RadioLink

Model RL-1

OPERATING MANUAL

RadioLink
Model RL-1

Part #040-074
Manual Revision E
ECO 760

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1.1 Welcome

Congratulations! You have purchased another fine AEA product. **Please,** before you go any further, fill out and return the *Warranty Registration Card* that has been packed with your RL-1.

1.2 Product Update Policy

From time to time AEA may make updates available to a product or its software. We can only tell you about these updates if we have your warranty card on file, so please send in your warranty card.

1.3 Overview

The RL-1 was designed by AEA to provide the amateur radio operator with the ability to control their HF, VHF, or UHF station or receiver by a full duplex radio link. The transceiver or receiver that RadioLink will control must have the ability to be controlled by a computer. The radio you use to control RadioLink must have a Touch Tone (Touch Tone is a trademark of AT&T) microphone or keypad. A computer is not required for use with RadioLink.

1.3.1 Definitions

Controlled Radio—The HF, VHF, or UHF radio that RadioLink will be used to control.

Link Radio(s)—The full duplex VHF and/or UHF radios that RadioLink is connected with. The link radio(s) could also be a repeater. The receiver on the link radios must be tuned to 220 MHz or higher to meet the FCC's rules in the U.S.

Up-Link Radio—The receiver which will receive commands being sent to RadioLink

Down-Link Radio—The transmitter through which RadioLink sends audio back to the user.

1.3.2 Capabilities

The RL-1 allows you to remotely control the frequency, mode, VFO selection, scan, and split operation of your radio. It also will announce the frequency of the controlled radio in a synthesized voice.

There are two methods of tuning the controlled radio. The operator can key in a frequency and have the radio go to that frequency, or the radio can be *tuned* either up or down in frequency in 10 Hz, 100 Hz, 1 kHz, or 5 kHz steps.

The transceiver may be switched to the memory mode. The operator can then step through the memories or a specific memory channel can be selected.

RadioLink may be interfaced to either a repeater, two radios (mobiles intended for amateur use will work), or a cross band radio capable of full duplex operation.

The user can also plug a local mic and speaker into the rear panel of RadioLink. There is a push button on the front of the RL-1 to switch between local and radio control mode.

1.3.3   Included Components

Your RL-1, RadioLink, package contains the following items:
* RL-1 RadioLink
* RadioLink Operating Manual
* Warranty Registration Card
* Wall Power Supply (12 VDC)
* Cable for Connection of VHF/UHF Link Radio Mic Connector to RadioLink (DIN connector to Mic Connector)
* Cable for Connection of VHF/UHF Link Radio Speaker Jack(1/8"jack on both ends)

1.3.4   Optional Components

Icom Interface Cable Model HL-61 — This cable plugs into the back of RadioLink and into an Icom receiver or transceiver that has a CI-V computer control port. With this cable, the user does not have to do any soldering to use RadioLink.

Kenwood Interface Cable Model HL-62 — This cable plugs into the back of RadioLink and into any Kenwood receiver or transceiver that has the Kenwood computer interface port. With this cable, the user does not have to do any soldering to use RadioLink.

Yaesu Interface Cable Model HL-63 — This cable plugs into the back of RadioLink and into a Yaesu FT-890, FT-990, FT-1000, FT-747GX, or FT-757GXII. With this cable the user does not have to do any soldering to use RadioLink. Provision is made to connect to both types of CAT interface connectors that are used on the above radios.

1.3.5   Other Equipment You Will Need

To control RadioLink, you will need a handheld radio with a Touch Tone pad or a mobile radio with a Touch Tone microphone.

In addition, you will need an up-link receiver and a down-link transmitter. Normally these would either be a repeater, two in-band VHF, UHF, or 220 MHz radios, or a dual-band full duplex radio. The down-link radio or transmitter must be rated for 100% duty cycle because it is continuously keyed when RadioLink is being used. **If you are using a mobile radio for the down-link transmitter or a dual-band radio, decrease the transmitter power output to use it in this application.**

RadioLink comes with a cable that supports any Alinco, Icom, Kenwood, or Yaesu radio with an 8-pin mic connector. See Appendix B for wiring instructions when any different radio is going to be used.

1.3.6 Control Frequency Limitations

The VHF or UHF up-link radio used with RadioLink must operate on 220 MHz c⁻ ≡.⁻⁻⁻ to meet FCC requirements in the U.S.

1.4 Equipment Requirements

RadioLink can be used to control most Icom, Kenwood, and Yaesu radios that ⁻≡⁻⁻ ⁻ computer control port.

1.4.1 Icom

Any Icom transceiver or receiver that has the CI-V computer control port can be ⁻≡⁻⁻ with RadioLink. At initialization, RadioLink searches through all the possible radio addresses to determine what type of Icom equipment it is connected to. It then memorizes this information. You do not have to program any address information into RadioLink to allow it to control your radio.

1.4.2 Kenwood

Any Kenwood transceiver or receiver that has an active computer control port (6 pin DIN socket) can be used with RadioLink.

With some Kenwood radios you will have to install Kenwood's computer interface kit inside your radio to activate the computer port. Refer to your Kenwood manual for this information.

You do not need Kenwood's optional RS-232 (IS-232C) adapter for use with RadioLink.

1.4.3 Yaesu

RadioLink may be used to control a Yaesu FT-890, FT-990, FT-1000, FT-747GX, or FT-757GXII. These are the only Yaesu transceivers that are currently supported by the RL-1. AEA's optional interface cable takes into account that two different computer port connectors are used on these radios. An adapter is included with each HL-63 cable to accommodate the different computer port connectors.

1.5 Specifications

The specifications for the RL-1 are listed below:

General

Power	115 VAC or 12 VDC at 220 ma (An AC power supply is included)
Temperature	0 to 35 degrees C
Size	9.125" (W) x 5.25" (D) x 2.25" (H)
Weight	3 pounds

Controlled Radio Interface

Any Icom HF, VHF, UHF transceiver or receiver with a CI-V computer port.

Any Kenwood with an active computer control port (see 1.4.2). The optional IS-232 interface is not required.

Yaesu FT-890, FT-990, FT-1000, FT-747GX, FT-757GXII.

Link Radios

Any Icom, Kenwood, Alinco, or Yaesu radio with a 8 pin microphone connector may be used for the up-link or down-link radio.

The RL-1 can also be interfaced to a repeater by building a custom cable.

The down-link transmitter must be capable of 100% duty cycle transmissions.

Software Initialization by Owner

Password   Any 2 to 6 digit alpha (A, B, C, or D) or numeric code

Auto Disconnect   Programmable 1 to 9 minutes

Additional Specifications

Indicators   Local, Remote, Down-Link On, T-T Level

Adjustments   None

Switches   Local/Remote

2.1 Installation

The RL-1 is easy to install. Simply set the jumpers inside RadioLink for the link transmitter that you will be using and connect the various cables. If you have elected to build your own interface cable for the controlled radio, refer to Appendix A for the wiring diagram and parts list.

2.2 Unpacking

Carefully remove the RL-1, cables, and wall mounted power supply from the box. Inspect the various parts to ensure there is no shipping damage. Immediately contact your dealer or the shipper if shipping damage is discovered. Do not attempt to install or use a damaged RL-1 or wall mounted power supply.

2.2 Connecting RadioLink

If you did not buy the optional interface cable that connects the RL-1 to your controlled radio, refer to Appendix A of this manual for the parts and the wiring diagram required to build the cable. You will either need one of the optional cables that AEA sells or you will need to build your own cable to proceed with the installation of your RadioLink.

> *Static Electricity Safety*—As with all electronic equipment, RadioLink can be damaged by static electricity. A few simple precautions are in order when working with RadioLink. Whenever you plug a cable into RadioLink, touch the case with your hand before you plug the cable into its socket on RadioLink. When moving the internal jumpers in RadioLink, touch the case with your hand before you touch the electronics in RadioLink. By touching the case first, you greatly reduce the possibility of damage.

1. Remove the six cover screws and remove the bottom of RadioLink (the board is mounted in the top of the case).
2. Configure the jumpers near the down-link transmitter connector using the drawings below. These jumpers are routing signals to the proper pins on the mic connector cable going to the down-link transmitter.

If you are going to interface your RadioLink to a radio that does not have an 8 pin mic connector see Appendix B for cable wiring instructions.
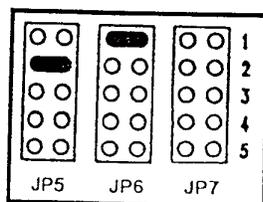
Yaesu
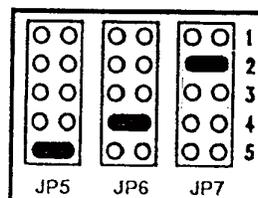
Kenwood/Alinco
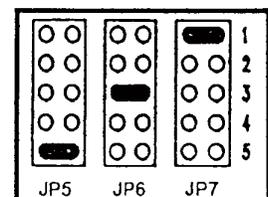
Icom

If you are going to use RadioLink with a local microphone, configure the local mic connector jumpers as shown below:

Yaesu

Kenwood/Alinco

Icom
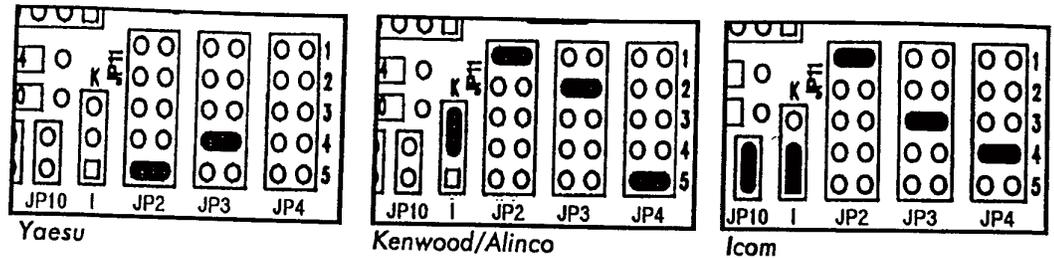
3. Replace the bottom cover on RadioLink and secure it with the case screws.
4. Plug the 9 pin (DB-9) connector on the HL-61, HL-62, or HL-63 interface cable for the controlled radio into the DB-9 connector on the rear panel of RadioLink.
5. Plug the 1/4-inch phone jack on the interface cable into the CW key socket on your transceiver. If you are interfacing the RL-1 to a receiver, do not connect this cable.
6. Plug the microphone connector of the interface cable into the mic jack on the controlled transceiver. If you are interfacing the RL-1 to a receiver, do not connect this cable.
7. Plug the computer interface connector on the interface cable into the computer port on the controlled radio.
8. Plug the remaining connector on the interface cable into the external speaker socket on the controlled radio.
9. If you are going to use a local mic and external speaker with RadioLink, plug the mic into the "Local Mic" jack and the speaker into the "Local" speaker jack on the back of RadioLink.
10. Connect one end of the supplied cable with 1/8" phone connectors on each end into the socket labeled "UP-LINK." Connect the other end of this cable into the external speaker jack on the link radio that is used for receive audio.
11. Locate the cable with an 8-pin DIN connector on one end and an 8-pin mic connector on the other end. Connect the mic connector on this cable to the mic connector on the down-link transmitter. Connect the DIN plug to the socket labeled "DOWN-LINK TRANSMITTER" on the rear of RadioLink.
12. Plug the power connector on the wall power supply into the power connector on the back of RadioLink. If you are using 12 VDC to power RadioLink rather than the wall power supply, the center pin of the connector must be connected to the positive lead from your power source.

3.1 Initialization

Follow these steps carefully and in the **exact order** listed to ensure that you properly initialize RadioLink.

1. **Turn power for your controlled radio off. Leave Kenwood TS-50, TS-450, TS-690, TS-850 or TS-950 turned on.**

2. Turn your link radio(s) on.

3. Use a mobile or hand-held (referred to as hand-held from now on) radio with a Touch Tone pad. Set the hand-held transmit frequency to the receive frequency of the link receiver. Set the hand-held receiver frequency to the link transmitter frequency.

4. Make sure the hand-held frequencies agree with the link frequencies. Transmit with the hand-held and send the code 1111 with the Touch Tone buttons. This is the default password for RadioLink.

5. The link transmitter will come on the air and you will hear 4 beeps in the hand-held receiver.

6. Key the hand-held transmitter and send the two-digit code from the following table which corresponds to the controlled radio you are using. **AFTER SENDING THE TWO-DIGIT CODE IMMEDIATELY TURN ON THE CONTROLLED RADIO UNLESS THE RADIO IS A KENWOOD LISTED IN STEP #1, WHICH SHOULD ALREADY BY ON.**

Icom	10
Kenwood 140, 440, 680, 711, 811, and 940	20
Kenwood 450, 690, 850, and 950	21
Kenwood TS-50	22
Yaesu FT-890	30
Yaesu FT-990	31
Yaesu FT-747GX	32
Yaesu FT-757GXII	33
Yaesu FT-1000	34
Radio with no computer port	99

   The 99 code above can be used if the controlled radio does not have a computer port. All the commands that access the computer port are deactivated when this code is specified at initialization.

7. After the above two-digit code has been entered, two beeps will be heard on the hand-held receiver indicating that communications have been established with the controlled radio.

8. Choose a 1 to 6 character password to be used in accessing RadioLink, DO NOT CHOOSE "1111". From the Touch Tone buttons on the hand-held enter the password (while transmitting) delimited with "#" (i.e., to have a password of "1234A" you would send the following Touch Tones: #, 1, 2, 3, 4, A, and #). After RadioLink accepts the password, it will ID then turn itself off. To proceed with the initialization process, use your personal password to cause RadioLink to turn back on and proceed with Step 9.

NOTE:

RadioLink takes from one to three seconds to acknowledge commands. DO NOT issue a second command until you hear the acceptance beep.

9. Program your call for the down-link transmitter CW identification. To do this, send the #7997# command to RadioLink. After you hear beeps, enter your call (you may use up to 11 characters) using the two number code from the table below for each character in your call. "DE space" is automatically added by RadioLink before your call is sent. Enter a "00" code as the last letter of your call to terminate the entry process.

A	01	L	12	W	23	7	37
B	02	M	13	X	24	8	38
C	03	N	14	Y	25	9	39
D	04	O	15	Z	26	0	30
E	05	P	16				
F	06	Q	17	1	31	/	40
G	07	R	18	2	32	Space	41
H	08	S	19	3	33		
I	09	T	20	4	34		
J	10	U	21	5	35		
K	11	V	22	6	36		

The program sequence to enter for the call K7RIE would be: #7997#, beeps, 11, 37, 18, 09, 05, and 00.

To totally deactivate the CW ID program four spaces (41 code) into RadioLink's memory.

10. RadioLink was designed to include a path for up-link audio to be routed to the down-link transmitter. When you use RadioLink with a repeater the other users on the repeater will be able to hear both sides of the conversation. If you do not desire this audio path it may be disabled by removing JP1 jumper inside RadioLink. JP1 is near the end of the relay and is the only wire jumper in RadioLink. See drawing in section 5.4.12.

4.1 Commands

Each of the RadioLink commands and their function are described below:

#11#	Set Mode to LSB
#12#	Set Mode to USB
#13#	Set Mode to AM
#14#	Set Mode to CW
#15#	Set Mode to RTTY (not recommended for use with RadioLink)
#16#	Set Mode to FM
#17#	Set Mode to Wide FM
#2KKKKK#	Set Current VFO Frequency
#2KKKKK*HH#	This command sets the current VFO to the specified frequency. There must be at least three digits after the 2 key in the command and before the ending # key. A decimal point may be entered (to allow Hertz to be entered) by using the "*" key.
#31#	Select VFO A
#32#	Select VFO B
#33#	VFO A = B Mode
#34#	A and B VFO Frequencies Set Independently
#35#	Set VFO B = VFO A
#41#	Activates Lock Out Frequency Changes
#42#	Deactivates Lock Out Frequency Changes
#43#	Activates Lock Out Transmit Function
#44#	Deactivates Lock Out Transmit Function
#45#	Activates audible beep during transmit to the downlink radio path (every 8 seconds).
#46#	Deactivates audible beep during transmit to the downlink radio path (every 8 seconds).
#51#	Select Memory Mode
#52#	Select VFO Mode
#53nn#	Select Memory Channel to be Scanned
#55#	Start Scan (either VFO or Memory)
#59nn#	Set the Maximum Number of Memory Channels to be Scanned.
#60#	Turn Logic Output on DB-15 pin 3 On
#61#	Turn Logic Output on DB-15 pin 3 Off
#62#	Turn Logic Output on DB-15 pin 4 On
#63#	Turn Logic Output on DB-15 pin 4 Off
#64#	Turn Logic Output on DB-15 pin 5 On
#65#	Turn Logic Output on DB-15 pin 5 Off
#66#	Turn Logic Output on DB-15 pin 6 On
#67#	Turn Logic Output on DB-15 pin 6 Off
#68#	Turn Logic Output on DB-15 pin 7 On
#69#	Turn Logic Output on DB-15 pin 7 Off

#71#	Turn Logic Output on DB-15 pin 8 High for 100 ms
#73#	Send Identification On Down-Link
#7997#	Program CW Identification Call
#88#	Time Out Time W/O Tone
	0 Will only turn off with #0# command (not recommended)
	1 1 Minute
	2 2 Minutes
	Etc. Up to 9 Minutes
#91#	Announce Frequency
#92#	Announce Mode
#93#	Announce Both Frequency and Mode
#94#	Announce VFO B Frequency
#0#	Terminate use of RadioLink & Turn Off Down Link Transmitter

You may not be able to access all of RadioLink's functions via the computer port in all of the different radios. If, for instance, your radio does not have a scan mode, you will not be able to scan with RadioLink connected to your radio. Some radios have scan but the manufacturer did not provide the ability to control the scan via the computer port on the radio; therefore, RadioLink will not be able to access the scan mode. Refer to your radio's owner's manual for this information
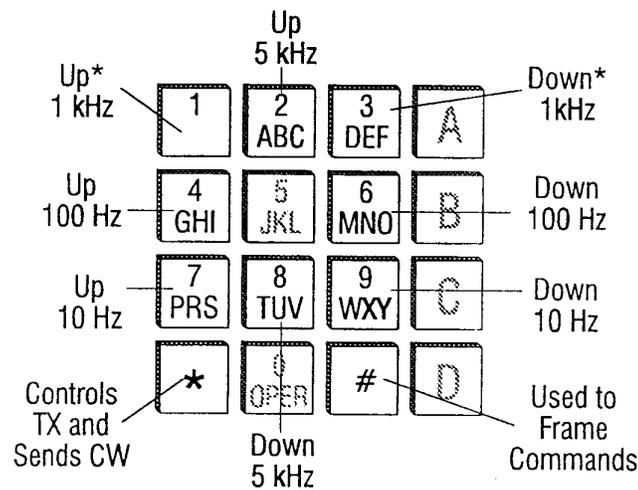
*Scans memory in memory mode

The following keys on your handheld can be used to tune the receiver or transceiver in small steps:

Up	Down	Step
2	8	5 KHz
1	3	1 KHz
4	6	100 Hz
7	9	10 Hz

In addition, when you are in the memory mode, the "1" key will step the memories up by one channel and the "3" key will step them down one channel.

5.1 Operation

RadioLink must be initialized as described in Section 4 of this manual before it can be used. If you have not initialized RadioLink, (told it which radio it is connected to, allowed it to establish communication with your radio via its computer port, and loaded in a password) please do so now.

5.2 Setting Up Your Controlled Radio

Turn the power to your controlled radio "ON." If you plan to scan memories with RadioLink or scan a range of frequencies, load your memories and/or the band limits into the radio. You can not load frequencies into your radio's memories with RadioLink.

Set the filters on the radio for both SSB and CW.

TURN THE VOX GAIN ALL THE WAY DOWN TO MINIMUM. You must do this to allow RadioLink to operate properly. On most radios you will have to leave the VOX switch on.

The easiest way to set your radio up to operate with RadioLink is to plug a normal key into the CW jack and plug a mic with a push-to-talk button into the mic jack. Select CW mode. Set the controls on the radio so when the key is depressed in the CW mode the radio transmits. Change the radio's mode to SSB, and with just this mode change, the radio must transmit on SSB by depressing the push-to-talk button on the mic.

Set the mic gain as you do normally.

The final setting of both the volume control and the mic gain control will have to be determined by experimentation while you are actually using RadioLink by remote control.

5.3 Setting Up the Link Radios

If you are going to use the same band for both the up-link and down-link frequencies, then you must either use two separate antennas or a duplexer.

> *It is important to make sure that the receiver volume on the up-link receiver never gets turned all the way down. If this happens, RadioLink will not be able to hear its control commands and will appear to be inoperative.*

Set the frequency on the radio used as the up-link receiver to the one that you will be using as a control frequency.

Set the volume on the receiver link radio to minimum while sending touch tone on the uplink frequency, turn the receiver volume up until the TT Level LED on RadioLink comes on. This is a good starting point for the uplink receiver volume.

Make sure that any CTCSS decoders or DTMF decoders on the link radios are turned off unless you plan on using these decoders to keep unwanted signals from accessing RadioLink.

Set the transmitter to the frequency that you will be using as a down-link frequency. If you are using the same band for both the up-link and down-link radios, make sure the transmitter is offset by the proper amount. On 2 meters this is 600 KHz (2 meters may not be used for the up-link frequency in the US), on 220 MHz this is 1.6 MHz, and on 440 MHz this is 5 MHz.

5.4   Using RadioLink On the Air

5.4.1   Accessing RadioLink

To access RadioLink and the controlled radio, simply transmit with a handheld (or mobile) radio, equipped with a DTMF encoder, on the up-link frequency. Send the password that you have programmed RadioLink to accept.

When RadioLink decodes the password, the down-link transmitter will start transmitting. The down-link transmitter will stay keyed until RadioLink is deactivated (#0#).

Adjust the volume setting on the controlled radio so receive audio from the controlled radio can be clearly heard in the handheld radio.

Transmit with your handheld and set the up-link receiver volume so the ALC reading on your transmitter is the same as when you use your local mic. Depress a Touch Tone button and make sure the TT Decode LED lights. Make sure that the mic gain setting on the controlled transceiver is the same as when you use the local mic.

After RadioLink receives the proper password, 4 beeps will be heard on the down-link frequency. This indicates that RadioLink is operating and that you are able to access the controlled radio.

If an incorrect password is entered, RadioLink will ignore it and nothing will happen.

All commands are sent to RadioLink with the handheld keyed using a DTMF pad. If you want to hear the acknowledge beeps (two short beeps indicating the command was accepted and acted upon) or the error beeps (four beeps indicating the command was rejected), the handheld must be un-keyed immediately after sending the command.

5.4.2   Changing Frequency

You can change the frequency of the controlled radio by depressing #2KKKKK*HH# where KKKKK is the frequency in kilohertz, "*" is the decimal point, and HH is the Hertz part of the frequency. To set frequency to 14235.34 KHz you would depress the following keys on the Touch Tone pad: #214235*34#.

If you enter a frequency that is on a different band, then the controlled radio will switch bands as well as go to the new frequency.

You can also "tune" your radio from the keypad. See section 4.1 for the key sequence to do this.

5.4.3   Split Frequency Operation

To operate the controlled radio in split mode (transmit on one frequency and listen on another one) for working DX, you must do the following:

1. Enable the split function on the controlled radio. You do this by turning "split" on or setting your radio to receive on VFO A and transmit on VFO B.
2. Use the #34# command to tell RadioLink to allow the VFO frequencies to be set independently.
3. Load the desired transmit frequency into VFO B with the #32# function and then the exact transmit frequency with the #2KKKKK*HH# function.
4. Load the desired receive frequency into VFO A with the #31# function and then enter the exact frequency with the #2KKKKK*HH# function.

Note: On most radios it is not possible to control the split function from the computer port. We take care of this by having the user manually enable the split function on the radio. Once the split function is "ON," and the RadioLink user turns on the "VFO A = VFO B" function on RadioLink with the #33# function, then RadioLink will load the same operating frequency into both the A and B VFO (since the split function is enabled at the radio), resulting in simplex operation. The user will experience a slowdown in the response of RadioLink in this situation since, while operating with the radio set on split mode and RadioLink set for simplex, the operating frequency must be loaded into both VFOs which can take up to several seconds depending on the radio.

The moral of this story is, if you are not going to operate split frequency, leave the split function "OFF" on your radio and enable the #34# function on RadioLink. Use the #34# command so RadioLink only loads the current VFO with the operating frequency and RadioLink's control will be twice as fast.

5.4.4   Voice Synthesized Frequency Announcement

You can have the operating frequency and/or mode announced by synthesized voice any time RadioLink is operational using any of the #9x# functions. See section 4.1 of this manual.

5.4.5   Mode Change

You can specify mode with any of the #1x# functions while RadioLink is active. See section 4.1 of this manual.

5.4.6   Transmit/Receive Switching

The "*" key is used while transmitting with your handheld to switch from receive to transmit (USB, LSB, AM, FM, and RTTY modes). While you are transmitting, depressing the "*" button will switch you back to receive. When you are in the CW mode, the "*" button will key your transmitter. You will be able to send CW with the "*" button until your finger gets tired! See Appendix D for instructions on connecting a COR (carrier operated relay) line if you are installing RadioLink at a repeater or if you have installed a COR in your link radio.

Using a COR input for RadioLink will allow the controlled radio to go into the transmit mode when you transmit on the up-link frequency. It is not necessary to use the "*" button to control transmit.

5.4.7 Turn RadioLink Off

To turn RadioLink off and cause the down-link transmitter to be un-keyed, use the #0# function.

RadioLink has a time-out timer. If a Touch Tone has not been received or the COR line has not gone low (if this feature is being used), then RadioLink will un-key the down-link transmitter and the controlled radio transmitter (if it is keyed). To reactivate RadioLink, the access password must be sent again.

The time-out timer duration is programmable with the #88n# command. The value of "n" will determine the number of minutes before shut-down occurs.

0   The time-out timer is disabled (this setting is not recommended)
1   1 minute
2   2 minutes
etc.

5.4.8 Scan

Before scanning memories in the controlled radio with RadioLink, set the number of memory channels to be scanned with the #59nn# command, where "nn" is the maximum number of channels to be scanned.

To scan memories, use the #51# command to switch the radio to memory mode. You can then start memory scan with the #55# command. The radio will stop and resume scan just as if you had started scan from the radio itself. RadioLink does not have control of the radio stopping on a busy channel or resume scan. You will have to set the controls on your receiver to accomplish this stop/start as if you were using the receiver locally.

If your radio has the ability to scan a range of frequencies under computer control, RadioLink can command your radio to scan in this manner as well. From the VFO mode just enter the command #55#. You will have to program the scan range limits in your controlled radio before you can scan a range of frequencies with RadioLink.

Scanning in any mode can be stopped by depressing any button on your Touch Tone pad.

5.4.9 CW Identification

To cause the CW identification to be sent on the down-link frequency, the user should send the #73# command. CW ID will be sent automatically every 3 minutes to meet the FCC's rules for remote control.

5.4.10 Local—Remote Switch

RadioLink will automatically switch to the remote mode when the correct password is received. If the user wants to use the mic and external local speaker that are plugged into the back of RadioLink, then the "LOCAL/REMOTE" switch on the front of RadioLink must be depressed momentarily.

When RadioLink is turned off by the #0# command or the time-out timer, the local mic and external speaker do not become active. The user must depress the push button switch on the front of RadioLink to activate the local speaker and mic.

5.4.11 Beeps

RadioLink will beep one time when it accepts a valid command.

RadioLink will beep three times when it receives a command it does not recognize.

5.4.12 Jumper for down-link audio

Jumper JP1 is factory installed. When installed, the audio from the up-link receiver is retransmitted by the down-link transmitter. If you do not want the receive audio retransmitted, cut this jumper. See the drawing below for the location of JP1.

JP1

5.5   Reset switch

RadioLink has a master reset switch. It is located on the printed circuit board. Depressing this switch will return all user programmable settings to factory original. It will not erase the CW ID programming.

The drawing below shows the location of the reset switch.

Reset Switch

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7.1 Other Accessories

7.2 External Outputs

There are 7 individual logic outputs on the DB-15 (labeled "EXPANSION") located on the back of RadioLink. There is a logic output that can be used to control the AC power to your station. One of the 7 logic outputs can be pulsed high for 100 milliseconds each time a valid code is received.

Each of these logic outputs are active high (+5 VDC). They are connected directly to a CMOS IC and can only source about 15 ma. It will be necessary to use an external transistor and relay to control some other device. A circuit for this is shown in Appendix C.

Each of the logic outputs, their commands, and their output pins on the DB-15 are shown below:

On Code	Off Code	DB-15 Pin
#60#	#61#	Pin 3*
#62#	#63#	Pin 4*
#64#	#65#	Pin 5
#66#	#67#	Pin 6
#68#	#69#	Pin 7
#71#		Pin 8 Pulsed high for 100 ms
Power		Pin 10

These outputs remain as set even if the RadioLink times out or the #0# disconnect command is issued.

The "POWER" pin is special in that it has no control code. When RadioLink receives a valid password, this line will go high. When RadioLink receives the "OFF" command, #0#, or the time-out timer deactivates it, this line goes low. Refer to Appendix C for a relay driver to control the AC power to your transceiver. This logic output could also be used to inhibit a Touch Tone decoder in a repeater controller so RadioLink commands would not activate the repeater controller.

Pin 8 on the DB-15 connector is only pulsed high for 100 milliseconds when the #71# code is received. It is intended to control a latching relay or any other control device that only requires a pulse to activate it (your antenna tuner "tune" switch).

Care should be taken when wiring any optional device to RadioLink to use shielded cable and good engineering practices. RadioLink does have a microprocessor in it and if an inferior or unshielded cable is used, it can radiate birdies that your receiver will pick up.

7.3 Rotator Control

It is possible to use your RadioLink to control a rotator. Simply connect one of the logic outputs (section 6.2) with its associated relay driver from Appendix C to the CCW switch on your rotator control box. Connect a different logic output to the CW switch on the rotator control box. Connect a third logic output to the brake switch.

In operation, send the code for the logic output which will release the brake on your rotator. Then send RadioLink the code to turn the rotator CW. Wait one minute to allow the rotator to reach its rotation limit. Send RadioLink the code to release the relay connected to the CW switch. All commercial rotators that we know of rotate at one revolution per minute. You simply send the code that rotates the antenna CCW for the amount of time it takes to point the antenna where you want it. Fifteen seconds is 90 degrees, 30 seconds is 180 degrees, etc. Make sure you send the "BREAK ON" code before you leave the station.

Since there are so many different rotators, we have not developed wiring diagrams to connect them all to RadioLink. We leave it up to your creativity to interface it.
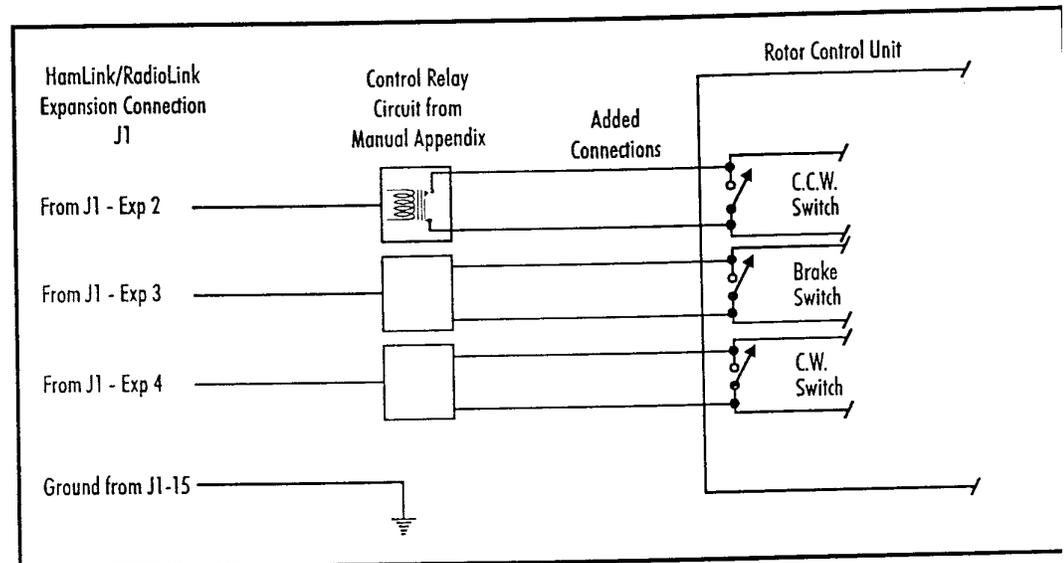
7.4 Other Accessories

Any other accessory that can be controlled by a relay can also be connected t RadioLink. Use your imagination and you will find all kinds of uses for these seven logi outputs on RadioLink.

7.5 External Inputs

RadioLink has a single input for an inhibit signal. When Pin 1 of the DB-15 is held lov RadioLink will not operate. This input could be connected to a repeater controller so th controller could "enable" RadioLink.

8.1 In Case of Trouble

For application and trouble shooting assistance, please call AEA between 8:00 and 11:30 a.m., 1:00 and 4:00 p.m. P.S.T., in Lynnwood, Washington. The Customer Service phone number is (206) 775-7373.

You may wish to attempt to solve problems locally using other hams or an AEA dealer. A helpful amateur with equipment similar to your own may be just around the corner.

AEA provides Technical Support for its line of Amateur Radio equipment by way of your personal computer and modem via CompuServe. Leave mail for 76702,1013; we check CompuServe every business day. If you are not a CompuServe user and would like to receive a free introductory CompuServe membership, call 1-800-848-8199 and ask for Representative 48. Tell them you want a starter kit.

Many of the AEA products that are sent to us for repair are in perfectly good order when we receive them. Please read this manual carefully and make sure you have correctly interfaced your unit before you call.

We would like you to call our service department for a Return Authorization Number before you return a unit to us for service. This gives our Customer Service personnel a chance to talk with you about the problem. Most problems can be solved over the phone, saving you time and money. When a unit is returned, to us it must be shipped freight prepaid. We will not accept COD shipment on returned units. **Also, please include a complete description of the problem you are having.** This is the most important step in returning a unit. In addition, make sure you have included your return address plus a daytime and evening telephone number where we can reach you if we need to.

Typically, we will service the product in five to ten working days after it has arrived at AEA if we have all the facts about the problem. If we must call you, it may take longer. Please include a letter stating the problem and where you can be reached by telephone. If possible please give us both a work and a home telephone number where we can reach you plus the times you are available to take calls at both numbers.

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9.1 Options and Accessories for RadioLink

At the time this manual was written there were 3 optional accessories for RadioLi Each of them is described below:

9.2 HL-61 Icom Interface Cable

The HL-61 is the optional interface cable for use with Icom radios. It is assembled fi the highest quality cable and connectors and will allow the RL-1 to be interfaced Icom radio that has a CI-V computer port.

9.3 HL-62 Kenwood Interface Cable

The HL-62 is the optional interface cable for use with Kenwood radios. It is assembl from the highest quality cable and connectors and will allow the RL-1 to be interfe to a Kenwood radio that has a computer control port (6 pin DIN socket).

9.4 HL-63 Yaesu Interface Cable

The HL-63 is the optional interface cable for use with Yaesu radios. It is assembled f the highest quality cable and connectors and will allow the RL-1 to be interfaced to FT-890, FT-990, FT-1000, FT-747GX, or FT-757GXII radios. It does include adapter cable to change the computer control port connector from the normal l connector to a miniature DIN connector used with some Yaesu radios.

Appendix A

The wiring diagram for each of the interface cables is shown on the following page. A part list for each cable is detailed below:
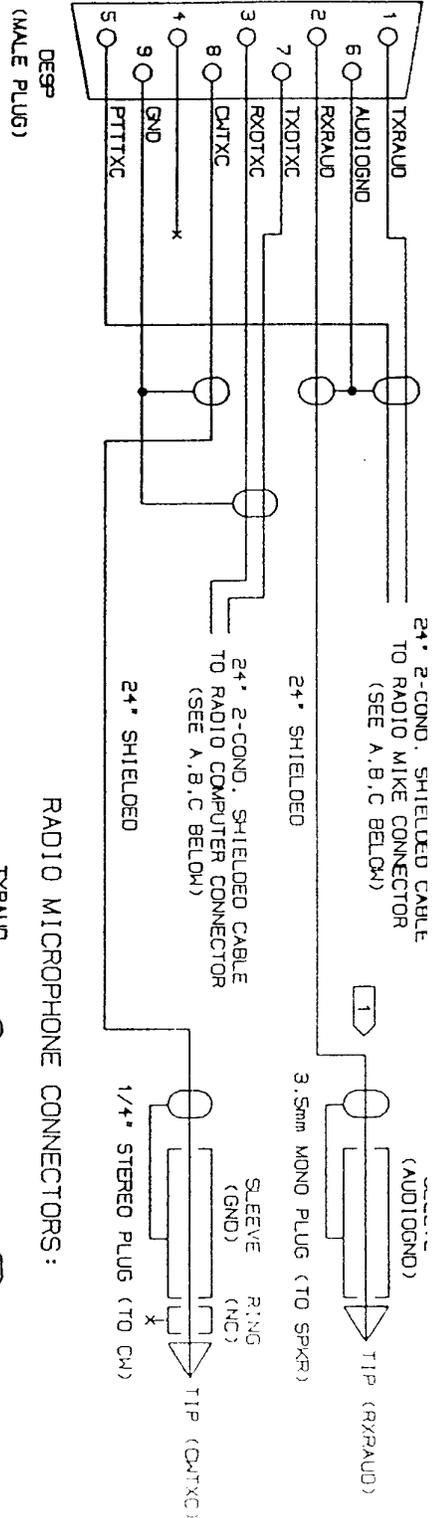
ICOM

1 ea	8-pin microphone plug
2 ea	3.5 mm stereo plugs
1 ea	1/4" phone plug
1 ea	9 pin "D" connector male solder cup
1 ea	9 pin "D" connector hood
92 in	22 AWG 2-conductor shielded cable

KENWOOD

1 ea	8 pin microphone plug
1 ea	3.5 mm stereo plug
1 ea	1/4" phone plug
1 ea	6 pin Male DIN connector
1 ea	9 pin "D" connector male solder cup
1 ea	9 pin "D" connector hood
92 in	22 AWG 2-conductor shielded cable

YAESU

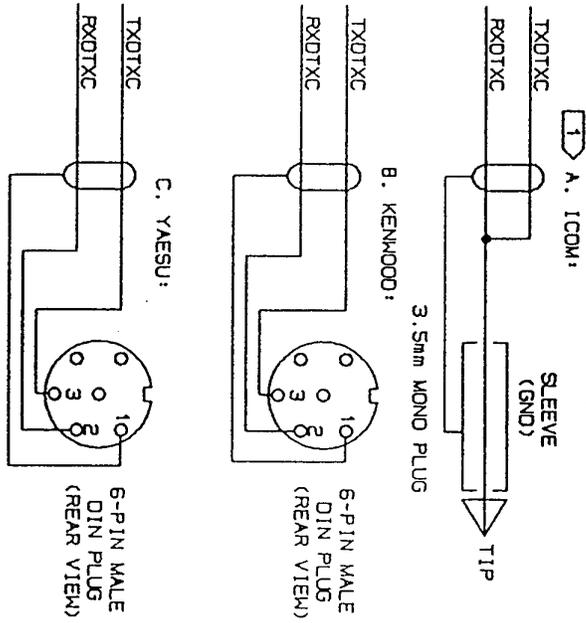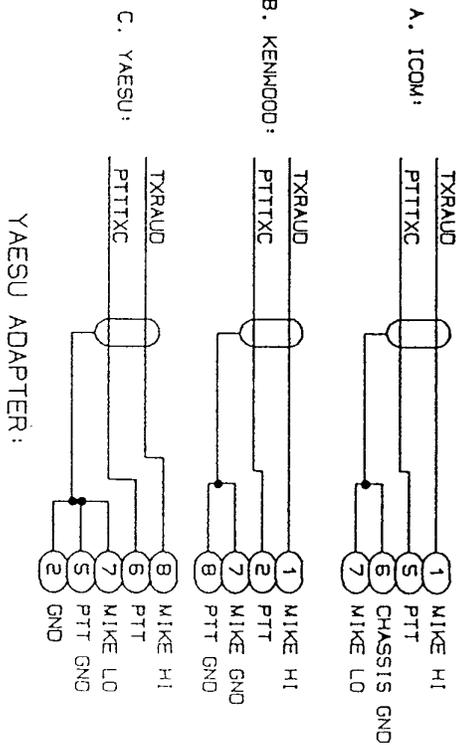|	
1 ea	8 pin microphone plug
1 ea	3.5 mm stereo plug
1 ea	1/4" phone plug
1 ea	6 pin Male DIN connector
1 ea	9 pin "D" connector male solder cup
1 ea	9 pin "D" connector hood
98 in	22 AWG 2-conductor shielded cable
1 ea	6 pin Mini DIN Male
1 ea	6 pin Female DIN

RADIO COMPUTER CONNECTORS:

DE9P
(MALE PLUG)

1 TXRAUD
6 AUDIOGND
2 RXRAUD
7 TXDTXC
3 RXDTXC
8 CWTXC
4 x
9 GND
5 PTTTXC

A. ICOM:

TXDTXC
RXDTXC
SLEEVE (GND)
TIP
3.5mm MONO PLUG

B. KENWOOD:

TXDTXC
RXDTXC
6-PIN MALE DIN PLUG (REAR VIEW)
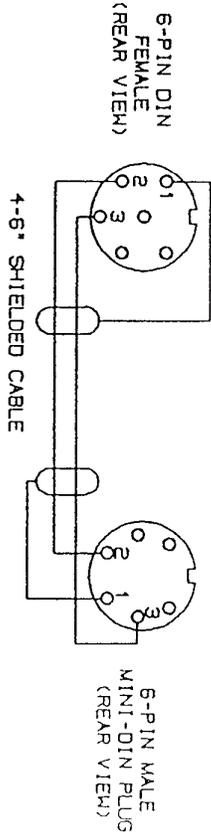
C. YAESU:

TXDTXC
RXDTXC
6-PIN MALE DIN PLUG (REAR VIEW)

NOTE: FOR THE ICOM CABLE, TXDTXC AND RXDTXC MAY BE TIED AT THE DE9, ALLOWING A SINGLE-CONDUCTOR SHIELDED CABLE.

24" 2-COND. SHIELDED CABLE TO RADIO MIKE CONNECTOR (SEE A,B,C BELOW)

24" SHIELDED

24" 2-COND. SHIELDED CABLE TO RADIO COMPUTER CONNECTOR (SEE A,B,C BELOW)

24" SHIELDED

3.5mm MONO PLUG (TO SPKR)
SLEEVE (GND)
RING (NC)
TIP (RXRAUD)

1 (AUDIOGND)

1/4" STEREO PLUG (TO CW)
SLEEVE (GND)
RING (NC)
x
TIP (CWTXC)

RADIO MICROPHONE CONNECTORS:

A. ICOM:

TXRAUD
PTTTXC
1 MIKE HI
2 MIKE GND
7 PTT
6 MIKE LO
5 PTT GND
8 MIKE HI

B. KENWOOD:

TXRAUD
PTTTXC
1 MIKE HI
2 MIKE GND
7 PTT
8 PTT GND

C. YAESU:

TXRAUD
PTTTXC
2
5 GND
7 PTT GND
6 PTT
8 MIKE HI

YAESU ADAPTER:

6-PIN DIN FEMALE (REAR VIEW)

4-6" SHIELDED CABLE

6-PIN MALE MINI-DIN PLUG (REAR VIEW)

1 ON ICOM VERSION, ADD FLAG CABLE TIES TO DIFFERENTIATE SPEAKER JACK CABLE FROM COMPUTER PORT CABLE.

Appendix B

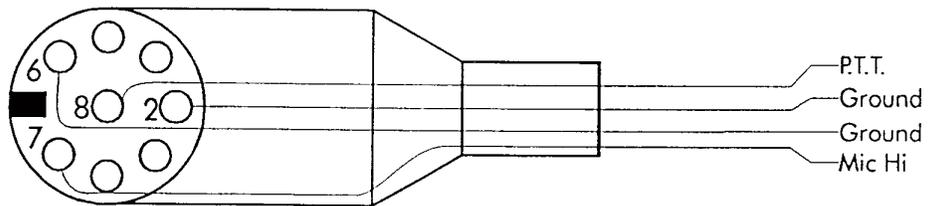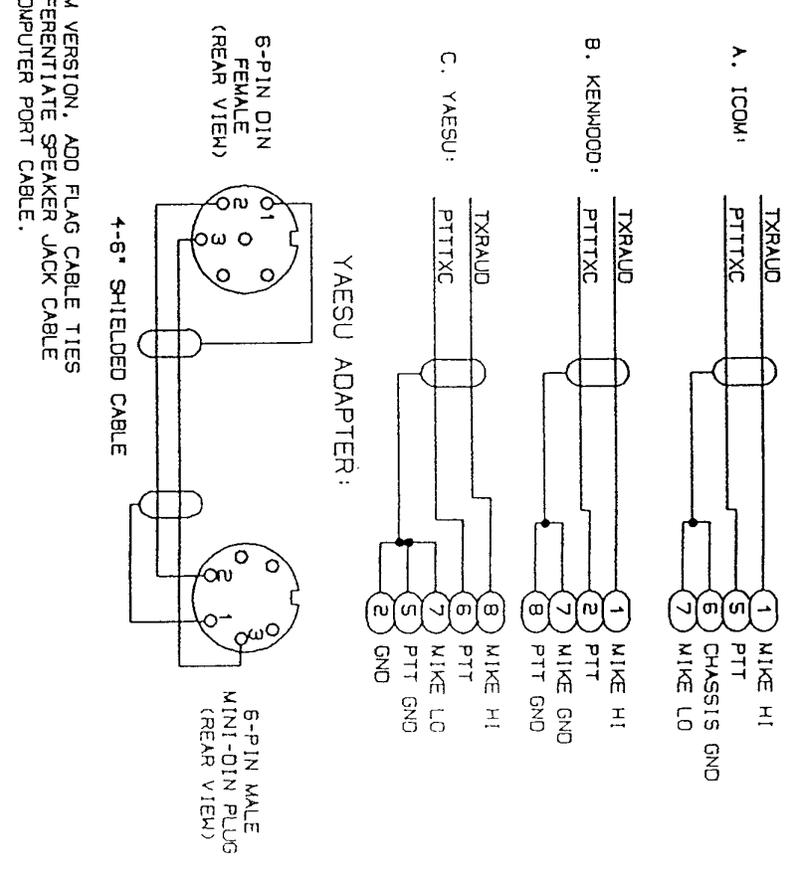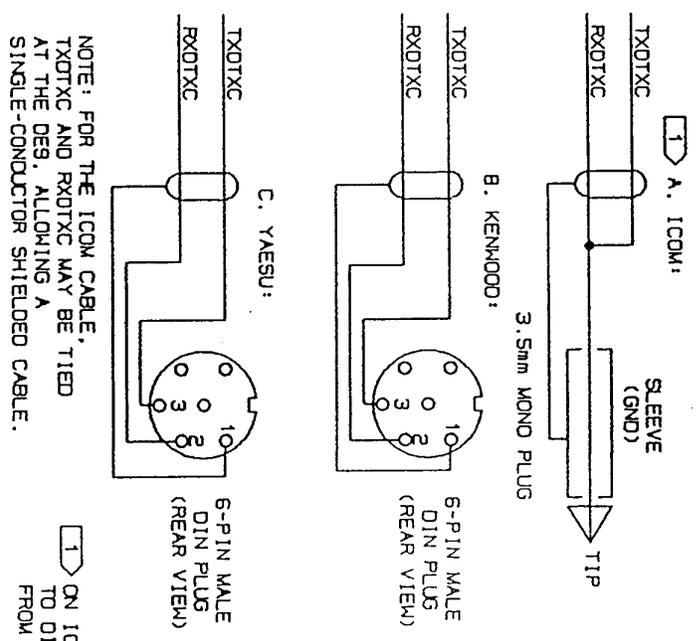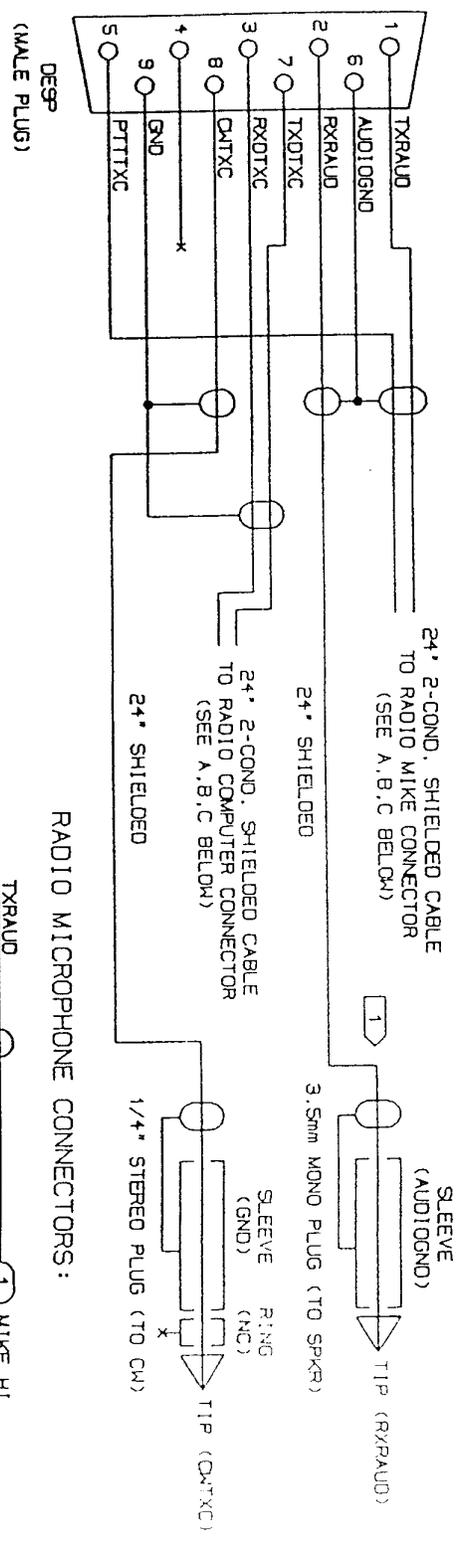To connect RadioLink to a radio that does not have an 8-pin mic connector or one that is not made by Alinco, Icom, Kenwood, or Yaesu, use the wiring diagram on this page.
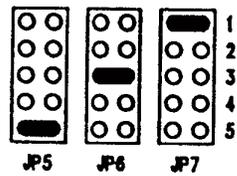
Jumper Positions


Generic Cable Wiring Diagram

DE9P
(MALE PLUG)

RADIO COMPUTER CONNECTORS:

1 TXRAUD
6 AUDIOGND
2 RXRAUD
7 TXDTXC
3 RXDTXC
8 CWTXC
4 GND
9 GND
5 PTTTXC

[1] A. ICOM:

TXDTXC
RXDTXC

3.5mm MONO PLUG

SLEEVE (GND)

TIP

B. KENWOOD:

TXDTXC
RXDTXC

6-PIN MALE DIN PLUG (REAR VIEW)

C. YAESU:

TXDTXC
RXDTXC

6-PIN MALE DIN PLUG (REAR VIEW)

NOTE: FOR THE ICOM CABLE, TXDTXC AND RXDTXC MAY BE TIED AT THE DE9, ALLOWING A SINGLE-CONDUCTOR SHIELDED CABLE.

24" 2-COND. SHIELDED CABLE TO RADIO MIKE CONNECTOR (SEE A,B,C BELOW)

24" SHIELDED

24" 2-COND. SHIELDED CABLE TO RADIO COMPUTER CONNECTOR (SEE A,B,C BELOW)

24" SHIELDED

[1]

3.5mm MONO PLUG (TO SPKR)

SLEEVE (AUDIOGND)

TIP (RXRAUD)

SLEEVE (GND)

RING (NC)

TIP (CWTXC)

1/4" STEREO PLUG (TO CW)

RADIO MICROPHONE CONNECTORS:

A. ICOM:

TXRAUD
PTTTXC

1 MIKE HI
5 PTT
6 CHASSIS GND
7 MIKE LO

B. KENWOOD:

TXRAUD
PTTTXC

1 MIKE HI
5 PTT
7 MIKE GND
8 PTT GND

C. YAESU:

TXRAUD
PTTTXC

8 MIKE HI
6 PTT
7 MIKE LO
5 PTT GND
2 GND

YAESU ADAPTER:

6-PIN DIN FEMALE (REAR VIEW)

4-6" SHIELDED CABLE

6-PIN MALE MINI-DIN PLUG (REAR VIEW)

[1] ON ICOM VERSION, ADD FLAG CABLE TIES TO DIFFERENTIATE SPEAKER JACK CABLE FROM COMPUTER PORT CABLE.

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Appendix C

The diagram below shows a sample schematic for a transistor driver and a relay that could be connected to the logic or power output lines on RadioLink to control external devices.
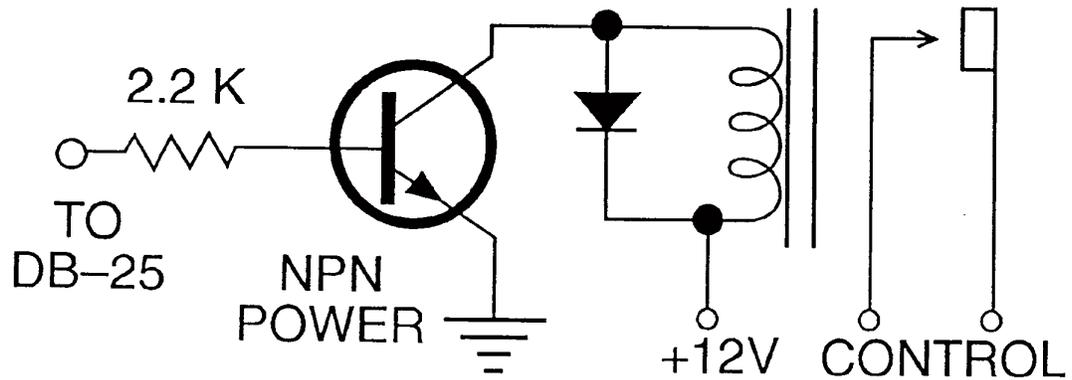
If you build this circuit and find that the relay energizes but will not de-energize, a "leaky" transistor was used. If this happens, put two diodes in series with the emitter lead on the transistor.

The following parts are required:

Qty	Part	Radio Shack Catalog Number
1 ea	Transistor MPS 2222A (2N2222)	276-2009
1 ea	25 Pin D Connector Male	276-1547
1 ea	25 Pin D Connector Hood	276-1549
1 ea	1N4001 Diode	276-1101
1 ea	DPDT Relay 12 VDC coil	275-218
1 ea	Relay socket	275-220
1 ea	Resistor 2.2K 1/4 watt	271-027
1 ea	12 VDC 500 ma Power Supply	273-1652

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Appendix D

Carrier Operated Relay

A COR (Carrier Operated Relay) can be used in conjunction with RadioLink to allow push-to-talk control of the transmit/receive function on the controlled radio. If a COR is installed in the up-link receiver, it can be used to control the transmit/receive function in place of the "*". The "*" key will still work normally if this control line is being used.

When the COR input to RadioLink is being used, just transmitting on the up-link frequency will cause the controlled radio to go into the transmit mode.

The COR relay input is active low. This means that when this line is at ground potential, the controlled transceiver will be in the transmit mode.

The COR input to RadioLink is on the DB-15 connector pin 2 on the rear of RadioLink.

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Appendix E

Federal Communications Commission (FCC) Regulations

To comply with FCC regulations, the following requirements must be met:

- The following information is required to be included in this manual to be in compliance with FCC regulations.
- This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may   cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- Repair work on this device must be done by Advanced Electronic Applications, Inc., or an authorized service center.

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Appendix F

Hadley's Hints

Hadley Allhands, N7REN, is our Customer Service Manager. He has developed this list of thoughts regarding RadioLink. We thought you would find them of interest.

1. If you find it necessary to return your RadioLink for any reason, please call first (206-775-7373) to obtain a return authorization number. When you send in your unit, please include your personal password in the note explaining the problem. This helps our service technician duplicate your problem, since we can access RadioLink without re-initializing it and overwriting the values you have programmed.

2. If you are using a Yaesu radio and are having trouble initializing your RadioLink (you can't get past section 3.1, step 7), place a 2.7K ohm 1/4 watt resistor from the cat serial out line, pin 2 on the DIN connector to ground (pin 1). We thank Yaesu Customer Service for this fix which is contained in Yaesu Application Note AN-93201.

3. It is possible to vary the amplitude of the CW ID by changing the value of R10. Making R10 a smaller value will increase the amplitude and increasing the resistance will decrease the amplitude. Do not decrease the value below 10 K.

4. It has been reported that a Kenwood MJ-88 can be used to convert from the modular mic connector to a 8-pin female mic connector.

Note: If you have a unique use or idea for RadioLink, let us know and we will add it to this section of the manual.

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Warranty

Advanced Electronic Applications, Inc., warrants to the original purchaser that this product shall be free from defects in material or workmanship for one year from the date of original purchase. In order to obtain warranty service (1) Complete and mail the warranty registration card within 10 days to Advanced Electronic Applications Inc., and (2) Send written notification to the address below, or telephone as soon as possible after discovering a possible defect.

> Advanced Electronic Applications, Inc.
> Attention: Service Department
> 2006 196th SW
> Lynnwood, WA 98036
> (206) 775-7373

The written notification must include a copy of the invoice. Include a description of the defective part or condition, with details of the electrical connections to associated equipment and list such equipment. Please enclose your name, phone number, and address. Shipping charges for any parts or units submitted for replacement under this warranty must be paid by the purchaser.

Correct maintenance, repair, and use are important to insure proper performance from this product. Carefully read the Instruction Manual. This warranty does not apply to any defect AEA determines is caused by (1) improper maintenance or repair, including the installation of parts or accessories that do not conform to the quality and specification of the original parts; (2) misuse, abuse, neglect, or improper installation; (3) accidental or intentional damage. The field installation of circuits or batteries according to the instructions in the manual will not nullify this warranty.

All implied warranties, if any, terminate one year from the date of original purchase. AEA is not responsible for damage to other equipment or property or any other consequential or incidental damage of any kind whether based on contract, negligence, or strict liability. Maximum liability shall not, in any case, exceed the purchase price of the unit.

The foregoing constitutes AEA's entire obligation with respect to this product. The original purchaser and any user or owner shall have no other remedy and no claim for incidental or consequential damages. Some states do not allow limitations of how long an implied warranty lasts or do not allow the excluding of incidental or consequential damages, therefore, the above limitations and exclusions may not apply to you.

This warranty gives specific legal rights. You may also have other rights which vary from state to state.
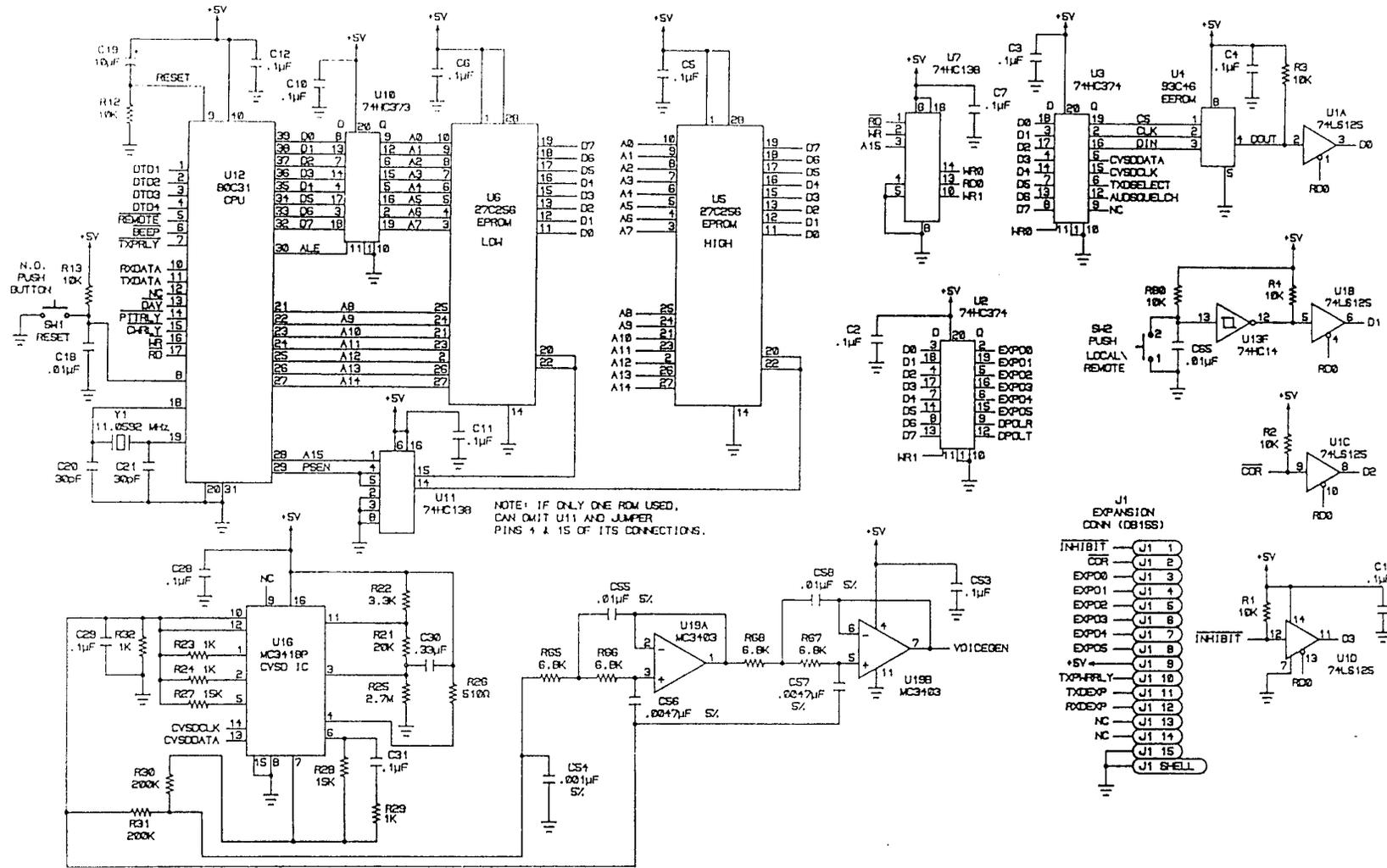
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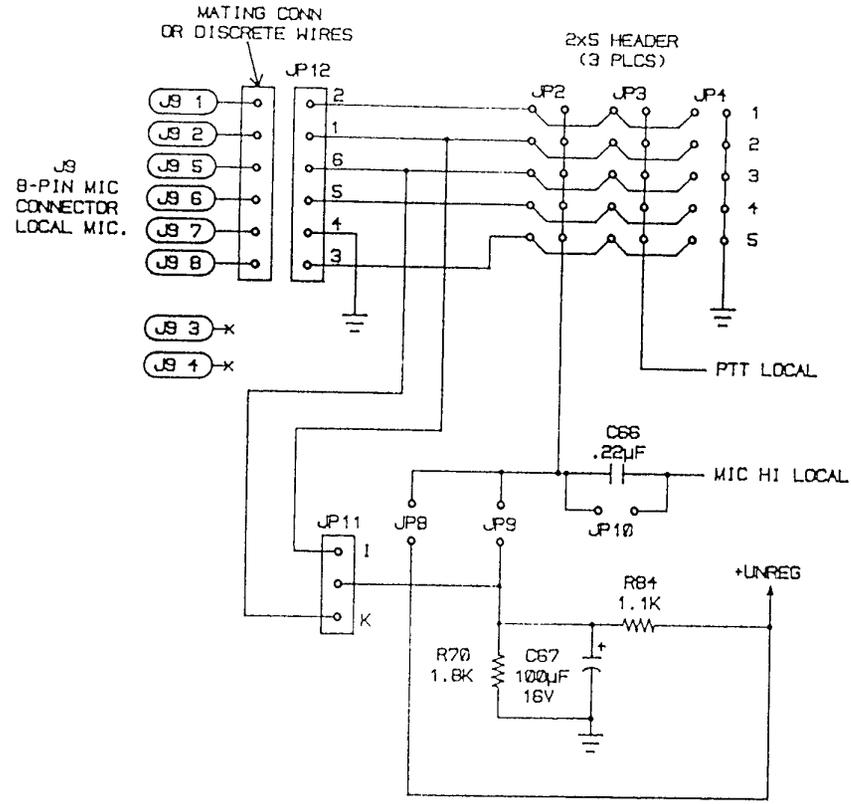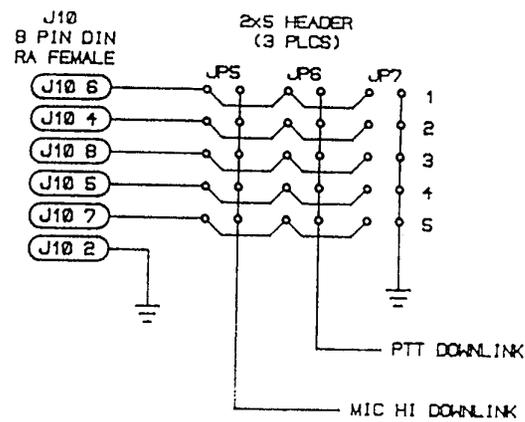
Parts Pictorial & Schematics
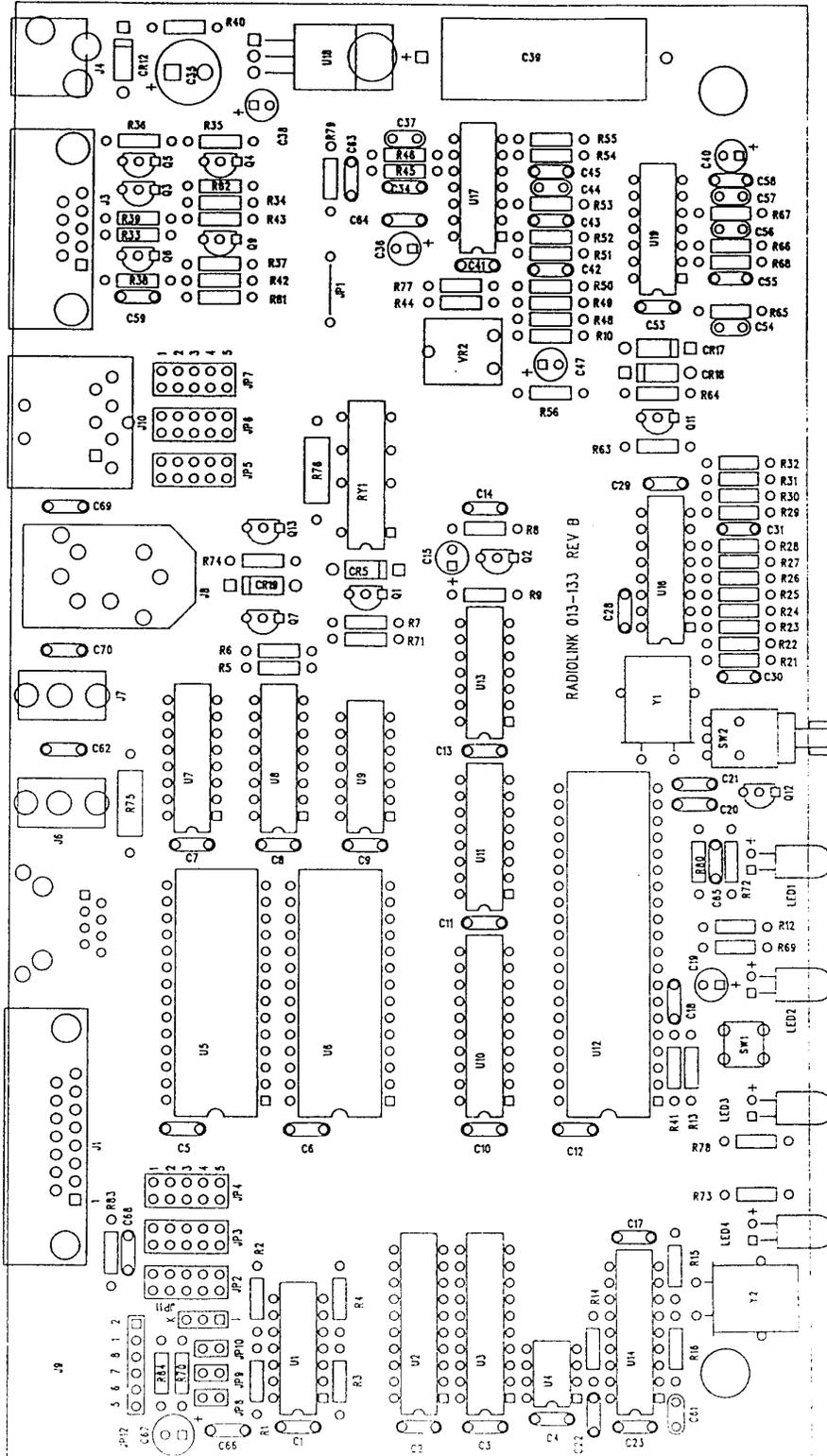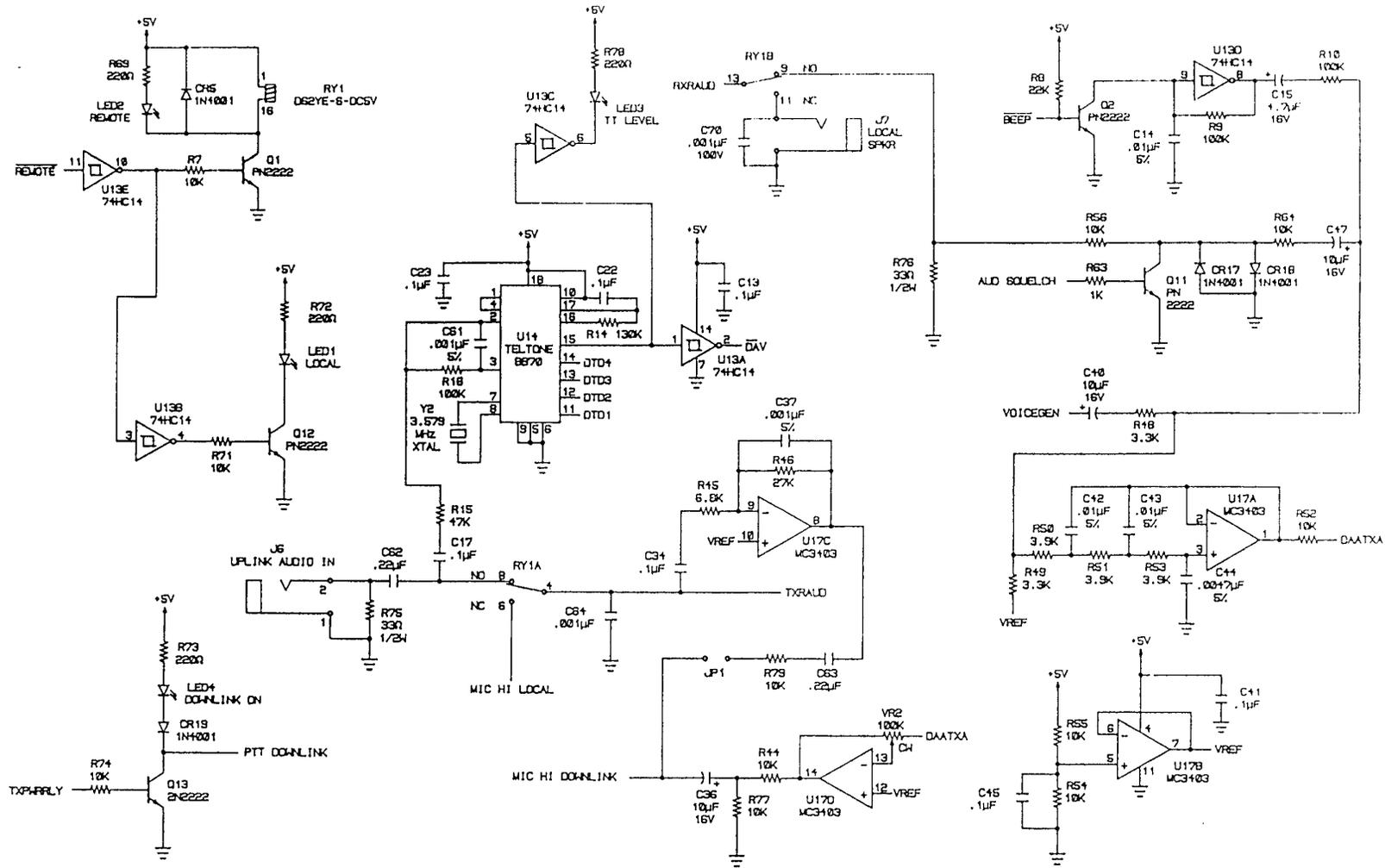
Schematic Drawing 1 of 4

Schematic Drawing 2 of 4

Schematic Drawing 3 of 4

LOCAL MIC MATRIX

DOWNLINK MIC MATRIX

Schematic Drawing 4 of 4

U.S. Retail Price List

Effective January 1, 1995

Advanced Electronic Applications, Inc. • P.O. Box C2160 • Lynnwood, WA 98036
Literature Request Line (800) 432-8873 • Upgrade Hotline (206) 774-1722

Data Controllers

PK-96 with PC PakRatt Lite™, APRS™ Shareware & 18K MailDrop	$ 229
PK-96 with PC PakRatt Lite™, APRS™ Shareware & 100K Mail Drop	279
100K MailDrop Option for PK-96	50
The Net Firmware for PK-96	call
PK-12 with GPS Firmware PC PakRatt Lite™, APRS™ Shareware & 15K MailDrop	129
100K MailDrop Option for PK-12	50
PCB-88 w/ IBM Software and Power Supply	179
PK-232MBX w/ PACTOR & GATEWAY	379
PK-900 w/ PACTOR & GATEWAY	569
9600 bps Option for PK-900 User-Installed Plug-in Modem Card	75
AEA-FAX III 900 Gray Scale/False Color Fax	75
DSP-1232 Single Channel DSP Data Controller	789
DSP-2232 Dual Channel DSP Data Controller	999

Support Software

PC-Pakratt II™ with fax.	69
PC-Pakratt Lite™ Packet-only	49
COM-Pakratt™ with Fax.	79
MacRATT™ with Fax.	69
PC-Pakratt for Windows™ Version 2.0	129
AEA-FAX III with Demodulator	149
Log Windows™ Version 2.0	99
AEA WeFax 256 for the DSP-2232/1232	129

Cables

APRS Adapter Cable for GPS use with APRS	$ 30
PK-232 Radio Cable 5 ft. Open Ended	9
KH Cable PK-232 to Kenwood Handheld	25
IH Cable PK-232 to Icom, Yaesu, or Alinco Handheld	25
WH Cable PK-232 to Icom W2A Handheld	25
KM Cable PK-232 to Kenwood or Alinco 8-pin Mic	25
KA Cable PK-232 to Kenwood 13-pin ACC2	30
IM Cable PK-232 to Icom 8-pin Mic	25
YM Cable PK-232 to Yaesu 8-pin Mic	25
RS-232 "T" Cable	39
IsoLoop 50 ft. Controller Cable with M-F Connectors	29
IsoLoop 100 ft. Controller Cable with M-F Connectors	39

Remote Radio Controllers

HamLink HL-60	$ 269
Radio Link	329
HL-61 Icom Interface Cable for HamLink/RadioLink	50
HL-62 Kenwood Interface Cable for HamLink/RadioLink	50
HL-63 Yaesu Interface Cable for HamLink	60
OpLink OL-80 HamLink Accessory	130
The Silencer External Speaker with DTMF Decoder for Selective Call	100
Digitalker Battery Operated Frequency Counter with Digitized Voice Output for VHF/UHF	250

Accessories

AC-1 12 VDC, 1/2 Amp Wall Adapter	$ 21
AC-4 12 VDC, 1 Amp Wall Adapter	32
DC-1 Power Cord with Cigarette Lighter Plug	7
PK-232MBX Operating Manual	25
PK-232MBX Technical Reference Manual	25
World Clock	25

Antennas

IsoLoop™ (Includes Controller and 50 ft. Shielded Controller Cable)	$ 389
IT-1 IsoTuner for the IsoLoop 10-30	279
430-16 16 Element Yagi 420-450 MHz	119
IsoPole™ 144 for Base Stations	59
IsoPole™ 220 for Base Stations	59
IsoPole™ 440 for Base Stations	89
HR-1 Hot Rod™ ½ Wave 2M	24
HR-2 Hot Rod™ ½ Wave 220 MHz	24

Miscellaneous

DM-1 Deviation Meter	$ 149
KK-1 Keyboard Keyer	199
KKCOM Optional Utility Program for KK-1	49
SWR-121 HF 1-32 MHz	399
SWR-121 V/U 120-175, 200-225, 400-475 MHz	499
AACOM Optional Utility Program and cable for the SWR-121	79
Carrying Case with Convenient Belt Loop	29
AVT Master Amiga Video Terminal for Slow-Scan Television	999
ST-1 Satellite Tracker	99

RadioLink

Control and Operate Your Ham Station
From a Hand Held Radio

Picture this—you're driving to work. The local DX spotting frequency announces that the DXpedition from Peter Island has just come on the air.

After hearing the announcement, you touch a few buttons on your Touch-Tone™ mic and suddenly you hear 3Y5AA from your 440 MHz radio in the car! You say "3Y5AA this is K7RIE—5-9." You've worked a new one from your car.

How? You had a **RL-1 RadioLink** *installed on your rig.*

With the **RL-1**, you can control almost any function of a ham rig from any hand held or mobile radio that has Touch-Tone.

RadioLink users never miss a schedule, net-check-in, or a new country. They can even "rag-chew" or call CQ from their home rig when they are away from their QTH (station location).

RadioLink sits along side your rig. It connects to the micro-
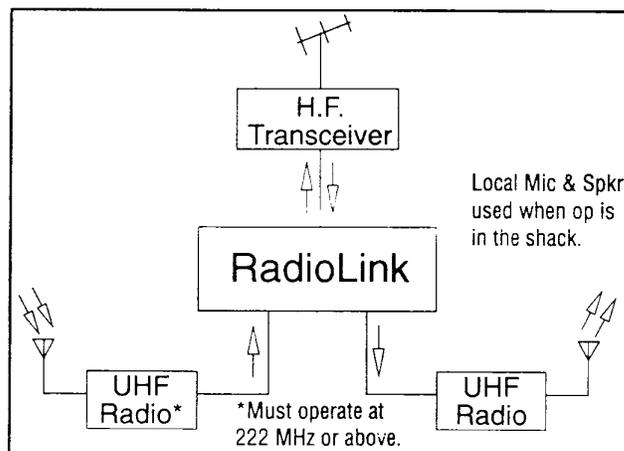

Diagram showing **RadioLink** *setup.*

phone, external speaker, CW key, and serial port jack on an Icom, Kenwood, or Yaesu transceiver. It also connects to a full duplex dual band radio, two mobiles, a separate transmitter and receiver, or a repeater for the up/down-link signal paths.

RadioLink *is intelligently engineered to control your HF, VHF, or UHF base station plus send and receive audio from it.*

RadioLink plugs right in. No soldering is necessary to interface to standard amateur radios.

Other people can use your station with your permission.

With a secret code, your friends can access your station too. They can use your equipment anytime you're not using it. DX clubs can create "mega-stations" that club members can use for chasing those rare ones. We even know of a ham who's buying a small lot outside of town to put up an antenna he can access from his condo.

Controlling your radio is easy.

Once you log on to your **RadioLink**, you use the Touch-Tone pad on the mic or your hand held to control your station. You can change bands and

(Continued on page 2)

Connect with us

frequency, switch modes AM, FM, SSB, CW, scan, run split VFO or almost any other feature your radio is capable of. Incidentally, **RadioLink** also works on computer controlled receivers, like the Icom R-7000, for remote monitoring.

The "star" key controls the transmitter. On voice, pressing this key once causes the transmitter to activate just like a push-to-talk button. When you are done transmitting, you again press the "star" key, which deactivates the transmitter. You'll hear the receiver audio coming back to you.

You can even send CW! If you switch to CW mode, the "*" becomes a telegraph key! You may not break any CW records, but it will allow you to snag that "rare one" who operates CW and only comes on while you are not at home.

RadioLink
Q&A

Can I install **RadioLink** *at my repeater and use the repeater for the link radios?*

Yes. **RadioLink** even has an input for a COR (Carrier Operated Relay) which every repeater has. When this is used, you no longer have to use the "*" button to key the radio. Just depressing the push-to-talk button on your hand held will key the radio. **Radio-Link** also has an input to allow the repeater controller to control access to it.

Can I use **Radio-Link** *with any VHF or UHF link radios?*

The first requirement for the link radios is that the up-link receiver must be able to receive while the down-link transmitter is transmitting (see diagram pg. 1). If you use an Alinco, Icom, Kenwood, or Yaesu mobile radio, the cables supplied with **RadioLink** will plug into these radios, with no further interface required.

Will **RadioLink** *work with my base radio?*

Does your rig have an Icom CI-V input, an active Kenwood computer port, or is it a Yaesu FT-890, FT-990, FT-1000, FT-747GX, or FT-757GXII? If yes, **RadioLink** will work.

Can I use **Radio-Link** *with a radio that does not have a computer control port?*

Absolutely. **Radio-Link** can be used with any radio. The logic outputs on **RadioLink** can control a radio with no computer interface for a user skilled enough to interface them.

How can I actually tune the radio remotely?

If you know what frequency and band you want, simply enter this on your Touch-Tone pad (see control codes, pg. 3). You can also tune up and down the band at various steps (see keypad drawing, pg. 3). You can scan preset memories or frequencies.

What if I loose track of the frequency my radio is on?

That's easy! Press *91* and you will hear a digitized voice telling you the frequency the radio is tuned to.

Forget the mode? Press #93# for both frequency and mode. It's not even one of those robotic voices, it's the voice of our engineer—we pack him in every box!

What about volume control?

Manufacturers do not generally make provision for controlling volume via the computer port. You will have to preset the volume to a normal level. The same is true for the microphone gain, although the ALC will prevent you from over-modulating the radio. You also may not be able to change your filters with **Radio-Link** unless you store them in a memory or your radio changes them with a mode change.

Can I work split frequencies for DXpeditions?

You bet! Look at the command structure on page 3. You have total control over VFO A and B. You can set them to any frequency to cover any situation.

What about having **RadioLink** *control my antenna?*

No Problem! There is an accessory output for controlling external relays. You can wire these outputs to turn your antenna or run the tower up and down.

Test It Yourself!

```
                    Up
                   5 kHz
 Up*       ┌───┬───┬───┬───┐   Down*
 1 kHz     │ 1 │ 2 │ 3 │ A │   1kHz
           │   │ABC│DEF│   │
           ├───┼───┼───┼───┤
  Up       │ 4 │   │ 6 │ B │   Down
100 Hz     │GHI│   │MNO│   │   100 Hz
           ├───┼───┼───┼───┤
  Up       │ 7 │ 8 │ 9 │ C │   Down
 10 Hz     │PRS│TUV│WXY│   │   10 Hz
           ├───┼───┼───┼───┤
Controls   │ * │   │ # │ D │   Used to
TX and     └───┴───┴───┴───┘   Frame
Sends CW        Down           Commands
               5 kHz
```

*Scans memory in memory mode

AEA has set up a demonstration unit similar to **RadioLink** you can access via the phone lines. Call (206)880-6050 and put a unit similar to **RadioLink** through its paces by telephone.

Since we can't control who calls, we have disabled the transmitter. (Disabled commands shown in italics in list.)

When the phone answers and you hear four beeps, enter the "secret" code 1234. You will then hear an announcement of the frequency and mode on which **RadioLink** was left. Once it accepts the code, you will hear the receiver. Use command list to test our unit. Please, don't stay on long, as there are others who would like to test **RadioLink**.

Change to the band and/or frequency you want to monitor using the #2nnnn# command.

Use keypad commands to vary the VFO up or down in frequency.

You will note from the listing that the pound sign (#) proceeds and follows each command, other than up/down frequency control. If **RadioLink** receives the # tone, it knows the numbers following represent a specific command. When **RadioLink** sees a second #, it knows that is the end of the command string. A single beep means the command is acceptable. Three short beeps means it does not understand the command. If the command is not proceeded by a pound sign, **Radio-Link** knows this is an up/down frequency control command.

This demonstration is actually using **Ham-Link**, an AEA product similar to **RadioLink** that uses a telephone interface rather than a radio up/down link.

Command Structure

The following is a list of commands for **RadioLink**. Note that all commands (other than those for frequency) are framed with a #.

Command	Description
#11#	Set mode to LSB (default)
#12#	Set mode to USB
#13#	Set mode to AM
#14#	Set mode to CW
#15#	Set mode to RTTY (see note 1)
#16#	*Set mode to narrow FM*
#17#	Set mode to wide FM
#2nnnn#	Set current VFO (see note 2)
#2nnnn*nn#	Set current VFO (see note 2)
#31#	Select VFO A
#32#	Select VFO B
#33#	*VFO A Always = B*
#34#	*VFO A & B Set Independently*
#35#	Set VFO B = VFO A
#51#	Select memory mode
#52#	Select VFO mode (default)
#53nn#	Select memory channel number
#55#	*Start scan (in memory or VFO mode)*
#59nn#	Set max. num. memory chns. to NN
#6n#	*Turns logic lines on and off*
#71#	*Pulse logic line high*
#73#	*Send CW ID on down link*
#7997#	*Program CW ID*
#88n#	Waiting time before disconnect (n = minutes, 0 = infinity) without receiving Touch-Tone input.
#91#	Announce frequency information
#92#	Announce mode information
#93#	Announce both freq. and mode info.
#94#	Announce VFO B freq. information
#0#	Disconnect (turns power relay off)

Note 1 Use not recommended.

Note2 This command sets the current VFO to the specified frequency. The frequency is expressed in kilohertz. There must be at least four digits after the 2 key in the command string and before the ending # key. The frequency entry may contain a decimal point and Hertz resolution using the "*" key after the kilohertz entry.

Specifications

Power: 117 VAC or 10 – 15 VDC
Temperature: 0 – 45 degrees C
Size: 9" (W) x 5" (D) x 2" (H)
Weight: 2 pounds
Indicators: Local, remote, down link on, TT Level
Adjustments: None
Switches: Local/remote

Radio Interface

Any Icom HF, VHF or UHF transceiver or receiver with a CI-V computer port. (Optional computer interface not required).

Any Kenwood HF, VHF, or UHF transceiver or receiver with an active computer port. (Optional IS-232 interface not required).

Yaesu FT890, FT-990, FT-1000, FT-747GX, or FT-757GXII. (Optional computer interface not required).

Software Initialization by Owner

Password: Any 2 to 6 digit code
CW ID: Up to 11 characters
Auto Disconnect: Up to 9 minutes

Options

HL-61
ICOM Cable. Allows any radio with a CI-V computer port to plug directly into *RadioLink*.

HL-62
Kenwood Cable. Allows any radio with the computer port to plug directly into *RadioLink*.

HL-63
Yaesu Cable. Allows FT-890, FT-990, FT1000, FT-747GX, and FT-757GXII to plug directly into *RadioLink*.

More Information

AEA also produces a product like *RadioLink* using a telephone to control your receiver or transceiver. This product is called *HamLink*.

Information on this product or any of AEA's other fine products can be obtained from your local ham radio equipment dealer or by calling AEA direct at (206)774-5554.

Specifications subject to change without notice or obligation.