

# TPS-2000

TWISTED PAIR SENDER

INSTRUCTION BOOK

IB6351-01

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## DESCRIPTION

The TPS-2000 Twisted Pair Sender is used to convert CCTV video from a camera for transmission over twisted pair wire gages 18 to 24 AWG. This unit is used at the camera to extend the transmission range of the video signal From 0 - 2000 feet. It can be used with any Twisted pair receiver. The distance is set using field programmable internal jumpers. By using the matching active receiver (GB60-UTP) camera range can be extended up to 4000 feet. This unit can be matched with the (TPT-4000) repeater and GB60-UTP receiver to extend the range of video transmission up to 8000 feet.

The TPS-2000 is powered by 24VAC and can be connected to the same power supply as the camera. The input has a female BNC connector to attach to the camera and a screw terminal connector for the twisted pair wire output.

The TPS-2000 "Pre-Equalizes" the twisted pair transmission path to reduce video noise and improve the video image. Because it is an active device it will convert the 75 Ohm impedance of the camera into a precise 105 Ohm impedance to correctly match the twisted pair wire and it has the power to drive the video signal without introducing loss. A correct match on the twisted pair wire will prevent reflections and ghosting in the picture.

A true common-mode video input provides elimination of interference signals and ground-loop problems. The unit has a power-on L.E.D. and draws about 30 milliamps from the existing power supply. We supply a 24 VAC power cube with each unit so the unit may be mounted away from the camera.

A DC powered unit called TPS-2000-DC will work with 9-24 VDC power for DC operation.

The unit is mounted in a bone white ABS enclosure that measures 3.3" Wide, 5.5" Long, 2.0" Deep. It has two mounting holes, one on each side that will hold it securely to any surface. All cable and wire mounting connectors are easily accessible on the front cover. The Jumpers for distance are set by removing four screws on the front cover and selecting the distance on the PC board.

## 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 TPS-2000 is normally located at the point where the coaxial cable and twisted pair wire meet. The unit should be mounted as close to the camera as possible. Select a position that gives you the best access to wire the system and reduces the labor in installation.

## HOW TO CABLE THE TPS-2000

Attach the cable coming from the camera to the Video Input BNC. Then attach the twisted pair wires that go to the monitor location to the screw terminal connector marked "VIDEO OUTPUT", be sure to observe the correct polarity. If the polarity is reversed, a good picture will not appear at the monitor output. The monitor will roll and the picture will be reversed black to white. Simply reverse the two wire connection to the video output and the picture will be corrected.

## POWER SUPPLY INSTALLATION

The TPS-2000 is powered by a 24 VAC wall mount power transformer. Connect the 24 VAC transformer low voltage side into the screw terminals marked " 24 VAC". The Green L.E.D. will illuminate when the power is applied.

## OPERATION

When video is attached to the input BNC connector of the TPS-2000 an internal common-mode rejection circuit reduces the 60 Hz ground-loop current from interfering with the CCTV video picture. Next the video goes into an un-balanced to balanced stage to provide twisted pair video driving impedance. There are three setting for the internal controls. These setting are used at the time of installation to pre-set the output for long cable runs. The settings for pre-set are 0', 1000' and 2000' Distance of twisted pair wire.

The video is then passed to the twisted pair wire output stage for output drive. The 105 Ohm impedance is matched to the twisted pair wire to prevent "Ghosting" in the picture.

## CARE AND MAINTENANCE

There is no routine maintenance or calibration required with this equipment. At time of installation the pre-set selectors are set for the wire distance. After initial set-up there is no further adjustments required.

## APPLICATIONS (WHERE TO USE THE SYSTEM)

This system can be used anywhere that a video signal in coaxial cable must be converted to twisted pair wire. It will improve Twisted pair transmission system response. Video pictures on long wire runs will benefit from the installation of the TPS-2000. In a long cable run the (TPT-4000) repeater can be placed at the mid point between the camera and the monitor to improve the transmission level and picture quality 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.

## CCTV INSTALLATIONS TIPS (cont)

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 GB60-UTP can be installed at the end of the twisted pair 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 GB60-UTP, you should be able to keep the 60 cycle bars out of your CCTV installations.

## SPECIFICATIONS

### **INPUT**

Level  
Impedance  
Video Standard  
Common Mode Rejection  
Connectors

### **SPECIFICATION**

1 Volt Peak/Peak Nominal  
75 Ohms  
CCTV, NTSC, PAL  
40 dB  
BNC (Female)

Power Requirements  
Connector

24 AC Wall Mount (Supplied)  
Screw Terminal

### **PROCESSING**

Distance (Programmable)  
RF Bandwidth

0, 1000, 2000, feet  
5 MHz Flat

### **OUTPUT**

Level  
Impedance  
Connectors  
Signal to Noise Ratio

1 Volt Peak/Peak  
105 Ohms  
Screw Terminal  
70dB

### **MECHANICAL**

Size  
Enclosure

5.5" L x 3.3"W x 2"D  
ABS with Mounting Flange