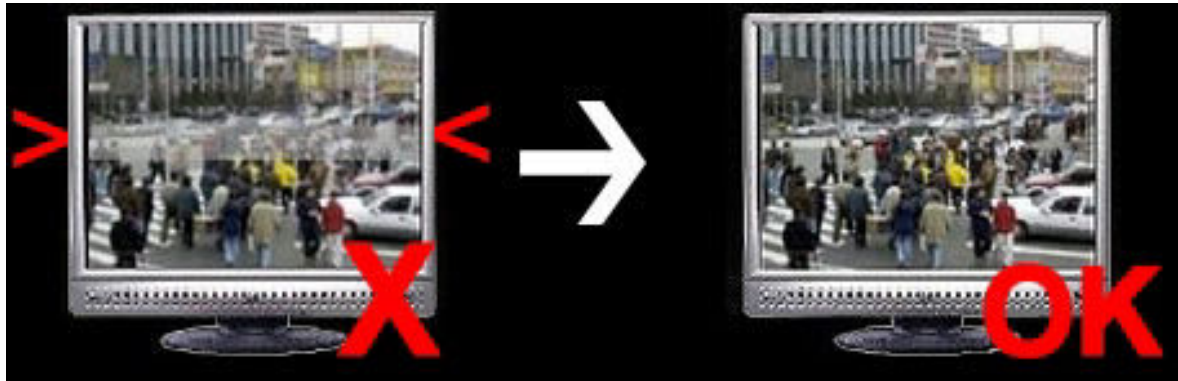




### **Facing a big problem in many CCTV installations – the Ground Loop rolling bar!**

A common problem that many installers face with CCTV installations is earth or ground loop problems. Many CCTV installers have seen the classic symptoms of hum bars in various patterns, but always as vertically "rolling hum bars", or a tearing picture but don't understand the cause of the problem and the solutions to cure it.

The "picture-set" below show an example of typical hum bar at the monitor to the left, and to the right with the ground loop corrector installed.



The above shown example of clearing out a ground loop problem could easily be done with a VIDATRONIC Ground Loop Corrector, either with our inline model CGC-752, or the DIN 35 Rail mountable type CGC-751D, kindly Look under **PRODUCT** at the website menu box to find product information.

***At the end of this document you will have some more pictures showing how a ground loop problem also could affect the picture.***

The CCTV installers may even have seen a small spark or felt a slight tingle when they disconnect interlinking cables from video recorders and other equipment; these are all signs of ground loop problems.

NOTE, a tearing picture can also be caused by a weak signal and a hum bar by over-voltage or an unregulated power supply used with a 12V camera such as a 13.8V alarm PSU)

#### **What is a ground loop?**

A ground loop occurs when there is more than one "ground" or "earth" between two pieces of equipment. Because the two pieces of equipment have multiple ground paths, loops (circuits) are formed in which current can flow. The current flowing through this unwanted circuit in the CCTV system can have a devastating effect on the system's performance.

The current flows through the shield of coax types of cable and instead of "dragging" any interference (usually 50Hz mains hum) down to a "true" ground at the receiving end of the cable, it actually picks this interference up and carries it to the sensitive inputs of CCTV equipment such as DVRs, Quads and Switchers or just a monitor. The DVR, quad or switcher simply interprets this "interference hum" as part of the intended video signal entering the equipment and displays it on the monitor as a "vertically rolling hum bar".

#### **How to prevent ground loops?**

In practice this can be hard to do or define a general solution, as each CCTV system is or can be very different from each other, so you can't apply general rules. Some equipment tends to be inherently free from ground loop problems, this is usually the more DIY equipment because the monitor powers all the cameras and the cameras don't have different ground potentials so there are no ground loops.

In systems that have different types of CCTV cameras installed with different types of power supplies, there is a greatly increased chance that some of the cameras and other pieces of equipment may have different ground potentials. Two pieces of equipment only need a "ground voltage" difference of 0.1V (which is tiny) and to be interconnected with an earth cable of 0.1 ohms resistance to form a ground loop current of 1A!!

Well designed 12V CCTV power supplies are often "double-insulated" and the 0V output is in effect floating. This has the benefit that it can "float up or float down" to the ground potential of other equipment minimizing ground loop problems. Some other power supplies such as "alarm-power supplies" may clamp the 0V output to an electrical earth causing ground loop problems with CCTV equipment.

**NOTE: NEVER REMOVE THE ELECTRICAL SAFETY EARTH of mains equipment, in an attempt to remove a ground loop, as it can endanger lives!**

By carefully using good CCTV power supplies for the cameras or whenever possible in systems, using a central supply from the DVR to all cameras (VIDATRONIC has actually developed such a unit for a customer), you will minimize ground loops. However, if some ground loop interference still exists, then a device that blocks the current flowing down the earth connection - a **ground loop corrector** - is an option. The ground loop corrector simply terminates ground loop currents in a cable and blocks the hum and interference carried in the ground loop.

**How many Ground Loop Correctors do I need to cure a problem?**

The ground loop corrector should be fitted between the camera and the input of CCTV equipment, such as a DVR or video switcher that it is connected to. Generally speaking the ground loop corrector would most correctly be fitted close to receiving unit video input, or inputs.

For example, in a 4 camera system it is possible that only one camera has an earth loop problem, and that one ground loop corrector added to this unit may cure it.

In reality though, if you experience ground-loop problems in a CCTV system, it is very often the best to fit one ground loop corrector to every input, as earth loops may sometimes not be sufficiently strong to show up as hum bars, but they may still cause erratic operation of equipment due to the unwanted currents flowing through the earth lines.

For that purpose, our CGC-752 is an excellent solution.

***To be honest ... the motto must always be - "better be safe than sorry".***

Below you have some more pictures showing possible ground loop affected pictures.

Fig. 1



Fig. 2



Fig. 3



Fig. 4



**Note:**

Fig.4 could also be caused by a combined ground loop problem and at the same time kind of electromechanically interferences.

**VIDATRONIC – VTR CONSULT**

25. August 2020.

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