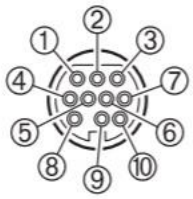
Establishing a connection for a link radio on the DR Repeater Series –

1.) Using the 10 pin mini din connection –

The DR repeater series has a 10 pin mini din data port on the back of the repeater. This 10-pin connection maintains a total of 6 pins with functionality in a stand packet layout. The remaining 4 pins (# 7 – 10) are for data control for Yaesu devices. These pins will not be needed, and the focus will be on pin #'s 1 – 6.

The pinouts and their function are as follows:



① PKD (packet data input)
② GND
③ PKS (PTT)
④ RX 9600 (9600 bps packet data output)
⑤ RX 1200 (1200 bps packet data output)

⑥ PK SQL (squelch control)
⑦ TXD (serial data output [repeater → PC])
⑧ RXD (serial data output [repeater ← PC])
⑨ CTS (data communication control)
⑩ RTS (data communication control)

DO NOT USE

PKD – Is for audio input (depending on the source of the audio flat might be able to be used)

GND – Ground, this can be used for mic lo and speaker lo (voltage-based speaker inputs should not be tied to this connection without filtering).

PKS – PTT Input (active Low), connect to ground to key the repeater

RX 9600 – Outputs recovered analog audio only, digital audio is unrecovered digital hash sound

RX 1200 – Outputs recovered analog AND digital audio

PK SQL – COR Output (active Hi) (+3 volts DC – referenced to ground) active when a carrier and the correct tone signaling is present with the carrier.

The design concept is that when a signal is received by the receiver of the repeater it will pass the audio out to the transmitter as well as out the RX 1200 & RX 9600 baud outputs. This will also cause the PK SQL to go active hi because of the signal received. In turn when the PTT (PKS pin) has an active lo (ground/0 volts DC) applied it will cause the transmitter to key.

It is important to remember three key things about the audio routing using this method.

1.) When the transmitter is keyed it WILL encode the programmed CTCSS or DCS signaling selected from the front panel of the repeater.

2.) If you are using a DR-1X series repeater you will need to manually select the mode of transmit to either FIXED FM or FIXED DIGITAL. The receive mode can still be either AMS, FIXED DIGITAL, (or on older models) FIXED FM.

3.) This method does not work if the repeater is being used in full duplex remote mode.

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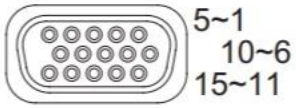
Establishing a connection for a link radio on the DR-2X Repeater Series –

2.) Using the DB 15 pin connection –

The DR repeater series has a DB15 pin connector on the back of the repeater. This 15 pin connection allows for connection of the repeater to a controller device or collecting audio. Not all of the 15 pins are needed for creating a linking output using the 15 pin connection.

The pins needed and their functions are as follows:

CONTROL I/O connector



(as viewed from real panel)

Pin No	Pin Name	I/O	Descriptions
1	EXT I/O	Input	[L] GND: Remote mode [H] OPEN: Repeater mode
2	PTT	Input	[L] GND: EXT PTT ON [H] OPEN: EXT PTT OFF When this pin is pulled low by an external device, it keys the repeater transmitter. On signaling while controlling the external PTT: Pin 6 (TONE IN) ... Valid Pin 7 (AF IN) ... Invalid
3	CTCSS/DCS (PKSQL)	Output	[L] GND: Decoded [H] OPEN: Undecoded Signaling settings in the repeater setup menu will be applied.
4	SQL DET (Noise SQL)	Output	[L] GND: SQL open [H] OPEN: SQL close This is an open-collector, active-low output capable of sinking about 10 mA. It indicates that the receiver squelch is open. If the squelch control is properly set, this indicates a carrier on the receiver channel.
5	GND	GND	Chassis ground for all logic levels and power supply return
6	TONE IN	Input	CTCSS/DCS EXT input / 600 ohm, 500 mV peak to peak Valid during external PTT control This pin is sub-audible tone input, and has a flat response characteristic (repeater deviation is constant for a given signal level over the frequency range of 5 ~ 250 Hz). Injecting a too high signal level here causes over-deviation of CTCSS or DCS, degrading performance. Use shielded cable to connect to this pin, connecting the shield to GND.
7	AF IN	Input	EXT Modulation input / 600 ohm, 1.5 V peak to peak Valid during external PTT control This pin is audio input (300 ~ 3,000 Hz). This audio is injected before the splatter filter stage, so excess signal input levels are clipped. It is impossible to input analog modulation signals and convert them to digital signals on DR-2X/DR-2XE. Use shielded cable to connect to this pin, and connect the shield to GND. To use the external AF input, set the Pin11/Pin12 EXT port setting to RX: Auto (AMS) / TX: FM (FIX).

Important for Analog usage

***** When keying the transmitter the CTCSS/DCS will be stripped. You will need an external tone board for CTCSS/DCS encode**

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Establishing a connection for a link radio on the DR-2X Repeater Series (Cont) –

9	AF OUT	Output	Up-link RX AF output (w/ de-emphasis), 300 mV peak to peak Analog audio output during up-link reception. Does not affect the operation mode of the repeater. This pin is an output for AF signal (300 mVp-p), being extracted after the de-emphasis. Demodulated digital signals can be output as well.
10	GND	GND	Chassis ground for all logic levels and power supply return
11	EXT port 1※	Input	In Remote mode, the logic combination of Ports 1 and 2 determines the transmit and receive modes as below:
12	EXT port 2※	Input	
13	EXT port 3※	Input	[L] GND: RX Tone OFF [H] OPEN: Setup mode Input a low level signal to indicate that the receiving tone is invalid.
14	EXT port 4※	Input	[L] GND: TX Tone OFF [H] OPEN: Setup mode Input a low level signal to indicate that the transmitting tone is invalid.
15	VCC	VCC	Power supply This pin provides 13.8V, 2.0A, DC from the repeater supply. There is an internal 3 A fuse to prevent damage to the repeater.

Port 1	Port 2	RX	TX
H	H	Auto (AMS)	Digital
L	H	Digital	Digital
H	L	Auto (AMS)	FM (FIX)
L	L	Auto (AMS)	Auto (AMS)

※ These functions may only be activated while the repeater is in Remote mode.

Gives analog and recovered digital audio output

When using this interface, it is important to determine if you will be using an external controller for linking or just a link radio. If you wish for the DR-2X to use the internal controls and just feed a link radio then you will not ground pin #1. Putting the repeater into remote mode and grounding pin # 1 disables the internal repeater function and makes it so that the repeater will only transmit when pin # 2 is taken lo (to ground). Also note that when pin # 2 is used for PTT the CTCSS/DCS tone programmed in the repeater is stripped. Therefore, an external CTCSS/DCS encoding board is needed when the transmitter activates.

When active in REMOTE mode, even if pin # 1 is NOT grounded, the repeater will go active in the RX & TX mode as listed in the truth table. This is to the right of the description of pins # 11 & 12 showing based on the state of pins # 11 & 12 what the functions of the repeater will be for RX & TX.

Pins # 3 & 4 will give an active lo sense when the correct parameters are reached based on the settings of the repeater. For pin # 3 CTCSS/DCS (PKSQL) when the RX tone is received and matches what the repeater has for a setting this pin will generate an active lo (0 volts). For pin # 4 SQL DET (Noise SQL) when a RX signal is present this pin will become active lo (0 volts) regardless if the CTCSS/DCS tone is the correct one.

<u>It is important to remember three key things about the audio routing using this method.</u>

1.) The repeater must be placed into REMOTE mode (via the repeater menu system) to use these pins listed above.

2.) To disable the internal repeat function # 1 above must be done and pin # 1 must be grounded.

3.) Isolators or directional devices should be used as a safety measure to prevent voltage or signals going into the repeater on a pin producing an output signal.

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