

# TPT-4000



## TWISTED PAIR REPEATER TAP

INSTRUCTION BOOK

IB6350-01

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## DESCRIPTION

The TPT-4000 Twisted Pair Tap Repeater is used to amplify and equalize video from a camera over twisted pair wire gages 18 to 24 AWG. The unit has one twisted wire video input, a BNC Tap or drop to use for a local monitor and two twisted pair video outputs (a splitter) so that the unit can drive two separate video lines with the same camera picture. This unit is used in the middle of a long twisted pair wire installation to extend the transmission range of the video signal From 0 - 4000 feet.

This unit is compatible with other twisted pair sender and receiver units. When used with the (TPS-2000) Sender and a (GB60-UTP) receiver, the range of a twisted pair signal can be extended up to 8000 feet. The distance is set using field programmable internal jumpers and variable equalization controls.

The video input has a screw terminal connector for the twisted pair wire. The video drop has a female BNC connector for use with a monitor or recording equipment. Two screw terminal connectors are used for the dual twisted pair video output.

The video input uses a true common-mode rejection system that eliminates interfering signals and ground-loop problems. Controls for both Video Level and Picture Definition can be adjusted to correct for twisted pair wire loss making the video output (BNC Drop) correct.

The TPT-4000 "Pre-Equalizes" the twisted pair transmission path to reduce video noise and improve the video image. Because it is an active device it will correct the twisted pair wire impedance of the incoming video signal and produce a precise 105 Ohm impedance to correctly match the twisted pair wire and it has the power to drive both video signals without introducing loss. A correct match on the twisted pair wire will prevent reflections and ghosting in the video picture.

The unit also has two separate outputs of the same signal so that you can split the video signal into two different twisted pair wires to send to other locations.

The unit has a power-on L.E.D. We supply a 24 VDC power cube with each unit.

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 TPT-4000 can be located at any point in the twisted pair wire run to equalize the video wire path. Select a position that gives you the best access to wire the system and reduces the labor in installation.

## HOW TO CABLE THE TPT-4000

Attach the twisted pair wires coming from the camera to the green "Video Input" connector, 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. Next attach a cable from the BNC connector marked "Monitor 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.

Then connect the output connector marked "Video Output" to the twisted pair wires you wish to drive the video signal down. There are two separate outputs marked "1 and 2", either output can be used they are the same video signal. You may use the second output to drive the video down a different set of wires to a separate location. Be sure to observe the proper polarity when installing the wires for transmission. If the picture will not lock on the monitor, then reverse the wires to correct the polarity.

## POWER SUPPLY INSTALLATION

The TPT-4000 is powered by a 24 VDC wall mount power transformer. Plug the 24 VDC connector into the jack marked "+24 VDC". The Green L.E.D. will illuminate when the power is applied. The L.E.D. will flash if there is no video at the input.

## OPERATION

When video is applied to the input connectors of the TPT-4000 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 adjustable gain stage that lets the installer adjust for twisted pair wire loss on long wire runs. A second control allows the installer to adjust for high frequency losses that cause reduction in picture quality. The Monitor Output video impedance is then matched to the 75 Ohm cable to prevent Ghosting.

## OPERATION (cont)

A sample of the video is used to operate the L.E.D. indicator to determine "presents of video".

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

## CARE AND MAINTENANCE

There is no routine maintenance or calibration required with this equipment. At time of installation the level and definition controls are set and 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 twisted pair wire exists. It will improve Twisted pair transmission system response. Video pictures on long wire runs will benefit from the installation of the TPT-4000. In a long cable run the TPT-4000 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.

## CCTV INSTALLATION TIPS (cont)

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.

## CCTV INSTALLATION TIPS (cont)

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 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 GB60-UTP, you should be able to keep the 60 cycle bars out of your CCTV installations.

### SPECIFICATIONS

#### **INPUT**

Level	1 Volt Peak/Peak Nominal
Impedance	105 Ohms
Video Standard	CCTV, NTSC, PAL
Common Mode Rejection	40 dB
Connectors	Screw Terminal
Equalization Distance	0-2000 feet (twisted pair)

#### **SPECIFICATION**

#### **PROCESSING**

Input Distance (Adjustable)	0 - 2000 feet
RF Bandwidth	5 MHz Flat

#### **DROP (TAP) OUTPUT**

Level	1 Volt Peak/Peak
Impedance	75 Ohm
Connector	BNC (Female)
Signal to Noise Ratio	70 dB

#### **OUTPUT**

Level	1 Volt Peak/Peak
Impedance	105 Ohm
Connector	Screw Terminal
Equalization Distance	0-2000 feet
Signal to Noise Ratio	70 dB
Total Equalization Distance	0-4000 feet (In-Out)

#### **MECHANICAL**

Size	5.5" L x 3.3"W x 2"D
Enclosure	ABS with Mounting Flange
Power Requirements	24 DC Wall Mount (Supplied)
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