**Security System ->**Main functionality of CCD Camera

**(1) Internal/External Synchronization**

Synchronization is categorized in the following three types:

**i) Internal synchronization**

Timing of the camera is controlled by internal electronics for achieving self-synchronization..

**2) External synchronization**

The camera may be synchronized by means of an external synchronization signal. The timing of the unit is adapted in accordance tothis signal.

**3) Power synchronization ( Line Lock )**

When Powered by AC, the LL Synchronizes camera to power line zero crossing for achieving vertical synchronization.

**( 2 ) Auto Gain Control (AGC)**

This AGC function provides clear image in low light condition. This controls an amplifier that is used to boost the video signal when thelight dims so as to increase the camera's sensitivity. In some bright environment, the amplifier may be overloaded and which may distort the video signal . So, it is necessary to monitor the signal level with AGC control circuit and AGC has to be switched off in case of necessity.

( 3 ) **Back Light Compensation (BLC)**

Generally speaking, the camera senses the whole area of the frame and measure the average light level. Working point of the AGC of the camera will be based on general testing of the whole environment and if there is a very bright background with very dim front image, back light compensation have to be switched on so that the camera can be adjusted to take the average on a specific zone forthe AGC working point. If the front image is put inside this zone, then the image quality can be much improved.

Lack of BLC function Unclear faces

Contain with BLC function Clear faces, but background over bright

( 4 ) **Wide Dynamic Range (WDR)**

WideDynamicRange is concentrated in the solving problems in reversible light environment, backlight compensation (BLC) is the function of the camera itself to compensate for the shortcomings of the design. WideDynamicRange camera does not need

backlight compensation ways to correct the picture. It is able to combine the advantages of the above two pictures.

Contain with WDR function à Clear faces and clear background

**( 5 ) Auto Electronic Shutter (AES)**

AES - (Automatic Electronic Shutter) is used when a manual or fixed iris lens is fitted and the shutter speed will respond to the amount of light to keep the signal output at optimum level. AES allows to change the iris level automatically without using the auto iris lens.

When the electronic shutter is off, the shutter speed is set as 1/60sec for NTSC system and 1/50 sec for the PAL system. When the electronic shutter is on, the electronic shutter can be set in steps from 1/60sec to 1/10000secs for NTSC system and in steps from 1/50sec to 1/10000 secs for PAL system. When the shutter speed increases, the light passing through the len will decreases and thecamera sensitivity will be reduced.

However, when shooting fast moving objects, the increased speed can provide freezing effect for the object image, thus providingbetter resolution.

The AES should be switched off when an Auto Iris Lens is fitted.

**( 6 ) Auto White Balance/ Auto Tracking balance(AWB/ATW)**

White Balance allows the camera to adjust the tone according to the color temperature of the light source illuminating the subject. It allows the operator to see object as they appear during daylight. Three are three white balance control modes, namely Auto trackingwhite balance (ATW),

Auto White Balance (AWB) and Manual White Balance to meet a wide range of operational conditions.

1) ATW functions by detecting white color in the scene at a color temperature from 2500 to 8000 Kelvin.

The color temperature is being monitored continuously and the white balance is set automatically by internal controller.

ATW is most suitable for viewing objects with changing color temperature and which can make the picture color looks more natural..


Auto Tracking White Balance - 5300 Kelvin

2) AWB is a preset type function whereby white color in the scene is detected and white balance is automatically adjusted, then the setting status is stored. It automatically memorizes the adjusted white balance value every time the AWB button is turned on. ATB ismost suitable for environment with little change in light source.


Auto White Balance

3) Manual (R/B Gain) – It is used to adjust the red and blue color of the viewing image.

It allows adjusting red and blue gain manually according to user requirement.. With the manual white balance turned on, the auto whitebalance will be automatically turned off.


Manual (R/B Gain)

**( 7 ) Auto Light Control/Electronic Light Control(ALC/ELC)**

**ALC (Auto Light Control)**

Automatic Light Control (ALC) indicates the image sensor's ability to automatically adjust in diverse lighting conditions to yield the most vivid video image possible. It allows the auto-iris circuitry to either take bright spots more into consideration (peak), bringing out detailin bright areas, or less into consideration (average) bringing out detail in shadows.

For automatic brightness control in the ALC function, an auto iris lens with a voltage controlled aperture (DC) is necessary

Without ALC function

With ALC function

**ELC (Electronic Light Control)**

ELC compensates for moderate light changes in indoor applications without the use of expensive auto iris lenses.

A fixed iris lens or manual iris lens can be used. ELC allows the changing of shutter speeds up to 1/100,000 second. This allows forsharper images, even in limited lighting conditions.

**( 8 ) Flickerless Mode**

Flickerless mode is used for suppressing the flicker of light (illuminating the captured scene) produced depending upon the frequencyof the power source. In 50Hz area, the CCD exposure time is 1/50sec and if NTSC camera is used with working frequency of 60Hz, there will be flicker on the screen. Same will happen in using PAL camera in a 60Hz area. The shutter speed is fixed to 1/100 sec forthe 50 Hz area and 1/120 sec for the 60 Hz area to reduce the flicker of the fluorescent light.