

Creating your first MD-380 Codeplug

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This document will walk you through the steps involved in configuring an TYT MD-380 radio for use on a nearby repeater. Although this article focuses on repeaters, the process for DMR hotspots is similar. The radio has features that are also beyond the scope of this article. The goal of this document is to cover the basics needed to get on the air. It does not attempt to cover every possible way to configure the radio.

Obtain the correct programming cable

You'll need a cable to send data from your 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. Note that cables built for the ubiquitous, Baofeng UV-5R FM radio and its kin will not work, even though they have the same connectors. The UV-5R cable contains a chip that converts serial signals to USB signals. The MD-380 does the conversion in the radio, so its cable doesn't have a conversion chip. Make sure you have the correct cable at hand. If your radio did not come with a cable, you'll need to order one separately.

Install the customer programming software

To program the radio, you must use the customer programming software (CPS) provided by the manufacturer. You will likely need to download the software from a vendor's website or the [manufacturer's website](#) and then install it as you would any other software. The file that the CPS creates is called a *codeplug*. The popular radio programming software, CHIRP is not appropriate for this radio.

DMR Use

The section immediately below covers DMR repeaters. A section on FM (analog) repeaters follows it.

Obtain a DMR ID

Every radio amateur who wishes to use a DMR radio must first obtain a unique, numerical ID from radioid.net. If you have not already done so, apply for a DMR ID. You may proceed with other parts of codeplug writing while awaiting your DMR ID assignment. After you receive your ID, enter it into the CPS. In the tree view on the left side of the CPS, click on "General Setting." Enter your numeric, DMR ID in the "Radio ID" field. In the "Radio Name" field, enter your call sign and your first name, e.g. "W9LW Jay".

Obtain repeater information

It is essential to gather certain information about the DMR repeater you intend to use, including:

- Transmitter and receiver frequencies
- Color code, which, despite its name, is a *numerical* code ranging from 1 to 15.
- A list of supported *talkgroups*, including the *time slot* assigned to each.

About talkgroups

DMR networks are divided into talkgroups. You can think of each talkgroup as a virtual channel. Users select different talkgroups, based on with whom they wish to communicate. Some talkgroups are devoted to geographic areas. Others are devoted to topics or purposes. Each talkgroup has a name and a numerical ID. For example, 3118 is the numerical ID for the Indiana statewide calling talkgroup, devoted to establishing communications with users anywhere in Indiana, USA.

It is important to understand that not every DMR repeater supports the same set of talkgroups. In addition, not every talkgroup with the same name has the same numerical ID, depending on the network to which a repeater is connected. For example, on the [Brandmeister network](#), talkgroup 91 is the worldwide talkgroup, but other repeater networks use numerical ID 1 for their worldwide talkgroup.

It is therefore imperative to learn exactly what talkgroups — including their numerical IDs — the repeater you wish to use supports. Some repeater owners put such information in online repeater directories, such as [RepeaterBook.com](#) and [php.rfinder.net/websearch.html](#). Unfortunately, some repeater owners do not update such directories. 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 might be necessary to contact a repeater owner directly (e.g. by looking up their call sign on [qrz.com](#)) to obtain an up-to-date list of talkgroups and the time slots to which they are assigned.

Brandmeister repeaters are a special case

When a repeater is part of the Brandmeister network, that repeater automatically supports *every talkgroup that the Brandmeister network carries*. You are not limited to talkgroups listed by the repeater owner. In fact, knowing that you can use any Brandmeister talkgroup, some Brandmeister repeater owners don't even provide lists of supported talkgroups. You can find a searchable list of Brandmeister talkgroups on the Brandmeister website at <https://brandmeister.network/?page=talkgroups>. Also, Brandmeister repeaters allow you to use any talkgroup on any time slot. Some repeater owners, however, have time slot preferences that you should learn and follow. For example, an owner might prefer that time slot 2 be reserved for the local talkgroups only and that all other talkgroups (e.g. Worldwide) use timeslot 1.

If you plan to use a DMR hotspot, it is up to you to know to what network your hotspot is connected and what talkgroups that network offers.

Add talkgroups to your codeplug

When you have a list of talkgroups supported by your local repeater, add them to the list of talkgroups in your codeplug.

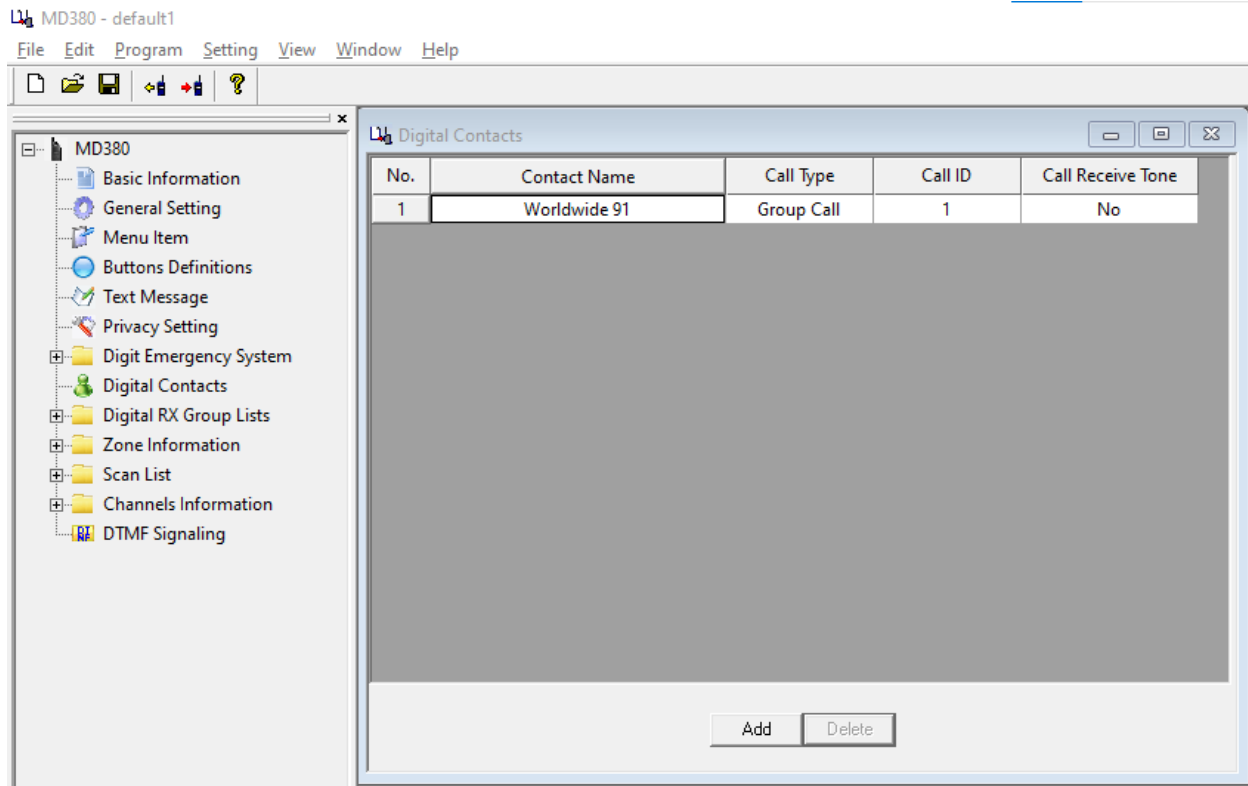


Figure 1. Adding a group call (talkgroup) to the talkgroup list

In the tree view on the left side of the CPS, click “Digital Contacts.” A table will appear. Edit the default “Contact1” by clicking in the Contact name field and then entering a new talkgroup name (e.g., “Worldwide”). Leave the “Call Type” field set to “Group Call.” Click in the “Call ID” field and enter the talkgroup number (e.g. 1 or 91).

As a personal preference, I include the talkgroup number in the name field, even though I must also put the number in the TG/DMR ID field. This is because different networks use different numbers with the same names. So, for example, I created a digital contact named “Worldwide 1” for the Worldwide talkgroup on the DMR-MARC network and another digital contact named, “Worldwide 91” for the Worldwide talkgroup on the Brandmeister network, because I intend to use different repeaters, of which some are on Brandmeister and some are on DMR-MARC.

Repeat the above process for each talkgroup supported by your local repeater, using the “Add” button at the bottom of the table to add new rows as necessary.

Parrot or echo – a special digital contact

Most repeaters support a service that echoes whatever you transmit. Some people refer to this as the “parrot” or “echo” service. This helps you know whether you are within range of the repeater and how well the repeater hears your signal. There are different parrots, depending on to what network your local repeater is connected.

For repeaters on the **Brandmeister** network, the parrot is a *private call* to ID 9990. In this case, the “Call Type” must be set to “Private Call” and the “Call ID” must be set to “9990.” I name this entry “BM Parrot” in my codeplug.

For repeaters on other networks (DMR-MARC, etc.) the parrot is talkgroup 9998. Enter it as a *group call*, just like any other talkgroup.

Obviously, it’s important to know to what network your local repeater is connected. You might be able to tell by its list of supported talkgroups. For example, if the repeater uses talkgroup 91 for Worldwide, it’s probably a Brandmeister repeater. If it uses talkgroup 1 for Worldwide, it’s probably not a Brandmeister repeater. If you’re not sure, ask the repeater owner what network it is on and/or what ID to use for the parrot.

Digital Rx group lists

Digital Rx group lists are optional with the MD-380. Such lists enable you to monitor multiple talkgroups simultaneously, without channel scanning. My preference is to create a digital Rx group list for each repeater and to put all the talkgroups I use on that repeater in a digital Rx group list dedicated to that repeater. This helps me know whether a time slot on which I intend to transmit is already in use. It also allows me to monitor multiple talkgroups without channel scanning. This practice might, however, confuse newer users, because they will sometimes hear transmissions on channels they have not selected with the channel switch. When I hear a call I want to answer, I must look at the radio quickly to see what talkgroup that user was on (because it might not be the talkgroup I’m set to) and then change channels as necessary before answering.

To create a digital Rx group list, in the tree view on the left side of the CPS, click the plus sign (if necessary) to expand the “Digital RX Group List” section. A list of existing lists will appear. To add a group list, right-click on the Digital RX Group List and then click “Add.” To edit the new list you just created or an existing list, click on list name under the folder. A dialog box will appear, with a list of available talkgroups on the left and list members on the right. In the Group List Name field, type a relevant name. Because I create a group list per repeater, I name my group lists after each repeater, for example, “LaGrange” for the repeater in LaGrange, Indiana, USA. Now, in the “Available Contact” list at left, select all the talkgroups you want in this group list and then click the “Add” button.

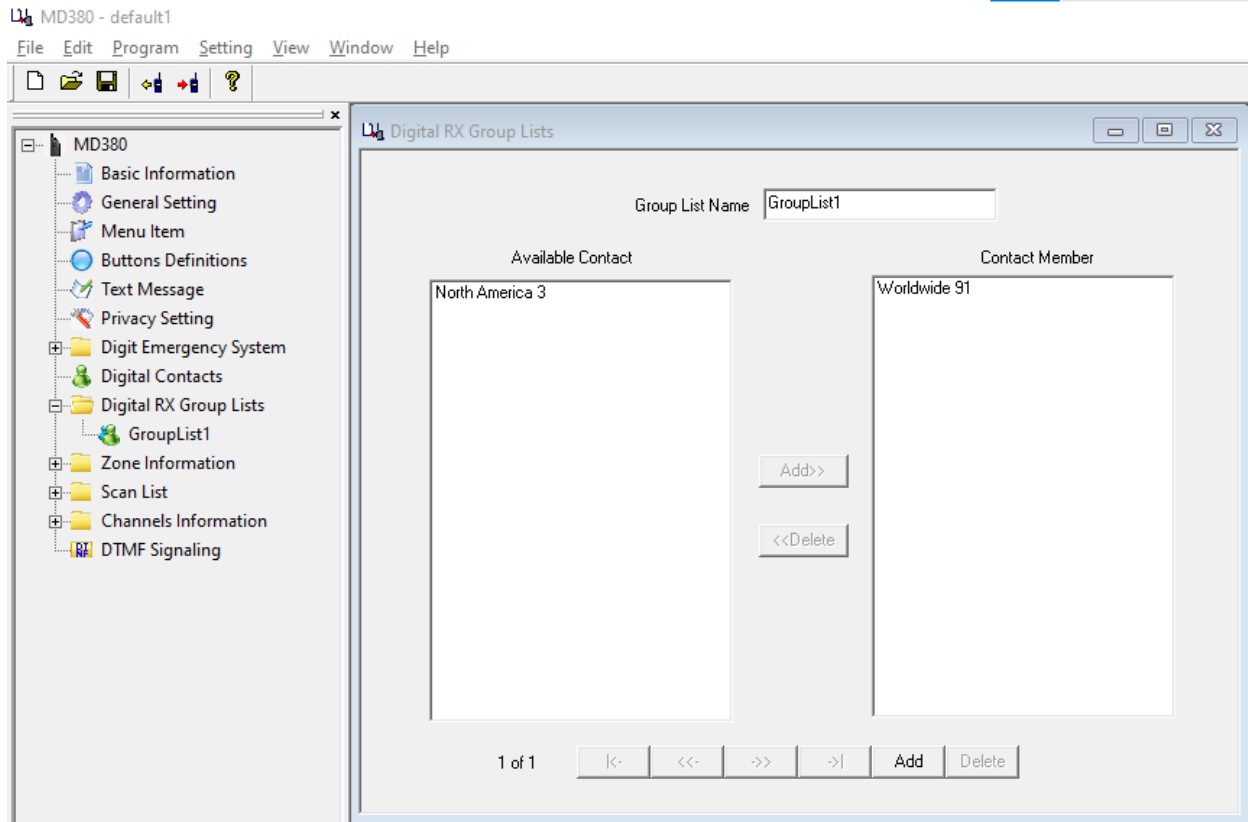


Figure 2. Creating a digital Rx group list for a single repeater.

Repeat this process for each digital Rx group list you wish to create.

Channels

Create a channel for each talkgroup-repeater combination. For example, if you plan to use talkgroup 13 on two different repeaters that operate on different frequencies, you'll need two channels devoted to talkgroup 13, one for each repeater, because repeater frequency and talkgroup information are stored in each channel record.

In the tree view on the left side of the CPS (see figure 3, below), click the plus sign next to the "Channels Information" folder to expand that part of the tree. A default, "Channel1" item will appear under the "Channels Information" folder. Click on the "Channel1" item to edit it, with the following settings:

- **Channel Mode:** Set to "Digital" for DMR use.
- **Channel Name:** Enter a relevant name. I always use include two bits of information in each channel name; first, I identify the repeater and then the talkgroup. For example, if I'm creating a channel to use the Worldwide talkgroup (talkgroup number 1) on the K9MMQ repeater in Fort Wayne, Indiana, USA, I might name the channel "FW WW" for "Fort Wayne repeater, Worldwide talkgroup". If I also create a Worldwide channel to use on the NT9M repeater in LaGrange, Indiana, USA, I might name that channel, "LaGrange WW".
- **Bandwidth:** The CPS automatically sets this to 12.5 KHz when you selected digital mode. You can't change it, which is good, because it's the correct setting!

- **RX Frequency(MHz):** Enter the frequency on which you will receive the repeater (the repeater's *transmit* frequency).
- **Scan List:** Ignore this setting for now. We'll come back to it later.
- **TX Frequency(MHz):** Enter the frequency on which you will transmit to the repeater (the repeater's *receiver* frequency).
- **Squelch:** Set this to "Normal"
- **Admit Criteria:** Set this to "Color Code."
- **RX Ref Frequency:** Leave this set to "low."
- **TX Ref Frequency:** Leave this set to "low."
- **TOT(s):** I leave this set to 60. It's the number of seconds you can transmit before the radio automatically stops transmitting on its own.
- **TOT Rekey Delay(s):** I leave this set to 0.
- **Power:** Choose "Low" or "High", depending on how much power you need to reach the repeater.
- **Contact Name:** Set this to the talkgroup this channel is for. Using the example from the Name field above, I'd choose "Worldwide 1".
- **Group List:** If you created a Receive Group Call List for use with this repeater, select it here. More on these lists below.
- **Color Code:** Set this to the color code used by the repeater this channel will use (see, "Obtain repeater information", above).
- **Repeater Slot:** Set this to the *timeslot* that your repeater uses with the above-referenced talkgroup. For example, the K9MMQ repeater in Fort Wayne, Indiana, USA supports Worldwide 1 only on time slot 2. For Brandmeister repeaters, follow any timeslot preferences communicated by the repeater owner.
- **Privacy:** Leave this set to "None" for compliance with U.S. amateur radio regulations that prohibit encryption.

Figure 3. Example channel settings to use Worldwide talkgroup 1 on a DMR repeater.

Repeat the steps above to create a new channel for every combination of talkgroup and repeater you wish to use. The “Add” button at the bottom of the Channel Information dialog box is a convenient way to add each new channel.

Zones

The channels you create in the step above *will not appear on your radio unless you create a zone* to hold them. A zone is analogous to a memory bank on a typical, amateur FM radio. Unlike such FM radios, however, there is no default, “all channels” zone on the MD-380. You must therefore manually put every channel you want to see on your radio in at least one zone.

My personal preference is to dedicate a zone to each DMR repeater, to hold only channels associated with that repeater. If you wish, you may assign any channel to multiple zones, but I rarely find this helpful. The MD-380 limits zones to 16 channels each, so I choose the 16 channels (talkgroups) I’m most likely to use on a given repeater.

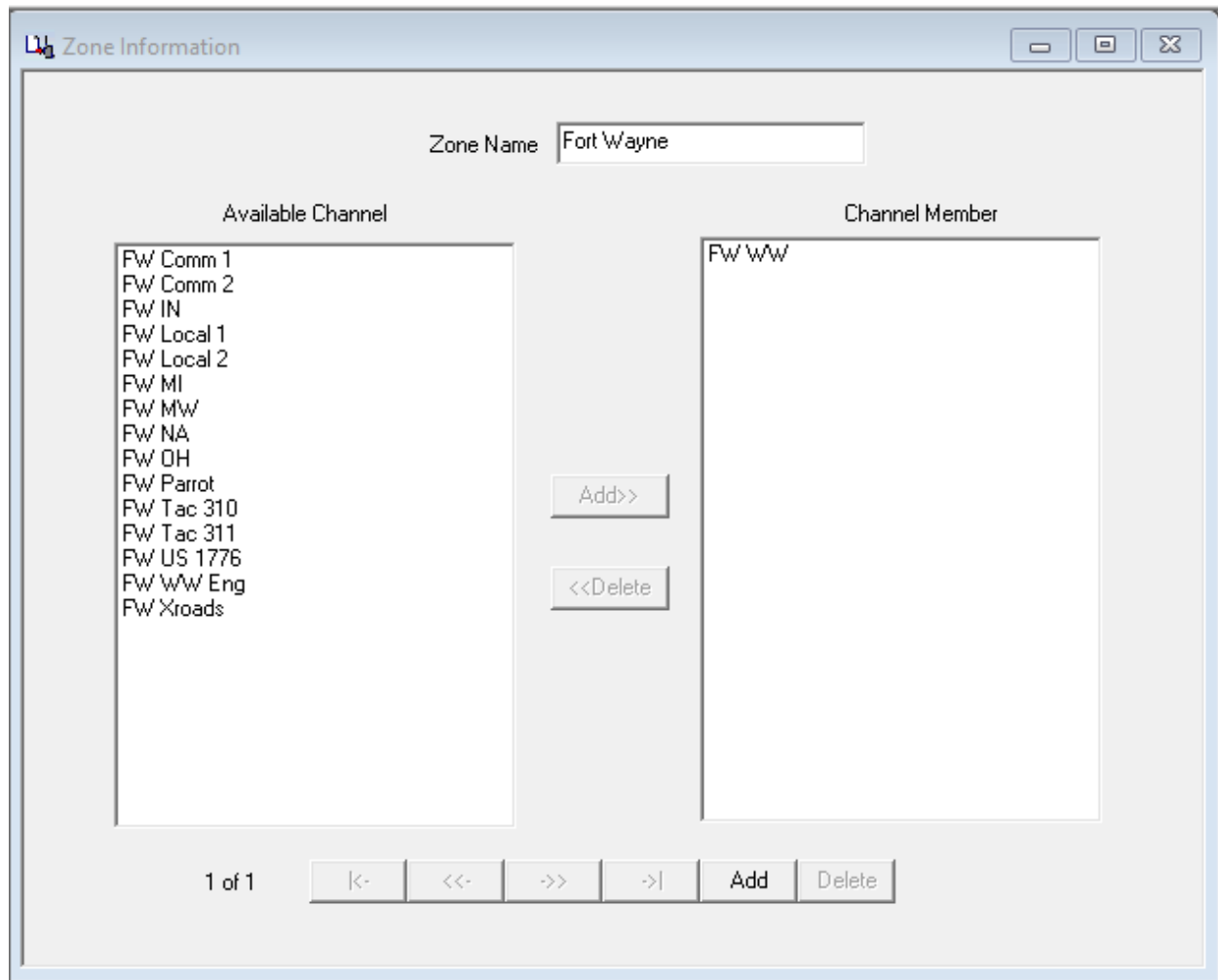


Figure 4. Example zone settings for a DMR repeater

In the tree view at the left side of the CPS, click the plus sign next to the “Zone Information” folder to expand that part of the tree. A default, “Zone1” item will appear under the “Zone Information” folder. Click on the “Zone1” item to edit it. A “Zone Information” dialog box will appear. Enter something relevant into the “Zone Name” field, such as the location or name of the repeater that this zone is for. In my example, I might enter “Fort Wayne” for the K9MMQ repeater in Fort Wayne, Indiana, USA.

In the “Available Channel” list on the left side of the dialog box, select the channels that you want in this zone. To the right of the “Available Channel” list, click the button that points to the right. The channels you selected will move to the “Channel Member” list.

Optionally, select a channel in the “Channel Member” list and then use the “Up” or “Down” buttons to move that channel up or down in the list. This is how you control the order in which channels appear on your radio.

Optional: Scan lists

The MD-380 will scan channels. It will only scan, however, channels that appear in a scan list; putting them in a zone is not enough if you want to scan them. In addition, before scanning begins, the radio must be set to a channel associated with the desired scan list.

In the tree view on the left side of the CPS, click the plus sign next to the “Scan List” folder. A default, “ScanList1” item will appear under the Scan List folder. Click on the “ScanList1” item to edit it. A Scan List dialog box will appear. Using the same procedure described for zones, above, name the scan list something relevant and add channels from the “Available Channel” list to the “Channel Member” list.

In the tree view, click the plus sign next to the “Channels Information” folder. In the channels that appear below the folder, click a channel from which you’d like the radio to begin scanning. In the Channel Information dialog box that opens, select your new scan list in the Scan List drop-down list near the upper left-hand corner of the dialog box. This enables the initiation of scanning when this channel is selected on the radio. You may assign the same scan list to multiple channels.

DMR Hotspots

Some users install DMR hotspots in their homes, autos or elsewhere. These devices connect to the Internet (via Wi-Fi or ethernet) and receive and send DMR signals on amateur radio frequencies. Configuring a hotspot is beyond the scope of this document.

Configuring the MD-380 for hotspot use is, however, essentially the same as the procedure described above, with a few exceptions. Hotspots typically operate on simplex, meaning the transmit and receive frequencies in the CPS channel dialog box must match. Most (but not all) hotspots use time slot 2 for all talkgroups, so all channels configured for such hotspots would need to be set to “Repeater Slot” 2. If your hotspot connects to the Brandmeister network, you may choose any talkgroup listed on the Brandmeister website (see link above) and the parrot channel would be a private call to ID 9990 (see above). Any users whose hotspot differs from the description above must understand how their hotspots are configured and configure their MD-380 codeplugs accordingly.

Call Signs

The MD-380 can display the call sign and name of the person you are receiving. Unless you install third-party firmware on the MD-380, displaying call signs and names requires entering each call sign and DMR ID number in the Digital Contacts list, the same place we enter talkgroups. This is an operation that is beyond the scope of this document.

Analog (FM) Repeaters

The section below covers adding analog (FM) repeaters to your code plug.

Obtain repeater information

It is essential to gather certain information about the repeater(s) you intend to use, including:

- Transmitter and receiver frequencies.

- Continuous tone-coded squelch system (CTCSS) frequency or digital code squelch (DCS) code (if required).

You can often obtain such information from the websites of clubs or individuals that operate repeaters, or online repeater directories, such as RepeaterBook.com and php.rfinder.net/websearch.html.

Channels

Create a channel for each FM repeater you wish to use, using the same procedure described in the DMR section above, with the following differences.

- **Channel Type:** Set to “Analog” for FM use.
- **Band Width:** Set to “25K.”
- **CTCSS/DCS Enc:** Set to the code type and code the repeater requires, e.g. CTCSS 141.3

Ignore all the settings in the “Digital” part of the dialog box.

Repeat the steps above for every FM repeater you wish to use, starting by adding a new channel with the “Add” button at the bottom of any Channel Information dialog box or right clicking the “Channels Information” folder and the clicking, “Add.”

Zones

Following the procedure described in the Zones section above, add every newly created channel to at least one zone. My personal preference is to dedicate a zone to each geographical grouping of FM repeaters. For example, I put all FM repeaters located in Fort Wayne, Indiana, USA in one zone.

Optional: Scan lists

If you wish, create a scan list for your FM repeaters, following the same procedure described in the Optional: Scan lists section above.

FM simplex frequencies

The procedure for adding FM simplex frequencies to the MD-380 is essentially the same as that described above. In the channel dialog box, you must assure that the transmit and receive frequencies are the same. It’s a good idea to indicate in the channel name that it’s simplex (e.g. “146.52 Sx”). CTCSS tones are not typically used in FM simplex communication.

Save your completed codeplug

When you have finished creating your codeplug, save it somewhere on your computer’s hard drive.

Write your codeplug to the radio

Plug the programming cable into the radio and the other end into a USB port on your computer. Turn on your radio.

On the CPS main menu bar, click “Program” and then “Write data.” Confirm that you wish to continue by clicking the “OK” button on the dialog box that appears. Wait for the process to complete and then unplug the programming cable from your radio. Your radio should now be ready to use with the

codeplug you created above. My first action after programming my radio is to set the radio to a parrot channel and test the repeater's ability to hear me.