Using the CS800D as a Repeater Controller

One of the features hams keep asking for is the ability to take two CS800D and make a repeater controller out of it. Hidden in the various menus and hardware, is the ability to do just that.

By understanding how the radio works, we can do cross band operation as well as same band operation. We can cross the following:

CTCSS	to	CTCSS
DCS	to	DCS
DMR	to	DMR
CTCSS	to	DCS
DMR	to	CTCSS
DMR	to	DCS
CTCSS	to	DMR
DCS	to	DMR

The input and output signals can be different. For example, you want to repeat if the input DMR uses color code 3 and group call 5 and the output DMR uses color code 1 and private call 210317. It is even possible to have the input any DMR signal by putting the receiver in promiscuous mode.

The key to doing this is understanding what is needed and then figure out how to achieve those results.

The receiver needs to have an audio output and a signal indicating that the radio is receiving the desired signal. The transmitter needs an audio input and a signal that tells it to start transmitting.

The audio out from the receiver can be obtained from three locations:

1. External Speaker output jack in the back of the radio.
2. Pin 1 of the 15 pin connector in the back. This is normal audio out.
3. Pin 4 of the 15 pin connector in the back. This is discriminator audio.

The audio in to the transmitter can be obtained from two locations:

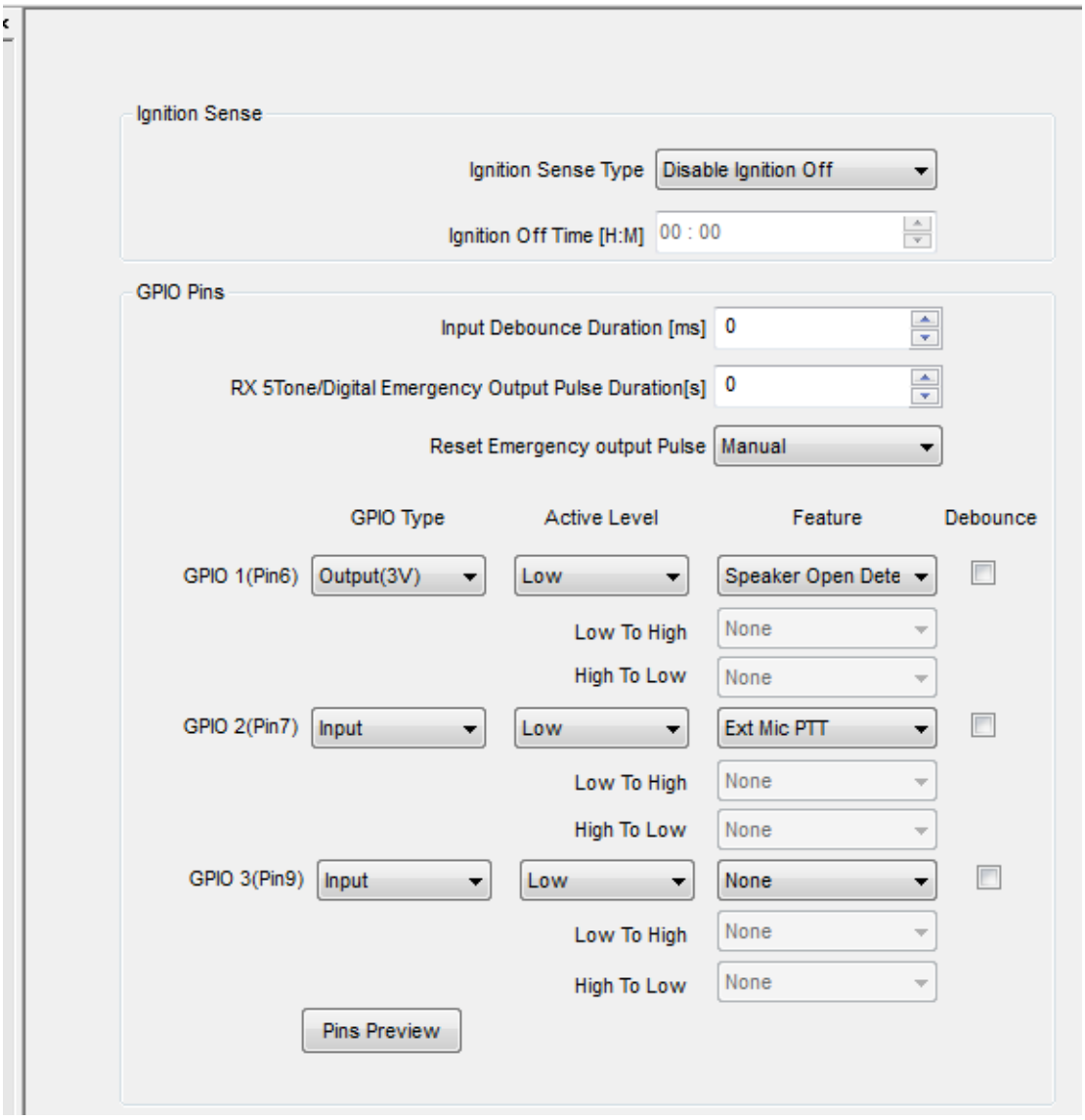
1. The microphone connector.
2. Pin 2 of the 15 pin connector in the back.

The signal to tell the transmitter to start transmitting can be found in the following location:

1. The microphone connector.
2. Pin 5 of the 15 pin connector in the back of the radio. This is the normal PTT pin.
3. Pin 6 of the 15 pin connector in the back of the radio. This is programmable auxiliary port 1 and must be programmed for External Mic PTT.
4. Pin 7 of the 15 pin connector in the back of the radio. This is programmable auxiliary port 2 and must be programmed for External Mic PTT.
5. Pin 9 of the 15 pin connector in the back of the radio. This is programmable auxiliary port 3 and must be programmed for External Mic PTT.

The signal from the receiver that indicates it is receiving the desired signal can be found in the following location:

1. Pin 6 of the 15 pin connector in the back of the radio. This is programmable auxiliary port 1 and must be programmed for Speaker Open Detect.
2. Pin 7 of the 15 pin connector in the back of the radio. This is programmable auxiliary port 2 and must be programmed for Speaker Open Detect.
3. Pin 9 of the 15 pin connector in the back of the radio. This is programmable auxiliary port 3 and must be programmed for Speaker Open Detect.



Go to the Accessories submenu of the General Settings menu to get to the screen above and then program GPIO 1 and optionally GPIO 2. Note that GPIO 1 is used for the CS800D that is used for the receiver and GPIO 2 is used for the CS800D that is used for the transmitter. For triggering the PTT, there are other sources as described before. There is no reason you cannot use GPIO 1 for both functions being that they are used on two different radios.

The next step is to program the channel on the radio that you want to use for receiving. This can be set for an analog channel with or without CTCSS or DCS or a digital channel.

If you want to use it in the promiscuous mode, you need to set the channel to digital, use one of the buttons for digital monitor mode, and then manually set it to the promiscuous mode after you change the channel to the digital channel you want to use.

Under normal circumstances, I would suggest to set each radio to have a single channel and a single zone to prevent mistakes in using and programming.

The next step is to program the channel on the radio you want to use for transmitting. This This can be set for an analog channel with or without CTCSS or DCS or a digital channel.

Now you just have to do the final wiring as follows:

Receiver	To	Transmitter
Audio Out		Audio In
Pin 6 of Aux Connector		PTT

You will need a separate antenna for the receiver and transmitter or a common antenna with a duplexer.