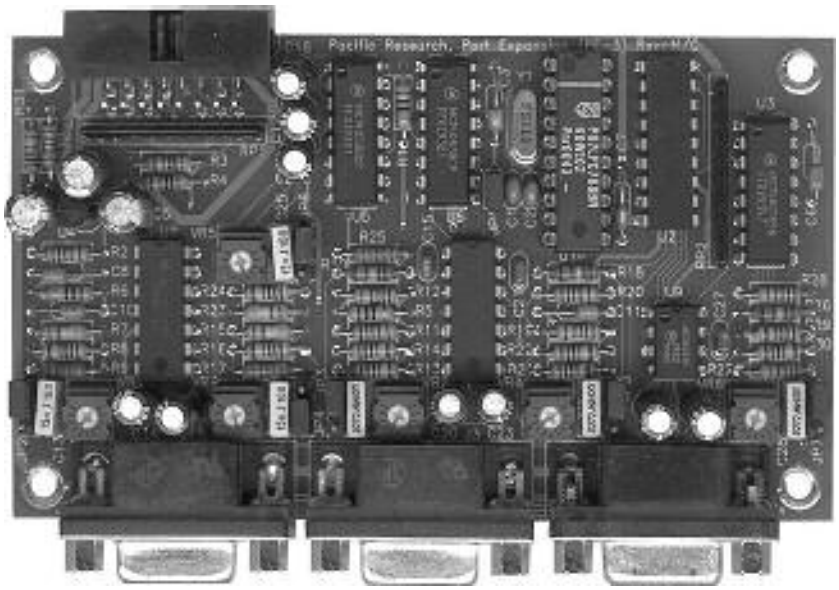
Pacific Research Solutions
PE-3, Port Expansion
(3-Link Ports)
User Manual



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INTRODUCTION

The Pacific Research PE-3 is a single circuit board that is connected directly to the RI-300 auxiliary buss to add 3 link ports to the controller. Each port output on the PE-3 can select 1 of 2 audio channels on the auxiliary buss. This allows you to have 2 RI-300/RI-310 controllers on the buss that can access any of the PE-3 port outputs. Each if the PE-3 port inputs are connected directly to a channel on the auxiliary buss. This allows a controller on the buss to access and sum any or all port inputs on the PE-3. In addition, you can plug up to 2 PE-3s on the auxiliary buss, adding a total of 6 link ports to 1 or 2 controllers.

PE-3 FEATURE OVERVIEW

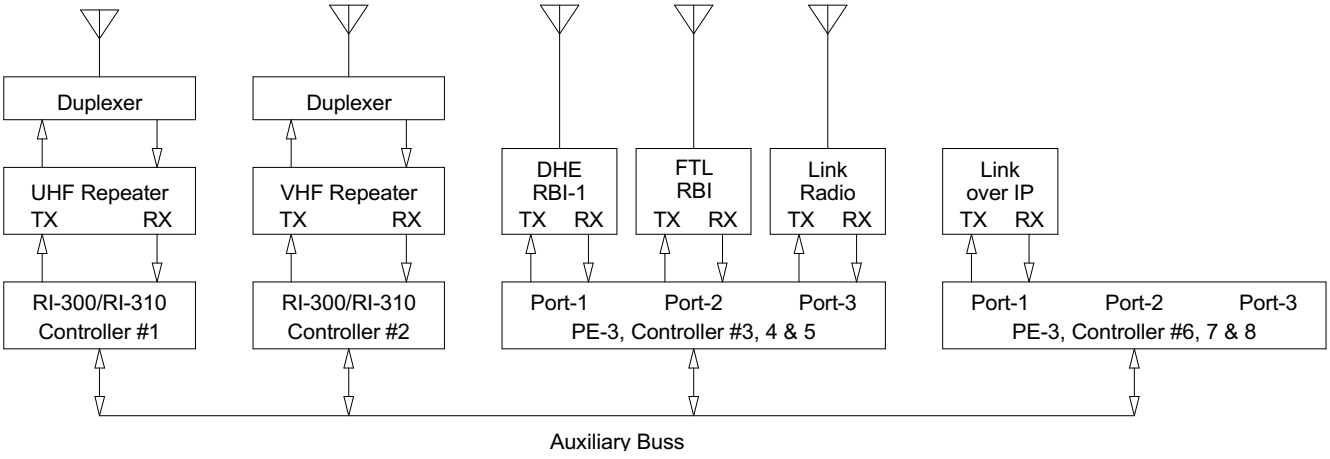
The PE-3 supports 3 identical full duplex link ports. This means that any port can be configured to output and input audio at the same time. The only limits to the PE-3's audio routing is that you cannot repeat audio on a port and you cannot connect ports together on the PE-3.

The PE-3 can supports various remote base options. Any or all ports can be connected to the Doug Hall RBI-1 or the Pacific Research FTL-RBI.

Supported Features

- Transmit audio level output adjust on each port.
- Receiver audio level input adjust on each port.
- Transmit audio select, Flat and Pre-Emphasis.
- Receiver audio select, Flat and De-Emphasis.
- Transmit audio auxiliary buss channel select.
- Doug Hall RBI-3 full feature support on each port.
- Pacific Research FTL-RBI full feature support on each port.
- User programmable output functions, 1 and optional 8 on each port.
- COS and TSQ active level select for each port.

The following block diagram shows an example of a system with a total of 8 ports. In this example, 2 ports are still available for future expansion

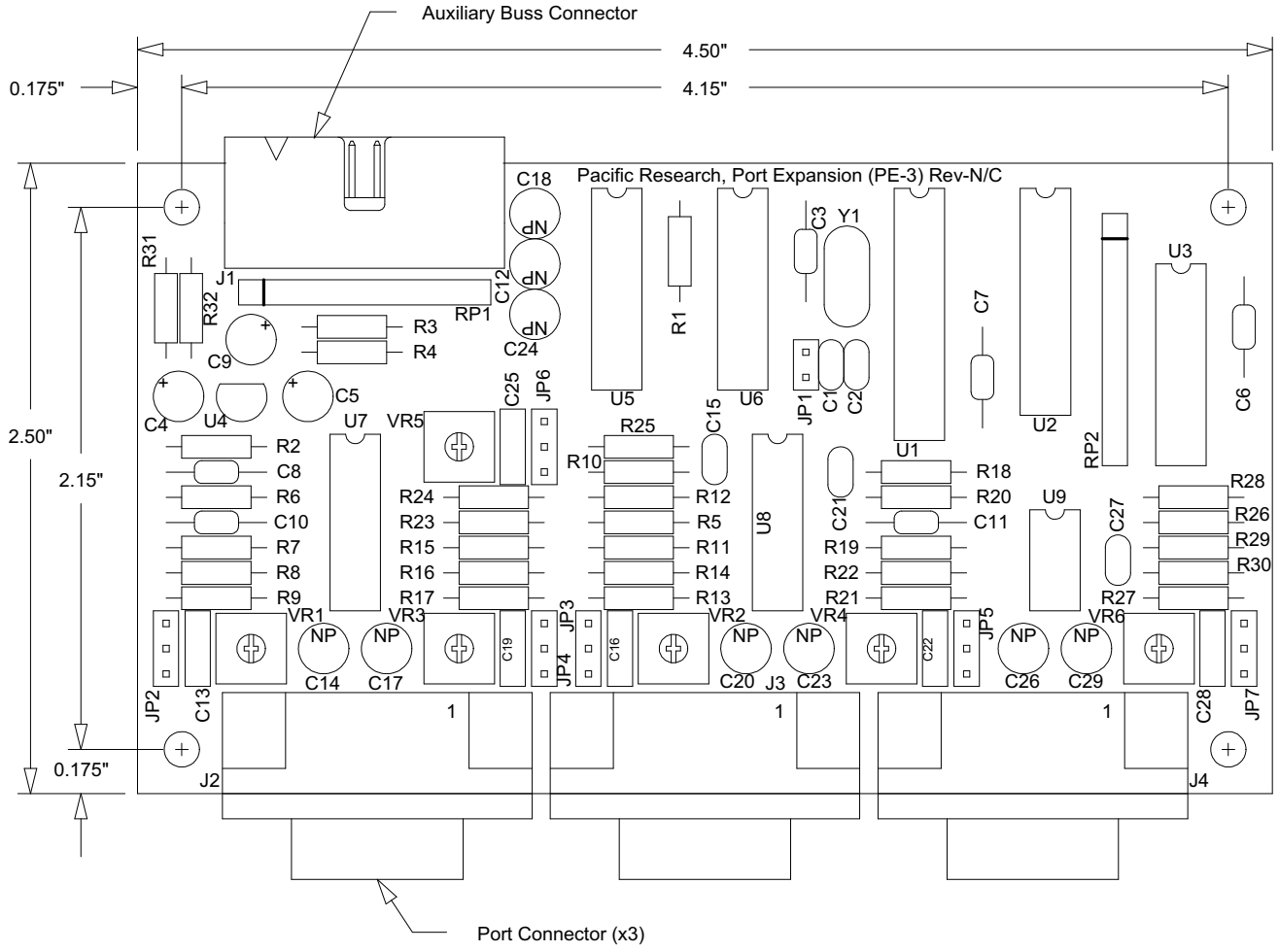


INSTALLATION

The PE-3 contains static sensitive components. Take great care when handling the board. Make sure you provide mounting and/or an enclosure for the PE-3 to insure against accidental shorts or static discharge. Standoffs and #4 mounting hardware have been provided for your convenience. See the drawing below for mounting hole dimensions. Hole size should between 0.125" to 0.140" diameter.

The PE-3 gets its power from the controllers that are attached on the auxiliary buss. Make sure that all controllers on the buss are powered down before plugging the PE-3 onto the buss. The PE-3 is connected to the auxiliary buss with a standard 16 pin IDC flat cable. To reduce noise problems, keep this cable as short as possible. Do not use a flat cable that exceeds 4 foot.

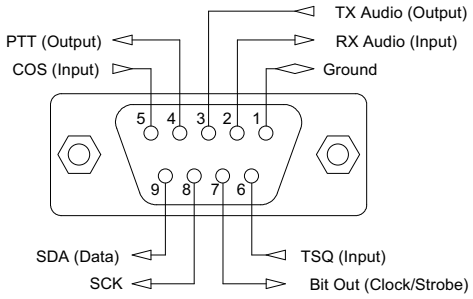
If you need to add 2 PE-3s to your controller for a total of 6 link ports, you can stack the boards and buss the flat cable between the boards. Make sure you review the Setup and Adjustment section for details on auxiliary buss channel assignments.



CONNECTIONS

This section details the PE-3 port connector. The three port connectors are identical. See the section on "SETUP and ADJUSTMENTS" for information on the port numbers for each connector. Note that the power to the PE-3 is supplied from the auxiliary buss.

The mating connector to the PE-3 is a standard DB-09 Male. Three of these connectors have been supplied with your PE-3.

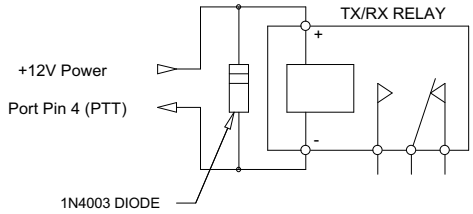


PE-3 Port Interface Connector

Port Pin Definition

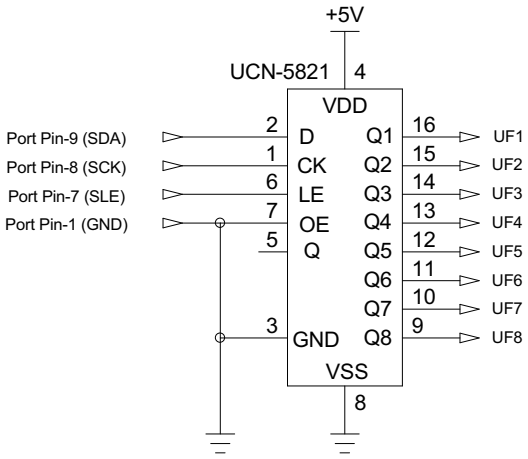
DB-09 Female	Signal Name	Details
1	Ground	This is the signal Ground.
2	RX Audio Input	This is the PE-3 audio input from your receiver. This input is user jumper selected for de-emphasized audio or flat discriminator audio. This input also has a level adjustment.
3	TX Audio Output	This is the PE-3 audio output to your transmitter. This output is user jumper selected for true FM (Flat) audio or pre-emphasized audio. This output also has a level adjustment.
4	PTT Output to Transmitter	This is an open collector output that signals the radio to transmit. This output is active low and can sink up to 100mA. If you connect this output directly to a transmit relay, make sure you add a diode to protect the output against back EMF.
5	COS Input from Receiver	This a 5-volt input with 4.7K pull-up. This input is used by the PE-3 to identify when a signal is present on your radio's receiver. Do not connect this to any device that can supply more than 5 volts. This input can be user programmed for active high or active low.
6	TSQ Input from CTCSS Decoder	This a 5-volt input with 4.7K pull-up. This input is used by the PE-3 to identify when a CTCSS (Tone Squelch) signal is present on your radio's receiver. Do not connect this to any device that can supply more than 5 volts. This input can be user programmed for active high or active low.
7	Bit Output, SLE & Generic Data Clock/Strobe	This output is an open collector with a 4.7K pull-up. It can sink up to 100mA. This output has multiple functions that are controlled by System Command 04. First, this output can serve as a user function output. Next, it provides the Clock and Strobe signal for Generic Data. And finally, it provides Serial Latch Enable for a serial to parallel device. See the schematic on the following page for this operation.
8	SCK	This output is an open collector with a 4.7K pull-up. This output provides a Serial Clock for a serial to parallel device. See the schematic on the following page for this operation.
9	SDA & Generic Data	This output is an open collector with a 4.7K pull-up. This output has multiple functions that are controlled by System Command 04. First, this output provides the Data for Generic Data. And finally, it provides Serial Data for a serial to parallel device. See the schematic on the following page for this operation.

Transmit Relay Diagram



Serial to Parallel User Function Diagram

The following diagram shows how to connect an Allegro UCN-5821 to any one of the PE-3's ports. You will have to provide the +5 Volt supply externally as there is no supply output from the port connector. The outputs of this device are open collector and can sink up to 100mA per pin but no more than 500mA total for all pins added together.



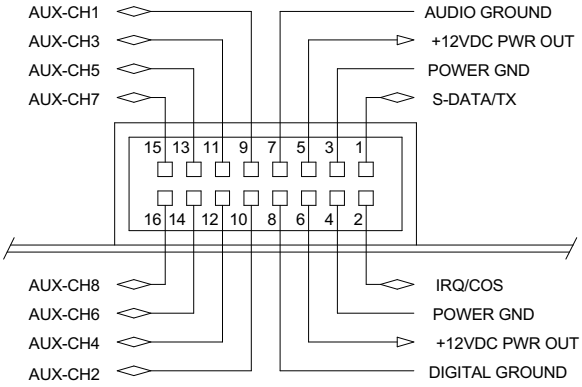
Doug Hall RBI-1 and FTL-RBI to the PE-3

This cable allows you to connect the Doug Hall RBI-1 or the Pacific Research FTL-RBI to any one of the three ports on the PE-3. If you chose not to build this cable yourself, it is available from Pacific Research. When connecting the Doug Hall RBI-1 to the PE-3, make sure you set the PE-3's S-Command 04 to mode 2. When connecting the FTL-RBI to the PE-3, make sure you set the PE-3's S-Command 04 to mode 3 and the radio function S-Command 10 5 1, COS active low.

Signal Name	PE-3, DB-09 Male	PE-3, DB-09 Male	Notes
RBI-1 Reset	1	Not available	
No Connection	2		
Data	3	9 (Serial Data)	
Clock/Strobe	4	7 (Bit Output)	
FTL TX Audio	5	3 (Audio Out)	
FTL RX Audio	6	2 (Audio In)	
COS from FTL RX	7	5 (COS Input)	
PTT to FTL TX	8	4 (PTT Output)	
Ground	9	1 (Audio Ground)	

Auxiliary Buss

The auxiliary buss has 8 channels available. Typically, channel 1 is used by the RI-300 as the default output channel. The PE-3 can use channels 1 or 2 as the audio input that is routed to the transmitter, pin 3. The port receiver, pin 2, audio is routed to 1 of 2 auxiliary buss channels depending on JP1. JP1 controls which group of audio channels (3-5 or 6-8) are used by the PE-3. See the block diagram on the following page and the table in the next section for details on this jumper. Each of these input and output channels can be independently enabled or disabled through System Commands.

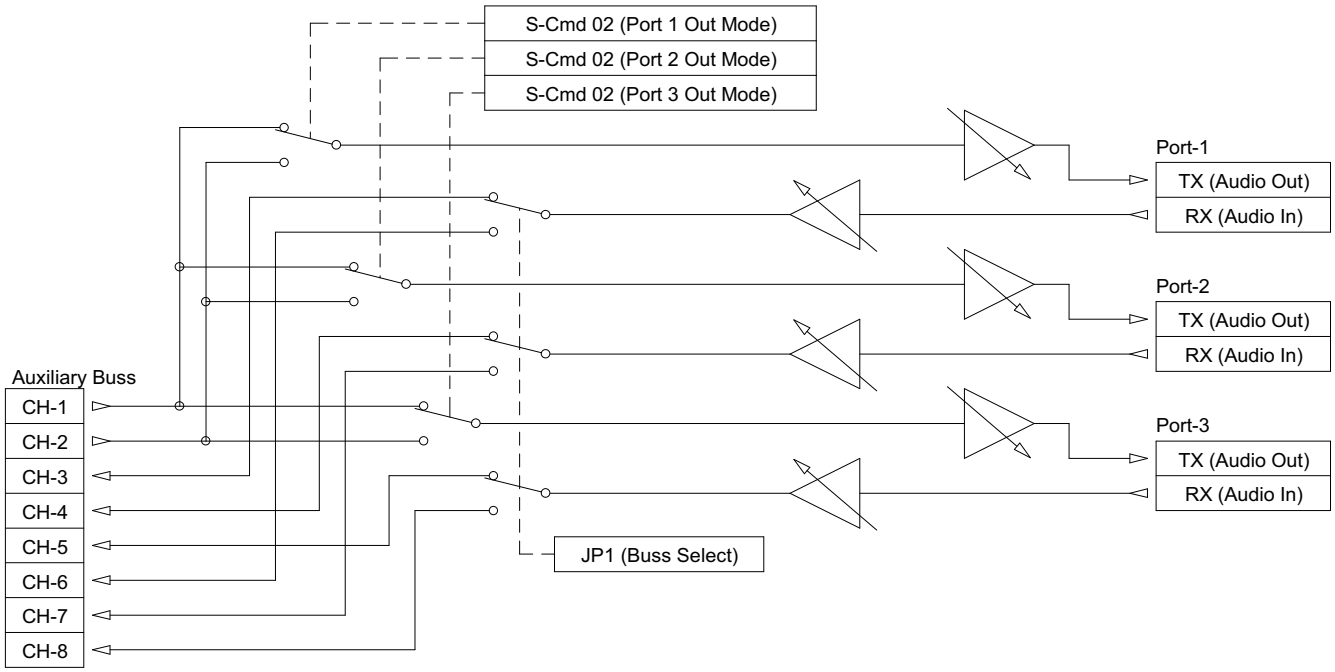


Auxiliary Interface Connector

Signal Name	16-Pin AUX Connector	Details
Serial Data	1	Auxiliary Buss Data
Buss Request	2	Auxiliary Buss Request
Buss Ground	3	PE-3 Supply Ground
Buss Ground	4	PE-3 Supply Ground
Buss Power	5	PE-3 Supply Power
Buss Power	6	PE-3 Supply Power
Audio Ground	7	Audio Ground
Audio Ground	8	Audio Ground
Channel 1	9	User selectable as an input to the Port 1, 2 & 3 TX output, S-Cmd 02
Channel 2	10	User selectable as an input to the Port 1, 2 & 3 TX output, S-Cmd 02
Channel 3	11	User selectable as an output from Port 1 RX input, S-Cmd 01 and JP1 In
Channel 4	12	User selectable as an output from Port 2 RX input, S-Cmd 01 and JP1 In
Channel 5	13	User selectable as an output from Port 3 RX input, S-Cmd 01 and JP1 In
Channel 6	14	User selectable as an output from Port 1 RX input, S-Cmd 01 and JP1 Out
Channel 7	15	User selectable as an output from Port 2 RX input, S-Cmd 01 and JP1 Out
Channel 8	16	User selectable as an output from Port 3 RX input, S-Cmd 01 and JP1 Out

Auxiliary Buss Channel Assignment

JP1 on the PE-3 is used to select a group of 3 auxiliary buss channels that are used to output audio from the port receiver. This jumper was included to allow two PE-3s to be installed on the buss, providing 6 link ports to your RI-300/RI-310 controller. When JP1 is installed, the PE-3 will used channels 3 through 5 and when the jumper is removed, the PE-3 will use channels 6 through 8. The following diagram show how channels 3 through 8 are used to route audio from the port receiver to the buss. You will also notice how channels 1 and 2 are used to route audio from the buss to the port transmitter. System Command 02 is used to select between channels 1 or 2.



SETUP and ADJUSTMENTS

In most cases, the default PE-3 jumper settings will be used. You should also confirm the jumper settings on the RI-300 or RI-310 for correct operation of the PE-3. JP2 should be installed and JP3 should be connected between pins 1 and 2.

Buss Select Jumper (JP1)

Receiver	Port 1	Port 2	Port 3
JP1 In	Buss CH 3	Buss CH 4	Buss CH 5
JP1 Out	Buss CH 6	Buss CH 7	Buss CH 8

This jumper is used to select a group of 3 auxiliary buss channels that are used to output audio from the port receiver. See the table for channel or address assignments. If you are installing 2 PE-3s on the auxiliary buss, one PE-3 should have the jumper installed and to other PE-3 should have the jumper removed. You will need to keep track which port is assigned to which auxiliary buss channel when programming macros in the controller.

Transmitter Audio Select Jumper (JP2, JP4, JP6)

Transmit Port	Pre-Emphasis (Default)	True FM Flat
Port 1	JP2 (1-2)	JP2 (2-3)
Port 2	JP4 (1-2)	JP4 (2-3)
Port 3	JP6 (1-2)	JP6 (2-3)

The PE-3 port transmit audio is user selectable as to the type of transmitter you will be interfacing to. These selections include transmitters with pre-emphasis and transmitters with flat or true FM modulation. Most all transmitters have a pre-emphasis stage. This includes frequency modulation and phase modulation transmitters. In most cases you will inject the audio prior to the transmitter pre-emphasis stage. This is the default jumper setting, pin 1 and 2 on the PE-3. This setting also includes connections to a speaker/amplifier and Voice over IP applications. However, in some cases, you may want to inject the audio directly into a FM type modulator. In this case, you will want to select pins 2 and 3 of the transmitter jumper.

Receiver Audio Select Jumper (JP3, JP5, JP7)

Receiver Port	De-Emphasis (Default)	Discriminator Flat
Port 1	JP3 (1-2)	JP3 (2-3)
Port 2	JP5 (1-2)	JP5 (2-3)
Port 3	JP7 (1-2)	JP7 (2-3)

The PE-3 port receiver audio is user selectable as to the type of receiver you are interfacing to. These selections include receivers with de-emphasis and directly discriminator. All receivers have a discriminator and de-emphasis. This jumper allows you to set the PE-3 based on which point you have connected the port to your receiver audio. The most common point is de-emphasis audio. This is the default jumper setting, pin 1 and 2 on the PE-3. This setting also includes connections to a microphone and Voice over IP applications.

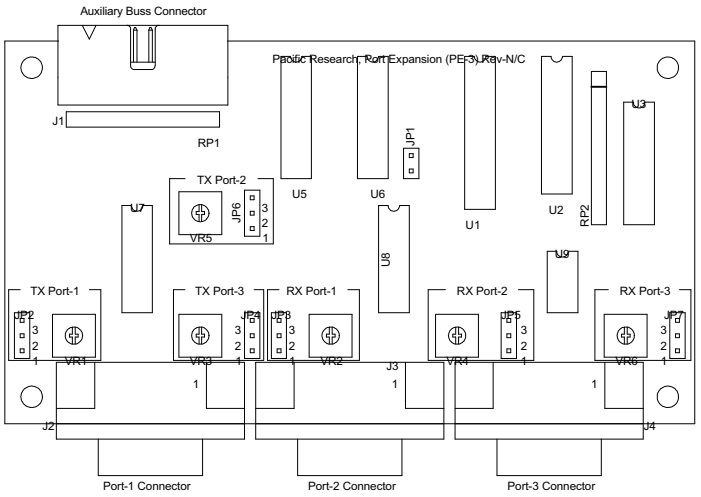
Audio Level Adjustments

Level Adjustment	RX	TX
Port 1	VR1	VR2
Port 2	VR3	VR4
Port 3	VR5	VR6

The PE-3 includes audio level adjustments for both receiver input and transmitter outputs. The following table identifies which potentiometer to used for each of these adjustments. Make sure you have properly adjusted the controller's audio prior to making any adjustments to thePE-3. The drawing below shows the location of each potentiometer.

Adjustment Layout

The drawing to the right shows the location of the above-mentioned jumpers and potentiometers. Some components on this drawing are not shown for clarity.



PROGRAMMING SOFTWARE

No programming of the PE-3 is required. All operational settings are controller with System Commands sent from the source (RI-300) controller. The standard PS-3 Programming Software can be used to monitor and verify the operation of the PE-3. The PE-3 will show as active controllers on the auxiliary buss channels 3,4,5 or 6,7,8 depending on the buss assignment jumper, JP1.

AUXILIARY BUSS OPERATION

The RI-300 has auxiliary input and output capability for connecting as many as eight RI-300 repeater controllers together. The Aux buss has eight audio channels and a digital serial data path to provide all the communication that is required when connecting multiple controllers together. The PE-3 acts like 3 controllers on the buss, as each port is assigned a channel on the buss. To control a port on the PE-3, you just send System Commands to the buss channel assigned to the port. See the above sections on jumper setting for buss channel assignment.

The features of the PE-3 are directly controlled with System Commands (S-Commands) from the source controller. Any of the following S-Command can be added to Macros in the controller to form custom User Command. Any S-Command values modified in the PE-3, only effect the runtime operation. If power is loss, the programming of the PE-3 returns to factory defaults. If you need a pre assigned setting when power is supplied, add the required S-Commands to a macro and point the Power On trigger event to this macro. See the controller programming for more details on programming Power On trigger, User Commands and Macros.

S-Command information is sent from the controller to the PE-3 by writing macros with data telling the controller to send S-Command information to the PE-3 and not to process that S-Command within itself. To build a macro with S-Commands that will be processed by the PE-3, you simply insert an “Ax” (where “x” is a numeral from 1 to 9, the PE-3’s port address on the buss) before the S-Command and its data within the macro. All data from the “Ax” through the “C” (S-Command separator) will be sent to the PE-3. Each PE-3 port on the auxiliary buss is assigned its own address number. The default auxiliary buss address used by the PE-3 to output audio and data is 3 through 5. See the section on Jumpers for information on changing the address.

You can also use the remote unlock procedure and Send S-Command window in the programming software to directly control the PE-3. See the RI-300 User Manual for more details on S-Command and Macro programming.

All S-Commands are shown with the syntax, as it would be programmed from the controller. The “x” value is the PE-3 port address on the buss.

S-Command 00, COS and TSQ Input Polarity

The COS (Squelch detect) inputs and TSQ (CTCSS or PL decode) inputs are programmable for active low or active high logic. Refer to your radio’s service manual for details on the polarity of these signals. You can also use a voltmeter to check the polarity of these signals.

SYNTAX: A[x] 00 [Mode]
PARAMETERS: Mode = See table
DEFAULT: 0
EXAMPLE:
A3 00 1 Set Port 1 COS input to active high
A4 00 3 Set Port 2 COS and TSQ inputs to active high
A5 00 2 Set Port 3 TSQ input to active high

Mode	COS Active	TSQ Active
0	Low	Low
1	High	Low
2	Low	High
3	High	High

S-Command 01, Port Input Mode

This function is used to control the port input mode. Each port can be set to enable audio and control signals to the controller when the COS and/or TSQ is active. Use this command to enable the port's receiver.

It should be noted that both COS and TSQ inputs are equal as to there logic. In other words, you could use the TSQ input as an external port input enable.

SYNTAX: A[x] 01 [Mode]
PARAMETERS: Mode 0 = Port input off, 1 = COS only, 2 = TSQ only, 3 = COS and TSQ
DEFAULT: 0
EXAMPLE: A3 01 3 Set Port 1 to require COS and TSQ active
A4 01 1 Set Port 2 to require COS only active
A5 01 0 Set Port 3 off

S-Command 02, Port Output Mode

This function is used to control the port output mode. Each port can be set as to the auxiliary buss source for audio and PTT output. Although the auxiliary buss has 8 audio channels, only buss channels 1 or 2 can be selected as source audio to the port output (transmitter). Use this command to enable the port's transmitter.

SYNTAX: A[x] 02 [Mode]
PARAMETERS: Mode 0 = Port output off, 1 = Select auxiliary buss channel 1, 2 = Auxiliary buss channel 2
DEFAULT: 0
EXAMPLE: A3 02 1 Route auxiliary buss channel 1 to Port 1 output.
A4 02 2 Route auxiliary buss channel 2 to Port 2 output.
A5 02 0 Turn off Port 3 output, disable transmitter.

S-Command 03, Port PTT Delay

This function is used to keep the port output PTT keyed for the programmed time after the control signal is no longer active. The delay value is programmed in 100mS increments.

SYNTAX: A[x] 03 [Delay]
PARAMETERS: Delay = 0 to 255 (0 to 25.5 Seconds)
DEFAULT: 0
EXAMPLE: A3 03 150 Set Port 1 transmitter PTT delay for 15.0 seconds
A4 03 5 Set Port 2 transmitter PTT delay for 0.5 seconds
A5 03 0 Set Port 3 transmitter PTT for no delay, 0.0 seconds

S-Command 04, Port Data Output Mode

This function is used to control the PE-3 User Function Port output mode. This output has multiple modes; first, you can control the pin as a single user function output. Next, you can select one of 2 Generic Data modes for controlling the Doug Hall RBI-1 or the FTL-RBI. See S-Commands 10 through 18 for details on setting Generic Data. Finally, you can select a (serial to parallel) device support. See the schematic in the connections section for more information.

SYNTAX: 04 [Mode]
PARAMETERS: Mode 0 = User function Low (Pin-7), 1 = User function High (Pin-7),
2 = Doug Hall RBI-1 Data, 3 = Pacific Research FTL-RBI Data,
4 = User Function Data, see "Serial to Parallel User Function Diagram"
DEFAULT: 0
EXAMPLE: A3 04 1 Set Port 1 user function bit high
A3 04 0 Set Port 1 user function bit low
A4 04 2 Set Port 2 to output data to Doug Hall RBI-1
A5 04 4 Set Port 3 to output user function data to serial to parallel device
See S-Command 10 for data control

S-Command 09, PE-3 Reset

This function is used to reset the PE-3. When this function is executed all S-Command values will return to their default setting. This command can be issued to any of the three port channels. Resetting one channel resets all channels.

SYNTAX: 09
PARAMETERS: N/A
DEFAULT: N/A
EXAMPLE: A3 09 Reset PE-3

S-Command 10, Generic Data User Functions

This command is used to modify the user functions. Two digits follow this S-Command are used to modify the user function. The first digit (value 1-8) selects the actual user function and the second digit will turn the function on/off. When the Doug Hall RBI-1 or the serial to parallel interface is connected to a port, you can use this command to modify each of the user function output bits.

SYNTAX: A[x] 10 [User Function] [Data]
PARAMETERS: User Function 1 – 8 = Bit output from device
Data 0 = Off or Low, 1 = On or High
DEFAULT: All user outputs = 0 (Output low)
EXAMPLE: A3 10 21 Port 1, User Function output 2 = High
A4 10 30 Port 2, User Function output 3 = Low

S-Command 11, Generic Data Radio Functions

The Radio Functions are used to turn on/off various radio features. Two digits follow this S-Command are used to modify the feature. The first digit (value 1-7) selects the actual radio function and the second digit will turn the function on/off.

SYNTAX: A[x] 11 [Radio Function] [Data]
PARAMETERS: Function 1 = Receiver Enable, 2 = Transmitter Enable, 3 = CTCSS Encode, 4 = Not available
5 = Not available, 6 = Squelch open, 7 = Radio Enable (TX and RX)
Data 0 = Off or disable, 1 = On or enable
DEFAULT: All radio functions = 0 (Off/Disable)
EXAMPLE: A3 11 71 Port 1, Radio Function, Radio = On
A4 11 11 Port 2, Radio Function, Receiver = On

S-Command 12, Generic Data Frequency and Transmit Offset

This function is used to set the receive frequency and transmit offset from the receive frequency. The transmit offset value is optional, as the receive frequency can be entered without changing the previous transmit value. You can also enter a transmit offset value without the receive frequency.

SYNTAX: A[x] 12 [Receive Frequency] <Transmit Offset>
PARAMETERS: RX Freq = **(*Receive Frequency*)** Up to 8 digits, First digit of frequency is the 100s MHz digit and trailing zeros are not required. Upper and Lower frequency limits are controlled by S-Command 93.
Offset = ***(Optional)*** #1 = Minus, #2 = Simplex, #3 = Plus
DEFAULT: RX Freq = Memory Channel 16
EXAMPLE: A3 12 14652#2 Set port 1 radio receiver frequency to 146.520 MHz simplex
A4 12 44445#3 Set port 2 radio receiver frequency to 444.450 MHz, plus transmit offset
A5 12 4421125 Set port 3 radio receiver frequency to 442.4425MHz, keep the previous transmit frequency
A5 12 #3 Change the transmit frequency to a plus offset on port 3

S-Command 13, Generic Data CTCSS Tone Select

This S-Command defines the CTCSS encode frequency. Select the tone number from the following data table. Note; tone numbers above 38 are only available on the FTL-RBI.

SYNTAX: A[x] 13 [CTCSS]

PARAMETERS: CTCSS

1 = 67.0Hz	2 = 71.9Hz	3 = 74.4Hz	4 = 77.0Hz	5 = 79.7Hz
6 = 82.5Hz	7 = 85.4Hz	8 = 88.5Hz	9 = 91.5Hz	10 = 94.8Hz
11 = 97.4Hz	12 = 100.0Hz	13 = 103.5Hz	14 = 107.2Hz	15 = 110.9Hz
16 = 114.8Hz	17 = 118.8Hz	18 = 123.0Hz	19 = 127.3Hz	20 = 131.8Hz
21 = 136.5Hz	22 = 141.3Hz	23 = 146.2Hz	24 = 151.4Hz	25 = 156.7Hz
26 = 162.2Hz	27 = 167.9Hz	28 = 173.8Hz	29 = 179.9Hz	30 = 186.2Hz
31 = 192.8Hz	32 = 203.5Hz	33 = 210.7Hz	34 = 218.1Hz	35 = 225.7Hz
36 = 233.6Hz	37 = 241.8Hz	38 = 250.3Hz	39 = 254.1Hz	40 = 069.3Hz
41 = 159.8Hz	42 = 165.5Hz	43 = 171.3Hz	44 = 177.3Hz	45 = 183.5Hz
46 = 189.9Hz	47 = 196.6Hz	48 = 199.5Hz	49 = 206.5Hz	50 = 229.1Hz

DEFAULT: CTCSS = 1 (67.0Hz)

EXAMPLE: A3 13 12 Set port 1 CTCSS to 100.0 Hz
A4 13 19 Set port 2 CTCSS to 127.3 Hz
A5 13 8 Set port 3 CTCSS to 188.5 Hz

S-Command 14, Generic Data Transmit Power Select

This S-Command is used to select the transmitter power level. One of three power levels can be selected, Low, Mid and High.

SYNTAX: A[x] 14 [TX Power]

PARAMETERS: TX Power 0 = Low Power, 1 = High Power, 2 = Mid Power.

DEFAULT: TX Power 0 = Low Power

EXAMPLE: A3 14 1 Set port 1 TX power to high
A4 14 0 Set port 2 TX power to low

S-Command 15, Generic Data Memory Recall

This S-Command will recall a memory channels that have been preprogrammed into the radio by the user. Entering a receive frequency with S-Command 12xxx will cause the radio to revert to the VFO mode.

SYNTAX: A[x] 15 [Memory Channel]

PARAMETERS: Memory CH 0 = VFO and 1 to 20 selects the available radio memory channel.

DEFAULT: Memory recall = 0 (VFO)

EXAMPLE: A3 15 3 Select memory channel 3 on port 1
A4 15 12 Select memory channel 12 on port 2

S-Command 16, Generic Data Memory Save

This S-Command is used to save a memory channel. When a memory channel is created, the current programmed receive and transmit frequency, power level, CTCSS encode, transmit timeout and radio functions are saved. These features can very from radio to radio.

SYNTAX: A[x] 16 [Memory Channel]

PARAMETERS: Memory CH 1 to 20 memory channel

DEFAULT: N/A

EXAMPLE: A3 16 3 On port 1, save current VFO and radio settings to memory channel 3

S-Command 17, Generic Data Squelch Level Control

This S-Command is used to set the squelch level value on the radio. The feature is not supported by all radios. On the FTL-RBI, the commands sets the detailed transmit power levels.

SYNTAX:	A[x] 17 [Squelch Level]	
PARAMETERS:	Squelch Level = 0 to 15.	
DEFAULT:	0	
EXAMPLE:	A3 17 3	Set port 1, level to 3
	A4 17 0	Set port 2, level to 0

S-Command 18, Generic Data Level Control

This S-Command is used to set the level value on the radio. The feature is not supported by all radios. On the FTL-RBI, the commands sets the transmit PTT timeout timer.

SYNTAX:	A[x] 18 [Level]	
PARAMETERS:	Level = 0 to 15.	
DEFAULT:	0	
EXAMPLE:	A3 18 8	Set port 1 level to 8.

TROUBLE SHOOTING

Port not responding

Check the port cable and auxiliary buss cable. Disconnect the port cable from the radio and measure the voltage between pins 1 (Ground) and 5 (COS) and verify you have around 5 volts DC. If not, recheck auxiliary buss cable and make sure power is applied to the controller. If still not working, run the programming software and verify that the PE-3 shows as active controllers 3, 4, 5 or 6, 7, 8.

Port is intermittent

This can be due to grounds currents between the radio and PE-3. Try the failing commands with the antenna to the radio disconnected. If this corrects the problem, you may need to add a bulkhead connector to the radio antenna then connect it to a common ground. Check the radios power cable and verify that you have a solid ground connection.

Port receiver input not responding

This can occur when the receiver input is not enabled or the polarity is not correct. You can also check the COS output from the radio to verify that it is working.

Port receiver COR or TSQ input not working correctly

Verify the polarity of the incoming signals (S-Command 00) and the input enable (S-Command 01). You can also check the COS output from the radio. Also, the PE-3 should be able to identify a change in signal when you short the COS or TSQ input or ground on the port connector

Port transmitter not responding

This can occur when the output is not enabled (S-Command 02). You can also check the PTT output from the port with a voltmeter. This signal is active low.

Port transmit or receiver audio too high pitch

The PE-3 supports both flat and emphasized audio. If the transmitter is too high pitch, change the transmitter modulation jumper to Flat audio. If the receiver is too high pitch, change the receiver jumper to De-Emphasis. See the section on jumpers for more information on this subject.

Port transmit or receiver audio too muffled

The PE-3 supports both flat and emphasized audio. If the transmitter is too low pitch, change the transmitter modulation jumper to Pre-Emphasis audio. If the receiver is too low pitch, change the receiver jumper to Flat audio. See the section on jumpers for more information on this subject.

Port PTT stays keyed after the control signal has stopped

S-Command 3 can add delay to the transmitter PTT. Verify that in your macro programming you have not set this value.

SCHEMATIC DIAGRAM

COMPONENT LAYOUT