

DMR Dstar Crossmode

What is cross-mode?

When you talk on digital radio, the radio encodes the analog signal of your voice using a codec and sends that digital stream of ones and zeros through the air. The receiver gets that stream of "one and zero", and uses the same codec to decode and recreate the voice on the speaker.

When you use a repeater, the repeater receives the digital stream on the input frequency and retransmits it on the output. The only thing the repeater sees is a digital stream.

To do cross-mode meaning to translate from one mode (DMR, for example) to another mode (D-Star, for example), you need to have a special kind of repeater or a reflector that decodes from one mode and re-encodes into the other mode and vice versa.

As of today, the Pi-Star software does not know how to do cross-mode between DMR and D-Star¹, but you can connect to a service that knows how to do that re-encoding. The Pi-Star DMRGateway service can connect to a reflector that knows how to translate from one mode to another.

These reflectors are called XLX reflectors. Even though these reflectors are mainly used for D-Star, it is not uncommon to have these reflectors interconnect D-Star, DMR, C4FM, or even analog networks.

Configuration

The blurred part of the screenshot is not relevant to this article.

First, you need to select **DMRGateway** in the field **DMR Master:**, and click on the button **Apply Changes** at the bottom of this section. The configuration page will reload, displaying a few more fields in the configuration section, as shown in the following screenshot.

Setting	Value
DMR Master:	DMRGateway
BrandMeister Master:	BM_United_States_3103
BM Hotspot Security:
BrandMeister Network ESSID:	11437 01
BrandMeister Network Enable:	<input type="radio"/>
BrandMeister Network:	Repeater Information Edit Repeater (BrandMeister Selfcare)
DMR Network:
DMR Network ESSID:
DMR Network Enable:	<input type="radio"/>
XLX Master:	XLX_010
XLX Startup Module:	Default
XLX Master Enable:	<input type="radio"/>

Pi-Star XLX configuration.

XLX Fields

XLX Master:

In this field, you select the XLX master reflector you want to connect by default. It is the reflector your Pi-Star will connect to after booting.

The **list of all the masters** is available on the dashboard or any master.

XLX Startup module:

Each master reflector can have up to 26 modules, **A** through **Z**. Each module corresponds to a discussion group or topic. The person managing the reflector defines what these topics are. They differ from one reflector to another.

For example, the reflector **XLX-216** has module **A** for D-Star International Interlink, and the module **D** and **E** linked with brandmeister talk-groups.

XLX Enable: This toggle button turns **on** or **off** that feature.

Save your configuration by clicking on the **Apply Changes** button at the bottom of this section. After saving your new setup, you should see your hotspot connected on the dashboard of the XLX reflector of your choice.

Radio Configuration.

All the code-plugs to program DMR radios are different; this is why I will not give any specific information on how to program your particular brand of receiver. I will provide you with all the information you will need to understand how things work. It will help you modify your actual code-plug to use XLX.

All the talk-groups you have on your code-plug to work with BrandMeister should still work the same as before.

The DMRGateway channel used by Pi-Star for XLX traffic is on the talk-group **1**, time slot **1**. It means all the traffic concerning XLX between your radio and your hotspot will be on this talk-group and timeslot.

After programming the talk-group **1**, timeslot **1**, group-call, on your radio, you can start making calls. All the calls will go to the XLX reflector and module you have chosen in your configuration.

Every time you want to change the reflector or the module, you don't have to change your Pi-Star setup. You can make these changes directly from your radio.

Changing module

To **change the current module**, I use the keypad on my radio to make a private call to the talk-group **6000**. As we discussed before, all the traffic sent to a talk-group starting with the number **6** tells the DMRGateway to address the traffic to XLX. The **0000** is a special talk-group that sends a command to the DMRGateway to connect to the module n. For example: **60001** = module A, **60002** = B, **60003** would be C, etc.

To talk on a reflector, the calls have to be a public call. The calls have to be private to send a command to the DMRGateway module.

To **connect to a different reflector**, use the keypad the radio to make a private call to the talk-group **6800**. The prefix 6 tells the DMRGateway module to address the command to XLX, and 8 is the command for connecting, followed by the ID of the XLX server. The **list of XLX servers** is available on any XLX dashboards. For example: **68050** = XLX-050, **68201** = XLX-201, etc.

After connecting to a new reflector or changing module to make your QSO, place your call to the talk-group **6**, time slot 2, group-call.

To **check the link status**, use the keypad on the radio to make a private call on the talk group **6500**. The prefix 6 is for XLX, and **5000** is the command to get the link status. A voice on the radio will give the name of the XLX reflector, as well as the module.

Conclusion

With a Pi-Star and DMR radio, you can connect to XLX reflectors. XLX is interesting because repeater managers or clubs use XLX reflectors to build gateways between different modes. XLX reflectors can speak REF, XRF, DCS, which are specific to D-Star, and used to interconnect reflectors together. XLX reflectors can be reached via DMR, Fusion, and P25 with full audio transcoding. Interconnecting all these modes helps fragmented communities with members using various digital modes to stay in touch. Check them out.