

testDRIVE

analyzing the latest CCTV products



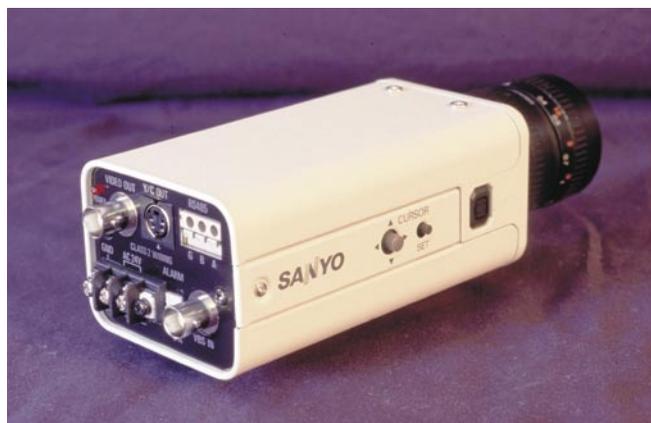
Sanyo VCC-6975P colour CCD camera

Test, text and photos by Vlado Damjanovski © 2001



Since our first issue of CCTV focus we haven't done any testing on another camera.

For this first issue in the year 2001 I have decided to take up the offer from Brad Ballesty of Sanyo Australia and test drive one of their many interesting CCD cameras. I had the opportunity to acquaint myself with three models that Brad kindly supplied, and these were the VCC-5775P, a little cube shaped camera offering 480 TV lines, the VCC-4374P, which is Sanyo's high resolution day/night camera (perfect for external applications), a colour / B&W camera and the VCC-6975P, a DSP and high sensitivity camera. Although all three models were interesting, especially when considering the value for money Sanyo offers, I decided to pay a bit more attention to the VCC-6975P model. This is a highly configurable and multi-functioning camera, including high resolution, low light performance, video motion detection and automatic digital zooming.

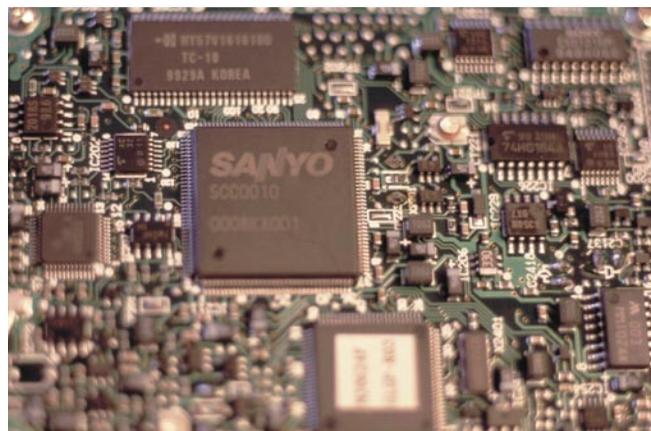


The key features of the VCC-6975P, as they appear on the cover of Sanyo's brochure say:

- 1/3" CCD chip
- 480 TV lines
- Built-in digital signal processing (DSP) circuit
- Intelligent digital motion detector
- 32X Electronic sensitivity (minimum illumination of 0.05 lux)
- 8X Digital zoom with digital pan and tilt
- SSP (Security Serial Protocol) compatible
- Dual power operation (24VAC/12VDC)

No question, a very attractive set of features, many of them not seen on any other camera. I must admit, after reading this list, I made a comparison in my head with some of the Panasonic cameras. Sanyo is also a very big and respected company and deserves credit for their high quality products all of which are very good value for money. It is a fact, perhaps unknown by many, that Sanyo has one of the widest range of CCTV products and has been much longer in the CCTV

game than other big names such as Sony for example. Some installers may not have seen or used Sanyo cameras, but the Time Lapse VCRs and monitors made by Sanyo are almost everywhere. One of the first integrated digital video recorders I remember seeing 3 years ago, was the Sanyo DVR. Sanyo products have always been very good value for money and I have always thought of Sanyo as a "quiet achiever."

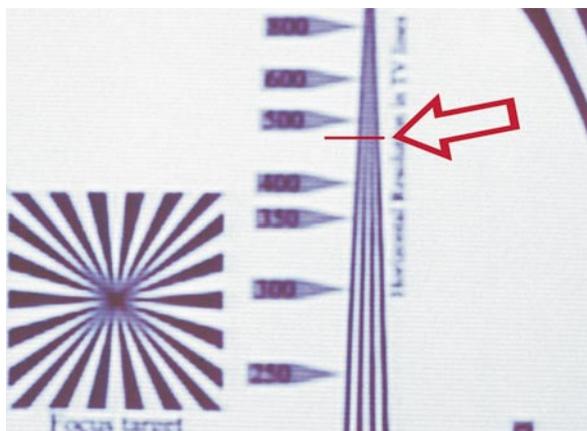
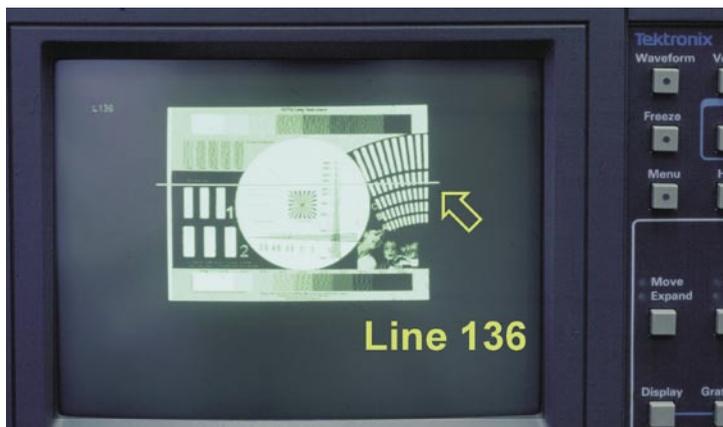


Sanyo makes most of the components for their cameras, including the ASIC chip specifically for VCC-6975P

With the help of my friend Olly D'Souza from Chubb, I tested some of the electronic parameters of VCC-6975P on the Tektronix VM-700 measuring set.

Sanyo states in their brochure that the VCC-6975P has 795(H)X596(V) pixels, of which 752(H)X582(V) are effective.

The camera resolution was measured using the CCTV Labs test chart, and 5% depth of modulation was apparent at around 470~480 TV lines. This confirms Sanyo's statement that



this camera has 480 TV lines. Such a high resolution does offer clear and crisp images, although you need to have a high-resolution monitor to

have just released a new camera model that offers 520 TV lines resolution. If this proves to be correct, this would be the first colour CCTV camera in the world to offer such a high resolution. Sanyo's intentions are quite obvious - to have their digital video recorder DTL-400 (tested in issue 7 together with the other DVRs) utilise the full spectrum of the 520 TV lines recorded by the DTL. We will leave this for testing in one of our future issues.

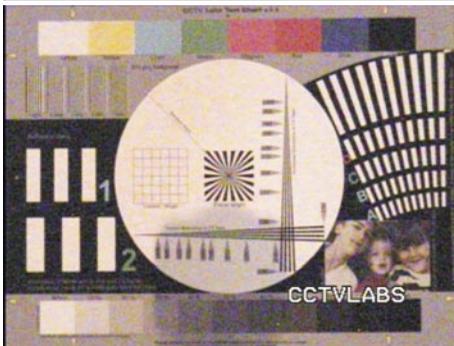
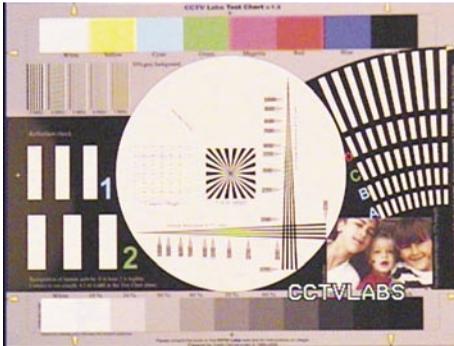
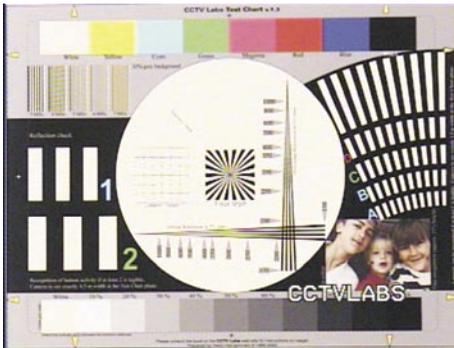
The VCC-6975P has an on-screen Menu, which can be accessed via two buttons on the camera body itself (for setting up in a workshop) or by use of a battery operated control unit via the coaxial cable output, or by use of a Sanyo controller keyboard unit (they all use SSP protocol) via



see this.

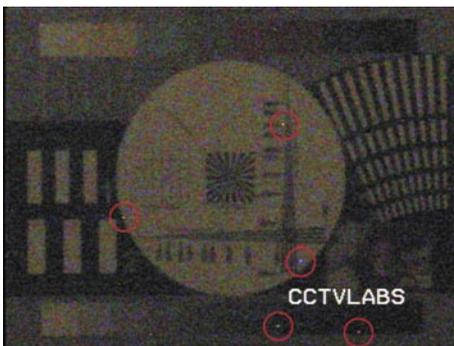
The VCC-6975P has Y/C output as well, so if you have a Y/C input monitor and not too distant point of camera installation you can enjoy the high resolution images. At the time of doing this testing, Sanyo people have informed me that they





Images from top to bottom:
 1. Normal test light (200lux)
 2. One Candle light at 1m (32X)
 3. One Candle light at 5m (32X), camera shadow in the centre
 (Images are captured with a 720X576 pixels capture card)

Images bottom and left show defective pixels which are visible as bright spots in extremely low light levels (using 32X sensitivity up). The VM-700 (left) measured 5 pixels over the threshold

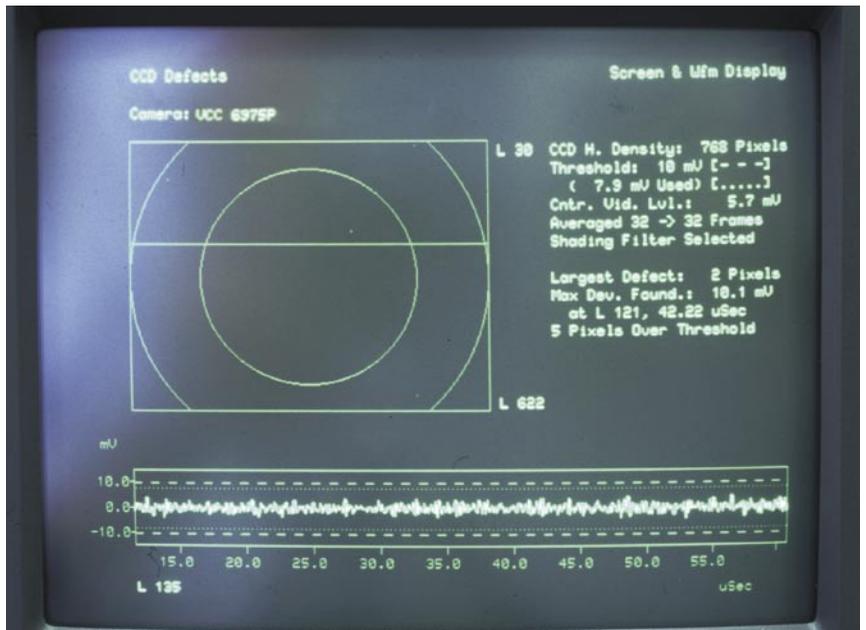


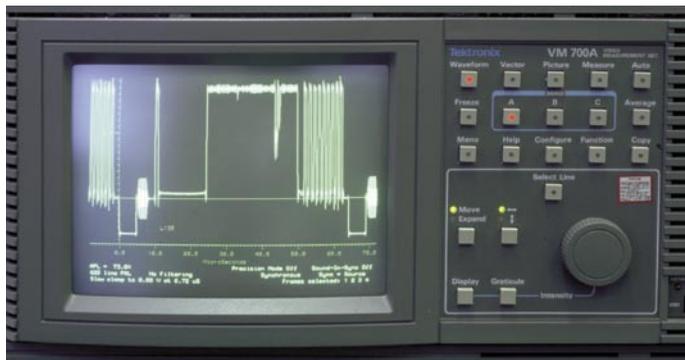
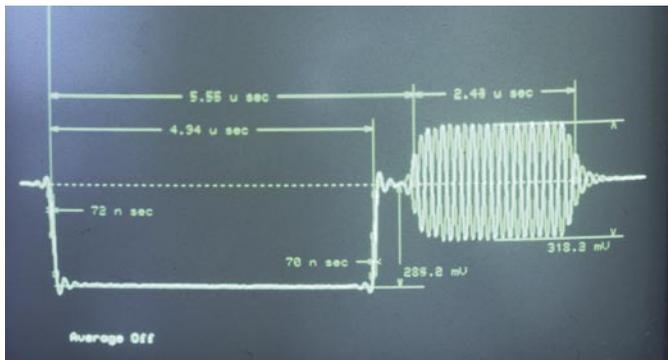
RS-485 terminals at the back of the camera.

The very impressive feature of VCC-6975P is the integration mode, i.e. what Sanyo calls "Sensitivity Up." This integration mode can be set in double steps, starting from 2X, then 4X, 8X, 16X and 32X. The camera's smart electronics (an ASIC chip designed and built by Sanyo) extends the "normal" 0.02 seconds (1/50) electronic shutter up to 32X, which is equivalent to 0.64 seconds time lapse mode. With such an extended exposure mode the low light performance of the camera is such that the camera literally sees better than the human eye.

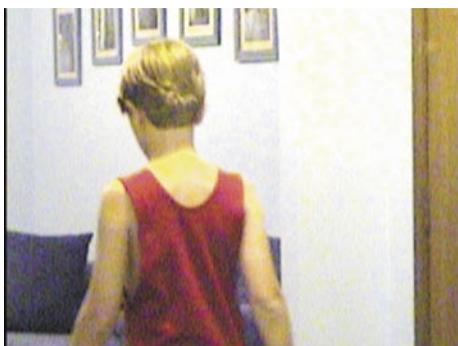
The intro image on Page 24 was made with a light source of one candle at 1m distance. By definition (refer to my book "CCTV", ISBN 0-7506-7196-3, page 14) one candle produces a luminous intensity radiated in all directions of one Candela (cd). A luminous flux is the luminous intensity in a certain

solid angle. One Lumen (lm) is produced by a luminous intensity of 1cd in one radian of solid angle. A luminous flux of 1 Lumen falling on an area of 1m² is better known as 1 lux (lx). So, knowing the CCTV Labs Test chart dimensions (381mmX286mm) we get an approximate area of 0.1m². The solid angle corresponding to 0.1m² of a sphere with 1m radius is 0.126 radians (there are 12.56 radians in a sphere). This means the luminous flux falling on the CCTV Labs test chart is approximately 0.126 lux. The reflectivity of the test chart is approximately 50%, which means the luminance coming off the test chart (as seen by the camera) is around 0.063 lux. The specification sheet of the VCC-6975P says that the minimum required illumination is 0.05lux@f-1.2, using 32X sensitivity up. I used a lens with f-1.8 setting, which is nearly 1 full f-stop difference, meaning if I had f-1.2 lens the image produced with 0.063





The top two pictures show nearly perfect PAL timing and correct 1Vpp video levels produced by the VCC-6975P



The above pictures demonstrate the VMD built-in the VCC-6975P and the automatic zooming following the detected movement. The red arrows indicate the direction of detection and the yellow rectangle indicates the configured sensitive area. These indicators were added later for explanation purposes. The bottom image demonstrates that movement in the opposite direction of the arrows does not trigger alarm.

using f-1.8 lens would be the same as when having 0.03 lux with f-1.2. So this is well within the Sanyo specs.

Many manufacturers define minimum required illumination differently, some say to produce a 50% video signal, some 30%, and some recognisable video. My exercise with one candle showed that VCC6975P produces around 50% video at 0.063lux @ f-1.8.

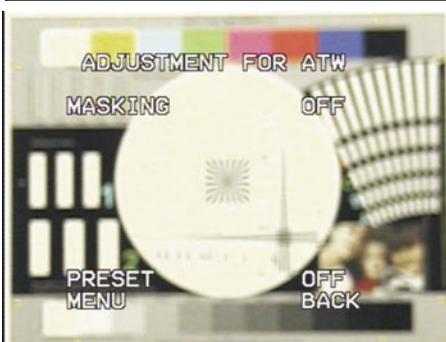
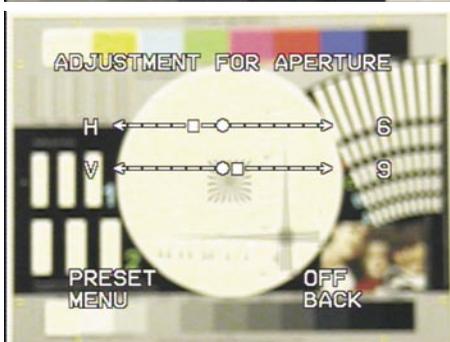
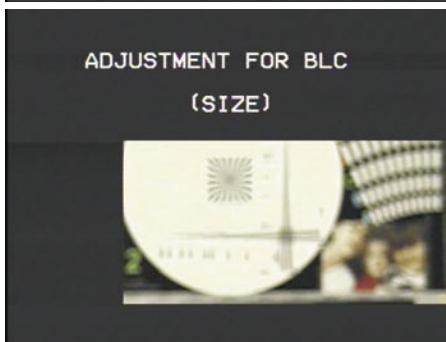
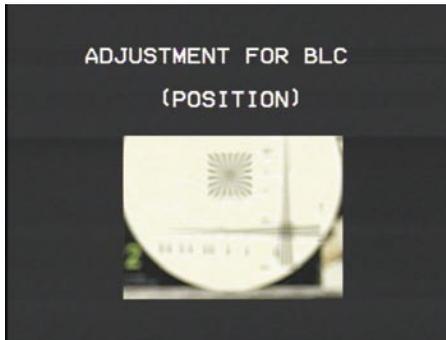
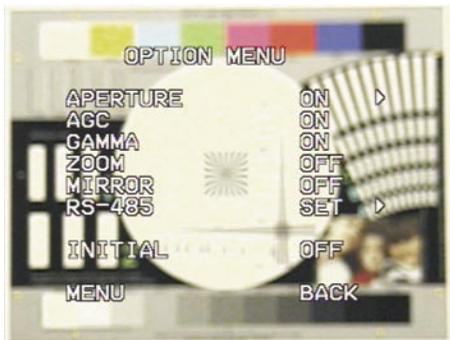
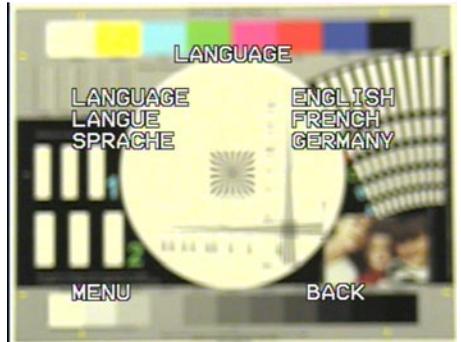
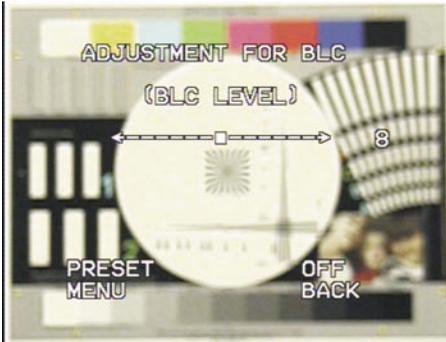
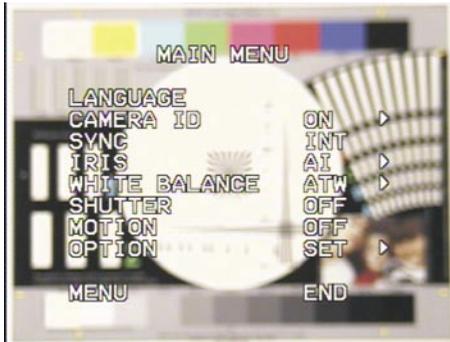
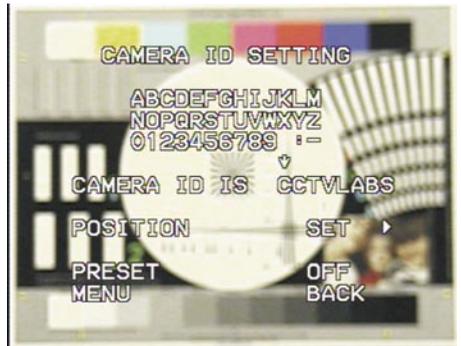
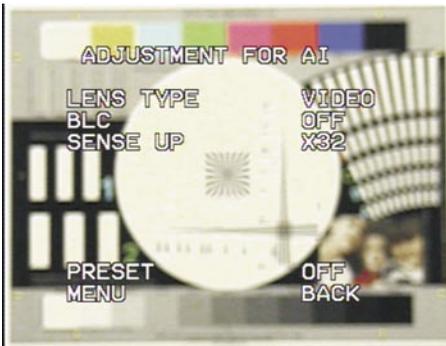
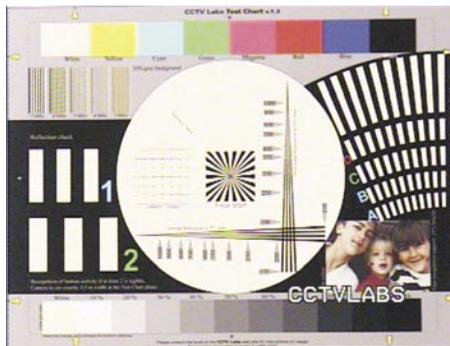
The next thing I wanted to test was how low the camera can see (with 32X up) for barely recognisable video. I positioned 1 candle at 5m distance and the image was still recognisable. Of course I had to adjust the brightness and contrast of the monitor to its extreme, but the third picture, from top to bottom, on the previous page demonstrates that this is possible. The camera shadow visible in the middle of the image was deliberately left to be seen as a candle light shadow. If you ever do such an experiment I suggest you also turn off the monitors as they will produce sufficient light for the VCC-6975P to see.

One little objection I have when a camera is used in such

low light levels is the number of pixels which could be seen as bright spots in the bottom left picture on the previous page. This demonstrates the imperfection of the CCD chip, although it is only detectable at such low light conditions. For "standard" light viewing (anything that is visible by human eyes) this is not detectable.

Of course, not many people want to use 32X sensitivity up, as it does not produce "live" video signal (50 fields per second) in low light conditions, but rather strobe effect images. But in many critical systems, this is better than seeing nothing at all. As soon as there is sufficient light to produce 50 fields per second the VCC-6975P switches automatically to this mode. And another note for the future users of VCC-6975P, if you want to use the sensitivity up feature you can not use the video motion detection, explained further in this text.

One of the more interesting features (at least for me) was the intelligent digital motion detector. What this camera does, that others may not do, is not only that the camera produces an alarm



Some of the extensive adjustments that can be done on the VCC-6975P

when motion is detected, but it can also be programmed to discriminate against direction of movement. The camera also offers a digital zooming with continuous ratio of up to 8X. I know, not many of us are in favour of digital zooming as it really only increases the pixelisation of the image, but because VCC-6975P has such a high resolution, I was surprised to see that the digital zooming does offer a better view on a person captured by the camera. Furthermore, when programmed carefully, the camera digital zooming can be programmed so that when movement is detected of someone, say entering a room, the digital zooming automatically zooms on the person and follows him/her until they disappear from the field of view. A nice little feature that I tested and, to my surprise, it works. More importantly, if the background scene has two

way traffic the camera ignores movement in one direction, and alarms the one in the other direction. If you just think carefully and creatively, this may open a whole new market segment where counting or admitting people in one direction is desired and not in the other. The movement detection can be programmed in one of four directions: left, right, up or down.

The camera's DSP offers another simple, but sometimes important, feature of mirror image effect. Namely the image can be flipped horizontally, vertically or both ways. This could be interesting for system designers and installers using cameras to see behind a vehicle, so that it can simulate a rear vision mirror, or perhaps using a camera to see through a mirror.

The VCC-6975P menu offers extensive choice of Back Light Compensation settings, which can provide a better image even in most difficult lighting conditions, especially when looking against bright light sources.

Other features, which may not be so exciting, but nevertheless give you extensive control over the camera and might be required in your system, are:

- Other than English language selection (French and German),
- Camera ID (up to 8 characters),
- Synchronisation mode (Internal, Line-lock and to a VBS signal),
- Iris setting (BLC, Sensitivity up),
- White balance (ATW - Automatic Tracking White, MWB - Manual White Balance and AWC - Push Lock White Balance),
- Electronic Shutter (Short mode and Long mode),
- Aperture setting (both Horizontal and Vertical, this effectively increases the sharpness on the edges),

- AGC (On and Off), Gamma (On and Off),
- Zoom setting (Can be turned Off or On; when in On position the amount of zoom can be set) and
- RS-485 settings (Baud rate, Alarm transmission via RS-485 and camera ID).

The back of the Sanyo VCC-6975 has connectors for both composite video output and the Y/C. For powering the camera you have the choice of both 24VAC and 12VDC, a very practical installation consideration. There is a 3-pin terminal for RS-485 communications (for adjusting the camera via a Sanyo control keyboard), and there is a two terminal connector for alarm output when VMD is used. On the top left hand side there is a red LED to indicate camera's operation.

On the right hand side of the camera body, two buttons are visible. The smaller one is to enter the camera set-up menu, and the other one functions as a miniature joystick with which you can navigate through the various menu selections.

Under the metal plate where these buttons are, the camera has some extra switches, one of which is RS-485 address DIP switch and the other is Auto Iris lens selector giving you a choice of using Video Driven or DC driven AI lenses.

On the other side of the camera body, there is a Flange Back adjustment screw for adjusting Back-focus and a screw to lock the position.

The whole camera measures 136(L)X67(W)X65(H)mm including the BNC terminal and the mounting base and it only weighs 470gr without a lens.

Considering the very attractive prices Sanyo has always had, this could be a high-quality top-end camera for the masses.

For information on this and other Sanyo CCTV products you can visit www.sanyocctv.com. •

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