

DR-1 REPEATER, BASE and REMOTE Mode Operations

Using the [CONTROL I/O] connector on the rear panel of the DR-1, operation modes and their features can be set.

Operation modes

● REPEATER mode

The DR-1 is a complete full function repeater, including control of COR, TOT, ID, CTCSS, DCS, C4FM, ASM, FM etc.

● BASE mode

By grounding Pin 1 of the [CONTROL I/O] connector at the back of the DR-1, the repeater may be used in BASE mode and functions as a VHF/UHF base station with an optional MH-48A6JA microphone. Pins 1, 2, 3, 4, 6 and 7 may be used for input and control while in BASE mode.

Tip

In case of jamming or interfering signal, Pin 1 may be grounded by external control to temporarily disable repeating the receiver input.

● REMOTE mode

When [REMOTE] is set to ON in the SETUP menu, the repeater transmit and receive modes are determined by the logic values on Pins 11 and 12 of the [CONTROL I/O] connector. In REMOTE mode, Pins 13 and 14 reflect the valid RX and TX tones. Discriminator and Audio outputs are provided on Pins 8 and 9.

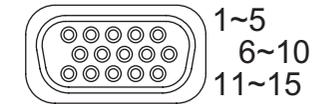
Connection to an external controller

To interface the DR-1 with an external controller for remote control, additional cables are needed to connect to the [CONTROL I/O] connector. Your controller may require rewiring. Link operation may require four connections: receiver audio, transmitter audio, receiver COR, and transmitter PTT; however these are not available on the DR-1's [CONTROL I/O] connector.

NOTICE

When using the DR-1 with an external controller, the COR, analog and digital IDs, TOT, DSC/CTCSS, TX power, etc. are already controlled by the DR-1 internal control. These internal controls cannot be disabled. The external controller must not conflict with these functions. Some functions of the internal controller cannot be overridden. Before connecting an external controller you must make sure which functions are already internally controlled. Special precautions must be considered when planning to link with external systems.

Pin assignment of [CONTROL I/O] connector



- *1: These functions may only be activated while the repeater is in Base mode.
- *2: These functions may only be activated while the repeater is in Remote mode.

Pin No	Pin Name	I/O	Function																				
1	BASE	Input	[L] GND: Base mode [H] OPEN: Repeater mode																				
2	PTT*1	Input	[L] GND: EXT PTT ON [H] OPEN: EXT PTT OFF Tip On signaling while controlling the external PTT: Pin 6 (TONE IN) ... Valid Pin 7 (AF IN) ... Invalid																				
3	CTCSS/DCS (PKSQL)*1	Output	[L] GND: Decoded [H] OPEN: Undecoded																				
4	SQL DET (Noise SQL)*1	Output	[L] GND: SQL open [H] OPEN: SQL close																				
5	GND	GND	GND																				
6	TONE IN*1	Input	CTCSS/DCS EXT input / 600 ohm, 500mV peak to peak Valid during external PTT control																				
7	AF IN*1	Input	EXT Modulation input / 600 ohm, 1.5V peak to peak Valid during external PTT control																				
8	DISC OUT	Output	Up-link RX DISC output (w/o de-emphasis), 500mV peak to peak discriminator output during up-link reception. Does not affect the operation mode of the repeater.																				
9	AF OUT	Output	Up-link RX AF output (w/ de-emphasis), 300mV peak to peak Analog audio output during up-link reception. Does not affect the operation mode of the repeater.																				
10	GND	GND	GND																				
11	EXT port 1*2	Input	In Remote mode, the logic combination of Ports 1 and 2 determines the transmit and receive modes as below:																				
12	EXT port 2*2	Input																					
<table border="1"> <thead> <tr> <th>Port 2</th> <th>Port 1</th> <th>RX</th> <th>TX</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>H</td> <td>AUTO (AMS)</td> <td>FM</td> </tr> <tr> <td>H</td> <td>L</td> <td>FM</td> <td>FM</td> </tr> <tr> <td>L</td> <td>H</td> <td>Digital</td> <td>Digital</td> </tr> <tr> <td>L</td> <td>L</td> <td>AUTO (AMS)</td> <td>AUTO (AMS)</td> </tr> </tbody> </table>				Port 2	Port 1	RX	TX	H	H	AUTO (AMS)	FM	H	L	FM	FM	L	H	Digital	Digital	L	L	AUTO (AMS)	AUTO (AMS)
Port 2	Port 1	RX	TX																				
H	H	AUTO (AMS)	FM																				
H	L	FM	FM																				
L	H	Digital	Digital																				
L	L	AUTO (AMS)	AUTO (AMS)																				
13	EXT port 3*2	Input	[L] GND: RX Tone OFF [H] OPEN: Setup mode																				
14	EXT port 4*2	Input	[L] GND: TX Tone OFF [H] OPEN: Setup mode																				
15	VCC	VCC	Switched VCC (13.8 V)																				

● Descriptions of pins on [CONTROL I/O] connector

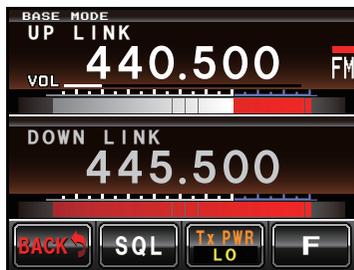
Pin 1: BASE

When the Base mode is selected, you can speak into the optional MH-48A6JA microphone connected to the MIC jack on the front panel to use this repeater as a transceiver.

Or, you can also control modulated signals input to Pin 6 or Pin 7 using an external PTT.

Once the Base mode is canceled, the repeater returns to the Repeater mode previously set.

- When the Base mode is set to ON, the repeater reboots to cancel repeater operations (The screen returns to the frequency display).
- When the AUTO mode (AMS) is set on the TX side, the Base mode function does not activate.
- While in Base mode, the communication mode cannot be set. The communication mode can be set only while in Repeater mode.
- While in Base mode, the received signal is not repeated.
- Base mode operations are based on the settings configured before entering the Base mode.
- If the repeater enters the Base mode while transmitting/receiving data using the AMS function, PTT operations will be prohibited.



Base mode activation screen

Pin 2: PTT

When the repeater is operating in the Base mode, and the 5 VDC at this pin is pulled low by an external device, it keys the repeater transmitter. (Only in Base mode)

Pin 3: CTCSS/DCS

Noise SQL and CTCSS/DCS decoded output. Signaling settings that are set in the SETUP menu will be applied. (Only in Base mode)

Pin 4: SQL DET

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. (Only in Base mode)

Pin 5: GND

Chassis ground for all logic levels and power supply return.

Pin 6: TONE IN [Transmitter Input] (Sub-audible Band: 5 ~ 250 Hz)

This pin is sub-audible input. Input impedance is 600 Ohms, and has a flat response characteristic (repeater deviation is constant for a given signal level over the frequency range of 5 ~ 250 Hz). Injecting too high a voltage here causes over-deviation of CTCSS or DCS, degrading performance.

Use shielded cable to connect to this pin, connecting the shield to GND. (Only in Base mode)

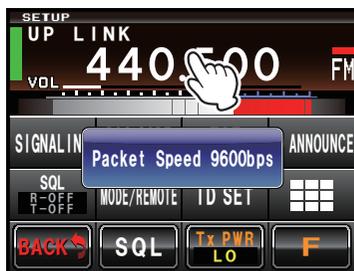
Pin 7: AF IN [Analog Transmitter Input (Packet 1200 bps)] (Voice Band: 300 ~ 3,000 Hz)

This pin is audio input. Nominal input level is 1.5 Vp-p. Input impedance is 600 Ohms. This audio is injected before the splatter filter stage, so excess signal input levels are clipped.

AF IN is usually used for analog modulation input, however, to input C4FM digital signals for digital modulation operations, enter the DR-1 Repeater mode, then touch the up-link frequency display area to change the packet speed to 9600bps. (Only in Base mode)

It is impossible to input analog modulation signals and convert them to digital signals on DR-1.

Use shielded cable to connect to this pin, and connect the shield to GND.



Packet speed changing (to 9600bps) screen

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Pin 8: DISC OUT [Analog Output] (Wide-Band: 0 ~ 3,000 Hz)

Received signals with standard deviation produce 500 mVp-p audio at this pin. The output impedance is 600 Ohm, and is extracted before the de-emphasis and squelch circuitry. Use shielded cable to connect to this pin, and connect the shield to GND.

Digital signals can be received as well.

Pin 9: AF OUT [Analog Output]

AF output (300 mVp-p) dedicated for analog mode. De-emphasis is applied.

This pin is an output for AF signal (300 mVp-p), with the signals being extracted after the de-emphasis.

Pins 6, 7, 8, and 9 Functions Controlled by Operation Mode

Pin No	Pin Name	Receive Mode	In Base Mode	In Repeater Mode
6	TONE IN	Digital	Invalid	Invalid
		Analog	Sub-audio modulation (up to 250 Hz)	Invalid
7	AF IN	Digital	Digital modulation audio input	Invalid
		Analog	Analog modulation input (300 Hz ~ 3 kHz)	Invalid
8	DISC OUT	Digital	Invalid	Invalid
		Analog	Discriminator output	Discriminator output
9	AF OUT	Digital	Demodulated digital audio output	Demodulated digital audio output
		Analog	Analog audio output	Analog audio output

Pin 10: GND

Chassis ground for all logic levels and power supply return.

Pins 11 and 12: EXT PORT 1, EXT PORT 2

When [REMOTE] is set to ON in the SETUP menu, the repeater mode is switched according to the EXT PORT1 and EXT PORT2 combinational logic (see the table in the previous page). (Only in Remote mode)

Pin 13: EXT PORT 3

This is an open-collector, active-low output capable of sinking about 10 mA. It indicates that the receiving tone is invalid. (Only in Remote mode)

Pin 14: EXT PORT 4

This is an open-collector, active-low output capable of sinking about 10 mA. It indicates that the transmitting tone is invalid. (Only in Remote mode)

Pin 15: VCC [Power Supply]

This pin provides 13.8 V, 2.0 A, DC from the repeater supply. There is an internal 3 A fuse to prevent damage to the repeater.

MIC jack

By connecting MH-48A6JA to the MIC jack on the front panel while in Repeater mode or Base mode, voice communications are possible in the mode which is set on the transmitter. However, when AMS is set on the transmitter, data transmission is not available via the MIC jack on the front panel.