

CX-AUTO_(tm)

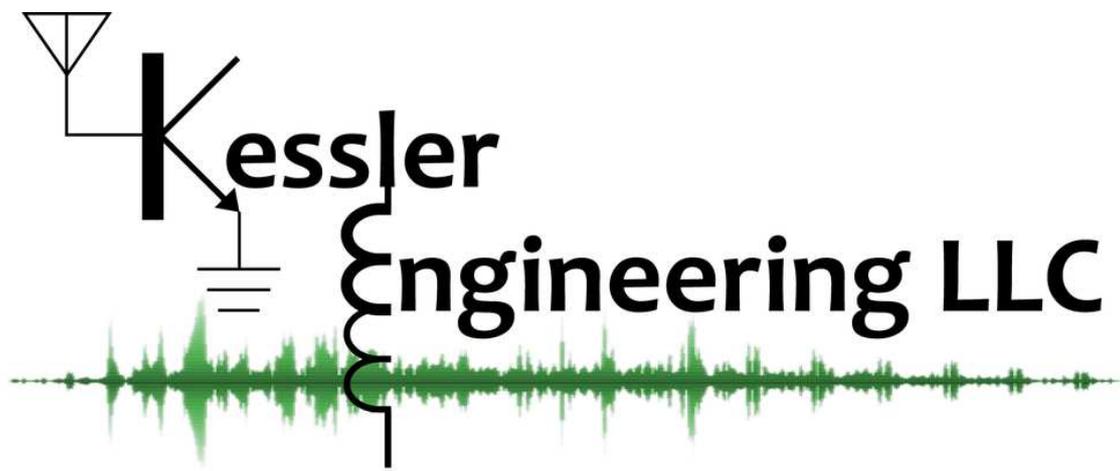
Automated RF Coaxial Switch

Compatible with the AT-AUTO_(tm)

Operating Manual



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Beavercreek, Ohio

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Thank-You!

At Kessler Engineering, we endeavor to make your ham radio hobby more enjoyable and trust that our products will bring you many years of faithful service. We ***Thank-You*** for the confidence that you have placed in us and in our products. 73!

Dr. Donald J. Kessler, Ph.D.,
President, Kessler Engineering, LLC

Introduction

1.1 General Description

Kessler Engineering is pleased to bring you the CX-AUTO_(tm) - An automated RF coaxial antenna switch that is fully compatible with the AT-AUTO_(tm), a QRO, fully autonomous, fully automatic “T-Match” antenna tuner, operating under microprocessor control. Designed to handle a 1500 W continuous carrier, and with no gaps in frequency coverage from 1.8-54 MHz, the CX-AUTO_(tm) and AT-AUTO_(tm) are well-suited for Amateur Radio, CAP, MARS, Military, and Government HF radio applications.

The AT-AUTO_(tm) features one coaxial and one balanced output. However, with the addition of the CX-AUTO_(tm), the AT-AUTO's_(tm) singular coaxial output is effectively increased to eight coaxial outputs.

The CX-AUTO_(tm) may be controlled manually from the AT-AUTO_(tm) front panel. By momentarily depressing the *Output* button on the AT-AUTO_{tm}, the user is prompted to rotate the *Tune-Select* knob to select the desired RF output. The AT-AUTO_(tm) then sends a serial data command to the CX-AUTO_(tm) via an Icom-style CI-V interface, causing it to select one-of-eight coaxial outputs.

The user may also configure the AT-AUTO_{tm} to automatically select any of the CX-AUTO's_(tm) coaxial outputs in accordance with a user-selectable AT-AUTO_(tm) configuration. As the user changes frequencies, the AT-AUTO_(tm) follows these changes, automatically recalling *L* and *C* match settings and then commands the CX-AUTO_(tm) to select a particular coaxial output whenever the user changes bands.

Although intended primarily as an enhancement to the AT-AUTO_{tm}, the CX-AUTO_(tm) may be controlled via a computer to CI-V interface as well as with a dedicated keypad presently in development. Due to limitations inherent with the RS-232 protocol, the CX-AUTO_(tm)/AT-AUTO_{tm} combination is not fully compatible with RS-232 control generally associated with Kenwood and Yaesu radios, and others.

1.2 Operational Overview

The CX-AUTO_(tm) emulates the CI-V command protocol, and is also well suited for computer automation applications and may be so used without an AT-AUTO_(tm). The CX-AUTO_(tm) is user-selectable to operate at 1200, 4800, 9600, or 19200 baud and features a user-selectable CI-V address, permitting up to four CX-AUTO_(tm)s to be operated from the same CI-V bus.

Under microprocessor control, the CX-AUTO_(tm) continuously monitors and responds to CI-V commands addressed specifically to it. In addition to the Open-Collector CI-V protocol, the CX-AUTO_(tm) also includes an RS-422 interface for situations where the CX-AUTO_(tm) must be located farther than approximately 50 feet from the hamshack.

The CX-AUTO_(tm) may also be supplied DC power via the RF coaxial cable (page 23).

A view of the CX-AUTO_(tm) in operation is shown in Figure 1.1, while an internal view of the CX-AUTO_(tm) is shown in Figure 1.2 (page 5).



Figure 1.1: CX-AUTO_(tm) 9600 Baud, Address=0xB0, Coax 0 Selected

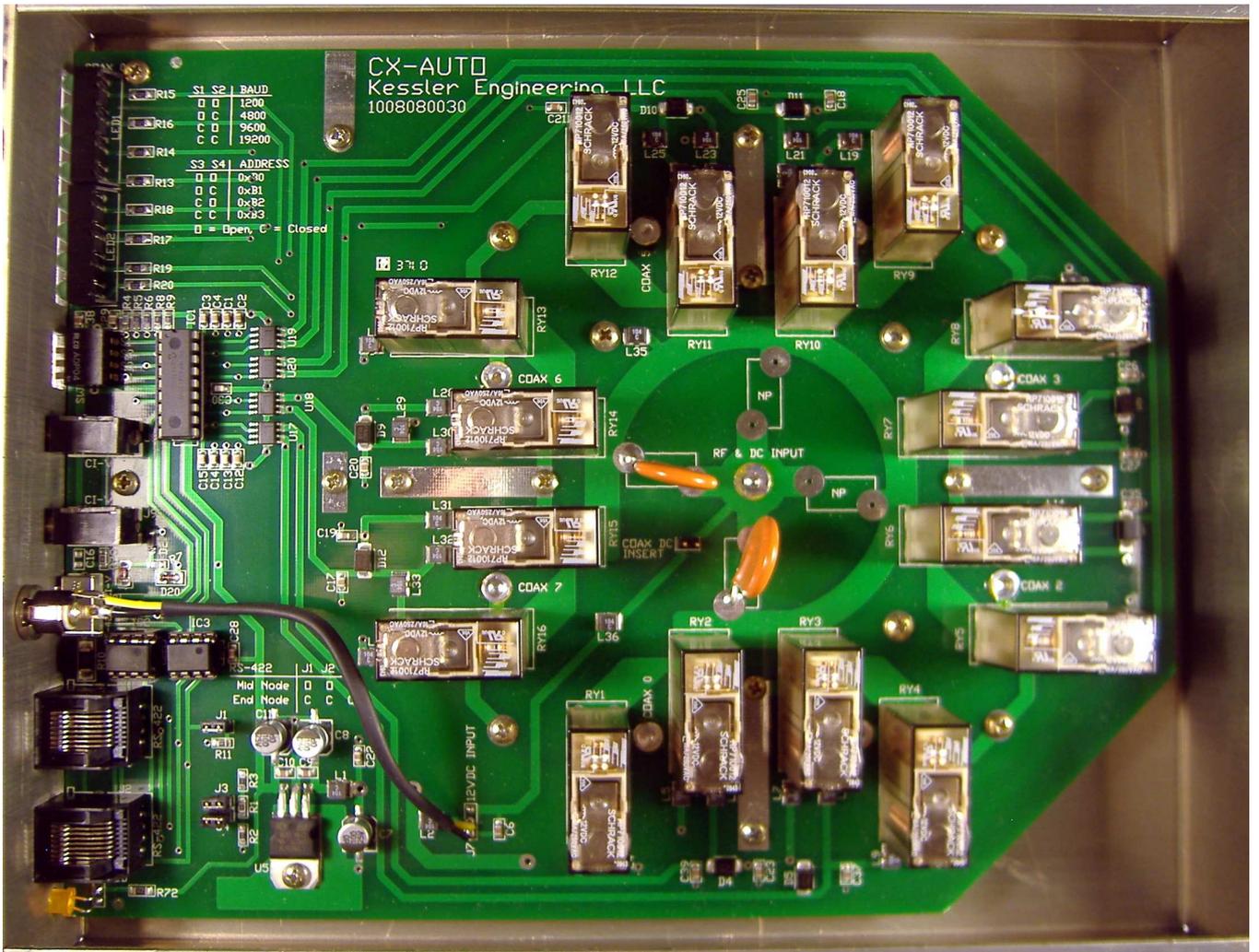


Figure 1.2: Internal View

1.3 Configuration and Setup

The CX-AUTO_(tm) Controls and Connections are illustrated in Figure 1.3, and are described in Table 1.1 (page 7). A generic setup consisting of CX-AUTO_(tm), AT-AUTO_(tm), and an Icom radio is shown in Figure 1.4 (page 8). A generic setup consisting of CX-AUTO_(tm), AT-AUTO_(tm), and a “Vintage” radio is shown in Figure 1.5 (page 9).



Figure 1.3: Controls and Connections

Table 1.1: Controls, Connections, Indicators and Specifications

Front Panel Controls	
RS-422/CI-V Select	User-selection of either RS-422 or CI-V data I/O ports
Address/Baud Select	Selects CX-AUTO _(tm) serial address & baud rate Available addresses are 0xB0 (Default), 0xB1, 0xB2, 0xB3 Available baud rates are 1200, 4800, 9600 (Default), 19200
Front Panel Connectors	
RS-422	Serial Data I/O. Use when deployed far from the Hamshack 8-Pin Ethernet-style jacks. See page 21.
CI-V	Serial Data I/O. Use when deployed in/near the Hamshack Standard 3.5mm mono jacks. See page 10, step 5.
DC Power Input	10-15VDC power input 5.5mm OD, 2.5mm ID, Center Positive
Front Panel Indicators	
Power LED	Illuminates when DC power is supplied to the CX-AUTO _(tm)
Active Output	LED indication of selected coaxial output
Top Panel Connections	
COMMON	SO239 coaxial connector Connect directly to the RF Source (AT-AUTO _(tm) coaxial output)
COAX 0	SO239 coaxial connector. Active when LED 0 Illuminated
COAX 1	SO239 coaxial connector. Active when LED 1 Illuminated
COAX 2	SO239 coaxial connector. Active when LED 2 Illuminated
COAX 3	SO239 coaxial connector. Active when LED 3 Illuminated
COAX 4	SO239 coaxial connector. Active when LED 4 Illuminated
COAX 5	SO239 coaxial connector. Active when LED 5 Illuminated
COAX 6	SO239 coaxial connector. Active when LED 6 Illuminated
COAX 7	SO239 coaxial connector. Active when LED 7 Illuminated
General Specifications	
Frequency Range	1.8-54 MHz
Power Handling	1800 W PEP SSB, 1500 W single-tone continuous
Power Requirements	10-15VDC, \approx 30mA (no output selected) $+\approx$ 90mA per selected output, max 630mA (8 outputs selected)
Dimensions	8.25" Wide, 2.5" High, 10" Deep (including terminals)
Weight	\approx 8Lbs
Materials	Chassis and top cover are .090 ga. aluminum, powder coated and epoxy screened

Note: Specifications are subject to change without notice.

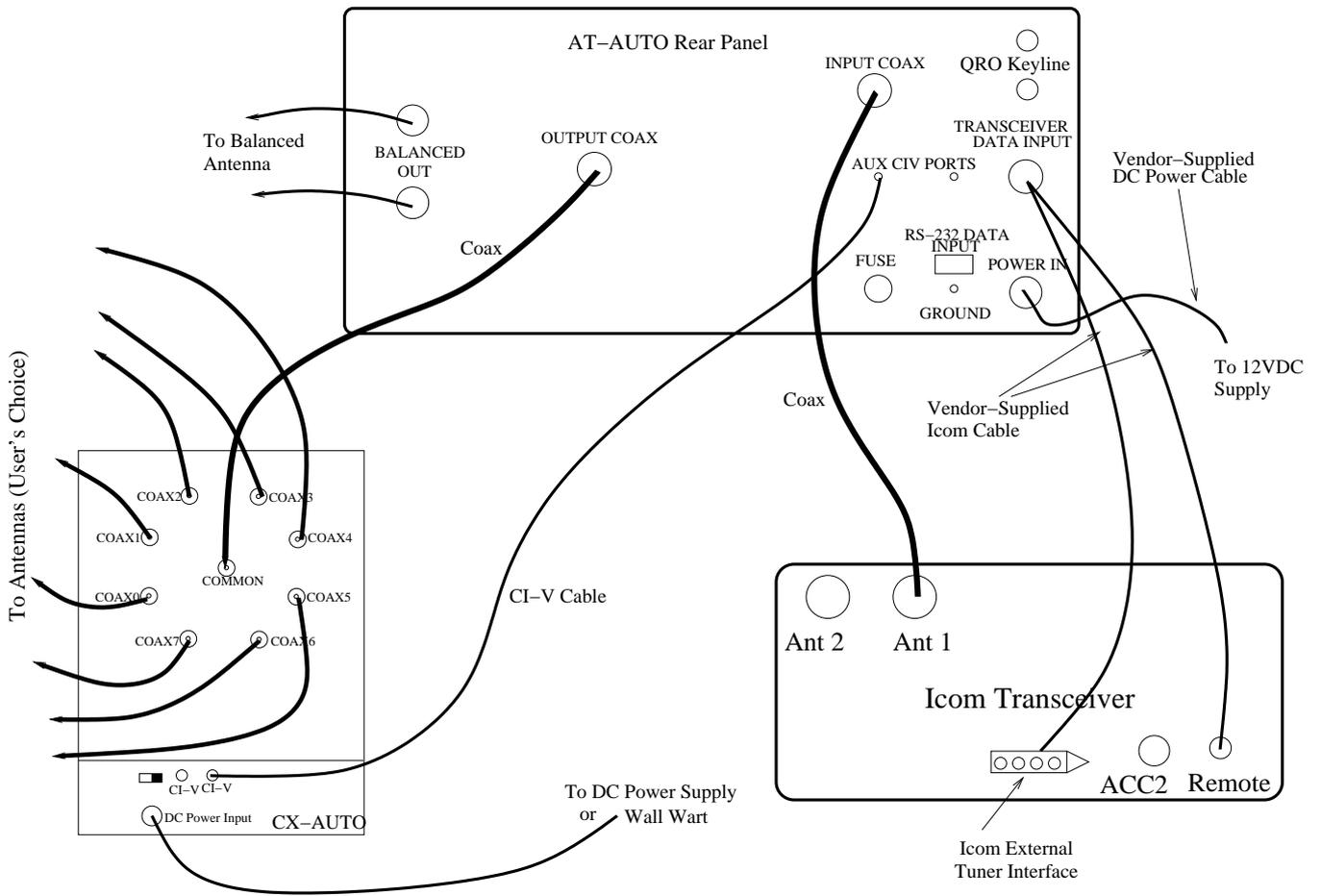


Figure 1.4: Generic Interconnections with an AT-AUTO_(tm) and Icom Radio

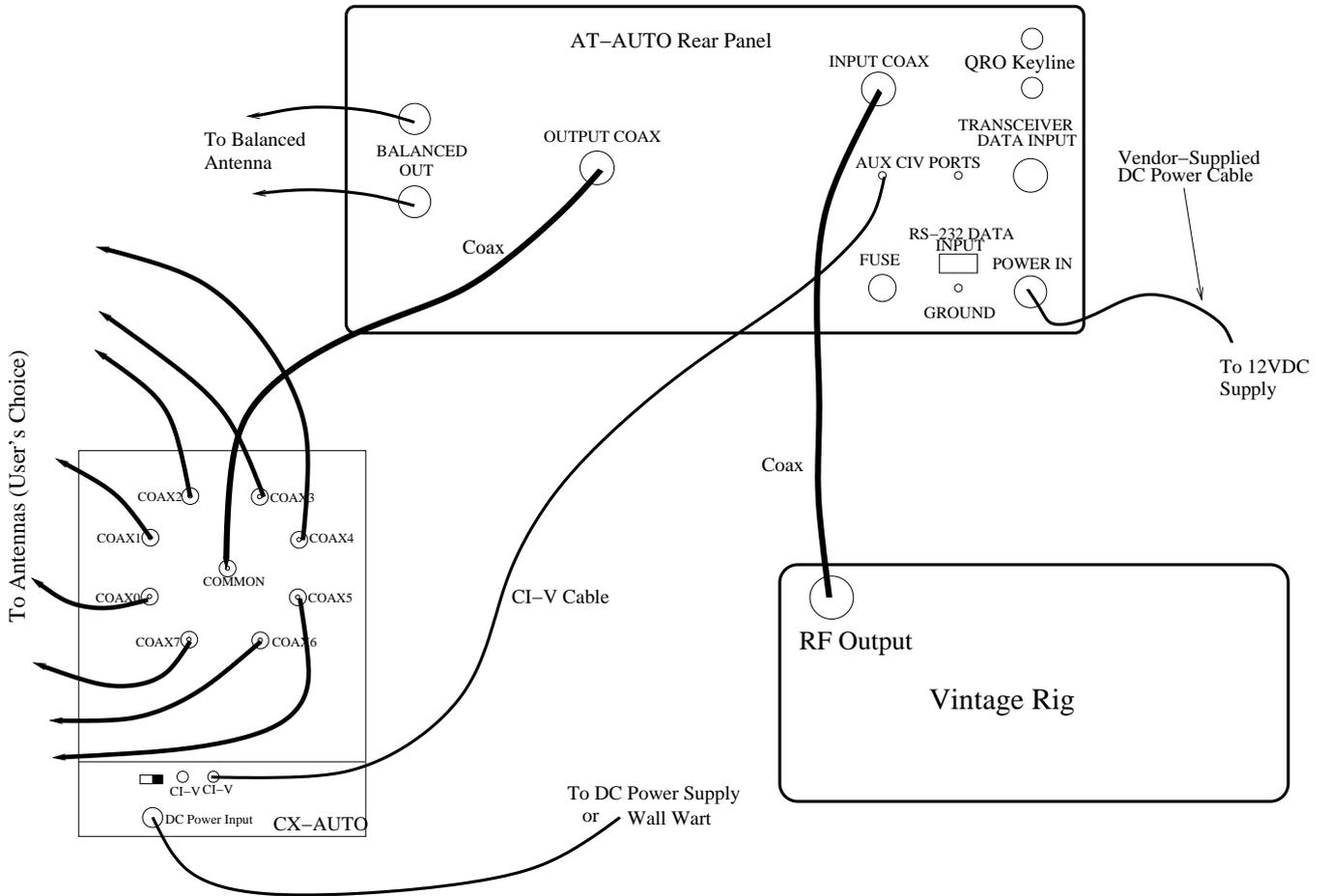


Figure 1.5: Generic Interconnection with an AT-AUTO_(tm) and “Vintage” Radios

1.3.1 CX-AUTO_(tm) Setup

In order to ensure proper configuration and setup of the CX-AUTO_(tm) to operate with the AT-AUTO_(tm), the user should follow these steps:

1. Make a written list of all coaxial-fed antennas (up to eight) to be used with the CX-AUTO_(tm) and assign them to Coaxial Outputs 0-7. On this list, annotate which antenna (coaxial output) should be automatically selected for each of the amateur radio bands. Connect each of the coaxial-fed antennas to the respective coaxial output on the CX-AUTO_(tm).

Band	Antenna	Assignment (COAX 0 - COAX 7)
160m		
80m		
60m		
40m		
30m		
20m		
17m		
15m		
12m		
10m		
6m		

Note: COAX 0 is automatically selected by the AT-AUTO_(tm) whenever the CI-V equipped and configured radio QSYS to the AM Broadcast Band.

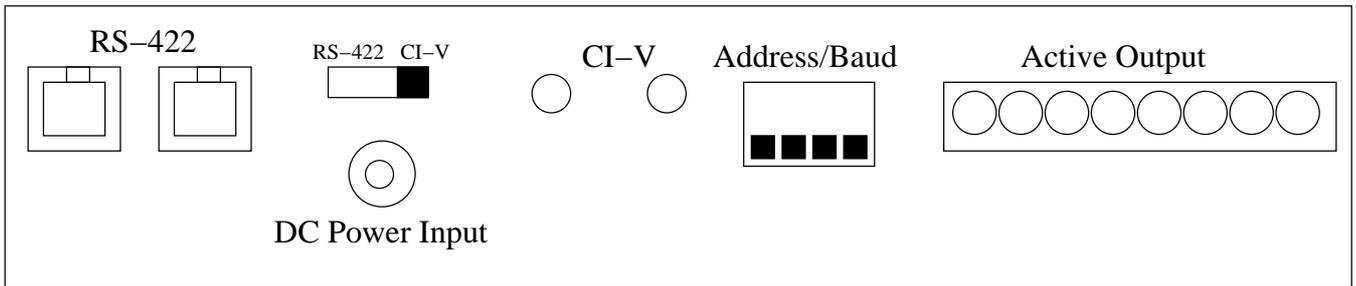
2. Set the CX-AUTO_(tm) to the same baud rate as the AT-AUTO_(tm). See Figure 1.6 (page 12).
3. **No devices on the CI-V bus may share the same address.** Determine the CI-V addresses of all radios, tuners, and other accessories connected to the CI-V bus and record them on paper. Ensure that all devices connected to the CI-V bus are each assigned unique CI-V addresses. If necessary, reassign the CX-AUTO_(tm) to a different CI-V address. See Figure 1.7 (page 13)
4. Connect the Coaxial output from the AT-AUTO_(tm) directly to the Coaxial connector on the CX-AUTO_(tm) labeled “COMMON” with a well made 50Ω coaxial cable (Recommended RG-213 or better).

5. Connect the CX-AUTO_(tm) to the CI-V bus by inserting one end of the CI-V cable into either CX-AUTO_(tm) CI-V jack, and then insert the other end of the CI-V cable into any of the AT-AUTO_(tm) “Aux CI-V” jacks. The CX-AUTO_(tm) CI-V jacks are connected in parallel. When daisy chaining multiple CX-AUTO_(tm), the other CI-V jack is used to link to the next CX-AUTO_(tm) or may be used to provide access to the CI-V bus for other accessories.
6. Ensure the “RS-422/CI-V Select” switch is in the “CI-V” position
7. Apply 10-15VDC to the CX-AUTO_(tm) with either the supplied “Wall Wart” or via a direct connection to the shack power supply.

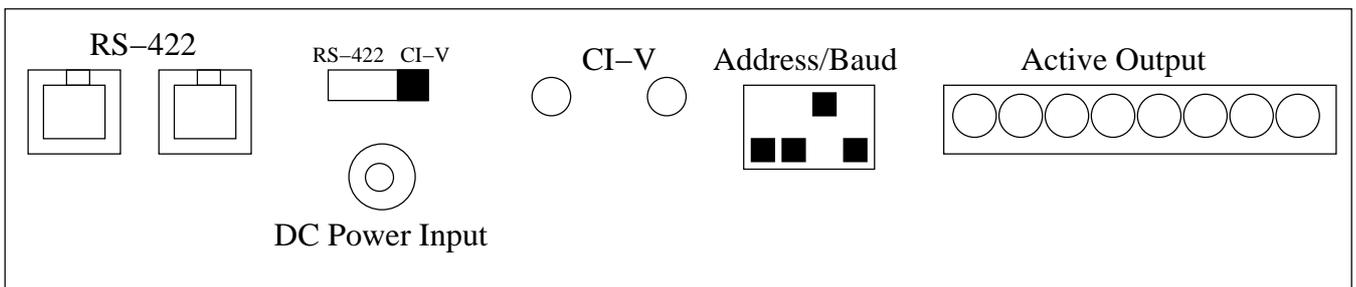
Baud Rate and Address Settings

The possible Baud and Address settings are shown in Figures 1.6 (page 12) and 1.7 (page 13). The CX-AUTO_(tm) has a user-selectable hardware address which enables it to respond only to commands addressed specifically to it while ignoring commands intended for other hardware utilizing the same CI-V or RS-422 data bus. Likewise, the CX-AUTO_(tm) is able to communicate at four user-selected data rates (baud). Therefore, to properly control and use the CX-AUTO_(tm), its baud rate must match that of the AT-AUTO_(tm) or other controlling hardware and its hardware address must also be correctly selected.

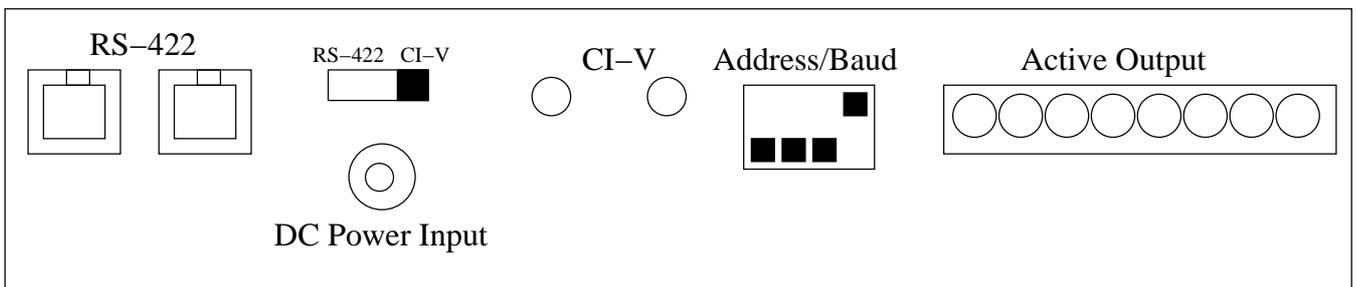
The default CX-AUTO_(tm) hardware address and baud rate as shipped from the factory are 0xB0 and 9600 baud, respectively. This configuration is shown in Figure 1.6.



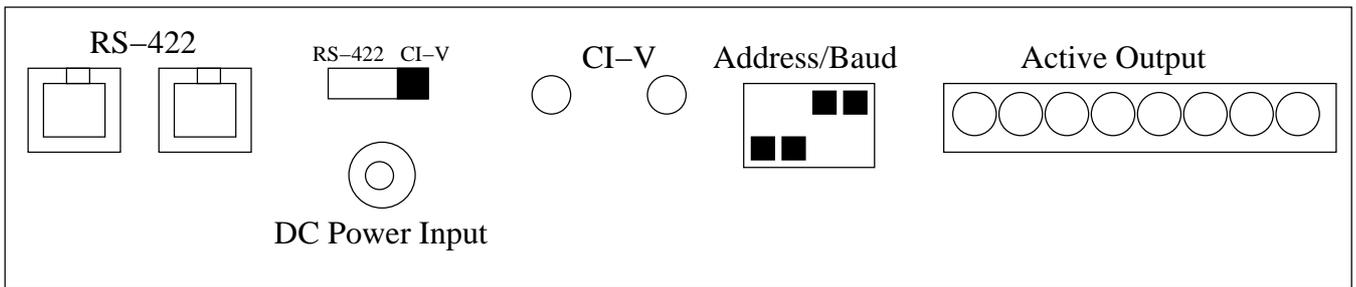
CI-V Selected, 1200 Baud, Address = 0xB0



CI-V Selected, 4800 Baud, Address = 0xB0

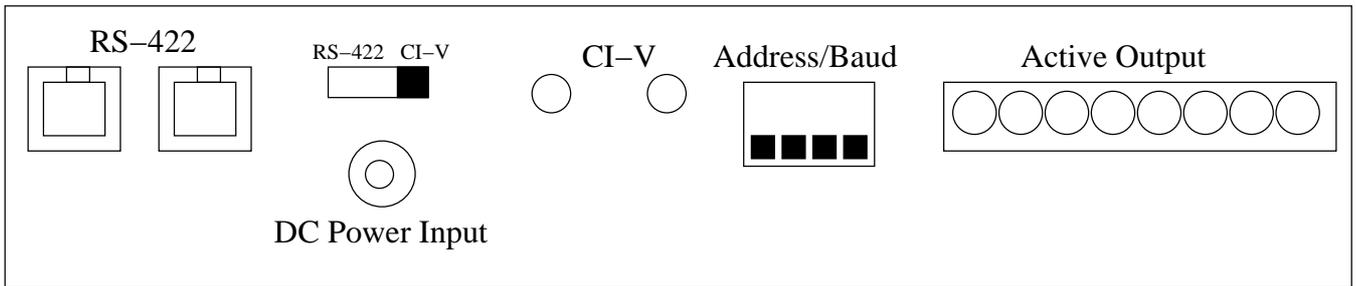


CI-V Selected, 9600 Baud, Address = 0xB0 (DEFAULT)

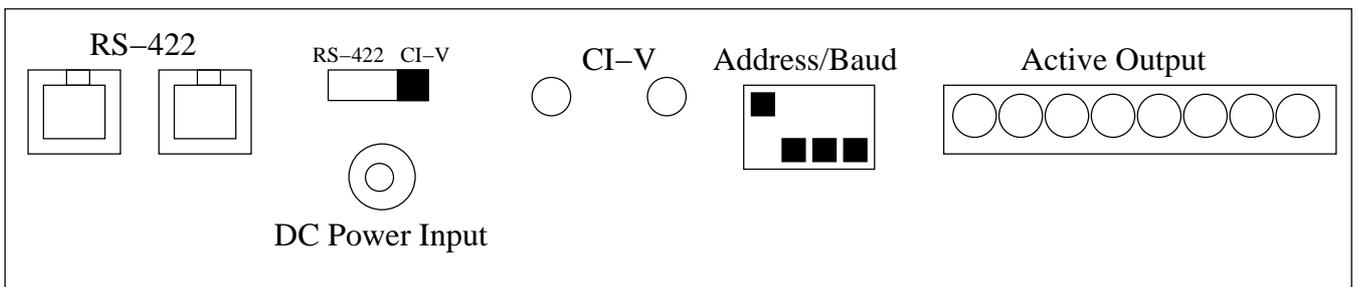


CI-V Selected, 19200 Baud, Address = 0xB0

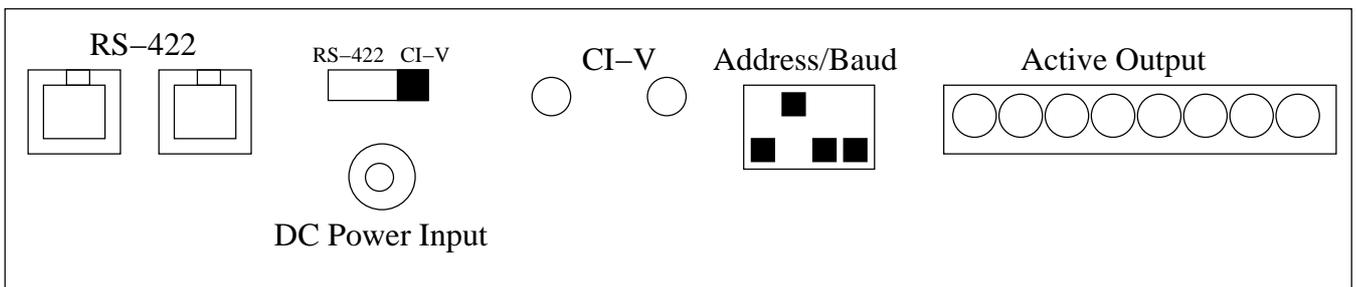
Figure 1.6: Baud Rate Settings



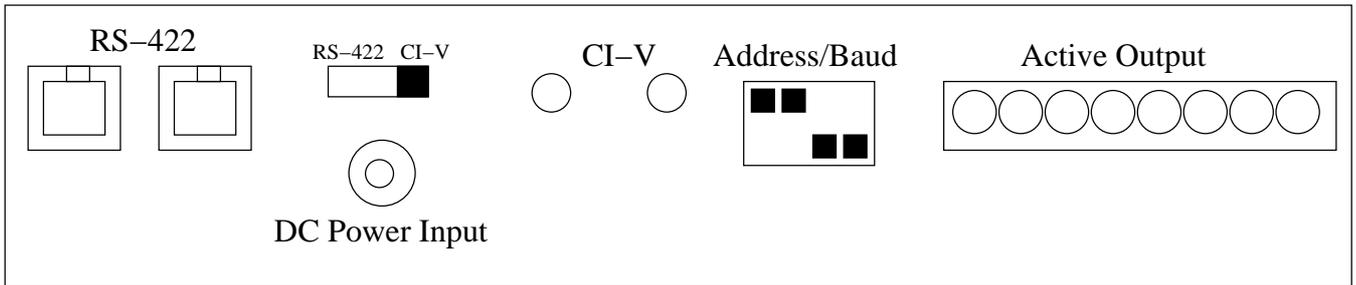
CI-V Selected, 1200 Baud, Address = 0xB0



CI-V Selected, 1200 Baud, Address = 0xB1



CI-V Selected, 1200 Baud, Address = 0xB2



CI-V Selected, 1200 Baud, Address = 0xB3

Figure 1.7: Address Settings

1.3.2 AT-AUTO_(tm) Setup

The AT-AUTO_(tm) must be properly configured via its “Service Menu” in order to control the CX-AUTO_(tm). The relevant “Service Menu” options are shown in Figure 1.9 and are explained in this section. To select a particular option, rotate the black “Tune-Select” knob, then momentarily depress it when the desired option is displayed.

1. Turn *Off* the AT-AUTO_(tm), remove its top cover, and configure its control board jumpers so that it is able to transmit data over the CI-V bus by jumpering the “TX Enable” pin. See Figure 1.8 (page 15). Replace the top cover.
2. Turn *On* the AT-AUTO, select “Automatic Mode” and enter the “Service Menu” by pressing and holding the “Mode” button for 10 seconds and then release. The display should show “Service Menu Exit?”
3. Rotate the black “Tune-Select” knob until the display shows “Config RF Output”, and select.
4. The display will then prompt for the CI-V address of the attached CX-AUTO_(tm). Select the CI-V address corresponding with the CX-AUTO_(tm) (Default address is 0xB0).
5. The display will then prompt for the CI-V address of the balanced antenna switch (still in development). Select “NONE”.
6. The display will then show “Auto Antenna Select?” Select *No* if you do not want the AT-AUTO_(tm) to automatically select CX-AUTO_(tm) outputs by RF band of operation. Select *Yes* if automatic antenna selection is wanted.
7. The display will then show “Bypass During Bandchange?” If you select *Yes*, the AT-AUTO_(tm) will momentarily route RF energy directly from the RF Input to the RF Output while the AT-AUTO_(tm) inductor is repositioning during band changes. Selecting *No* will constantly route RF energy through the tuning network even when the tuner is transitioning from band to band.
8. “Auto Select 160m” will then be displayed along with the current configuration. This is the antenna selection and configuration that the AT-AUTO will make when changing from any band to the 160m band. Select the desired antenna and configuration for the 160m band. Choosing “Thru” will route RF through the tuning network, while “Bypass” will bypass the tuning network. Any *One* of the RF outputs may be picked for automatic selection.
9. Repeat this process for each of the amateur radio bands until “Service Menu Exit?” is displayed.

10. Rotate the “Tune Select” knob and select the “Adj Serial I/O” menu. The current baud rate and Number of stop bits will be displayed, typically 9600 8-N-1. The available baud rates for use with the CX-AUTO_(tm) are 1200, 4800, 9600, and 19200. All devices to be used on the CI-V bus must be set to the same baud rate and single stop bit (8-N-1). Adjust as necessary so that all devices on the CI-V bus are using the same baud rate and one stop bit.
11. Select the “Configure Radio?” submenu and then select “Icom Normal CIV & Ext Tuner I/O” if using the CX-AUTO_(tm)/ AT-AUTO_(tm) combination with an Icom radio that has an external “TUNER” I/O control capability (the radio will have a 4-pin Molex connector on the rear panel). If using an Icom CI-V equipped that lacks external “TUNER” I/O control capability, select “Icom CIV Only No Ext Tuner I/O”. However, if the radio does not have CI-V capability (Collins, Drake, Heathkit, etc.,) then select “Vintage Rig no CAT or Tuner I/O”.

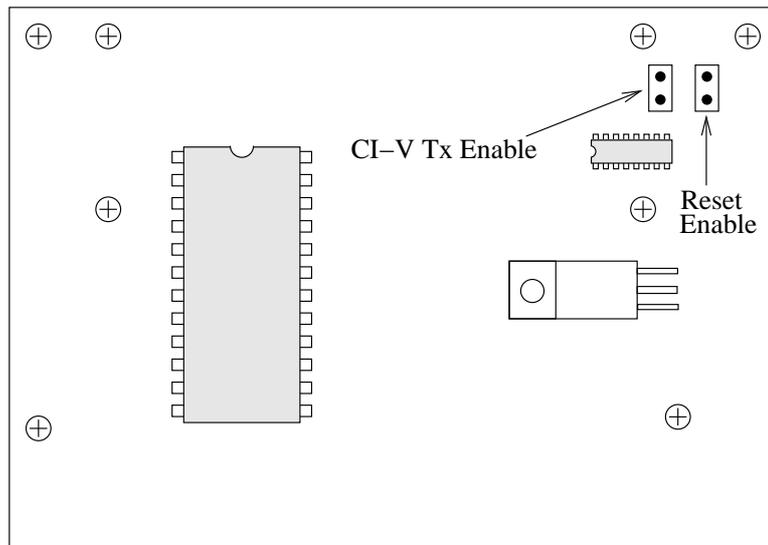


Figure 1.8: AT-AUTO_(tm) Jumper Settings

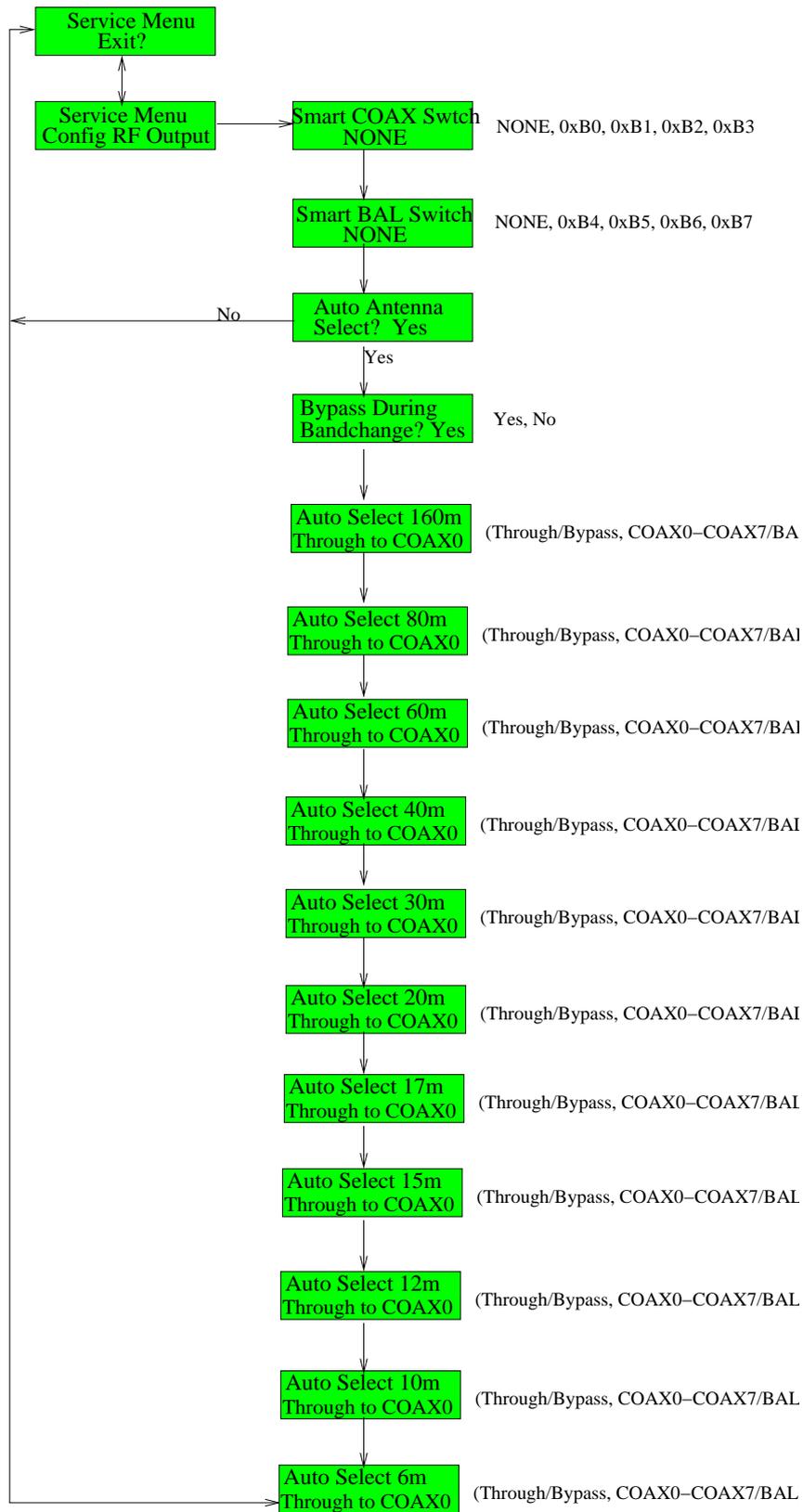


Figure 1.9: AT-AUTO_(tm) “Configure RF Output” User-Options

1.4 Remote Control and Array Operation

The CX-AUTO_(tm) is remotely controllable from a computer serial port via the Icom-style CI-V bus, and uses command syntax compatible with the Icom CI-V protocols. In addition to the normal AT-AUTO_(tm) mode of selecting 1-of-8 coaxial outputs, the CX-AUTO_(tm) may also be used to control an complex antenna array and any/all of the 8 coaxial outputs may be enabled simultaneously.

The CX-AUTO_(tm) has a specific CI-V address (default 0xB0) (hexadecimal) which may be changed to 0xB1, 0xB2, or 0xB3 . The CX-AUTO_(tm) will ignore any commands not addressed specifically to it. All CI-V addresses must be unique.

All CX-AUTO_(tm) CI-V commands are preceded by two identical header bytes (0xFE), and then followed by one trailer (end-of-command) byte which is always 0xFD. All commands are therefore of this format (commas added for clarity only):

0xFE, 0xFE, To-Address, From-Address, Command, Command-Sub Byte(s), 0xFD. The CX-AUTO_(tm) command set is shown in Table 1.2. The Command to select a single RF output is 0x12, the Set Array Command (select multiple outputs) is 0x13, and the Command-Sub Byte(s) are specific RF output(s) to be selected.

Table 1.2: Remote Control Command Set

Command	String	To	From	Cmd	Sub-Cmd0	Sub-Cmd1	Trailer
	Header						
COAX 0	0xFE 0xFE	0xB0	0x3A	0x12	0x00		0xFD
COAX 1	0xFE 0xFE	0xB0	0x3A	0x12	0x01		0xFD
COAX 2	0xFE 0xFE	0xB0	0x3A	0x12	0x02		0xFD
COAX 3	0xFE 0xFE	0xB0	0x3A	0x12	0x03		0xFD
COAX 4	0xFE 0xFE	0xB0	0x3A	0x12	0x04		0xFD
COAX 5	0xFE 0xFE	0xB0	0x3A	0x12	0x05		0xFD
COAX 6	0xFE 0xFE	0xB0	0x3A	0x12	0x06		0xFD
COAX 7	0xFE 0xFE	0xB0	0x3A	0x12	0x07		0xFD
ALL OFF	0xFE 0xFE	0xB0	0x3A	0x12	0x08		0xFD
QUERY	0xFE 0xFE	0xB0	0x3A	0x03			0xFD
SET ARRAY	0xFE 0xFE	0xB0	0x3A	0x13	0x0?	0x0?	0xFD
QUERY Array	0xFE 0xFE	0xB0	0x3A	0x04			0xFD

Command Strings

The controlling PC may be assigned any unique CI-V address. For these examples, assume that the controlling PC is assigned a CI-V address of 0x3A and the CX-AUTO_(tm) is assigned

its default address of 0xB0.

To command the CX-AUTO_(tm) to select coaxial output 2 (COAX 2), the PC must send the following command string:

0xFE 0xFE 0xB0 0x3A 0x12 0x02 0xFD

The CX-AUTO_(tm) will select COAX 2 and acknowledge the command by sending:

0xFE 0xFE 0x3A 0xB0 0xFB 0xFD.

To command the CX-AUTO_(tm) to turn *Off* all coaxial outputs, the PC must send the following command string:

0xFE 0xFE 0xB0 0x3A 0x12 0x08 0xFD

The CX-AUTO_(tm) will de-energize all relays, de-selecting all coaxial outputs and acknowledge the command by sending:

0xFE 0xFE 0x3A 0xB0 0xFB 0xFD.

The status of the CX-AUTO_(tm) may be determined by sending it the *QUERY* command. To do so the PC should send the following command string:

0xFE 0xFE 0xB0 0x3A 0x03 0xFD

The CX-AUTO_(tm) will respond by returning the currently selected coaxial output (0x00 - 0x07) or 0x08 if none of the coaxial outputs are presently selected. If COAX 6 were currently selected, the CX-AUTO_(tm) would return the following data string:

0xFE 0xFE 0x3A 0xB0 0x06 0xFD.

In the event that an invalid command is sent to the CX-AUTO_(tm), it will indicate *Failure* by sending the failure acknowledgement string:

0xFE 0xFE 0x3A 0xB0 0xFA 0xFD.

In the event of a data collision on the CI-V bus, the CX-AUTO_(tm), as well as other equipment attached to the CI-V bus should transmit the “Collision” bitstring:

0xFC 0xFC 0xFC 0xFC 0xFC.

Array Strings

Each of the individual 8 coaxial outputs may be active simultaneously, permitting use of any of the 256 possible combinations of the 8 coaxial outputs. To do so, the individual bits in the lower nibble of the Sub-Cmd0 and the Sub-Cmd1 bytes are set/cleared corresponding to which output(s) are to be selected/de-selected. The individual bit patterns are then “OR-ed” together to form the combined Sub-Cmd0 and Sub-Cmd1 bytes. Please see Table 1.3

Table 1.3: Array Strings Sub-Command Nibble Patterns

Active Output	Sub-Cmd0	Sub-Cmd1
COAX 0	0x01	
COAX 1	0x02	
COAX 2	0x04	
COAX 3	0x08	
COAX 4		0x01
COAX 5		0x02
COAX 6		0x04
COAX 7		0x08

For example, assume an antenna array is comprised of 8 antennas, all connected to the CX-AUTO_(tm). If to steer the array in the desired direction it is necessary to make COAX0 and COAX1 the active antennas, the Sub-Cmd0 would be 0x03, the inclusive-OR’ed combination of COAX0 and COAX1 nibble patterns from Table 1.3, and Sub-Cmd1 would be 0x00 (COAX2-COAX7 inactive).

The command string sent to the CX-AUTO_(tm) to select combination of COAX0 and COAX1 would then be:

0xFE 0xFE 0xB0 0x3A 0x13 0x03 0x00 0xFD

Likewise, if COAX2, COAX4, and COAX7 were to be simultaneously selected, the command string would be:

0xFE 0xFE 0xB0 0x3A 0x13 0x04 0x09 0xFD

For purposes of illustration, to select all 8 antennas simultaneously, the command string would be:

0xFE 0xFE 0xB0 0x3A 0x13 0x0F 0x0F 0xFD

The CX-AUTO_(tm) will select the antenna(s) and acknowledge the command by sending:

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0xFE 0xFE 0x3A 0xB0 0xFB 0xFD.

To de-energize all relays, de-selecting all coaxial outputs and acknowledge the command by sending:

0xFE 0xFE 0x3A 0xB0 0x13 0x00 0x00 0xFD.

The array status of the CX-AUTO_(tm) may be determined by sending it the *QUERY Array* command. To do so the PC should send the following command string:

0xFE 0xFE 0xB0 0x3A 0x04 0xFD

The CX-AUTO_(tm) will respond by returning the currently selected coaxial outputs. Refer to Table 1.3 to decode the returned data.

1.5 RS-422 Hardware Interface

While the CX-AUTO_(tm) will normally connect to the CI-V data bus, there will likely be installations where it is desirable to place the CX-AUTO_(tm) at considerable distance (\approx 50 feet or more) from the associated AT-AUTO_(tm). While it may be possible to operate over greater distances utilizing the CI-V bus, there is greater likelihood that such an attempt will adversely effect the CI-V bus and perhaps cause it to fail entirely. The RS-422 interface permits the CX-AUTO_(tm) to overcome the distance limitation associated with CI-V bus and enable it to be installed up to several hundred feet from the AT-AUTO_(tm).

The RS-422 interface uses ordinary CAT-5 cable and connectors, but it is NOT an internet-enabled device and one should NOT attempt to connect the CX-AUTO_(tm) to a computer network (LAN). The CAT-5 style hardware implementation was chosen to permit the user to readily acquire appropriate and inexpensive control cabling for the CX-AUTO_(tm) from multiple sources (computer store, big-box retail outlets, etc.).

The CX-AUTO_(tm) must still be configured for the correct baud rate and address as described on page 11. Just as there are two parallel CI-V jacks for daisy chaining CX-AUTO_(tm), there are also two parallel RS-422 connections.

Unlike CI-V which operates as an open-collector bus that uses an unbalanced, ground-referenced electrical signal, the RS-422 uses differential signals transmitted via “twisted pairs” of copper wire. The twisted pairs must be electrically balanced and properly terminated (or else electrical reflections – think of it as SWR in the digital world – will likely occur and interfere with or otherwise impede the correct flow of data). For this reason, there are three jumpers installed in the CX-AUTO_(tm) to provide the proper “loading” of the RS-422 data lines. These jumpers are shown in Figure 1.10 on page 22, and are identified as *J1*, *J2*, and *J3*, respectively

By default, the three jumpers are installed in their *Closed* position when using a single CX-AUTO_(tm). If daisy chaining multiple CX-AUTO_(tm) from the RS-422 bus, only the CX-AUTO_(tm) at the *End* of the chain (“end node”) should have its jumpers in the *Closed* position. For all other CX-AUTO_(tm) in the daisy chain (“mid node”), these three jumpers must be *Open* (remove the jumpers).

Make sure that the “RS-422/CI-V Select” switch is in the “RS-422” position.

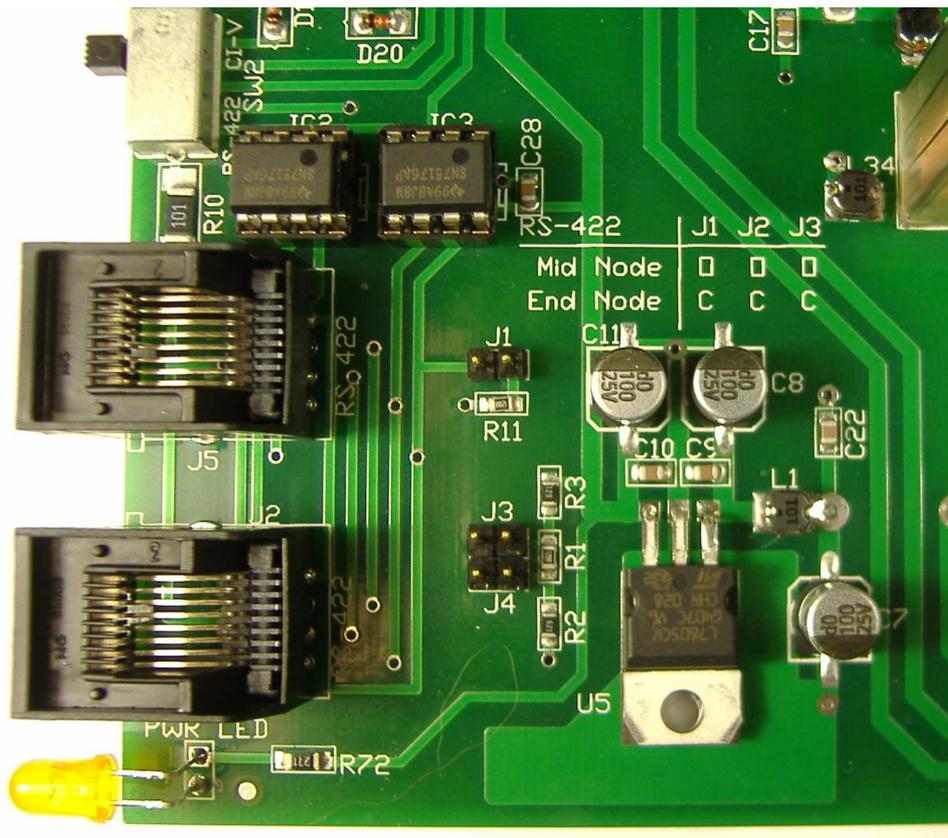


Figure 1.10: CX-AUTO_(tm) RS-422 Jumpers

Service and Warranty

Warranty

Kessler Engineering, LLC. warrants all of our products to be free from defects in material and workmanship under normal use for a period of one year from the date of purchase. During this one-year warranty period, Kessler Engineering will either repair or replace the product at its option at the Kessler Engineering facility in Beavercreek, Ohio.

This warranty will be void if the product has been repaired or altered by anyone other than the staff at Kessler Engineering. This warranty does not apply to products damaged due to improper installation or abuse/misuse.

Repair Policy

Please contact our service department for return authorization and shipping instructions prior to sending any product for service or repair. All items shipped to Kessler Engineering, must be packed appropriately and insured against damage. Kessler Engineering is not responsible for merchandise damaged in shipment. Be sure to include a note describing the problem in detail and include your contact information (phone number and e-mail).

Return Policy

All returns must receive prior authorization. Returned items must also include a copy of the original sales receipt and be returned with the original box, manuals, and accessories. Returns must be received within 7 days of purchase and are subject to a restocking fee. Shipping expenses are not refundable.

Frequently Asked Questions

This section covers the most frequently asked questions. However, we are also aware of a users group available on Yahoo that many AT-AUTO_(tm) users have found quite helpful. While Kessler Engineering, LLC is not affiliated with this group, we are certainly aware of its existence and thankful for the very professional manner in which it is run. The URL is:

http://groups.yahoo.com/group/KesslerEngineering_ATAUTO/

3.1 Serial Port Related Questions

I'm using a Kenwood radio and it is connected to the AT-AUTO_(tm) serial port. Why can't I use the CX-AUTO_(tm)?

Answer: The AT-AUTO and the Kenwood radio each only have one RS-232 serial port. The RS-232 protocol only permits two devices to communicate over the RS-232 bus. Neither the AT-AUTO or the Kenwood radio are able to communicate with additional devices such as the CX-AUTO_(tm) when using the RS-232 port. The CI-V port and protocol do not have this two-device limitation and hence the CX-AUTO_(tm) and the AT-AUTO_(tm) are able to operate with multiple radios, etc., when connected together via the CI-V bus.

The AT-AUTO_(tm) sometimes displays "Coaxial Switch Not Responding". What does this mean?

Answer: The AT-AUTO_(tm) expects an acknowledgement from the CX-AUTO_(tm) every time that it sends a new command to the CX-AUTO_(tm). The AT-AUTO_(tm) will make approximately 10 attempts to communicate with and get a response from the CX-AUTO_(tm). After the 10th attempt, the AT-AUTO_(tm) will cease sending that particular command and prompts the user that there may be a communication problem with the attached CX-AUTO_(tm). Most of the time that this occurs is because the CX-AUTO_(tm) had not been powered *On*.

3.2 General Usage Questions

Can I manually switch antennas even though I have the AT-AUTO_(tm) setup to automatically select the antennas when I hop from band to band?

Answer: Yes. The AT-AUTO_(tm) automatically selects the antenna by band based upon your particular firmware configuration. Once you have QSY'ed to a particular band and the AT-AUTO_(tm) has selected one of the CX-AUTOs'_(tm) coaxial outputs, you may manually select whichever coaxial output that you want. Your selection will remain in effect while you remain within the band, but once you depart this particular band and then subsequently return, the AT-AUTO_(tm) will again select the antenna based upon your particular firmware setup.

I have two AT-AUTOs_(tm) on the same CI-V bus. Can I add a CX-AUTO_(tm) to each of them? And still have everything on the same CI-V bus?

Answer: Yes. But each device *must* be assigned a unique CI-V address.

Firmware Copyright

The microprocessor contained within the CX-AUTO_(tm) has been programmed with firmware written by and for Kessler Engineering, LLC. This firmware and all derivatives are Copyright, Kessler Engineering, LLC. The User is strictly prohibited from extracting, decompiling, or otherwise accessing any portion of this Copyrighted firmware. Kessler Engineering, LLC takes Copyright infringement seriously and shall take whatever steps necessary to protect its intellectual property.