

## Basic D-STAR using the W8MAI Repeater

(Digital Smart Technology for Amateur Radio)

D-STAR uses digital modulation, GMSK, typically called DV (digital voice). Analog audio is converted in your transceiver to a digital signal and the converted back to an analog signal in the other stations transceiver you're communicating with. The digital signal, or data packets, can be transmitted by RF or over the Internet.

*GMSK modulation: Gaussian Minimum Shift Keying or Gaussian filtered Minimum Shift Keying, GMSK, is a form of modulation with no phase discontinuities used to provide data transmission with efficient spectrum usage*

The D-STAR Repeater has two signal inputs and two signal outputs. The inputs are 442.775 MHz RF and the D-STAR Gateway via the Internet. The outputs are 442.275 MHz RF and the D-STAR Gateway via the Internet.

The RF input and output operate in a similar manner to an FM repeater. Local coverage can be increased, over simplex operation, by using the repeater. Using the D-STAR Gateway, coverage can be increased by linking repeaters together or linking a repeater to a reflector.

Users can also connect to the repeater via the D-STAR Gateway using a Dongle or a Digital Voice Access Point, also called a "HotSpot".

Since there are options on how your transmission can be routed, the repeater has to have instructions to route your transmission as desired. The routing instructions are typically called programming or memory channel programming. A memory channel, in your transceiver, has to be programmed to link repeaters together or link a repeater to a reflector. Also, your transceiver must be programmed to unlink a repeater or reflector.

**NOTE:** *Only two repeaters can be linked together at one time. For this reason, if it is necessary to link more than two repeaters together, each repeater must be linked to a reflector which provides a bridge to connect all repeaters.*

Before you can use the D-STAR Gateway you must be registered on the gateway. This insures that operators using the gateway have a valid Amateur Radio license. You can register using the W8MAI Repeater at <https://173.165.86.174/Dstar.do>

## Instructions for Memory Channel Programming, UR, RPT1 and RPT2.

To use your D-STAR transceiver to communicate with any station you hear on the W8MAI repeater, program one memory channel with the following information. No other programming has to be done unless you want to link repeaters or reflectors to the repeater.

Mode: DV  
Frequency: 442.275 MHz  
Offset: +5 MHz (default)  
UR: CQCQCQ (default)  
RPT1: W8MAI B (2 spaces between I and B)  
RPT2: W8MAI G (2 spaces between I and G)

In addition to the memory channel programming, you must have your call sign entered into the call sign memory location MYCALL. There are typically 6 locations available and selectable for 6 different call signs. Usually only one call sign is used.

### Definitions:

UR: This is either set to the call sign of the station you want to talk to, or is set to **CQCQCQ** so you can call CQ or work round-table as on a conventional FM repeater. When using a gateway, **UR CALL** either designates the call sign of the individual you are calling, or is used to control gateway linking or for accessing a reflector.

RPT1: Used to enter the call sign of the local repeater you are using. The 8<sup>th</sup> character position is special as it specifies the band and port you are operating on. You need to insert spaces as necessary to make sure that the port switch letter (A, B, or C) falls in the 8<sup>th</sup> character position.

Port A is used for the 23 cm TX/RX module or band  
Port B is used for the 70 cm TX/RX module or band (UHF)  
Port C is used for the 2 meter TX/RX module or band (VHF)

**NOTE:** *The W8MAI D-STAR Repeater only has a UHF TX/RX module. For this reason RPT1 is always programmed as W8MAI B (2 spaces between I and B).*

RPT2: This is the call sign of where we want our transmission to go, either to one of the other ports on the same repeater system, or to the gateway used to access the D-STAR network. Again, the 8<sup>th</sup> character position is special because it is used for the port switch designation letter: A, B, C or G.

**NOTE:** *I suggest you always enter W8MAI G (2 spaces between I and G) in RPT2. If you DO NOT have G entered in the 8<sup>th</sup> space anyone listening to W8MAI on a Dongle or DVAP will NOT hear you.*

MYCALL: The station operators call sign EX: KD8ZB

### **Programming Examples:**

#### Repeater Linking

UR:                   W8DF CL (2 spaces between F and C)  
RPT1:               W8MAI B (2 spaces between I and B)  
RPT2:               W8MAI G (2 spaces between I and G)

This example links the W8MAI UHF repeater to the W8DF VHF repeater. The L after the call sign and port switch indicator in the UR entry programs the repeater to LINK to W8DF.

#### Reflector Linking

UR:                   REF030CL  
RPT1:               W8MAI B (2 spaces between I and B)  
RPT2:               W8MAI G (2 spaces between I and G)

This example links the W8MAI UHF repeater to reflector 30A. The L after the call sign and port switch indicator in the UR entry programs the repeater to LINK to Reflector 030C.

**NOTE:** *After linking a repeater or reflector you must switch back to the memory channel with CQCQCQ in UR to talk.*

#### Repeater Unlinking

UR:                   U (seven spaces and the letter U)  
RPT1:               W8MAI B (2 spaces between I and B)  
RPT2:               W8MAI G (2 spaces between I and G)

This example unlinks repeaters and reflectors that are linked to the W8MAI repeater. The U in the UR entry programs the repeater to UNLINK the Repeater or Reflector.

**NOTE:** *After unlinking a repeater or reflector you must switch back to the memory channel with CQCQCQ in UR to talk.*

**Links to Internet sources for more D-STAR Information:**

<http://www.dstarinfo.com> The Web Site D-STAR Info, Information, FAQs, and More. There is a list of Reflectors at this web site.

<http://www.dstarusers.org/> Last Heard D-STAR Users, Repeater Directory

<http://www.dstarusers.org/viewrepeater.php?system=W8MAI> Repeater Details for W8MAI. List of stations heard on W8MAI in the last 14 days.

<https://173.165.86.174> W8MAI Dashboard. A list of stations linked to W8MAI and a list of stations heard on W8MAI in the last 24 hours. This web site is located at the computer controlling the repeater.

## **Amateur Radio Nets on the W8MAI D-STAR Repeater**

### ***Michigan ARES D-STAR Net:***

This Net meets every Monday at 8:00 PM EST. When checking in wait until Berrien County is called. When checking in state your CALL, NAME and COUNTY. If you do not have any comments for the net ask to check in-and-out.

### ***Michigan 5<sup>th</sup> District Hospital Net:***

This net meets on the first Wednesday of the month at approximately 7:15 PM EST. The purpose of this Net is to check emergency communications equipment at the 5<sup>th</sup> district hospitals and EOC's. After the hospitals check in other stations can check in from home or mobile. Wait for Berrien County to be called and then check in with your CALL, NAME and COUNTY.

### ***Calhoun County Net:***

This net meets every Tuesday at approximately 7:15 PM on the W8DF and W8MAI Repeaters. The purpose of this net is to maintain station activity. When checking in state your CALL and NAME. You will be added to a list and your Call Sign will be called to check in. Normally there are no comments but if you have any they are welcome. Berrien County stations will be called after Calhoun County stations.

### ***Berrien County ARES Net:***

This net meets on the primary 146.82 MHz FM repeater on Sunday at 7:00 PM EST. After the roll call on the 146.82 MHz FM Repeater the W8MAI D-STAR Repeater is checked for additional stations or rechecks.

### ***Berrien County Skywarn Net:***

This net meets on the primary 146.82 MHz FM repeater on Wednesday at 7:00 PM EST. After the roll call on the 146.82 MHz FM Repeater the W8MAI D-STAR Repeater is checked for additional stations or rechecks.