

Honeywell Security and Custom Electronics

Optiflex – Video Processing Unit

White Paper

Introduction

Honeywell Security and Custom Electronics offers Optiflex, a six-camera video controller. The primary function of Optiflex is to digitize video input (from cameras) and send video in digital format to Optiflex clients using a LAN, Internet or directly to NTSC monitor. Optiflex provides local viewing of the cameras from NTSC output, from a local PC using Optiflex Direct software application, or with Symphony (8132/8132i) touch screen interface. Secure remote viewing may be accomplished by using Optiflex Connect web-based application that utilizes the AlarmNet Network Control Center to provide the necessary infrastructure

Hardware Required



Optiflex Hardware

Optiflex is a server device designed to process up to six cameras. The digitized video is sent to LAN clients (example, Symphony or PC application) and to NTSC video monitor.

Optiflex expects a DHCP server to be running on the LAN segment to which it is attached. However, the unit can also work with the IP address statically assigned.

NTSC Standalone Mode

Optiflex can work in “standalone mode” – in this mode the unit is connected to cameras and an NTSC monitor. The NTSC programming is performed easily via 8-position dip-switch. NTSC programming allows for the following viewing modes: selecting any camera (1-6) or viewing all detected cameras in the tour mode. Tour mode can be further tuned by selecting desired camera dwelling time. In this mode Optiflex switches from one camera to another continuously – camera switches are spaced based on the programmed dwell time.

Optiflex Client Support

When Optiflex is connected to a LAN it sends the digital video in the following formats:

1. For Symphony (8132/8132i) video frame is color space converted to RGB332. The frame resolution is 320 by 240 pixels or in Symphony quad-camera view 160 by 120 pixels.
2. For PC software– video is sent as discrete JPEG frames. The frame resolution is 352 by 240 pixels.

For the above video formats Optiflex sends discrete frames at the rate of 4 frames per second. The actual frame rate depends on the following factors:

1. The number of concurrent Optiflex clients connected to Optiflex – the more clients the less frame rate.
2. The frame size – only JPEG compression – the larger the compressed frame size the less frame rate.

Mini Video Recorder Mode

Optiflex also works as mini video recorder. The unit continually switches throughout the detected cameras and acquires a single video frame from all cameras. The frames are collected at the rate of 1 frame per second from each installed and detected camera. The frames are accumulated in the circular buffer that can hold up to 10 frames. It means that Optiflex can “record” up to 10 seconds of video from each camera.

However, new frames will overwrite video frames unless the sequence of 10 frames from a given camera is saved to Optiflex flash memory. Saving to flash memory is performed via external trigger.

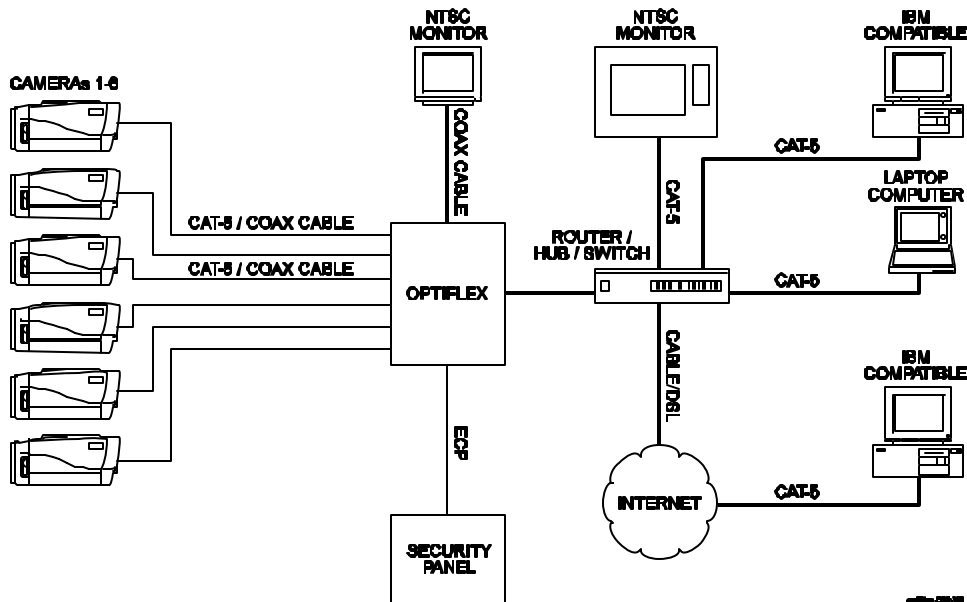
Optiflex can be connected to Honeywell security panels via ECP data bus. When Optiflex is connected to the panel it works in 4204 relay emulation mode allowing programmable events to trigger video capture. The panel can associate relay commands and trigger Optiflex to save a video clip to its flash memory. Optiflex allows up to nineteen 10-frame sequences to be saved before new clips overwrite them. Saved clips are viewed via a PC using Optiflex Direct or Optiflex Connect.

Additional Optiflex Features

Optiflex video unit can be remotely upgraded to the newest firmware as long as Optiflex has access to Internet.

Optiflex is fully multitasking – it can serve multiple LAN clients - up to 2 concurrent TCP connections, up to 20 UDP unicast connections, NTSC video, concurrently run with video clip saving or playing back previously saved clip – all run at the same time.

Optiflex System Setup



Optional Hardware



Symphony 8132/8132i

Optiflex is capable of generating the compatible video for the Symphony touch screen interface. Video frames are sent from Optiflex to Symphony over Ethernet LAN. No special setup is needed for Symphony to work with Optiflex, provided both are on the same LAN segment and use DHCP server for IP assignment.

Images sent to Symphony are specifically formatted so the only Symphony can use them – the color conversion from native Optiflex format to RGB332 is required.

In short, Optiflex sends a series of bitmaps that can be displayed using minimal Symphony resources.

Symphony can display 2 video frame sizes: full screen (resolution 320 by 240 pixels) and while in quad view it can display up to 4 video frames which are scaled down to 160 by 120 pixels.

The commands to start particular video stream are sent from Symphony via LAN connections. Optiflex and Symphony communicate over UDP unicast and broadcast. They use port 10000-10010.

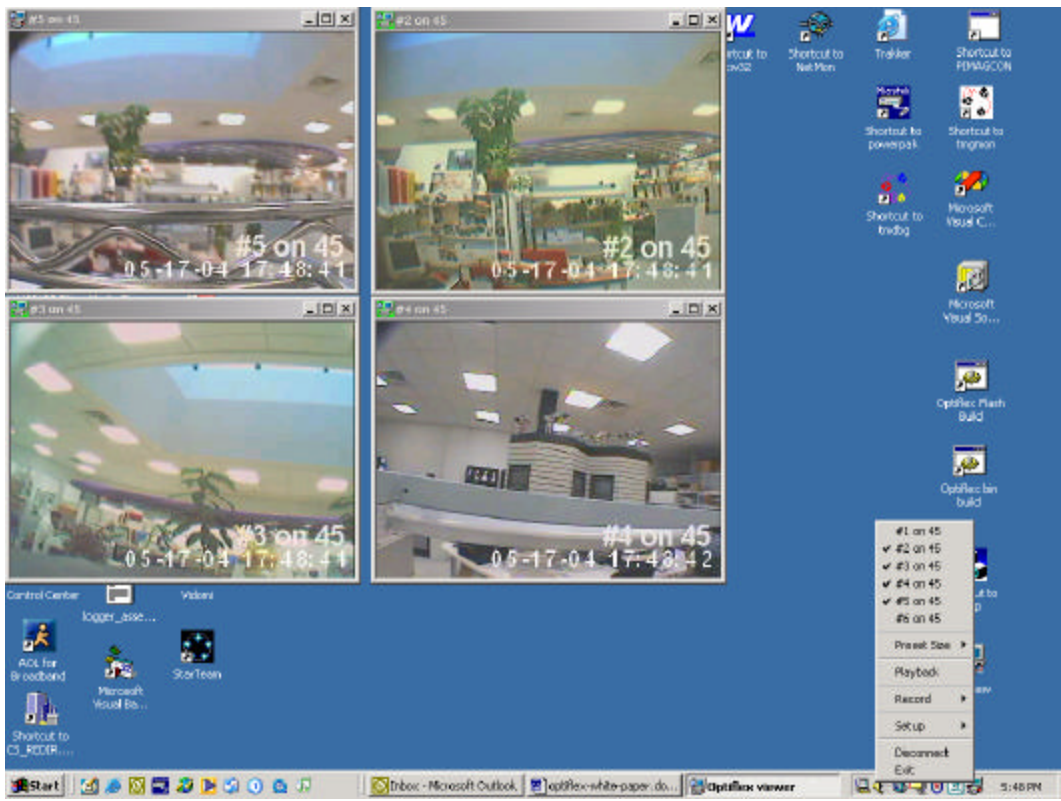
There can be multiple Symphony's on a given LAN segment, all receiving video from the different cameras at the same time.

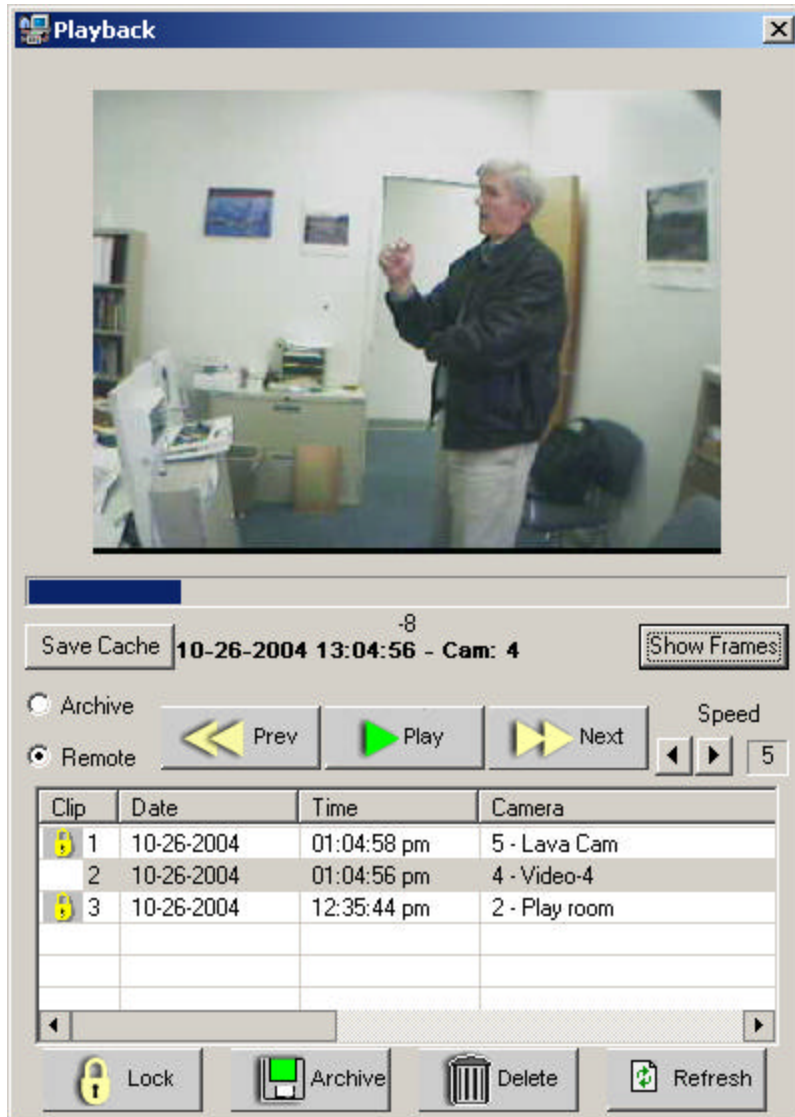
Any Symphony can be upgraded remotely to support video feature.

PC Optiflex Client

Optiflex can interface with a PC client using Optiflex Direct software. Optiflex Direct connects to Optiflex using UDP unicast/broadcast protocols. Optiflex Direct and Optiflex use IP ports 10000-10010 to exchange information.

Optiflex Direct receives video in the form of JPEG frames. It can request multiple, concurrent video streams from Optiflex (up to 6 video streams). In addition, Optiflex Direct is designed to retrieve and play previously saved clips (video sequences saved to Optiflex flash memory). The software has the ability to archive all or selected video clips. Archiving of clips is simply a process of copying the video sequences on to PC's hard disk. There can be up to 500 video clips archived on the PC.





Optiflex Connect

Optiflex can also interface remotely using Optiflex Connect. Optiflex Connect requires a Symphony account. Optiflex Connect is a downloadable application designed as a Microsoft Internet Explorer plugin – ActiveX.

Download and installation of Optiflex Connect is seamless to the end user.

Once download and install is complete, the ActiveX will be launched from Internet Explorer. The download and install of the application is possible only after creating a Symphony account. Please see Symphony manual for details on how to setup an account.

Optiflex Connect communicates to Optiflex using a TCP connection over port 80 – the multiple secure network links are created to provide maximum privacy and security. The data link to our video server is encrypted by Blowfish block cipher and Internet connectivity to the server is secured by SSL (standard – Secure Socket Layer). Blowfish block cipher encrypts the video data with 448-bit key assigned during the video session handshake. Each new video session uses a different key.

The above design provides plug and play installations. There is no firewall setup required. Optiflex and Optiflex Connect, both implement the network client applications – no network server sockets are created or required.

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