

Programming the Baofeng DM-32UV

Part One: Preparations --By Jay Farlow, W9LW

- December 03, 2025

Before you can program any radio for DMR, you must obtain the correct cable, register for a DMR ID number and gather essential repeater information.

OBTAIN A DMR ID

Every radio amateur who wishes to transmit on a DMR radio must first obtain a unique, numeric ID from radioid.net. If you have not already done so, visit that website, register, and apply for a DMR ID. It could take a day or more to receive a reply, so do this first and then proceed with the steps below.

OBTAIN THE CORRECT PROGRAMMING CABLE

You'll need a cable to send data from your Windows computer to the radio. The cable should have a "Kenwood-style", two-pin, speaker mic connector on one end and a USB connector on the other. Do not assume that every cable that has those connectors is wired the same, because they are not. For the [DM32-UV](#), I used the same cable I already had for the ubiquitous Baofeng [UV-5R](#) handheld radio; one with an FTDI universal asynchronous receiver-transmitter chip in the USB connector. The best way to obtain the correct cable is to acquire it from a vendor that sells the DM-32UV and who will guarantee that the cable will work with that radio (see Figure 1, below).



Figure 1: The [Baofeng K-Plug Programming Cable](#), SKU 28-020-122, that the company sells for use with its DM-32UV DMR handheld radio. Note that the USB connector is large enough to house USB-to-RS232 circuitry.

INSTALL THE CUSTOMER PROGRAMMING SOFTWARE

Download and install the customer programming software (CPS) provided by the manufacturer. You should be able to find the CPS on the manufacturer's website. For this guide, I used CPS version 1.41, the latest version that was available on the Baofeng website at the time I wrote. The popular radio programming software, CHIRP is not appropriate for this radio.

The file that the CPS creates is called a codeplug. You'll save the codeplug on your computer and write it to the radio.

UNDERSTAND NETWORKS AND TALK GROUPS

If you're new to DMR, this section will help you understand some important concepts about how this mode works. Most DMR repeaters are connected via the internet to one of several DMR networks that link users of different repeaters. These networks support different talk groups on which different groups of users may communicate separately and simultaneously. You can think of each talk group as a virtual channel. Users select talk groups, depending on with whom they want to communicate. Some talk groups are devoted to geographic areas. Others are devoted to topics or purposes. Each talk group has a name and a numeric ID. For example, on many networks, 3118 is the numeric ID for an Indiana statewide calling talk group, devoted to establishing communications with users in Indiana, USA.

Not every DMR repeater supports the same set of talk groups. In addition, not every talk group with the same name has the same numeric ID, depending on the network that hosts that talk group. For example, on the [Brandmeister network](#), talk group 91 is the worldwide talk group, but other repeater networks use numerical ID 1 for their worldwide talk groups.

Some talk groups are linked across networks, and some are not. For example, a statewide talk group for a U.S. state on the Brandmeister network might have the same numerical ID as the same state's statewide talk group on another network, with no connection between the two. Another state's statewide talk group, however, might be interconnected between the same two networks.

Many repeaters support only a subset of a network's talk groups; the talk groups that the individual repeater owners choose to support.

When a repeater is part of the Brandmeister network, however, that repeater automatically supports every talk group that the Brandmeister network hosts. You are not limited to talk groups chosen by the repeater owner. In fact, knowing that you can use any Brandmeister talk group, some Brandmeister repeater owners don't even provide lists of supported talk groups. You can find a searchable list of Brandmeister talk groups on the [Brandmeister website](#).

TIME SLOTS

DMR is a **time-division, multiple access** (TDMA) digital voice protocol. That means that a single radio frequency can support two simultaneous but separate conversations, without interfering with each other. DMR repeaters do that by alternating the data stream between the two conversations every 30 milliseconds. Each 30ms period is called a time slot and they are numbered “time slot 1” and “time slot 2”. The radio’s CPS enables the user to specify on which time slot each channel will operate. Normally if the DM-32UV is set to a channel on time slot 1, the user will not hear audio that the repeater is transmitting on time slot 2 (the dual watch feature, however, allows the radio to quickly alternate between two channels, each of which can be on a different time slot). Some repeater owners specify the time slot that must be used for each supported talk group. In that case, users must gather that information to create a working codeplug.

Brandmeister repeaters allow you to use any talk group on any time slot. Repeater owners, however, might have time slot preferences that you should learn and follow. For example, an owner might prefer that time slot 2 be reserved for local and regional talk groups and that all wider area talk groups (e.g., Worldwide) use time slot 1.

STATIC VS. DYNAMIC TALK GROUPS

When gathering repeater information, it is also helpful to learn which talk groups are configured as static on that repeater and which are dynamic. While you don’t need this information to program the radio, knowing it makes operation easier. Static talk groups are always on. A repeater will transmit any traffic on a static talk group without action by local users. Just set your radio to the correct channel and you’ll hear any traffic that’s currently on that channel’s talk group. Dynamic talk groups are available on a repeater, but the repeater will not transmit traffic from a dynamic talk group unless a local repeater user has recently activated it. Users activate dynamic talk groups by transmitting briefly on them, using that repeater’s radio frequency. If no local user has activated a dynamic talk group recently, the repeater will not transmit that talk group’s traffic. The definition of “recently” varies, depending on repeater owner and network preferences. Typically, a repeater shuts off a dynamic talk group 15 minutes after the last time a local user transmitted on it. That time can, however, be considerably shorter.

On Brandmeister repeaters, it is possible but discourteous to activate a talk group on the time slot opposite the one on which it is set as static. The Brandmeister website has a search feature with which you can **look up any repeater that’s connected to that network** and learn what talk groups are static and on what time slots.

GATHER REPEATER INFORMATION

Gathering repeater information is especially important for DMR (digital) channels because users need significantly more information to configure their radios for DMR repeaters than for FM (analog) channels.

For each FM channel you wish to program, you must know: - The receive and transmit frequencies. - The squelch code, if needed (continuous tone-coded squelch system (CTCSS) tone frequency or digital coded squelch (DCS) code).

For each DMR channel, you must know: - The receive and transmit frequencies. - The color code, which is a number between 0 and 15 and is analogous to CTCSS. - A list of supported static and dynamic talk groups. - The time slot (1 or 2) that is associated with each talk group.

Some repeater owners put such information in online repeater directories, such as [RepeaterBook.com](#). Unfortunately, those directories often contain out-of-date or otherwise incorrect information, especially for DMR repeaters. A more reliable source, therefore, is often a repeater owner's own web page, which can sometimes be found via web searches. In some cases, it is necessary to contact a repeater owner directly (e.g., by looking up their call sign on [qrz.com](#)) to obtain current network, talk group and the time slot information.

DMR HOTSPOTS

A DMR hotspot is a radio-to-internet gateway that you can set up for personal use. These devices receive the signals of your DMR radio (typically on an obscure simplex frequency) and send them to the DMR network of your choice. Similarly, they transmit network traffic to your radio. If you plan to use a DMR hotspot, it is up to you to know how that device is configured, including RF frequency, color code, network, and what talk groups and time slots it supports.

MAKE A TALK GROUP LIST

Create a list of talk groups that you want to use and that are supported by your local DMR repeater or your hotspot, including talk group name and number. If your local repeater specifies which time slots to use with each talk group, include the time slot number (1 or 2) next to each talk group in your list.

In my [next article](#), I'll write about using the CPS to create a codeplug by inputting the information you've gathered.

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