

# NHRC-2 Repeater Controller

## Frequently Asked Questions about Assembling a Partial Kit

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### **I can't find a IRL530. Is there another part I can use for Q6?**

The closest substitution is the IRL530N (Digi-Key P/N: IRL530N-ND). It's the next generation device, and just a bit more expensive. (\$1.66 each in 1-9 qty.) Digi-Key has stock on this item. Just about any N-channel TO-220 MOSFET will work here; the pinouts are pretty much standard. We chose the IRL530 for it's low "Rds on" value (about 0.16 ohms) and because it is a "logic-level" device, meaning a 5 volt level on the gate will turn the device fully "on". Other good values would include the IRL510 & IRL520, IRF 510 and the new IRL520N & IRL540N. Harris part RFD15N05L (available thru Newark) is also a good sub. Radio Shack has the IRF510 in their catalog.

### **I have some ISD1020s lying around. Can I use them in the NHRC2?**

Not easily. The ISD1000 series parts use a slightly different interface for record/play, power down, and chip select. To use a ISD1000 series part would require some changes to the PC board, and some software changes as well. These changes are not impossible, in fact the original prototype controller used an ISD1020, but the ISD1420 is a less expensive, newer part.

### **In looking at the parts placement diagram in the back of the manual supplied with the kit, it looks like the pinout shown for Q2 does not match any 2N2222 made on this planet. What gives?**

Ouch. We goofed. The correct pinout for Q2 is EBC. The orientation shown is correct, it's just the labels for E and C are reversed. Install the transistor with the flat side facing the end of the board with the DB9 connector.

### **How come my DB9 connector mounting holes do not line up with the holes on the board?**

The NorComp part listed in the BOM indeed does have the wrong offset, and Digi-Key does not offer a correct sub. Newark Electronics P/N: 89F1583 (SPC DE9S-FRS \$2.96ea. 1-24pcs.) or Newark P/N: 87F2251 (Amphenol 617-C009S-AJ120 \$1.99ea. 1-24pcs.) both devices have the proper offset (0.318") and boardmount locks, however the Amphenol part does not come with jack screws, but are available separately using Newark P/N: 50F4689 (Keystone 7228 \$0.16ea.) Some kit builders have reported that the AMP Amplimite 754781-4 (Digikey A2100-ND), will fit in the board, but extreme care must be taken if this part is used to make sure that none of the traces on the PC board under the connector are shorted out. Use some electrical tape or mylar sheet to insulate the connector housing from the board. The Amphenol 617-C009S is the preferred part.

### **I built my controller, and it doesn't work. What can I do?**

Look at the [Troubleshooting Information](#) page for some ideas to get your controller running.

### **I want to build a controller without the ISD1420, for use as a link controller. What parts are not needed?**

You can leave the following parts off the board:

C5, C9, C12, C15, C18, C23, C24, C25  
Q3, Q4  
R9, R10, R13, R20, R21, R24, R25, R26, R27, R28  
U2  
VR3, VR5

Remember to set bit 0 of the configuration flag bits to indicate to the microprocessor that the ISD1420 is not present. Consider setting bits 4 and 5 as well, depending on your linking requirements.

### **What's all this about deemphasis, and why should I care?**

Deemphasis is used to remove the preemphasis put on a FM signal by the transmitter. Together, they work to reduce the amount of hiss you hear in a received FM signal. The concept is similar to Dolby noise reduction: the transmitted signal has the high-frequency component boosted before transmission, then a corresponding reduction occurs in the receiver. The receiver removing a significant part of the high-frequency component of the received signal actually removes a lot of hiss and noise with it.

If you use receiver audio that has not been deemphasized (like what is commonly found on the high side of the squelch control), then the repeated audio will sound very tinny and unnatural. However, the high side of the squelch control is a good place to take audio from a receiver used in a repeater because the audio there is not subject to level changes caused by the volume control. In many radios, the deemphasis filter is "downstream" of the volume control, which makes taking audio from there unattractive.

The NHRC-2 has the capability to perform deemphasis filtering on board. To use the onboard filter, some parts substitutions must be performed. It is probably easier to decide whether you want the filter or not *before* soldering part to the board.

<b>Component</b>	<b>No Deemphasis</b>	<b>With Deemphasis</b>
C3	not present	.0068uF
R3	100K	51K
R4	100K	510K

### **There seems to be some distortion in the repeated audio. What can I do?**

Try replacing U5 (the LM358) with a TL062, or install a 4.7K resistor from U5 pin 7 to ground. Do not use both modifications.

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*This page will be updated as we discover more frequently asked questions. You may want to check back often.*

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