

# DMR CODE PLUGS

Brought to you by your Repeater Committee  
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## **What is a Code Plug**

A Code Plug is nothing more than a fancy name for the software file that gets loaded into your radio to tell it what to do.

There are two stages to programming a DMR radio. The first stage is very similar to an analog radio. It determines the transmit and receive frequency of your repeater. The second part directs you through the network.

At first a code plug will seem a bit intimidating, but the object here is to make you comfortable with the various terms and the procedure to build one.

Before we start, let's get familiar with a few of those terms and their definitions.

## **TDMA / Time Slots**

TDMA stands for Time Division Multiple Access.

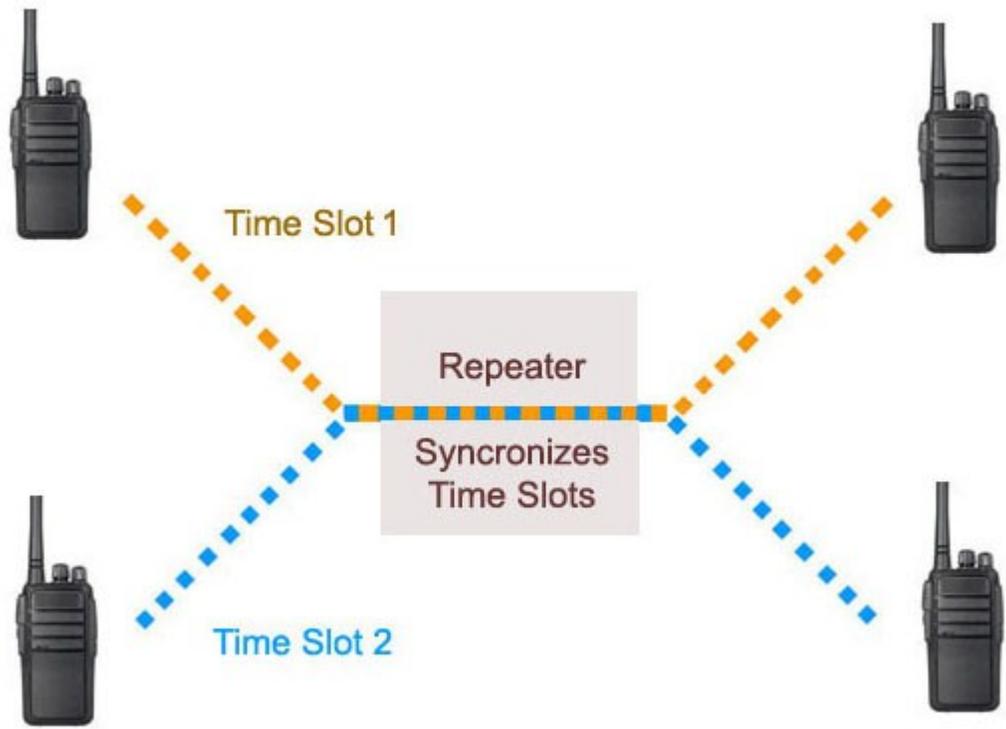
A standard FM handheld transmits a single carrier from the time you press the PTT to the time you release it. With the digital magic of TDMA, your signal is actually divided into alternating 30ms segments. This allows two signals to interweave, so two different conversations can take place on the same frequency at the same time.

The graphic on the next page illustrates the splitting of a transmitted digital signal into these 30ms time slices. These are called Time Slots.

The code plug's Time Slot (TS) parameter determines which path you will be using, TS1 or TS2.



Tier II TDMA 30ms Time Slots



## **Color Code**

The digital Color Code (CC) has nothing to do with a color. Compare it to a CTCSS or DCS code. Its function is to prevent interference between two repeaters with overlapping coverage. The proper CC is required for access and is assigned by the repeater's owner. (normally, but not always CC1)

## **Talk Groups (TG) / Digital Contacts**

There are well over a thousand different Talk Groups worldwide, each with its own assigned network ID. These TGs fall into various categories, such as States, Regions, Countries, Languages, etc. as well as general chat channels.

When you determine which TG's you want to use, you would then add them to your Digital Contact list.

## **Channels**

This is what ties everything for a specific channel together. Channel information contains information such as frequency, power, time out, TG, CC, etc.

## **Zones**

A Zone is the area in your radio where you group together related Channels. Some radios allow up to 16 channels per zone, others have no restrictions. You can set up the zones in groups such as:

- Your local repeater's channels
- Simplex channels
- Most commonly used channels, etc.

## **Admit Criteria**

This determines when you are allowed to transmit. The options are:

Color Code (preferred) - Allows you to transmit only when the time slot is available.

Channel Free - Allows you to transmit when the channel is clear, however there may be someone using the same time slot.

Always (impolite) - This allows you to transmit even if there is another QSO on a different time slot. This would interrupt the current QSO. The only time 'Always' should be used is if on a simplex channel or in the analog mode.

## **Step 1 – Transmit Talk Groups**

The first step is to identify the Talk Groups desired by Name and Groups ID.

The TG fields may be labeled differently, depending on your radio's software, but they all serve the same purpose.

For example: Tx Contacts / Digital Contacts / Talk Groups

\* When entering the TG ID, you are required to enter 'Group Call' or 'Private'. Enter Group Call for all Talk Groups.

## **Step 2 - Channel Information**

This is where the control information is entered. The data required here is the Frequency, Power, Color Code, TG, and Time Slot where the desired TG can be found.

### **Step 3 - Zone**

After your Channels have been set up, you will need to place them into areas called Zones. The channels in a Zone can be arranged in any order. The same channel can appear in multiple zones.

Now we will talk about our new DMR repeater just installed. At this point the CC and TG's are defined.

**146.685 VHF Repeater** operated by the Gainesville Amateur Radio Society (GARS) is now a DMR repeater. The repeater is a Bridgecom 50-Watt 100 Percent duty cycle machine. It is still located at the WUFT Tower Site location with the antenna at 187ft.

We are sharing the BrandMeister access with the two other DMR Repeaters locally and have split the Static talk groups so each repeater does not overlap each other. This doesn't mean you couldn't still access any talk group Dynamically. Just program the TG's into your code plug!

The GARS DMR Repeater uses the following color code and Static Time Slots.

(Color Code 1):

TS1 TG91 World Wide **TS** Stands for Time Slot

TS2 TG312572 K4GNV Group across repeaters and HS

There are two additional Brandmeister DMR repeaters in our area operated by a GARS member but not part of our GARS Club repeater group.

**444.8375 UHF Repeater:** Operated by KC4MHH

TS1 3100 USA Nationwide

TS1 3112 Florida Statewide

TS1 31227 Florida State ARES

TS1 3199 Hurricane Network

**146.640 VHF Repeater:** Operated by KC4MHH

TS1 3199 Hurricane Network

TS1 31127 Florida State ARES

"Local 9" on time slot 2 is recommended for local conversations within this repeater only. If you need to communicate with someone who is on another repeater or a hotspot you can communicate between **DMR** repeaters and **HOTSPOTS** using the **K4GNV** group.

All other groups are "dynamic" in nature. This means you can activate them by simply keying up on that talkgroup. It will now be active until either replaced by another dynamic TG, or disconnected (using TG 4000), or times out after 15 minutes of no local activity (This is setup by BrandMeister). Again! Using TG4000 is an option you program into your code plug.

Once you have created your channels, it is time to organize these into groups or "zones". These "zones" are simply a group of channels, they can even be a mix of analog or digital and even give you the opportunity to organize them in any order you wish. You can even have the same channel appear in multiple zones.

Another option you have are "scan groups". These are also selected on a per channel basis. Scan groups are used to scan through your analog repeaters. You can place a DMR repeater in the group, but only selecting one channel of that repeater.

Some radios, such as the Anytone models, also sport a "Promiscuous Mode". This function allows you to monitor any talkgroup on a specific time slot or even both time slots, irregardless of what "channel" you have selected. Some radios call this function "digital monitor".

Another programming option you will have involves "programmable buttons". Depending on your radio, these buttons can make selecting zones, power output, scan functions and digital monitor as easy as pressing a programmed button. Like many other features, the available functions can vary depending on manufacture and model of your DMR radio.

If your radio has the ability to display information about the users (their callsign, name, and location), then you can obtain and download a file from Radioid.Net database. Please keep in mind the capability of your radio. Some older radios might hold as few as 10,000 contacts where one of the newer radios (the latest Anytone D-878 HT) can hold over 500,000. The entire world database now sports over 200,000 registered DMR users, so you may have to either use Radioid's custom download or manually remove users from the downloaded CSV file prior to uploading it to your radio.

In the next picture we see our new Bridgecom repeater below our 146.820 analog repeater.

Just above the repeater is the MMDVM Modem connected to the internet via a Cat5 cable. The Modem is the device that converts an analog repeater to digital use.

So there you have it. Now Lets move onto the actual building sample of a code plug.

