: When I select a channel, I get an error saying that this channel is not currently available.

Check that the channel you have selected is assigned to a camera, by clicking on the "?" button on the TV/Video control.

Problem: When I try to use the Codec, run-time errors are reported.

Run-time errors are reported if ActiveX security options are disabled. To prevent these errors, you need to change your security options.

To change your security options on Internet Explorer:

1. Select the Internet Options menu item under View.

2. Select Local Intranet Zone in the Zone box.

3. Set the security level to Custom.

4. Click on the Settings… button.

5. Set the following options to Prompt or Enable:

- Run ActiveX controls and plugins.

- Initialize and script ActiveX controls marked as unsafe.

6. If you set these options to Prompt, security messages are reported. You can safely ignore these messages when you use the Codec.

7. If you set these options to Enable, no security messages are reported. However, enabling these options could compromise the security of your PC when you read other web pages.

8. Click on OK.

Problem: When I try to use the Codec, security messages are reported.

Security messages are reported because the Codec uses ActiveX controls. You c an safely ignore these messages.

Alternatively, you can prevent these security messages from being reported, by changing your security options. However, changing these options could compromise the security of your PC when you read other Web pages. To change your security options on Internet Explorer:

1. Select the Internet Options menu item under View.

2. Select Local Intranet Zone in the Zone box.

3. Set the security level to Custom.

4. Click on the Settings… button.

5. Set the following options to Enable:

- Run ActiveX controls and plugins.

- Initialize and script Active X controls marked as unsafe.

6. Click on OK.

Problem: The TV does not fit into the browser page.

Change the screen resolution to 1024x768 if possible, or else to 800x600. For information on how to change the screen resolution, see your PC manufacturer's documentation.

Problem: I can select a TV channel, but I don't get any video.

Check that:

1. The camera is powered on.
2. The cable between the camera and the Codec is securely connected.
3. The Network Video Codec must be configured to use the UDP Multicast protocol (the Network Video Codec must be configured to use the UDP Multicast protocol when more than one person is required to view video at the same time).

Problem: I can select a TV channel, but I get an error message saying that I need to select 16, 24, or 32 bit video.

The Network Video Codec supports only 16, 24, and 32 bit color palette. Use the Control Panel to change your PC's display settings.

Problem: Recording fails

Check that you have not run out of disk space for the video library. If you have run out of space, delete any video clips that you no longer want, and try again.

Appendix. Pinning Diagram

8-pin mini-DIN male to DB9 female cable

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