DMR FOR SMART PEOPLE
WRITTEN BY DUMMIES

Let me start by saying that I am not a DMR guru. I know just enough to get on the air. The problem is that when I read or view DMR tutorials they are still confusing and typically focus on DMR repeaters that are connected to the internet. The Madras UHF DMR repeater is not connected to the internet. Throw out what you may know about DMR and focus on this:

Unless a user has a DMR radio that is capable of "hitting" the Madras UHF repeater he will NOT be able to talk on our DMR repeater. You cannot access it through an internet connection, there are no DMR apps that will get you on from your phone, you can't fire up a shark RF from Boston and get access. The only way to use our local DMR repeater is to have a DMR radio that is in range of the repeater and the only people that will hear you are other people who have DMR radios that are within range of the DMR repeater. There is no magic to our DMR repeater. Its just like the Madras VHF repeater (you have to be able to hit it with a radio) except the Madras UHF will do traditional analog as well as digital. It operates just like a traditional repeater EXCEPT the signal is digital instead of analog when utilizing DMR.   There is no VOIP or internet requirement. The only difference is that it is a clear digital signal vs. an analog signal. Is digital better than analog? I can't answer that question but I can say that over 95% of all critical services groups (fire, EMS, police, Etc.) now use digital communications.

Ok so I want to try this DMR stuff, what radio can I use. Any radio that is DMR capable will work. The most popular are the TYT MD 380 which is a handheld that costs about $70. It is a UHF only radio that does analog and DMR. The TYT 2017 is an analog and DMR radio that does BOTH UHF and VHF and costs about $150. Motorola makes several good DMR radios as well. So to clarify if you bought a TYT 2017 it could talk on ALL of the BGMRC repeaters whether it was analog or digital. The TYT 380 would allow you to talk analog or digital BUT, just on the UHF repeaters. The TYT 9600 is a mobile or base unit at 40watts that is VHF or UHF and is both digital or analog. So, its just like the TYT 2017 except it is a radio for your vehicle or home base station. There are many more radios available but these are the most popular due to performance VS price point.

So your radio has arrived and now we have to program it to talk on the DMR repeater. Before we go into how to program I think it is critical to understand how a DMR repeater works. Yes, you could just download my codeplug onto your radio if you had a TYT-380 and be done but, understanding the repeater is important. So, I will NOT be providing a drop in code plug.

FIRST THINGS FIRST
Plug your radio into the computer, open the software and BEFORE you try to program anything you will want to hit the button that says READ RADIO under the program tab at the top. Once it successfully reads your fadio go under the FILE tab and hit SAVE AS and name it original configuration. IF you screw everything up later (probably wont happen) you can go back and load in the default settings and firmware. Once you have this done carry on!!

TIMESLOTS
First the repeater has 2 time slots. The time slots act like individual repeaters. Two separate digital conversations can go on simultaneously with one group on time slot 1 and another on time slot 2. Neither would have to wait for the other to stop transmitting. Signals from timeslot 1 and timeslot 2 can be transmitted or received at the exact same time. So when I say timeslot 1 and 2 you should be thinking repeater 1 and 2. HOWEVER, when the repeater is in mixed mode like ours is (where it can do analog OR DMR) then only timeslot 1 will be active. So, on the Madras DMR repeater ONLY time slot 1 is operating at this point.

COLOR CODE
The repeater uses color codes to allow transmissions to be rebroadcast by the repeater. When I say color code you should think PL tone. You have to have your color code programmed in properly or you will not get out on the repeater. We use color code 1 on the Madras DMR repeater. Why is it called color code and then it it represented by a number? It goes back to motorola stuff years ago but, just remember we use color code 1 and that is what MUST be in your radio.
That is all that you need to know about the repeater but we are far from done. For review we will need to be on timeslot 1 and use a color code of 1. From this point forward all of the other programmed info relates to how we want to be heard and the rest of the programming will occur on your radio. This is going to get a little confusing but hear me out....

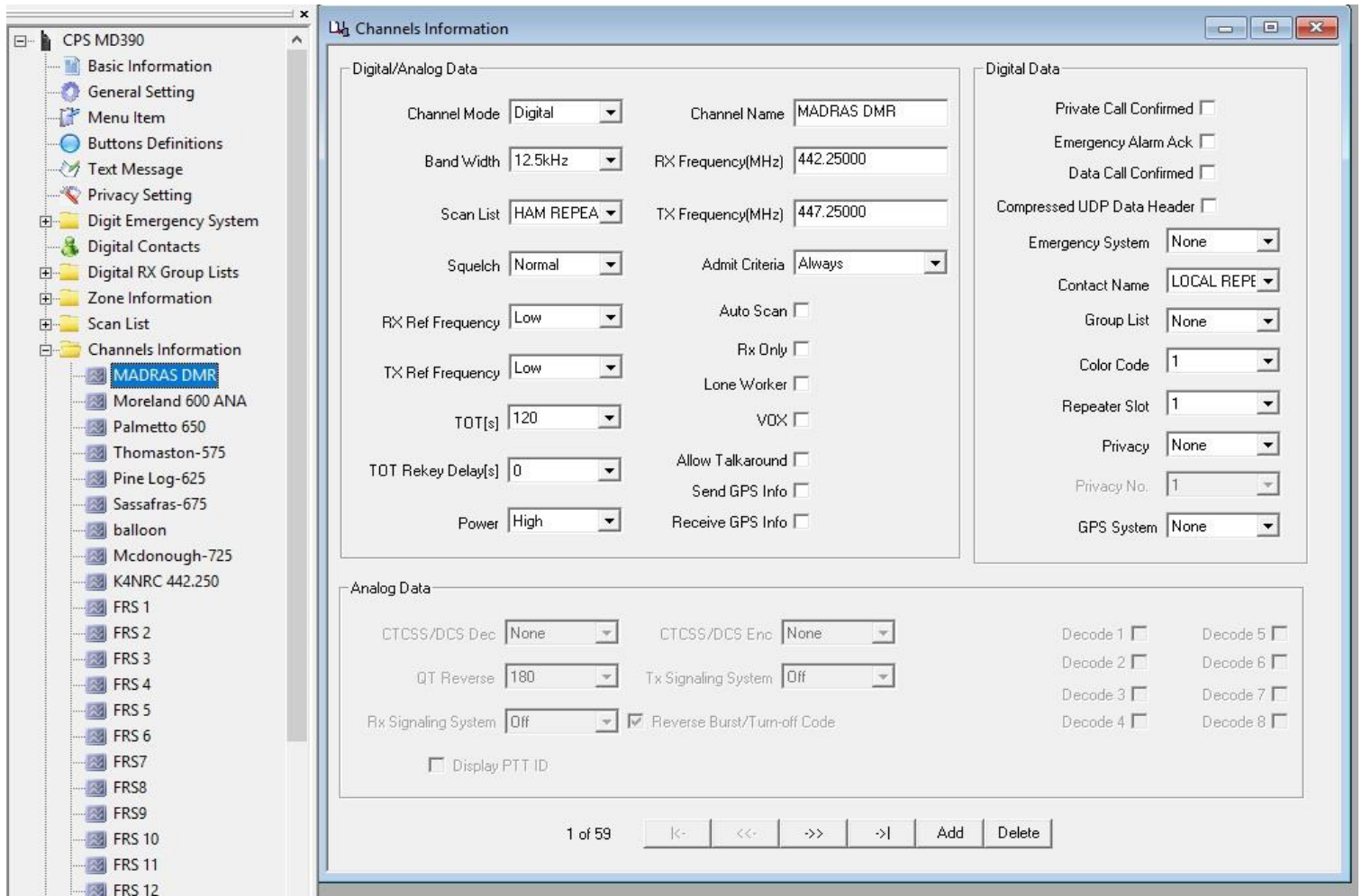Here is a screenshot from the TYT 380 software:

The FIRST thing that you will want to do is go to DIGITAL CONTACTS. You can see from the picture above that I have added a few but the important one is line 5. LOCAL REPEATER. Set your digital contact like this. LOCAL REPEATER / GROUP CALL / CALL ID is 9 / RECEIVE TONE: No.   If you don't set your digital contact like this you will not be able to talk to anyone on the Madras repeater. The ONLY critical contact to use the Madras DMR repeater is the local repeater ID 9 that is on my line 5 (But, it will probably be on your line one, makes no difference where it is as long as its in the list).

STEP 2
So, step to is to go to your channel information. When the below screen pulls up you click ADD at the bottom which takes you to a new input screen like above. Now, lets go line by line from left to right. The channel mode is : DIGITAL (because its a digital signal, if analog you would pick analog). Next is band width which is 12.5mhz because digital is narrow band. If it was a wide band analog frequency (like the madras VHF or temple avenue VHF) you would pick 25mhz. Scan list don't worry about this now, we will come back to it. Follow my inputs until you get to second column where you name your channel (mine is MADRAS DMR and that's what it shows as in my radio) You input the RX and TX frequency as above...*Now, the most important part (other than getting the frequncy correct) is in 3rd column CONTACT NAME: From the drop down menu select LOCAL REPEATER that we added in step one. Then COLOR CODE 1 and TIME SLOT 1.*

Channel screenshot programming of the TYT-380

So lets recap. You program in your frequency and offset just like analog. You program in your color code just like a PL tone on analog. You pick the correct time slot which is unique to digital and lastly you pick your contact name. Not too hard. Right now we are just trying to get the DMR repeater programmed into our radio so just like above and you are golden. The NUMBER ONE THING done wrong when programming in a DMR repeater is NOT adding the digital contact.
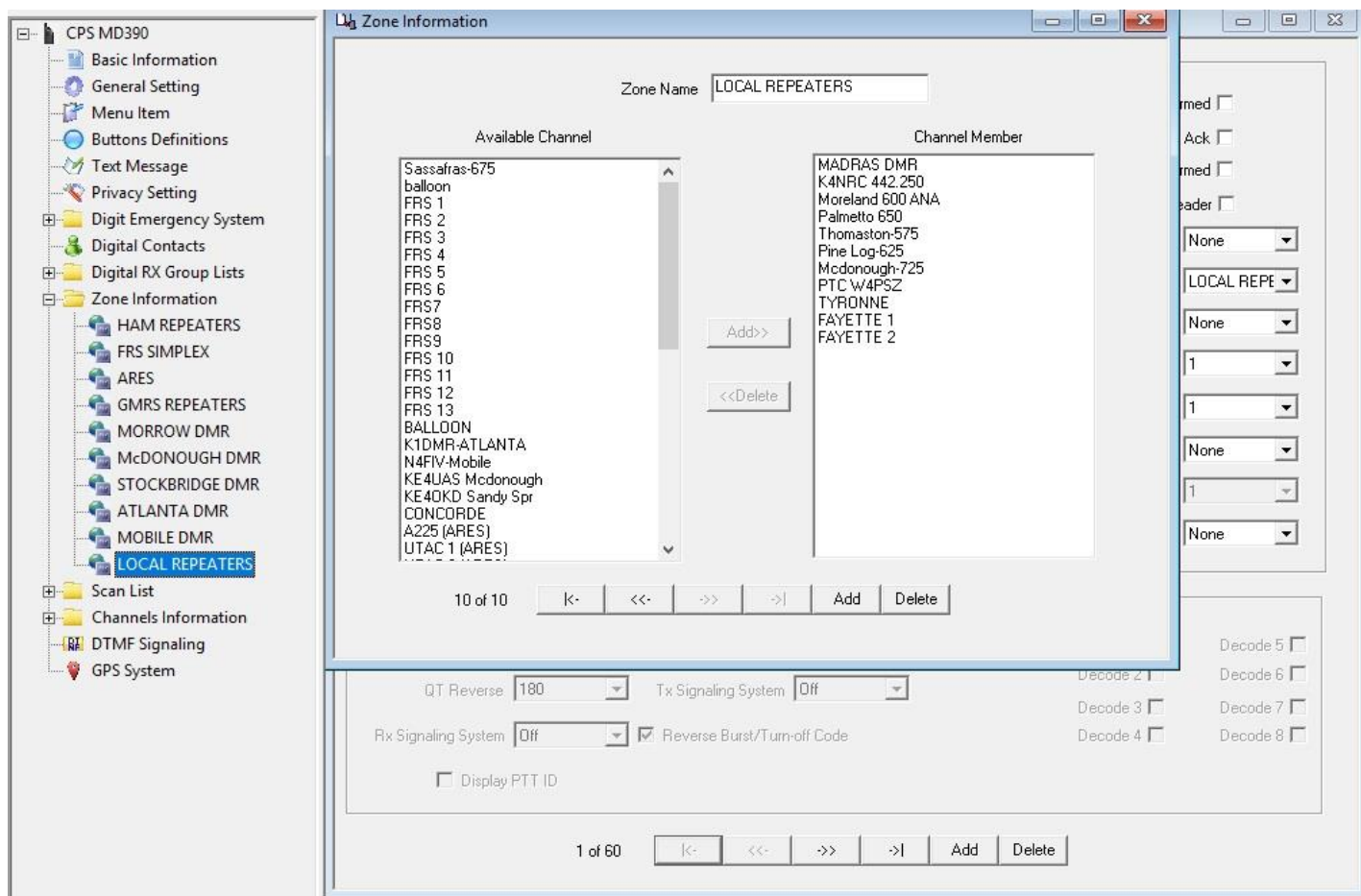
From an operational standpoint you transmit on the desired frequency in DIGIATL mode. You are on timeslot one and on color code one so, the repeater says OK, lets re-transmit this guys message because his credentials are correct. Then the repeater transmits it back out with the identifier of ID number 9. Now, ONLY people who have Madras DMR repeater programmed on their radio as Contact ID 9 (digital contact) will hear you. That is why setting the digital contact ID to LOCAL REPEATER 9 on all of our radios the same is CRITICAL.

So why do we use channel 9 on our DIGITAL CONTACT? Wouldn't using ID # 1 be easier to remember? In the DMR world there are set channels that are well known. Kind of like the national simplex calling channel on analog. Its not set in stone but most know it. Channel 9 is the local repeater channel. Channel 1 is the WORLDWIDE channel. Visitors or hams passing through know that a DMR repeater not operating on internet (like ours) will probably have most users on channel 9. That's why we have it on local repeater channel 9. Nothing prevents a user from programming in and using say channel 3101 which is the Alabama statewide channel BUT nobody is ever going to look on the Alabama channel for a repeater in West Georgia!! Remember, only those on the same channel will hear each other talk! We use LOCAL REPEATER ID # 9

So, I hope the wheels are turning in your head and it is starting to make sense. But, at this point all we have is one repeater in our radio and that's not going to do us much good. How do I get all of the other repeaters in my radio and organized like I want them??
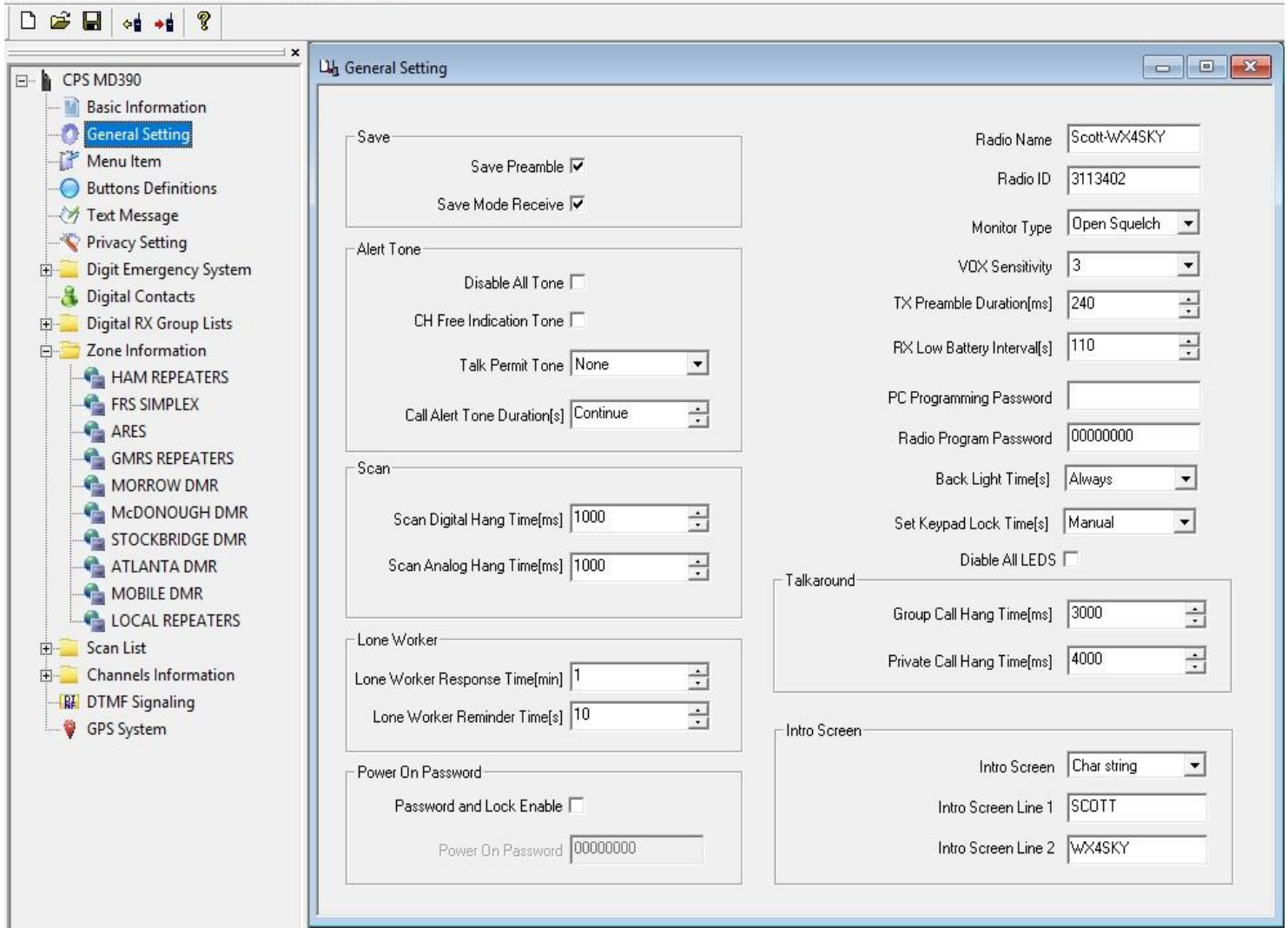
Welcome to the world of ZONES!!

In my radio I have a LOT of zones. A zone is a group of channels that you want to keep together to scan. So, you might want to have all of the BGMRC repeaters in a zone called BGMRC REPEATERS. If you scan this zone you can monitor all of the club repeaters. In zones you CAN mix analog and digital repeaters. So, the first thing that you do is add all of the frequencies that you will want to monitor or use in your CHANNEL LIST. You can do HAM repeaters, GMRS repeaters, simplex channels, FRS channels, Etc. So first get the channels in and then break them into zones to monitor. You CAN have the same channel in multiple ZONES. Here is a look at the UHF channels I monitor under LOCAL REPEATER ZONE

Now my radio is UHF only but you can see that I monitor the madras DMR, the Madras UHF analog, various Fayette UHF repeaters AND various GMRS repeaters. I run several zones and you can add as many zones to do as many things as you need to do. If you have a VHF/UHF radio you could do club repeaters, ARES channels, GMRS, and anything else you want. Basically no limit to the number of zones or the number of channels. Just drag and drop from the available channels list on the left to the channel member column on the right.

OK...don't give up yet. There is a bit more. Under GENERAL SETTINGS you have a few other options. Here is a screenshot

Pretty straight forward but you see RADIO ID. My number is 3113402. Where did that come from? That is my D-Marc network ID. It is NOT critical to have this number. You can get one for free from Dmarc network and then other users can use an import tool so that when you transmit other DMR users see your name. You may have seen Todd, Matt, Brian, Josh and others in the first screen shot as my digital contacts. If you add me or others to your digital contacts you can see the operators name when he/she transmits BUT this is NOT critical and you can still use the repeater without an ID or a non standard ID. Some users prefer non standard IDS such as KM4VEV who uses 420 as his ID...once you see a users ID number on your screen you can add it to your digital contacts along with his name and from then on the name and ID number will pop up on your screen. Whatever number you put in this radio ID slot is what will be transmitted and seen by other users.

That should be enough to keep you busy for a few hours.....

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