

# GB-60

## GROUND-LOOP BLOCKER

INSTRUCTION BOOK

IB6329-01



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## DESCRIPTION

This product blocks and removes the most common problems in CCTV video installations. The GB-60 also restores the picture quality before it goes to the monitor or recorder. The unit is placed at the monitor site or anywhere a video problem exists. Ground-Loop Bars in CCTV pictures caused by AC power ground-loops are cancelled completely.

The GB-60 will eliminate ground-loop problems induced by lightning protection equipment. It also corrects for video level loss and loss of picture definition caused by long cable runs and twisted pair transmission systems up to 3000 feet. The unit prevents Ghosting in the picture by absorbing and eliminating the reflected video ghost signal. It will also restore the correct impedance to down-stream video signals to prevent secondary ghosting in the picture.

Longer cable runs can be accommodated by placing additional GB-60 units at intermediate locations to be used as line extenders. In this way, a mile or more of cable loss can be corrected and 60 cycle bars found particularly on long cable can be eliminated.

Each GB-60 corrects up to 4 CCTV channels with each channel having independent video level and definition controls as well as independent ground-loop blocking. A second fully isolated video output is offered as an option for systems that require additional monitor locations, so the GB-60 will operate as a Distribution Amplifier.

## MOUNTING INSTRUCTIONS

The rugged one piece mounting structure allows you to mount the unit firmly in place with two screws. Select a place to mount the unit away from harsh or wet environments, indoors is recommended. The GB-60 should be located near the monitor equipment or the place you wish to bring the video signal to. Select a position that gives you the best access to cable the system and reduces the labor in installation.

## HOW TO CABLE THE GB-60

Attach the cable coming from the camera to the Video Input BNC. Then attach a cable from the BNC connector marked Video Output to the monitor equipment. BE SURE TO TERMINATE THE END OF THE VIDEO CABLE WITH A 75 OHM TERMINATION OR PROPERLY TERMINATE INTO OTHER EQUIPMENT. Repeat this step for each channel you wish to improve.

## POWER SUPPLY INSTALLATION

The GB-60 is powered by a 24 VDC wall mount power transformer. Plug the 24 VDC connector into the jack marked PWR. The Green LED will illuminate when the power is applied.

## OPERATION

When video is applied to the input connectors of the GB-60 an internal active video clamp blocks the 60 Hz ground-loop current from interfering with the CCTV video picture. Next the video goes into an adjustable gain stage that lets the installer adjust for cable loss on long cable runs. A second control allows the installer to adjust for high frequency losses that cause reduction in picture quality. The down stream video impedance is then matched to the 75 Ohm cable to prevent Ghosting downstream.

## CARE AND MAINTENANCE

There is no routine maintenance or calibration required with this equipment. There are no field adjustable controls inside the box. Opening the box will void your warranty. All adjustments are made through the front panel.

## APPLICATIONS (WHERE TO USE THE SYSTEM)

This system can be used anywhere that a video signal in coax cable exists. It can be used to improve Twisted pair transmission system response. Video pictures on long cable runs will benefit from the installation of the GB-60. In a long cable run the GB-60 can be placed at the mid point between the camera and the monitor to improve the transmission level of the signal.

## CCTV INSTALLATION TIPS

This section will discuss video ground loop problems in CCTV installations. The cause and how it effects picture quality with solutions to eliminate the problem.

When Video Ground Loop problems or 60 cycle Bars occur, they are easy to see on a video monitor. They look like a horizontal band or bar across the video monitor, that slowly moves up the video screen. These bars can be barely noticeable, or can be so bad that the video monitor loses lock and breaks up the picture. If the video camera is Line-Locked to the 60 cycle main power, the bars may stand still in the picture, but they still obscure picture definition and create customer complaints.

The source of the 60 cycle bar originates from the power industries use of local grounds to balance their power grid.

Everywhere 60 cycle power is used, a local ground is attached to the power grid to return all unbalanced current flow to ground. As an example, you will notice that every main power breaker box will have a ground wire or conduit going to a ground rod or similar device connected to an earth ground. Every correctly installed power outlet will have a connection to this ground.

Not all grounds are created equal. In fact the earth ground in one building is most likely to have a different voltage potential relative to any other building, even grounds inside the same building will have different voltages between them, based on the uneven current flow of the power load.

Here is how the 60 cycle bar gets into your video picture. If you connect a coaxial cable to a monitor or other equipment that plugs into the 60 cycle main power and the other end of the coaxial cable becomes grounded locally for any reason a Ground Loop is created. Any difference in the 60 cycle voltage between these two ground points will create a current flow in the shield of the coax that induces the 60 cycle AC voltage into your video signal. It is easy to measure these differential voltages, simply disconnect the video cables at the monitor point and using your voltmeter on AC volts, measure between any two shields of the incoming video cables, you will be amazed at the difference.

The solution is to never connect both ends of a video cable to local grounds. Any cable can be grounded at one end without inducing the ground loop current. When you run coax cable from one building to another, it is acceptable to install through connection points, but do not allow the shields to come into contact with one another or the local ground.

A coaxial connector laying in a cable tray or conduit box can accidentally contact ground, don't let this happen. Use tape on the connector to prevent accidental grounding. Also try not to attach the camera to any structure that is likely to be grounded. Remember that the camera is already grounded at the opposite end of the coaxial cable by the monitor equipment.

At the monitor station you may have many pieces of equipment connected together, like a (Quad, Tape Recorder, Monitor) all of which plug into the main 60 cycle power. This will not present a problem if you plug all of the equipment into the same power line at the monitor point. Making sure that all the equipment share the same ground point at the monitor station. Also try to keep the video cables between equipment, (the service loops) as short as possible.

If you already have an installation that has 60 cycle bars, there are some steps you can take to solve the problem. If coaxial cable shields are connected together anywhere in the system, separate them if possible.

Similarly remove all but one ground connection on each coaxial cable if possible, the ground is usually at the monitor end of the coaxial cable because the monitor equipment plugs into the 60 cycle main power supply which is grounded.

Sometimes a ground loop problem can be reduced by reversing the AC plug on the power transformer used to power the camera, or reverse the 24 VAC power connection to the camera. This technique will not work on DC powered camera's.

If the problem still persists, a GB-60 can be installed at the end of the coaxial cable to eliminate the 60 cycle bars. This is much easier and cost effective when you consider the labor cost to find and solve the ground-loop problem.

With an understanding of Ground Loop problems and the use of the GB-60, you should be able to keep the 60 cycle bars out of your CCTV installations.