Text, test and photos by Vlado Damjanovski ©

Philips
NetCam
DVR

For this issue of CCTV focus we have analysed the Philips digital camera NetCam DVR, model number LTC-0208/10, a surveillance camera ready to be plugged into your computer network.

For this issue of CCTV focus magazine I got to analyse the Philips digital camera NetCam-DVR, model LTC-0208/10. And yes, when I say digital, this means truly digital with network connection, as opposed to the DSP cameras with analogue output.

There are an increasing number of manufacturers that have started to offer this type of product and slowly but surely, our CCTV installation mentality is changing. If you are an installer, or a CCTV consultant you will find that very soon you will have to start considering such cameras for your projects. Perhaps, many of you will say, the time still hasn't come for this because of the certain limitation of such cameras, such as resolution, frame rate and similar, and you could be right. But don't ignore things just because you are not familiar with them. This is the reason that I wanted to do one of our sections of Test Drive with this type of camera. The easiest make and model to obtain for this issue of "CCTV focus" was Philips NetCam LTC-0208/10. Later on I found out that this is an OEM product and there are some other similar products on the market.

The key features of this camera are as follow:

- Integrated 1/3" colour CCD camera with built-in 6GB hard drive (there is a model without a hard disk)

- LAN connector to connect to a network

- Composite video output, should you need to see or adjust the camera on a composite monitor.

- 4XComposite video inputs for connecting up to 4 existing analogue cameras on the same camera case

- D-15 connector for PTZ and AI control

- Recording with Wavelet compression, using the AD611 chip

- Linux operating system

- The original package of the NetCam contains the camera itself; a CD-ROM with the NetCam software for Windows; short LAN cable and even shorter cross-over LAN cable; power supply; D-15 plug; Instruction booklet and a miniature hex-key for back-focus adjustment.

The first step to have the camera operate is to power it up and connect it to a LAN network . You can use any computer connected to the same network and "ping"

it from there. Usually, Category 5 cable (or better known as CAT-5) with RJ-45 plugs is used for 10/100 Mbps network connections and this type socket is available at the back of the NetCam. For the IT-illiterate people that don't know what "pinging" is I suggest they get some books to read and learn (and please don't feel bad, I was one of them and I am still learning). The "ping" command is to find out if a network device with an IP address is connected properly to a network or not. The NetCam comes with a default IP address written on the instruction booklet.

If you decide to connect one camera directly to your computer, which is what I initially did, you need to get a cross-over network cable, since you are connecting

directly to your NIC (Network Interface Card) card on your PC, and the pins of the RJ-45 need to be reversed for Tx and Rx data. In a corporate environment, you would have hubs that take care of the data distribution, so you would need just a straight LAN cable.

As an analogue video engineer, the first question that comes to mind when connecting such a camera to a network is "How far can I go with LAN cable?" The Cisco web site is one of the very popular ones for IT enthusiasts and they recommend up to 100m with Category 5 cables for networks of 10/100 Mbps. If you need to go much further, fibre-optics is the best choice.

In order to get connected to the camera you need to know what and how to set the networking options on your PC, which would presumably be running on Windows OS. This should be a trouble-free operation and the basic steps are already explained in the booklet, although, I must admit, in not too many details. I stumbled on a problem from the very beginning. Not so much because of the limited instruction in the booklet, but more so because of my limited IT knowledge. Namely the notebook PC that I installed the NetCam software on was a part of a bigger network and when running on its own, out of the network, could not see the NetCam. So, I had to talk to an IT expert. Luckily, my friend Lindsay was one of them and he instructed me to set up a Gateway IP address to which the NetCam address belonged. This was easily done and I could already see the NetCam as part of my local network. And just for things to get a bit more complicated, the same settings would have been slightly different on Windows 95/98. This

If you want to install and position the NetCam before you actually connect to it's IP address, you can use the first BNC's analogue output. Just flick the min DIP-switch to "Out" and you can view and set-up the camera on a composite monitor. Other sockets at the back include 12VDC power socket and a D-15 socket for Auto Iris and PTZ control, and of course, the

The Net-Cam DVR has a simple and intuitive control window. The play-back (top left hand corner) can be in full screen or quad. The live image (shown here with the CCTV Labs Test Chart) can only be in separate windows floating on top of the control window (up to 4, for all cameras connected to the Net-Cam DVR). The maximum resolution of the live images is limited to CIF size (360X243) in order to save the speed of the compression chip for

is a warning for all of you that might have a PC as part of an existing network, make sure you understand how the connection works through to your LAN.

Once the camera is part of the network, the operation of the NetCam software is very straight-forward and easy to understand.

The first test I wanted to do was the resolution of the camera, about which I was even more interested since there was no specification in the booklet itself.

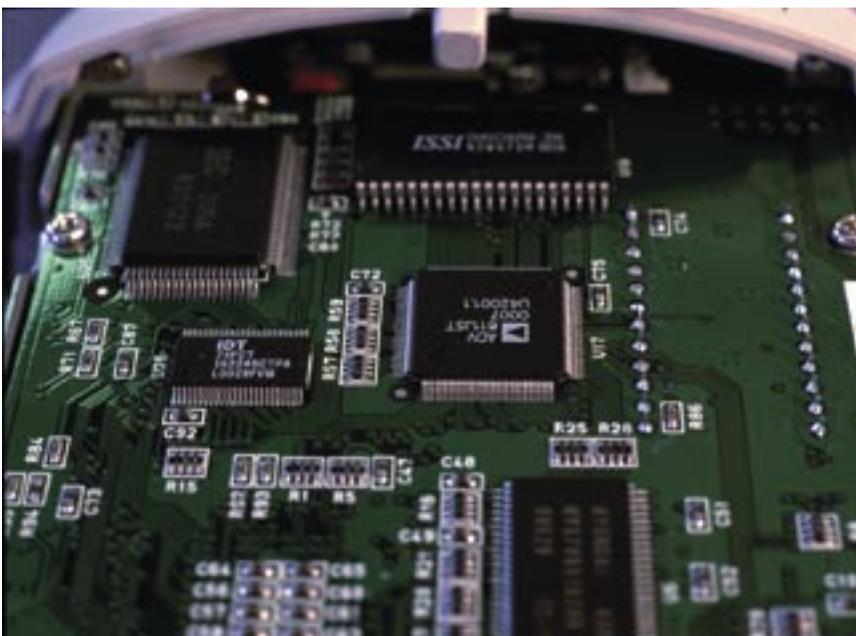After connecting the composite video out directly to a monitor and adjusting the 100%

view of the CCTV Labs test chart, I could adjust the best view to be with around 400TV lines of horizontal resolution. This was an analogue output straight out of the camera and it does not indicate the quality of the compressed image yet. That was my next step in the test drive.

When the NetCam DVR program is opened, it first asks you to log on with a password (case sensitive!). Then you have a choice to connect to one of the cameras on your system by selecting the Connect button. If there is more than one camera, of course, you have to enter different IP addresses. Although you can select up to 4 video signals from one such connection, that is if you have additional 3 (analogue) cameras connected to the NetCam DVR, it is also possible to open more then one session of the NetCam DVR

The hard disk management of Net-Cam DVR is pretty simple. You can instruct it to disable auto delet once the hard disk gets filled up, or to automatically delete portion of program. So you can simultaneously playback images from more than one NetCam at a time. Certainly, your network bandwidth needs to be considered as a limiting factor. It is not very difficult to calculate the maximum data flow coming from one NetCam DVR and I will do this later in this article, after I introduce you to the file sizes produced with various NetCam settings. It is also possible to have playback from the NetCam disk as well as live view

The Net-Cam DVR allows not only to export BMP images, but also backup a sequence of events selected on time basis, or index. You need the Net-Cam software to at the same time.

The supplied 6GB hard disk (which is a notebook hard disk size, 2.5") is perhaps not as big as you may want it to be, but it is sufficient for many hours, if not days, of video motion recording. The NetCam allows you to set permanent recording or VMD triggered or alarm triggered. The nice part is that it shows graphically, on the time scale bar, the points in time when the recording was done due to VMD or alarm activation. In

The actual live image is slightly cropped at the top and bottom, but recorded image is a full 100% of what the CCD chip sees.

A little "M" on the live and playback image indicates detected movement. Also, the time scale has two colours to indicate normal and movement recording addition, during live monitoring via the LAN and when playing back a little red "M" appears at the bottom right hand corner indicating that the camera logic has detected motion. It may not be the most sophisticated VMD in CCTV, but it does work. Of course, sensitivity of the VMD can be adjusted.
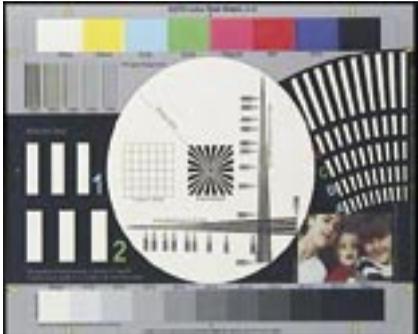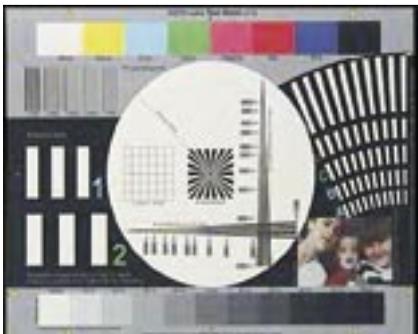
The most critical part of the

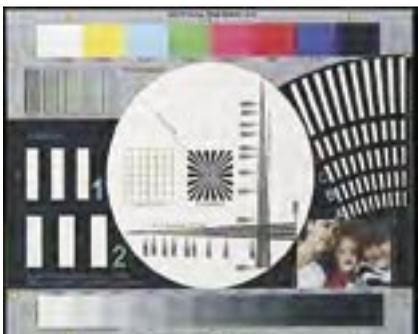Individual video signal adjustments can be made for all 4 channels
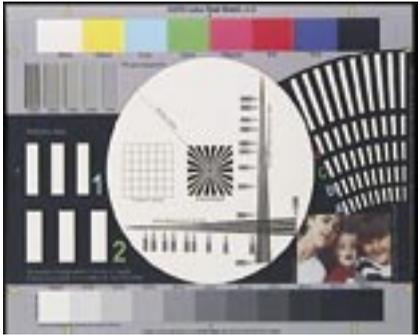
The wavelet compression chip ADV-611 is the heart of the hardware

Full frame resolution 720X486 with

Full frame resolution 720X486 with

Full frame resolution 720X486 with


Full frame resolution 720X486 with

whole concept I consider to be the operating system of the NetCam DVR, and the designers didn't make a mistake by choosing Linux. The NetCam is very stable and quick to boot if the power is unplugged (the same experiment we did with many various DVRs in issue 7). It takes only 18 seconds to come back to recording again. No recording before the power disconnection was lost, as opposed to the testing in our Issue 7 showed that some DVRs lost almost 30 minutes of recording before the power was disconnected.

I did see however a few glitches in the operation of the NetCam-DVR, and this was due to the incorrect settings I had. Namely, I did connect an additional, analogue, camera at the back of the NetCam DVRs just to test the recording performance of the camera when two cameras are connected, and forgot to disable it after I disconnected it. The Net-DVR program was flashing and intermittently disconnecting. After I changed the settings, everything turned out to be correct again. The moral for the future installers and users would be to be very careful with entering the correct camera configuration details.

When the camera is opened, you will see a miniature fan blowing on the 2.5" hard disk sitting in the middle of the camera case. The main board is an OEM board made by Web Gate Inc., running on a 32-bit RISC processor. The camera itself is basically a PCB camera, while the frame grabbing and compression board contains an Analog Devices 611 wavelet chip - the heart of the hardware compression. We wrote about this chip in last year's CCTV focus issue No.3. The main difference between the ADV-601 (used in many popular DVRs) and ADV-611 is that the latter one has a so-called quality box. Namely, if
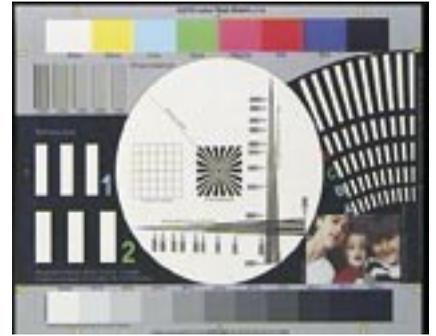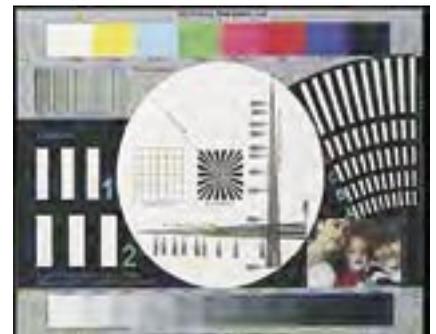

CIF resolution 360X243 with quality setting of 9 (30kB)
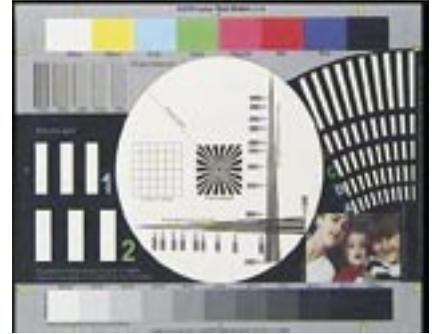
CIF resolution 360X243 with quality setting of 5 (21kB)
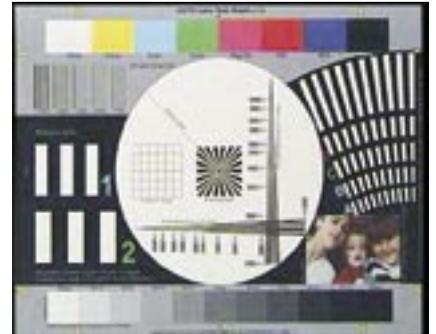
CIF resolution 360X243 with quality setting of 3 (17kB)

CIF resolution 360X243 with quality setting of 0 (7kB)

the compression file size needs to be further reduced, it is possible to select and highlight a rectangular area, while having the rest of the image semi-transparent (so that you still see the rest of the image on that area). This way, high quality compression can be used on the area of interest with small file size. The images in this article (the image of the cat and the dog) illustrate file size difference of 40kB for full image and 8kB for the image with the quality box. A nifty, and possibly handy feature for some application.

Now, we have come to the point of image quality analysis. The maximum pixel setting on the Net-Cam DVR is 720X486, corresponding to a full frame image; the next one is 720X243, which is like field mode, then CIF size of 360X243, and QCIF of 180X121.

The live image size is cropped a little bit at the top and at the bottom (approximately 10%, see the illustration on page 29, top right hand corner), but the recorded images are 100% of what the camera chip sees. All of these frame grabs can be set with 10 different levels of compression, starting from 0 as the lowest quality (highest compression) up to 9 as the highest quality. The image of the CCTV Labs test chart was used as a reference point, so that you can compare this quality with the images of various DVRs available on our web site. The file size ranged from 70kB for a 720X486 image with compression 9, down to only 6~7 kB for a CIF size. The printed images are only indicative of the quality, since the print technology is not the same as the computer screen display. For a more accurate evaluation we have made all of these images available from our web site as BMPs.

Although QCIF is available on the Net-Cam DVR I didn't even

An image with Quality box on, and highest compression quality produced a file size of 8kB

The same image with Quality box off, and highest compression quality, produced a file size of 40kB

consider exporting the Quarter CIF size as I think this size is not practical at all for most application.

The next step was evaluating the frame rate. I am told the camera can record at live frame rate (25 pps), but at the highest quality of 9, and full frame setting of 720X486 I could only measure 12 pictures per second when one camera is recorded (the original Net-DVR camera) and no live image is selected for viewing. This is not a bad rate, especially if you limit yourself to only one camera. As soon as you select a live camera however, to view it concurrently with the playback, or perhaps another camera to record, the recording rate drops down to 4~6 pps. I think this is understandable as only one compression processor has to do the hard work for all the signals that you want to see.

As for the data bandwidth, this can be easily calculated from

the maximum quality mentioned above, i.e. 70kBX12=840kBps, which translates to approximately 6.7Mbps, and this is only when playing back. But don't forget, the file size of the CCTV Labs Test Chart is pretty complex and usually would give you a much higher file size than with an average, real-situation camera view. Most of the full frame images I have recorded, other than the Test Chart were around 40kB.

I have noticed that for live viewing only CIF mode and QCIF mode is available, presumably not to overload the network. The recording is processed and stored on the Net-Cam itself, at a maximum rate possible, and does not affect your network unless you view it live or play it back constantly.

The Net-Cam DVR can export snap shots on a floppy as BMP images (no compression) and it can also back-up motion sequence on your computer's hard disk. BMPs can be viewed on any PC, but in order to playback a motion sequence you need to have the Net-Cam DVR software installed and select the file for playback in the same way as you would be connecting to the camera.

All in all, a very interesting camera, or should I say CCTV network server.

Although the price of around AUD$2,500 may seem a bit high to an average CCTV customer, don't forget that with the Net-Cam DVR you are actually buying a colour camera, RISC-based computer, a wavelet compression card, a hard disk, a network adapter and a very interesting piece of software for managing your security, all in one box with dimensions H(74mm) X W(95mm) X L(185mm) and weight of 650gr. [][][]