HUMDINGER SYSTEMS

Ground Loops

Ground loops (earth loops) are produced when two different electrical earth points are connected by a conductor such as the braid of a coaxial cable. If this happens, a.c. currents are allowed to flow through the braid, the intensity of which may vary as other external electrical equipment is switched on and off. The reason for this is that there are often significant voltage differences between local electrical earth points emanating from other plant or electrical equipment.
Within a CCTV system, ground loops may cause the appearance of dark and light horizontal bands across the monitor picture often affecting field synchronisation in severe cases. These bands may move up or down the picture depending on the relative frequencies of the mains and video signal field rate. In less severe cases, although this interference may not be visible, it can sometimes interfere with the synchronisation of inserted text and/or coax-fed telemetry signals.
It has to be remembered that, although the coaxial braiding is grounded and acts as a screen, it also forms the return path for the video signal that, in common with all conductors, has finite resistance. This means that any unwanted electrical current that is allowed to flow in this braid will produce a voltage that will add to the video signal in the form of interference. Ideally, the cable should be grounded at only one end but for safety reasons this is neither desirable nor legal.

Overcoming ground loop problems

The problem may be overcome by adding a passive video isolating transformer at one end such as the NG Systems "Humdinger" (part number VT11), therefore breaking the ground loop path provided by the braid, whilst allowing the video signal to pass through the transformer.
This will only work if the transformer is effective in breaking the earth loop between two points, the camera and the monitoring equipment – it follows therefore, that *no other earth connection must exist along the cable length.*
When installing coaxial cables between cameras and switching equipment etc., it is necessary to ensure that the coaxial screens (including metal BNC connectors) are prevented from coming into contact with any unintended local earth. This includes such things as metallic trunking, towers, piping, other coaxial braid etc., in fact any surface likely to introduce noise into the system. This problem is not restricted to metalwork, very often brickwork and concrete provide a disruptive earth path, particularly when wet and so contact with the building masonry must also be avoided. It is therefore important to ensure all cables and connectors are suitably insulated and protected, making electrical contact only as intended.

Coax-Fed Telemetry

Systems employing coax fed telemetry signalling require a duplex (two-way) transmission path and so it is important to ensure that the bandwidth of the isolating transformer is sufficient, otherwise telemetry control may be adversely affected. The ample bandwidth of the VT11 is adequate for most coax-fed telemetry systems including NG Systems, Baxall, Panasonic, VCL, Pelco etc. (See fig. 1)

Fitting a HUMDINGER

The Humdinger is fitted in a screened mild steel enclosure and is furnished with two BNC connectors. Always connect the "IN/OUT" socket to local equipment and the (insulated) "LINE" socket to the incoming cable to prevent inadvertent grounding by Humdinger's enclosure.

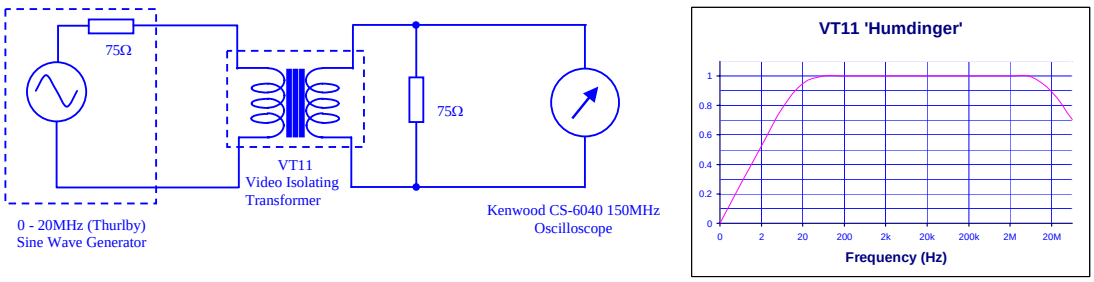

Fig 1 VT11 'Humdinger' Video Isolating Transformer Test Circuit and response curve