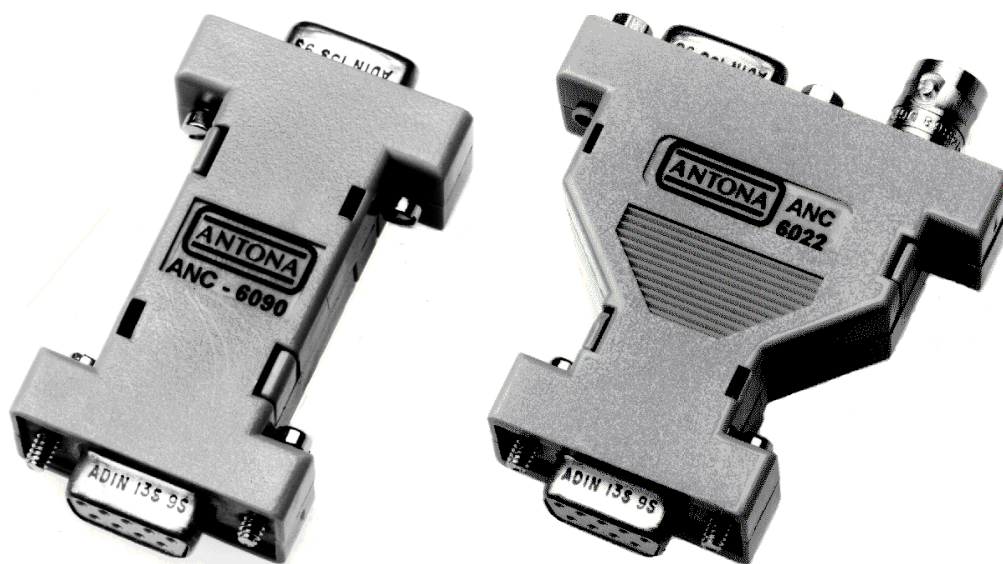


**ANC - 6000 Series  
RS-422 Serial Communications Adapter**

*Antona*

**Antona Corporation, Los Angeles, CA**



## **Antona Corporation**

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## Features

- ◆ Full duplex operation -
- ◆ Baud rates to 115.2 Kbaud
- ◆ Uses DB-9 connector on Pc serial port
- ◆ Powered from serial port for most installations
- ◆ Latest surface mount technology (SMT) for low power and small size
- ◆ Pin connections on converted signal side mate directly to many professional multimedia units (SMPTE interface for Sony, BTS, Grass Valley, Ampex, etc.)
- ◆ ANC-9022 provides input for composite video to detect vertical sync

## Overview

The ANC-6000 series adapters convert the RS-232C level signals input and output on an IBM personal computer (Pc) or compatibles into bipolar-current RS-422 type signals. The interface voltage levels produced are *true* RS232 and RS-422 type signals. These adapters find wide use in high-speed long distance serial communications, or to interface a Pc with equipment that uses an RS-422 type input/output. The adapters are powered by the host computer system's signal lines, the same way a "mouse" is powered. For *most* installations this eliminates the need for an additional external power supply making the adapters an ideal choice for portable use. Extended cable runs and/or terminated RS-422 connections require more current than the serial port power can provide. The RS-422 connector can accept +6 to +9v regulated DC at 100 milliamps to provide the added power to the adapter. The ANC-6022 allows the designer to apply composite video sync that is readable on the serial port's Data Carrier Detect (DCD, referred to as RLSD on some systems) or Ring Indicator (RI) line.

## ***Mechanical Specifications***

Adapter case size: ANC-9090 = 2.2" X 1.2"  
ANC-9022 = 2.2" X 2.1"

Connectors: Female DB9 to Pc  
Female DB9 to RS-422 equipment  
Video Input to ANC-9022 by BNC type connector

## ***Electrical Specifications***

Power requirements= 12 ma for short cable, non-terminated applications  
100 ma for long and/or terminated cable applications

RS-422 output drive= short proof output, non-terminated operation to 150 feet,  
terminated operation with external power supply to 4000 feet.

RS232 output drive = short proof output, under worse case conditions,  $\pm 5v$  switching  
to exceed  $\pm 3v$  EIA RS232 specification

## **Adapter Installation**

Turn off the personal computer and any other remote equipment before performing the adapter installation. ***Never install or remove the adapter with the power applied to the Pc or any of the attached equipment. This could result in permanent damage to the adapter due to static discharge.***

Normally the adapter is plugged directly into the serial port male DB-9 jack on the back of the Pc. ***Be sure to look at the label on the adapter to identify and insure that the proper DB9 is plugged into the Pc's serial jack.*** The ANC-6022 would be difficult to plug in backward, but the ANC-6090 has female DB9s at both ends. The user should screw the 2 mounting screws into the serial port's hex nuts for permanent installations to assure good long-term connection. The ANC-6022 may require the mounting screws be used as both a DB-9 cable and coax cable will be installed at the opposite end and so will exert a cantilever force on the adapter. The user of the ANC-9022 should be aware of this, and take the appropriate care with cable strain relieving.

The adapter may be attached to a ribbon cable type extension from the Pc to the Antona adapter. This is sometimes useful when the space is limited behind the Pc. The ribbon cable extension should not exceed 3 feet. A 12' shielded wire cable could also be used. Remember that the signal is still RS-232C level leaving the computer and entering the adapter. *Also note that if the designer is using a DB9 to DB25 adapter an A-B selector box or break-out box for testing, that all 9 pins should be connected through the adapter or test setup.* Power is drawn from the host system and pins 1 or 9 may be driving the host with the video sync information on the ANC-6022.

## **Video vertical synchronization interrupt**

The ANC-9022 user may input and examine the video sync input to synchronize operation of command outputs to video editing equipment. The interrupt may also be used for sync time delay, type of sync determination and presence of valid video sync.

The process is as follows:

1. Enable desired interrupts under software control in initialization.
2. When interrupt is requested, save all registers upon vectored entry.
4. Input modem status register to determine F1/F2 source of interrupt
5. Do interrupt service routine.
6. Restore all registers, re-enable software interrupts and return to main program.

## **Serial Port**

Three of the Pc's serial port RS-232C level signals are used by the Antona adapter to derive power from; RTS, DTR and TX. The user must therefore insure that the RTS and DTR signals from the Pc's serial port are brought to a high output level 100 ms before communicating over the adapter. Usually this is performed once during the user's program initialization.

## **Cable Termination**

For site lengths greater than 150 feet, resistor termination across the receive pair end of the cable may be necessary. Use a resistor value that matches the

impedance of the wire or coax being used (typically 100 to 200 ohms). If the user wishes to DC decouple the transmit signals, thereby significantly *lowering* the current used by the adapter. It is suggested that a 1000pf capacitor be placed in series with the TX- signal on the RS-422 side of the adapter. Alternatively, an external DC power supply may be feed into pin 9 on the RS-422 connector to supply the additional current that the adapter is unable to draw from the RS-232 side of the interface. Note that some multimedia equipment has internally connected circuitry for resistor termination. So even if the separation distance is less than 150 feet, it may be necessary to provide an external source of DC power or place a 1000pf capacitor in series with the TX-output. Some equipment also allows the user to disconnect the internal termination network.

## **Adapter Jumper Options**

To open the enclosure hood use a small flat blade screwdriver and carefully pry the plastic latches on one side of the enclosure and gently separate the sides slightly (about .020"). Place a second flat blade screwdriver (or paper clip) between the separated sides of the enclosure to keep it from re-latching shut while you repeat the process on the two plastic latches on the other side of the hood. The two sides of the hood should now come apart. The computer side mounting screws are loose within the enclosure so be careful of these small parts. To reassemble the enclosure hood back around the adapter electronics place the small screws back into position before closing the sides and double check that the hood sides are properly oriented. The hood sides should easily reassemble if oriented properly.

## **ANC-6090 Tx - Rx Pin Reverse Jumpers**

These 2 jumper sets, designated JP1 and JP2 on the ANC-6090 circuit board and schematic, allow the designer to swap the transmit and receive pairs on the RS-422 side of the adapter. The configuration as shipped from Antona is set for 'master'. This configuration is for the adapter acting as a controller to multimedia type equipment with an RS-422 SMPTE interface. Figure 1 shows the jumper locations from the back or solder side of the ANC-6090 circuit board. The user may move all four jumper shunts on the component side of the card from the 'vertical' controller configuration to the 'horizontal' receiver configuration. All four jumpers must be changed to either all horizontal or all vertical for proper adapter operation.

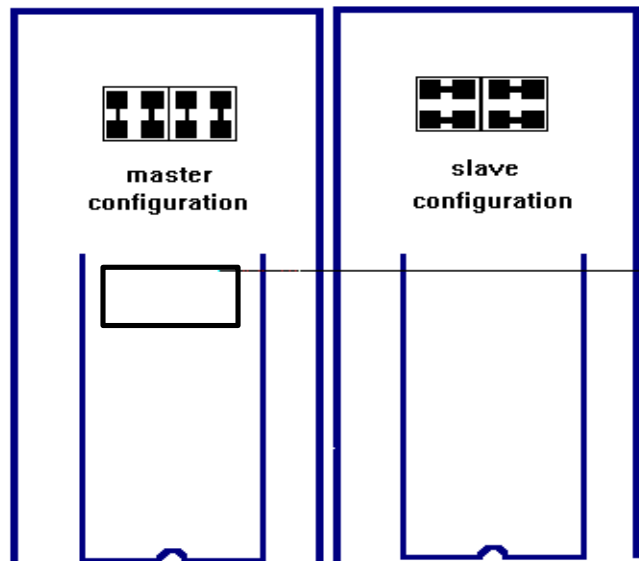


Figure 1 - ANC-6090 jumper locations and configuration

### ANC-6022 Tx - Rx Pin Reverse Jumpers

These 2 jumper sets, designated JP1 and JP2 on the ANC-6022 circuit board and schematic, allow the designer to swap the transmit and receive pairs on the RS-422 side of the adapter. The configuration as shipped from Antona is **highlighted**. This configuration is for the adapter acting as a controller to multimedia type equipment with an RS-422 SMPTE interface. Figure 2 shows the jumper locations from the back or solder side of the ANC-6022 circuit board. The user may move all four jumper shunts on the component side of the card from the 'vertical' controller configuration to the 'horizontal' receiver configuration. All four jumpers must be changed to either all horizontal or all vertical for proper adapter operation.

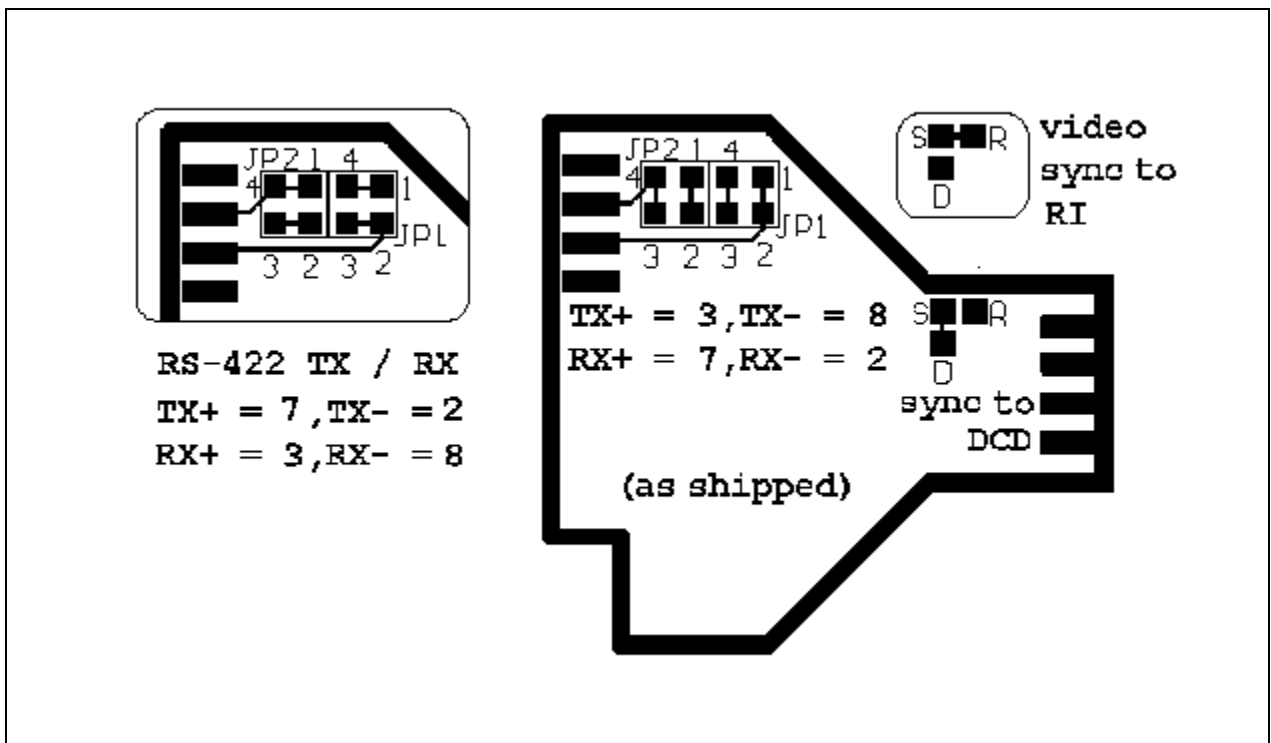


Figure 2 - ANC-6022 jumper locations and configuration

### ***Tx - Rx Jumper Function Chart***

common pin	jumper pins 1-4/2-3	jumper pins 1-2/3-4	DB9 Conn.
JP2, PIN 2	<b>TX+</b>	RX+	3
JP1, PIN 2	<b>TX-</b>	RX-	8
JP2, PIN 4	<b>RC+</b>	TX+	7
JP1, PIN 4	<b>RC-</b>	TX-	2

### ***Video vertical sync. interrupt jumper***

The ANC-6022 is capable of generating an interrupt on NTSC, PAL or SECAM RS-170 level sync input with both odd/even field or even field detection. The Data Carrier Detect (DCD or RLSD) RS-232C input signal is used for edge detection of both the odd and even video field (as shipped). It may be desired in some applications to receive interrupts for field 2 (even field) only detection. The user may change the vertical sync decoder output destination from DCD to RI by cutting a shorting jumper between the "S" and "D" pads and "bridging" or soldering a bare piece of wire from the "S" to "R" pad. The pads are located on the back side of the ANC-6022 adapter circuit board near the RS-232C (J1) connector.



## External connections to ANC-6022

### DB9 RS-232C Signals

	<b>Function</b>	<b>DB-9 Pin #</b>	<b>Comment</b>	<b>Data Direction</b>
DCD/ RLSD	Data Carrier Detect	1	video sync input	input to computer
RX	RECEIVE DATA	2	RS-232 level input	input to computer
TX	TRANSMIT DATA	3	RS-232 level output	output from computer
DTR	Data Term Ready	4	+v to power adapter	output from computer
GND	GROUND	5	signal ground	I/O signal ground
DSR	Data Set Ready	6	tied to DTR (pin 4)	input to computer
RTS	Ready to Send	7	+v to power adapter	output from computer
CTS	Clear to Send	8		input to computer
RI	Ring Indicator	9	alternate video sync input	input to computer

## External connections to ANC-6090

	<b>Function</b>	<b>DB-9 Pin #</b>	<b>Comment</b>	<b>Data Direction</b>
DCD/ RLSD	Data Carrier Detect	1		input to computer
RX	RECEIVE DATA	2	RS-232 level input	input to computer
TX	TRANSMIT DATA	3	RS-232 level output	output from computer
DTR	Data Term Ready	4	+v to power adapter	output from computer
GND	GROUND	5	signal ground	I/O signal ground
DSR	Data Set Ready	6	tied to DTR (pin 4)	input to computer
RTS	Ready to Send	7	+v to power adapter	output from computer
CTS	Clear to Send	8		input to computer
RI	Ring Indicator	9		input to computer

### DB9 to DB25 pin to pin chart - for use of adapter on a DB25 type com port

	<b>Function</b>	<b>DB-9 Pin #</b>	<b>DB-25 Pin</b>	<b>Comment</b>
DCD/ RLSD	Data Carrier Detect	1	8	
RX	RECEIVE DATA	2	3	RS-232 level input
TX	TRANSMIT DATA	3	2	RS-232 level output
DTR	Data Term Ready	4	20	+v to power adapter
GND	GROUND	5	7	signal ground
DSR	Data Set Ready	6	6	tied to DTR (pin 4)
RTS	Ready to Send	7	4	+v to power adapter
CTS	Clear to Send	8	5	
RI	Ring Indicator	9	22	

## RS422 connections to ANC-6090

For normal or multimedia interfacing, this is the jumpering of JP1/2 as shipped. Usually the user hand-wires a 9-pin cable assembly from the RS-422 piece of equipment to the Antona adapter. The only difference between the master and server version is the jumper positions of JP1 and JP2 within the adapter. The *electronics* are exactly the same, only the 2 transmit and 2 receive signal lines are exchanged.

### ***DB9 RS-422 Signals for Master (Multimedia Controller)***

DB9 CONN (J2)	FUNCTION	IDENTIFICATION
1	GROUND	ground for RS-422 and/or external power
2	RC-	RS-422 minus side input
3	TX+	RS-422 plus side output
4		<i>-not used-</i>
5	GROUND	ground for RS-422 and/or external power
6		<i>-not used-</i>
7	RC+	RS-422 plus side input
8	TX-	RS-422 minus side output
9	+V	Optional +6V to +9V DC @ 100ma

### ***DB9 RS-422 Signals for Server (Receive from Master)***

DB9 CONN (J2)	FUNCTION	IDENTIFICATION
1	GROUND	ground for RS-422 and/or external power
2	TX-	RS-422 minus side output
3	RC+	RS-422 plus side input
4		<i>-not used-</i>
5	GROUND	ground for RS-422 and/or external power
6		<i>-not used-</i>
7	TX+	RS-422 plus side output
8	RC-	RS-422 minus side input
9	+V	Optional +6V to +9V DC @ 100ma

## Appendix A - Program listing

The following short BASIC program will allow the designer to quickly verify the operation of the ANC-6022 video sync input. It is assumed that the adapter is plugged into COM1: (use A=&H2FE for COM2:) with a suitable video input attached to the adapter's BNC connector input.

```
10 A=&H3FE  
20 PRINT HEX$(INP(A) AND &H80)  
30 GOTO 20
```

The D7 value should toggle with proper operation.

## **Appendix B -Circuit Board Schematic**

*The following page(s) contain the schematic for the series 6000 adapter. The schematic and card artwork are copyright protected by Antona Corporation and are included only to aid the end user to configure the adapter or for competent technical service personnel to use in maintenance or repair.*

**Note: The schematics are included with the purchase of the product.**