ATU-2HD \ ARU-2HD

RELAY TRANSMITTER \ RECEIVER UNIT

INSTRUCTION BOOK

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DESCRIPTION

These devices transmit and receive relay and contact control signals encoded on all 26 HD and SD video formats like HD-TVI, HD-CVI, AHD, NTSC, and PAL video coaxial cable. You can insert your contact relay, alarm, and control signals anywhere a video signal is being used on Unshielded Twisted Pair wire (UTP) or Coaxial cable. Two relay control input signals are inserted onto one line of the vertical interval of the video and will travel over any distance the video signal can go. One of the contacts can be used as a signal integrity alarm for complete signal security.

The ATU-2HD RELAY TRANSMITTING UNIT and the ARU-2HD RELAY RECEIVING UNIT used together create a two channel, alarm relay control, or remote-control system.

Both units have a DIP Switch for line selection signal insertion control and video mode selection. By selecting different lines of operation, you can provide up to 8 control signals by installing additional units in series with the video signal. The DIP switch is also used to select the type of video you want to use. You can select HD-TVI, HD-CVI, AHD, NTSC, CVBS, and PAL video formats.

The relay control signals are inserted onto the Vertical Interval of the video signal and will not interfere with the image.

One channel may be used as a system alarm that will operate upon loss of power to either terminal or loss of transmission path (coax cable cut). In the event of power failure to the ATU-2HD or ARU-2HD the video thru-put will not be interrupted. This loop-through method allows you to place the transmitter/receiver pair at either end, so you can send the signals in either direction. Also, if you use two sets of units, you can send relay contact control in both directions at the same time on any coaxial or twisted wire path.

For a gate camera you can put a button at the gate to ring a bell and then send a switch control for a relay to open the gate going in the other direction all on the same video signal without having to run additional wires.

Contact closures to the ATU-2HD input will be repeated as relay closures at the ARU-2HD output.

The system is housed in a black ABS enclosure that has a UL flame rating of 94-VO and is powered by any 12 VAC or VDC power supply, a 12 VDC is supplied with the units. The system has a power on, video on LED for installation and trouble-shooting of the video system. When power is on, and video is not connected the LED will flash on and off to indicate a video loss has occurred.

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 ATU2HD should be located near your originating contact signals and the ARU-2HD should be near your alarm panel or the place you wish to bring the relay signals to. Select a position that gives you the best access to cable the system and one that reduces the labor in installation.

HOW TO CABLE THE ATU-2HD

Connect the video cable you wish to use from the camera to the "VIDEO IN" BNC connector and connect the cable going to the ARU-2HD to the "VIDEO OUT" BNC connector. It is not necessary for power to be on at this time, the video path will only be interrupted during the cable attachment. This system will function with HD-TVI, HD-CVI, AHD, CVBS, NTSC, and PAL video types. Next attach the alarm or control wires for each station to the green connector block marked A and B. Each pair of screw terminals marked A and B are LOOP inputs. Attach your Dry Contact Closures or switches to these screw terminals. The current for loop sensing is built into the ATU-2HD. Do not connect TTL signals to these connectors.

HOW TO CABLE THE ARU-2HD

Connect the video cable you are using to the "VIDEO IN" BNC on the ARU-2HD and the "VIDEO OUT" BNC goes to the monitor, recorder or other video equipment. BE SURE TO TERMINATE THE END OF THE VIDEO CABLE WITH A 75 OHM TERMINATION OR PROPERLY TERMINATED INTO OTHER EQUIPMENT. Next attach the alarm or control wires for each station to the green connector block marked A and B. These relay output wires can go to your alarm panel or control device. Each pair of screw terminals marked A and B are relay contact closures outputs. The outputs from connector block A and B will duplicate the input signals from the ATU-2HD inputs. A contact closure at A of the ATU-2HD will result in a contact closure at A of the ARU-2HD and the same for the B channel.

POWER SUPPLY INSTALLATION

The ATU-2HD and ARU-2HD are powered by two 12 Volt AC or DC wall mount power transformers, 12VDC are included with the units. Connect the 12 VDC power transformer to the Green terminal block marked 12VDC. The ATU-2HD can be powered by power sources as low as 9 volts AC or DC. However, the ARU-2HD must be operated with 12 Volts AC or DC.

Connect the power source and you will see the Green LED turn on to indicated power up, it will be on, or it will be flashing on and off, depending on the video status. Power on with no video will cause the LED to light up and flash on and off. Power on with video input will cause the LED to light up fully.

SET-UP OF THE ATU-2HD AND ARU-2HD
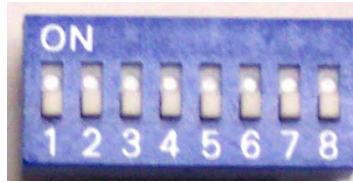
Both units can operate on a maximum of 4 separate line channels allowing up to four sets of ATU/ARU-2HD units to be used on any HD-TVI, HD-CVI, or AHD video source and on CVBS, NTSC, and PAL up to a maximum of two sets of ATU/ARU-2HD units can be used due to the limited number of lines (see the table on page 5). The units are shipped on the standard channel 1 for HD-TVI 720P (25fps) video format. If you wish to use the units on a different channel or wish to operate more than one unit on the same video signal, then it is necessary to program the new channel using the DIP switch on the PC Board.

Programming a new channel is done with switch 1-2 of the 8 position DIP switch on the inside of the box. Open the box by removing the 4 screws in the outer most corners of the box. Open the lid and look for the Blue 8 position DIP switch.

The first 2 switches 1-2 are for line selection, switches 3-7 are for selecting the video mode or type of video, switch 8 is not used. Select the channel you wish to operate on 1-2 and select the video format using switch numbers 3-7. You must select the same channel and video format for both ATU-2HD and ARU-2HD so they will work together.

As many as 4 ATU-2HD and ARU-2HD units can be used on the same video signal by programming them to different channels. When the ARU2HD is on the same channel as an ATU-2HD with the power applied and the video on the Green LED on both units will stop flashing and stay on. This indicates that the video is being received.

OPERATION

When the units have been installed and programmed for the correct video source you will see that when a contact on the ATU-2HD is closed a relay in the ARU-2HD closes in response. Through the video\data path the contact sense is relayed to the alarm panel or other equipment directly. If the power on the equipment is remove or turned off the video path will not be obstructed by either the ATU-2HD or ARU-2HD units.

If the power is turned off on the ARU-2HD then both relays will open regardless of the position of the ATU-2HD input contacts. If a system alarm is desired to indicate a loss of communication between the ATU-2HD and the ARU-2HD, one of the contacts at the ATU-2HD can be wired closed then that contact will serve as a system alarm channel. This contact will open if power is turned off on either unit or if the video path between the two units is interrupted.

CARE AND MAINTENANCE

There is no routine maintenance or calibration required with this equipment. There are no adjustments required inside the box. Open the box only to choose the desired operating channel and video mode.

SETUP LINE & VIDEO FORMAT

When you change one of the switch settings, the switch is read and the unit changes the channel or video mode immediately. Also, in the case of a power or video interruption the unit reads the switches and resets the controls to operate as selected. ON is switch up toward the "ON" marking, and OFF is down toward the number side and X means doesn't care.
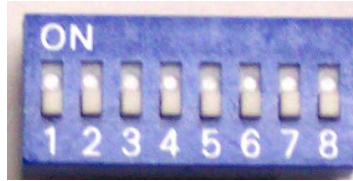
CHANNEL LINE SELECTOR

SW	1	2	
1	ON	ON	LINE 3-4
2	OFF	ON	LINE 7-8
3	ON	OFF	LINE 11-12
4	OFF	OFF	LINE 15-16

VIDEO MODE SELECTOR

SW	3	4	5	6	7	8	
1	ON	ON	ON	ON	ON	X	TVI 720P 25fps
2	OFF	ON	ON	ON	ON	X	TVI 720P 30fps
3	ON	OFF	ON	ON	ON	X	TVI 1080P 25fps
4	OFF	OFF	ON	ON	ON	X	TVI 1080P 30fps
5	ON	ON	OFF	ON	ON	X	TVI 4MP 15fps
6	OFF	ON	OFF	ON	ON	X	TVI 4MP 25fps
7	ON	OFF	OFF	ON	ON	X	TVI 4MP 30fps
8	OFF	OFF	OFF	ON	ON	X	TVI 5MP 12.5fps
9	ON	ON	ON	OFF	ON	X	TVI 5MP 20fps
10	OFF	ON	ON	OFF	ON	X	CVI 720P 25fps
11	ON	OFF	ON	OFF	ON	X	CVI 720P 30fps
12	OFF	OFF	ON	OFF	ON	X	CVI 1080P 25fps
13	ON	ON	OFF	OFF	ON	X	CVI 1080P 30fps
14	OFF	ON	OFF	OFF	ON	X	CVI 4MP 25fps
15	ON	OFF	OFF	OFF	ON	X	CVI 4MP 30fps
16	OFF	OFF	OFF	OFF	ON	X	AHD 720P 25fps
17	ON	OFF	ON	ON	OFF	X	AHD 720P 30fps
18	OFF	ON	ON	ON	OFF	X	AHD 1080P 25fps
19	ON	ON	ON	ON	OFF	X	AHD 4MP 15fps
20	OFF	OFF	ON	ON	OFF	X	AHD 4MP 25fps
21	ON	OFF	OFF	ON	OFF	X	AHD 4MP 30fps
22	OFF	ON	OFF	ON	OFF	X	AHD 5MP 12.5fps
23	ON	ON	OFF	ON	OFF	X	AHD 5MP 20fps
24	ON	OFF	OFF	OFF	OFF	X	PAL 625L 50hZ
25	OFF	OFF	OFF	OFF	OFF	X	CVBS, NTSC 525L 60hZ

APPLICATIONS (WHERE TO USE THE SYSTEM)

This system can be used anywhere that a video signal on coax cable or twisted pair exists. Some uses are in a CCTV camera installation, LASER OPTICAL transmission, STL microwave applications, Broadcast TV transmissions, Cable TV, Relay, Alarm and Control and many other applications. Relay control can be sent in either direction on the video cable and both directions when two sets of units are used.

TROUBLESHOOTING THE INSTALLATION

When installing ATU-2HD and ARU-2HD units care must be taken to assure that both units are set to the same channel and video mode or standard for operation including (TVI,CVI,AHD ect), then determine the number of line (720p, 1080P) ect, then determine the frames per second or frame rate (12.5, 25, 30 ect. Then see the chart to determine the correct switch settings. If all the switches are set the same on the ATU-2HD and ARU-2HD units, they will operate on the same selected video line and video mode or video format.

It is also important to select the proper format of video for correct operation. Check with your cameras specifications for the video type or format of the video source, be it HD-TVI, HD-CVI, AHD, PAL, or CVBS (NTSC) the USA format for standard definition (SD) video. If you experience the relays in the ARU-2HD chattering on and off, then it is most likely that the Video Mode selector switches 3-7 are not set correctly for the format of video being used.

If only one of the two relays operate then check the Line Selector settings switches 1-2 and make sure they are set the same on both units and make sure they are not set to a line that exceeds the maximum line setting for the selected video format. Also, we have determined that some HD cameras put signals in the first few lines of the vertical interval to help balance the DC component of the video coming out of the vertical interval. If you find that the relays on the receiver are always on and the LEDs are always lit then select a different channel of operation with DIP switches 1-2.

If you have no relay operation, then check for power at each unit and make sure that the GREEN Power LED is on and not flashing. A Flashing LED indicates no video input to the unit. When any format of video is applied the Power LED will turn on solid and stop flashing.

If the relays turn on and off every few seconds, then check your video signal for any ground loops. Ground loops can disrupt video images and display horizontal bars, normally two on the screen at a time moving up the screen slowly. If you have this condition, then lift the camera side of the video cable off any local ground and use only the DVR side of the system for the cable ground. Non powered balun style ground loop blockers can also be used to remove the ground loops.

If your relay signal is going from the camera to the DVR the signal generated in the ATU-2HD will pass through amplifiers and other active (powered) devices and work fine. However, if you wish to pass signals up the coaxial cable in the opposite direction from the flow of the video signal you may not have any active (powered) equipment in the path of the ATU-2HD units signals. Amplifiers will block the reverse path from DVR to Camera for control.

If amplifiers are used at the end of the line to boost the signal, place our equipment ahead of the amplifiers so that our transmitter is directly connected to our receiver by the coaxial cable with no amplifier in between them.

Any amplifier that is placed between the ATU-2HD and the ARU-2HD units in the reverse direction will block the signal from going through. Passive (non-powered) equipment such as ground loop baluns are allowed between the ATU-2HD and the ARU-2HD because they will pass the signals in both directions with no blocking and function correctly. Any equipment can be placed outside of the connection between the ATU-2HD and the ARU-2HD units if the two units are directly connected to each other with the cable or twisted pair wire (UTP).

If you still have intermittent operation of the relays or only one relay operates then you have not selected the correct video mode on the dip switch. If you cannot completely identify the video cameras type of video it is possible to use the trial method to determine the video standard you are working with. This equipment will work with all 24 types of HD video and both PAL and CVBS SD standards. To use the trial method to set the dip switches do the following procedure.

Connect the Transmitter unit to the receiver unit and power them both up. Connect the unknown camera format to the transmitter. It is not necessary to connect the DVR but you must terminate the video source with a 75 Ohm termination or connect the DVR to the receiver output. Next put select all zeros on the 8 position DIP switch. Start by turning the switch number 3 to ON, wait 5 seconds and see if both contacts communicate reliably if not go to the next switch setting on the switch table. They change in a binary progression. Be sure to wait 5 seconds between switch changes for the equipment to set up the new format of operation. This method takes some time and it is better to determine the correct video format from the specification sheets if possible.