BTech DMR-6X2 CodePlug Programming Guide

INTRODUCTION

The BTech DMR-6X2 radio is a Dualband VHF and UHF radio with both Digital DMR (Tier I and II) and Analog capabilities. It offers 4,000 channels (Analog and Digital), 10,000 Digital Talk Groups, and up to 150,000 contacts, as well as multiple DMR ID numbers (Radio ID's) for a single radio. With the enhanced capabilities of the DMR-6X2 radio, this Programming Guide will help users to understand all aspects of how to program and set up the radio for maximum usability.

Some of the extended features described include:
- Simplex Repeater (Digital Mode)
- Talk Group change (on-the-fly)
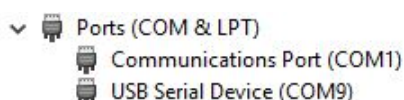- Priority Channel Scanning
These are described in Section 6

Please note that the DMR-6X2 radio may have a locked key-board upon arrival. The FCC requires per 47CFR90.203 that an unauthorized user shall not be able to enter frequencies or transmit on an unauthorized frequency. Frequencies should only be entered by service or maintenance personnel. This Guide is provided for such service or maintenance personnel. To unlock keypad, press the "Menu" key and the "*" (star) key.

The programming software (CPS) creates a file that contains the frequencies and operating parameters is called a "codeplug". Creating a codeplug is a 'bottom up' process where the lowest (common) elements must be created first, then built upon until a fully functional codeplug has been created. The DMR-6X2 software can both create the codeplug and write it to the radio. This software (also called CPS) has the capability of both "importing" and "exporting" large data files, such as contact names.

1.0 GETTING STARTED

The programming cable for the DMR-6X2 radio is typically provided by BTech. The USB cable required programming cable has a two pin 'K-1' connector.
There is no circuitry inside the cable. Similar appearing cables with circuitry inside the cable will not work. Make sure the computer has the correct driver for the cable – see the Device Manager on your PC.

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If the driver does not load automatically, you can download the proper 32bit and 64bit drivers from https://baofengtech.com/dmr-6x2

Open the Device Manager, and then double click on the "Ports" to display the driver. Right click on the driver name and open **Properties**. This will display the driver details. Under **Port Settings,** set the "Bits per second" to 128,000 for faster read/write to the radio.
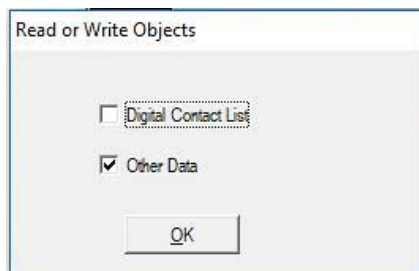
Note: Before programming, read the current information from the radio to your PC to create an initial program template.

The Computer Programming Software (CPS) for the DMR-6X2 may be updated periodically as features new features are added.
The BTech website will offer those updates at https://baofengtech.com/dmr-6x2
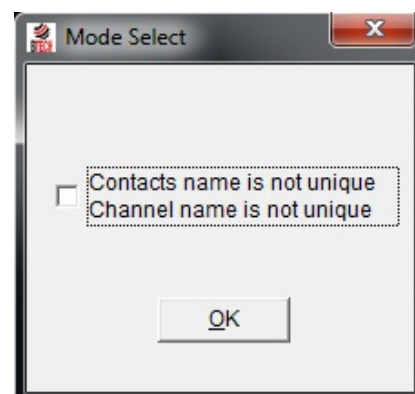
Note: The Software version should always match the Firmware version. i.e. Software version 1.00 should always be used with Firmware version 1.00, etc. Do not mix FW and SW versions. This firmware is specific to this model only. Loading DMR-6X2 firmware to a different model radio will Not added extra features to that radio.

When reading/writing data, the software will ask to select "Digital Contact List" and/or "Other Data" (codeplug parameters). The DMR Contact List contains information on over 100K DMR IDs, and will take up to 5 minutes process. Only select this when loading the DMR DB.

Read or Write Objects

☐ Digital Contact List

☑ Other Data

OK

A good starting point for a new codeplug would be a local ham that has a DMR-6X2. If you are starting from scratch, refer to RepeaterBook as a source for repeater information. Also, check if the "N0GSG Contact Manager" is available for this radio.

Mode Select

☐ Contacts name is not unique
  Channel name is not unique

OK

If the **Mode Select** screen appears when you open the CPS, leave underchecked and click "OK". This option allows the use of identical Contact names and Channel names.

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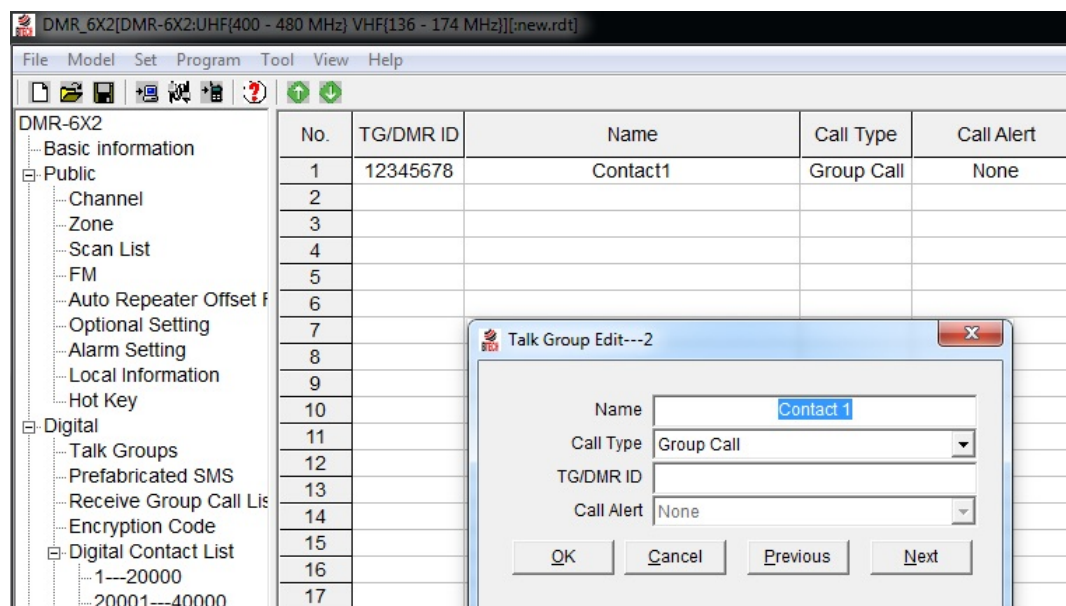
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STEP 1 – TALK GROUP (DIGITAL CONTACT) LIST

The first step is to identify Talk Groups (TG) you wish to use. These can be Local, Statewide, Worldwide or Special Interest group. Although there are hundreds of potential Talk Groups, not all TG are available through all repeaters as they are selected at the discretion of the repeater owner. This is where RepeaterBook is extremely useful.

A list of talk groups can also be found at http://www.dmr-marc.net
On the right side of page, click on Talkgroup Databases.
An Excel file will be downloaded.

To populate the Contact List, open the Digital Contact Talk Group tab on the left side and double click on the first line (No.1). The Digital Contact List contains the DMR Talk Groups to be used. Regardless of the number of repeaters entered, the TG information only needs to be entered once in the Contact list.
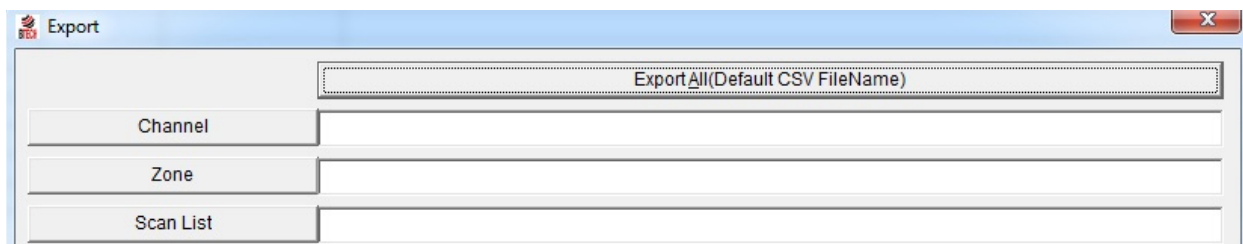

An easy way to populate the Talk Groups is to:
- Enter at least one or two TGs manually.
- Use the TOOL / Export function shown below to create a .csv file.
- Save this file to where you can access it in the future.
- Add the additional talk groups to the spreadsheet.
- Sort the data as desired.
- Then use TOOL / Import function to load the .csv file back to the program.

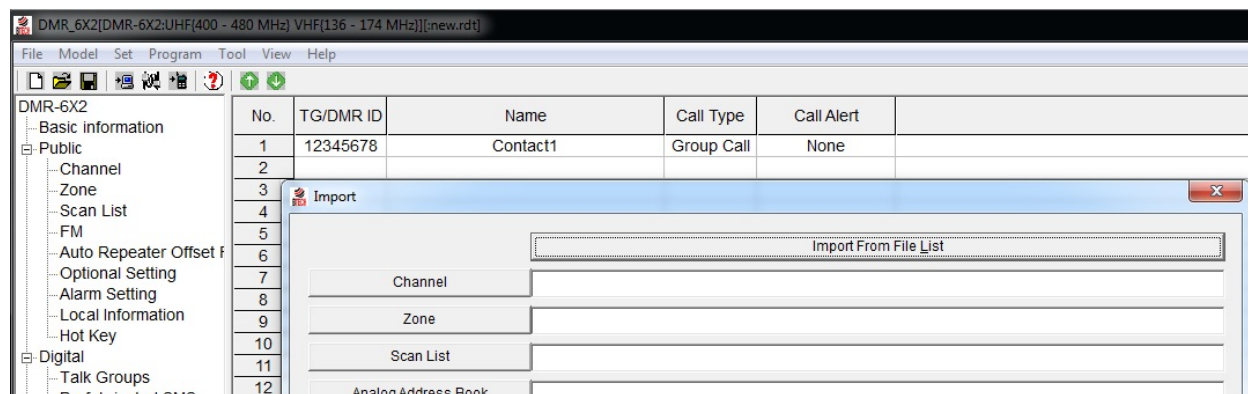You will quickly realize that Import/Export of .csv files is your friend.

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Spreadsheet will appear in the following format:

	A	B	C	D	E	F	G	H	I	J
1	No.	TG/DMR ID	Repeater Number	Name	City	State/	Country	Remarks	Call Type	Call Tips
2	1	1	World Wid	World Wide					Group Cal	None
3	2	2	Local 2	Local 2					Group Cal	None
4	3	3	North Ame	North America					Group Cal	None
5	4	4	UA All-La	UA All-Lang 1					Group Cal	None
6	5	8	Local 8	Local 8					Group Cal	None
7	6	9	Local 9	Local 9					Group Cal	None
8	7	10	WW German	WW German					Group Cal	None
9	8	13	WW Englis	WW English					Group Cal	None

Sample Tool/Import screen shown below:

NOTE: Always sort the TG Contact list and remove duplicates. They will cause the Import to Radio to Fail.

STEP 2 – DIGITAL CONTACT LIST

Without the DMR ID database loaded, the only information that will appear on the LCD is the DMR ID number. This next step allows the radio to display the name, DMR ID, Call sign etc. of the station being received.

Note: The DMR Database is steadily growing and eventually you may need to pare it down to your needs.

Marshall Dias W0OTM, has developed an excellent online DMR DB generator.
http://www.amateurradio.digital/wizard.php
Select the radio model from the dropdown and follow the 3 Steps to download the latest formatted DMR ID database. Save this .csv file and prepare to import the database to the software. The downloaded DB will be in the following format.
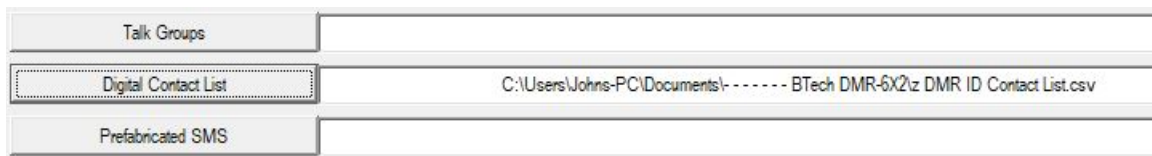
	A	B	C	D	E	F	G	H	I	J
1	No.	Radio ID	Callsign	Name	City	State	Country	Remarks	Call Type	Call Alert
80345	80345	3142422	KE3IN	Bradford Bobbitt	Etters	PA	USA	DMR	Private Call	None
80346	80346	3142423	K3NXU	John Lamartina	York	PA	USA	DMR	Private Call	None
80347	80347	3142424	N3RMM	Angela Treffinger	Etters	PA	USA	DMR	Private Call	None
80348	80348	3142425	KA3MYI	Michael Senica	Warrington	PA	USA	DMR	Private Call	None
80349	80349	3142426	W3ZW	Andrew Mcluckie	Wayne	PA	USA	DMR	Private Call	None

Note: If you decide to alter the information in the database, do not change the column headings or delete any of the columns.
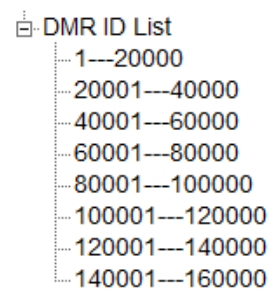
To enter the current DB:
- Save the database generated from the link above.
- Use the TOOL / Import function to load the database .csv file.
- Click on Digital Contact List and select the location of the downloaded DB file.
- Select Import at the bottom of the screen. (Loads DB to software image).
Because of the size of the database, it may take upwards of 5 minutes to load the data.

Once loaded to the software, the data can be viewed by selecting DMR ID List from the menu on the left. The DB record will be broken down into 20K segments.

STEP 3 – DMR RADIO ID

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To operate on the DMR network, you must register for a DMR identification number. This can be done at https://www.radioid.net/   Select Register ID at the top of the page, then select User Registration at the bottom.
You should receive your new DMR ID within 24 hours.

Your DMR ID can now be entered into the CPS.
- Select Digital / Radio ID List on the left
- Enter your DMR ID and Name

NOTE: If you download a CodePlug from the Internet for your radio, you must enter your DMR ID as per above before you load this CodePlug into the radio.

STEP 4 - SCAN LIST

A Scan List is a group of channels that can be monitored when Scan is selected using one of the programmable side keys. The DMR-6X2 has the capability of storing multiple Scan Lists per channel.

- Select Scan List from the left column
- Double click on the first open line
- Enter a name for the new Scan List
- Highlight the channel name you want to appear in the list and press >>

Up to 50 channels can be loaded into an individual list. You also have the ability to sort or rearrange the channels in this list. The Scan List will later be assigned to a channel of your choice during Step 7 below.

Please note – If you want to change the scan list using the Menu on the radio
- Go to Scan List > Scan List > select the TG list you want
- Go to bottom of the list and "Select Current List" to make the one you selected become the new scan list.
- Then go back to Scan List and select "Scan On/Off" and turn the scan on.

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Scan List Name	Name given to group of scanned channels
Available Channels	Will list the channels available to scan
Scan Channel Member	List of channels to be scanned
Priority Channel select	Select the priority channel or off
Priority Channel 1	Sets which channel is priority 1
Priority Channel 2	Sets which channel is priority 2
Revert Channel	During scanning, if no station is being received, pressing the PTT will transmit on this channel.
Look Back Time A	During scanning, it will scan the priority channel when check the look back time A every time.
Look Back Time B	(Analog only) During scanning, when the priority channel has signal but with incorrect CTCSS/DCS, it will scan the priority channel when check the look back time B every time.

Dropout Delay Time   (Analog only) When scanning with a signal and starting a transmit, after release the PTT key, the radio will resume scanning after reaching the Dropout Delay Time.

Dwell Time   (Analog only) When PTT key is released, the radio will resume scanning after reaching the Dwell Time.

Once all done, click on "OK" to save this set-up.

STEP 5 - ZONE LIST CREATION

Creating a 'Zone' allows you to put your configured 'channels' into logical groups so they can be accessed.
- Up to 250 individual Zones can be created and named to identify each channel group.
- Each Zone can contain as few or as many channels as convenient.
- Zones can be named to identify repeaters, functions, etc.
- The channels in each zone can be sorted or rearranged in any order.

Once the Zone list is created, the individual Zones can be re-sequenced by using the **green up** and **green down** arrows shown below.
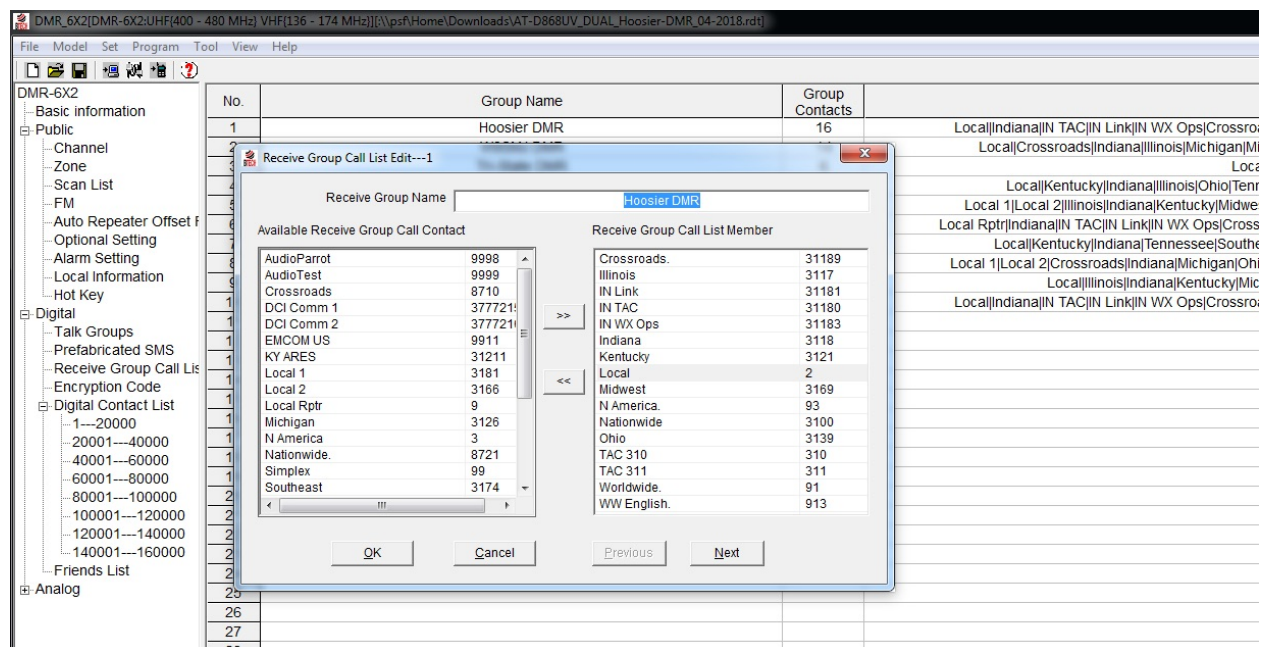
The example below shows the group of channels selected for the Shrewsbury PA repeater. Another possible option would be a zone set up for traveling from one repeater to another. For instance:
- Local 2 Hickory
- Local 2 Shrewsbury
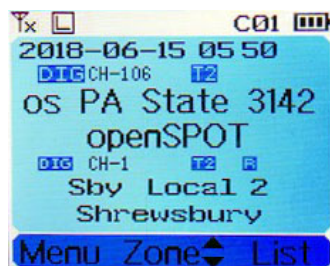- Local 2 Keystone
- Local 2 Harrisburg

While traveling, I would only need to turn the channel selector one click to change from one repeater to another, rather than switch zones.

NOTE: Holding the up/down key down allows zones to switch continuously rather than individually.

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A Channel: The channel the radio starts up with for channel A
B Channel: The channel the radio starts up with for channel B

A typical display when in the dual receive mode and listening to two channels (A plus B).
- The channel with the larger text (A) is the TX channel. You can also see the channel numbers (CH-106 and CH-1)
- Time Slot **(T2)** and Repeater **(R)**
- On the top bar the Color Code **C01** is displayed.
- The date line may from time to time change and show sequentially the TG, last call person name, and time if you are in dual mode. In single mode the bottom of the display will show this info.
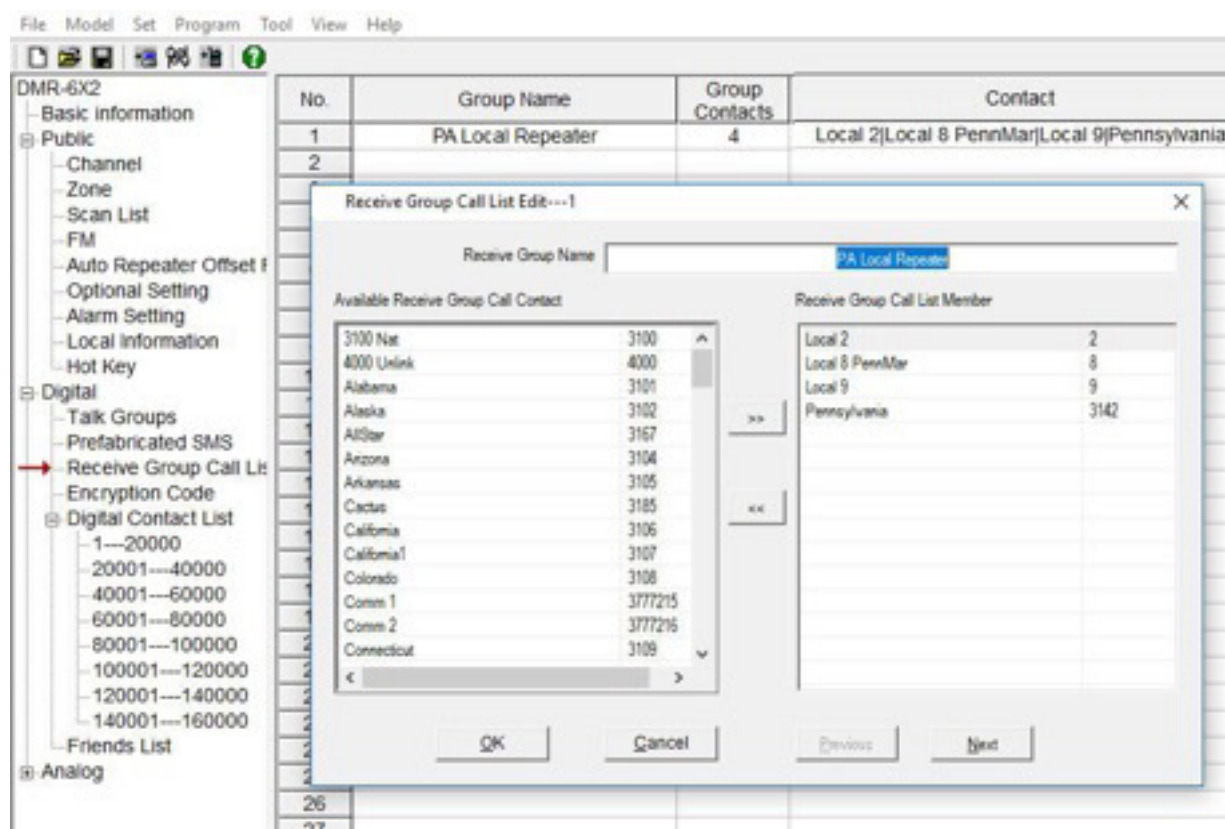
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STEP 6 – RECEIVE GROUP CALL LIST SET-UP

You can leave this blank if all you want to do is to listen to the same channel that you transmit on. Then under Channel set-up in the section below you select "NONE" for the Receive Group List. Your receive TG will now default to the transmit TG.

If you want to listen to additional TG's on a channel, add the TG in the Receive Group Call List. Under Channel set-up in the section below, select the name of the Group List. You can program up to 64 TG's per receive group.

Note: If the Talk Group List contains a TG with the same number as another one, then this Receive Group List will not work.

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STEP 7 - CHANNEL – FREQUENCY SET-UP

The DMR-6X2 offers programming of 4,000 channels for UHF and VHF. To start double click on the first line No.1 to open the Channel Information programming window for that channel:

The Channel Information Edit window contains several options which will be explained below:

Channel Name	the name of the channel (typically name of repeater and TG)
Receive Freq.	the VHF or UHF frequency
Transmit Freq.	the VHF or UHF frequency
Channel Type	Select Analog, Digital, Mixed Analog or Mixed Digital
Transmit Power	Select one of four levels 6W/2.5W/1W/0.5W
Band Width	Select the bandwidth of transmit
TX Permit:	Selects PTT transmit criteria – typically Same ColorCode
Scan List	Select which Scan List(s) will be scanned
TX Prohibit	Check if the frequency is a listening channel only
Work Alone	Check if the "alone" emergency function should be allowed

Talk Around Through Mode	Check for RX freq. the same as the TX freq. (Simplex).

Digital

Contact	Select the Talk Group this frequency belongs to
DMR/Radio ID	Select which of the DMR ID's to use for this channel
Color Code	Select which CC is related with this channel
Slot	Select which slot (1 or 2) applies to this "Channel"
Receive Group List	If programmed, select the Talk Group List desired. Select NONE if Transmit and Receive TG the same.
Digital Encryption	Select Off or which number to use for encryption
Encryption Type	Select desired encryption method.
TDMA	Check if working dual time slot simplex
TDMA Adaptive	Check if for adaptive slot selection between slot 1 and 2
Call Confirmation private calls	Check if the receiver needs to transmit before accepting
Ranging:	Check if GPS ranging between two radios is desired

Analog

CTCSS/DCS Decode	Select Off or CTCSS or DCS and tone frequency
CTCSS/DCS Encode	Select Off or CTCSS or DCS and tone frequency
Squelch Mode	Select how to use the squelch
Optional Signal	Select Off, DTFM, 2Tone or 5Tone
DTFM ID	Select DTFM ID
2Tone ID	Select 2 Tone ID
5Tone ID	Select 5 Tone ID
Custom CTCSS	Enter value when requiring a custom CTCSS tone
PTT ID	Select off, at start, at end, or both

Once completely filled in, click OK to save this Channel.

Spread Sheet Option
For large amounts of channel data, this may be a desired method as it allows cut and paste of large amounts of data. This is especially desired when adding multiple repeaters with similar configurations.
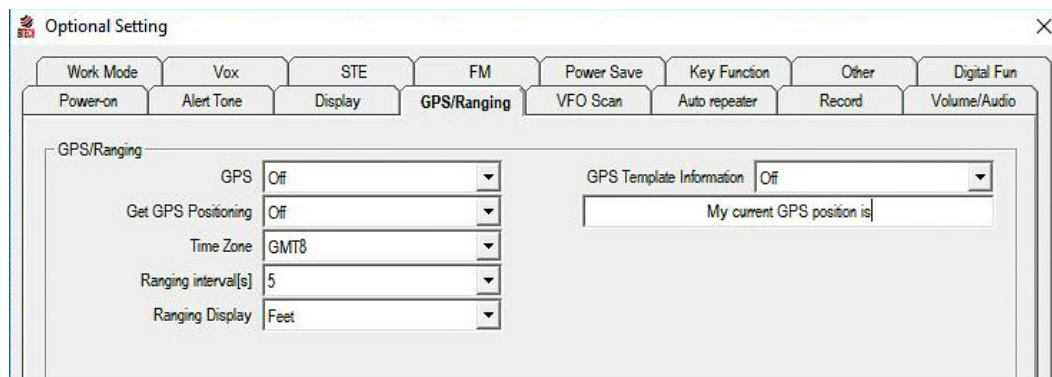The current channel configuration can be exported to a csv file, enhanced, then imported back to the code plug.
Always save data files for recovery purposes.

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The DMR-6X2 radio basic configuration set-up is done in the Optional Setting window. This page contains a lot of important information for the radio operation.

Once the Optional Setting window is open, there are several sub-sections to program. The above window shows all the 10 sub menus available in the Optional Settings.

Work Mode

Display Mode	Defines what the radio display will show when in receive mode – frequency or channel name
VF/MR (A)	Select VFO or MEM for the "A" upper channel
MEM Zone (A)	Select the initial Zone to appear at power up.
VF/MR (B)	Select VFO or MEM for the "B" lower channel
MEM Zone (B)	Select the initial Zone to appear at power up
Main Channel Set	Select "A" or "B" as the main channel
Sub-Channel Mode	Select OFF if only the "A" channel is to be used; ON for both A+B

VOX

VOX Level	Select VOX sensitivity. OFF, 1, 2, 3
VOX Delay	Select delay time in seconds. .5, .6 > 3.0s
VOX Detection	Select internal Micr, Spkr/Micr, or Both

SQUELCH TAIL ELIMINATE (STE)

STE Type of CTCSS	Select Off, Silent or a selected setting
STE When No Signal	Select Off, 55.2Hz, or 259.2Hz

FM

FM VFO/MEM	Select VFO or Memory mode
FM Work Channel	Select the initial FM channel (after set-up done)
FM Monitor	When in FM mode, select ON if radio is to receive calls

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Power Save

Auto Shutdown	Select Off or minutes before auto shut-down
Power Save	Select Off or 1:1 or 2:1 for saving power

Key Function

Key Lock	Select Manual or Auto key lock function
PF1 Short Key	Select from function list for the radio key below PTT
PF2 Short Key	Select from function list for the radio key 2 below PTT
PF3 Short Key	Select from function list for the orange radio key
P1 Short Key	Select from function list for the P1 radio key
P2 Short Key	Select from function list for the P2 radio key
PF1 Long Key	Select from function list for the radio key below PTT
PF2 Long Key	Select from function list for the radio key 2 below PTT
PF3 Long Key	Select from function list for the orange radio key
P1 Long Key	Select from function list for the P1 radio key
P2 Long Key	Select from function list for the P2 radio key
Long Key Time	Select time in seconds to hold the key for Long duration

Other

TOT	Tx Time Out Timer. Off, 30s, 60s > 240s
Frequency Step	In VFO mode, selects the frequency steps
Language	English
SQL Level A	Squelch level for the "upper" channel – set at 1
SQL Level B	Squelch level for the "lower" channel – set at 1
TBST	Tone Burst - 1000, 1450, 1750, 2100Hz repeaters
	PTT + PF1 key to send tone!
Select TX Contact	When On, the radio DMR ID can be changed from keyboard
Analog Call Hold Time	Select how long a call is held for Analog reception.
Call Channel maintained	Off / On - Allows a transmit on the sub-channel B if done within 5 seconds after the call carrier was dropped.
Show Last Call on Launch	Off / On
Priority Zone A	Select Off or the zone that should become priority
Priority Zone B	Select Off or the zone that should become priority

Digital Functions

Group Call Hold Time	Select hang time for a Group Call
Personal Call Hold Time	Select hang time for a Private Call
Prewave Time	Select the time to wake-up the radio from a power save

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Wake Head Period	Select the time for the preamble
Filter own ID in Miss Call	Select Off or On then the radio will not remind of a miss call when receiving a call with same ID.
Digital Remote Stun/Kill	Select Off or On to allow remote shut-down of a radio
Digital Monitor	Select Off or Single or Dual Slot to allow promiscuous mode
Digital Monitor CC	Select Any or Same to allow same Color Code monitor
Digital Monitor ID	Select Any or Same to allow monitor for a DMR ID
Monitor Slot Hold	Select Off or On to monitor Slot continuously
Remote Monitor	Select Off or On to allow other radio to check this radio
SMS Confirmation	Select Off or On if you want to confirm a SMS
SMS Format	Select Off or On to allow an SMS to be confirmed recommend On if sending SMS
Radio Name	DMR identification number
Radio ID	User name or Call Sign

Power On

Power-on Interface	Default, Custom Char, or Custom Picture at start-up
Power-on Display Char.	Enter your unique characters for the start-up display
Power-on Password	Select Off or On
Power-on Password Ch.	Write in keyboard characters to unlock the radio

Alert Tone

SMS Alert	Ring / None - Notification when receiving an SMS
Call Alert	Ring / None - Notification when receiving a digital call
Dig Call Reset Tone	Select Off / On - A digital call has a group call hold time

and a private call hold time to prevent voice missing after the call. When set Digi Call Reset Tone is On, it will beep when the hold time terminates.

Call Tone	Select if you want a tone confirming Digital and/or Analog repeater connection at the start of a call
Key Tone	Select Off or On if you want a tone when pressing a key
Idle Channel Tone	Select Off or On if you want a tone when a channel is idle
Startup Sound	Select Off or On if you want a tone when powering on
Volume Change Prompt	Select Off or On to show a volume screen when changed

The programming also allows you to program the tone frequency for the Idle Channel Tone, the Call Tone and the Call Reset Tone as well as the duration of those tones.

Display

Brightness	Sets the display brightness – 5 is the brightest
Auto Backlight Duration	Sets the time the display is on or "Always"
Menu Exit Time(s)	Set the time the Menu selection is left on - minimum 5 sec
Time Display	Select On to show current time, or Off
Last Caller	Select Display ID, Caller, or Both

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Call Display Mode   Select Name or Call Sign as primary display
Call Sign Display Color   Select Red or Black for how to display the call sign
Current Contact Display   Select Off or On for rotating display of all data on LCD

GPS Ranging

GPS   Set On or Off (can also be changed under Menu)
Get GPS Positioning   Select Off or On to allow other radio to check this radio
Time Zone   Set the GMT time zone for the radio
Ranging Interval   Select from 5 to 255 sec for checking received GPS position
Ranging Display   Select Meters or Feet
GPS Template Info   Select Off or On to define the format of the GPS display
GPS Template (text)   GPS message to be part of the GPS TX data

VFO Scan

Scan Type

-- TO (Time Operation) Scan stops when signal detected.
Scan resumes after 5 seconds (even if channel still active).
-- CO (Carrier Operation) Scan stops when signal detected.
Scan resumes when signal disappears.
-- SE (Search Operation) Scan stops when signal detected.
Scanning will not resume.

VFO Scan Start UHF   Start frequency for a UHF Analog scan
VFO Scan End UHF   Stop frequency for a UHF Analog scan
VFO Scan Start VHF   Start frequency for a VHF Analog scan
VFO Scan End VHF   Stop frequency for a VHF Analog scan

Auto Repeater

Auto Repeater   When On, changing the TX frequency via keyboard also
                           changes RX with correct offset.
Auto Repeater UHF   Set to Off, or set the offset for the UHF RX frequency
Auto Repeater VHF   Set to Off, or set the offset for the VHF RX frequency
Simplex Repeater   Digital Simplex Repeater (Store and Forward)
Spkr during Rx of Simplex Repeater   On / Off
Simplex Relay Slot   Repeat on TS1, TS2, or Same TS as Tx
Min Freq of Auto Rptr (VHF)
Max Freq of Auto Rptr (VHF)
Min Freq of Auto Rptr (UHF)
Max Freq of Auto Rptr (UHF)

Record

Record Function   Select Off or On to record each TX and RX internally
Record Delay   Select 0 to 5 sec to eliminate a short TX being recorded

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Volume/Audio

Maximum Volume	Select 1 > 8 for higher max volume – 8 is max
Max Headphone Volume	Select Indoor, or 1 > 8 for max volume
Mic Gain	Allows increasing the mic sensitivity from 1 to 5 times
Enhanced Sound Qual.	Set to On for increased high pitch voice or Off for normal.

Once all the parameters have been programmed, click on "OK" to save.

OTHER SET-UP OPTIONS

ALARM SETTING

Analog and Digital alarm settings can be programmed via above set-up.

LOCAL INFORMATION

With the radio attached to the USB port on your computer, you can access Embedded Message information about the radio. To change or add any of the information it requires a separate software package from BTech only provided to dealers.

CREATE ANALOG ZONE AND CHANNELS

Create a zone(s) for your analog channels, then add the desired repeater or simplex combinations. Name your zone accordingly. Optionally you can also create scan lists for your analog channels and assign a scan list to a group of channels or an entire zone.

STEP 9 - ANALOG ADDRESS BOOK

The radio allows a set of addresses for the Analog mode. Open the Analog Address Book and click on the first line to open the Analog Address Book Edit window.

The Call ID reference the DTMF or 5Tone number programmed under its menu

STEP 10 - PREFABRICATED SMS

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The radio the capability of sending SMS messages to other Digital Contacts. You can create SMS messages in advance and store them in the radio. This can be done in the Prefabricated SMS window.

STEP 11 – ENCRYPTION CODE

This function should not be used in the USA.
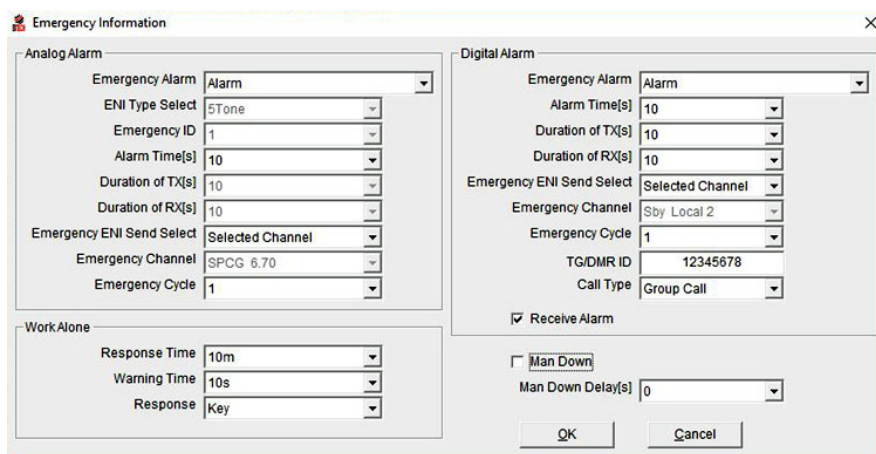
STEP 12 - ALARM SETTING

The radio offers a comprehensive alarm system to protect the user of the radio under several conditions. Open the Alarm Setting to gain access to the Emergency Information Edit window.

Analog Alarm

Emergency Alarm   Select from Alarm, Transpond + Background, Transpond + Alarm, or Both

ENI Type Selected   Select from None, DTMF or 5Tone

Emergency ID   When ENI Type choose DTMF or 5Tone, you should edit the DTMF or 5Tone firstly, then choose the required number in this column

Alarm Times   Select after what time the alarm should be initiated

Duration of TX   Select the duration of the Alarm transmission

Duration of RX   Select the duration of listening mode after an alarm reset

Emergency ENI   Select which channel the Alarm should be sent out on

Emergency Ch.   Select which channel to use

Emergency Cycle   Select Continuous or a time

NOTE: A channel is the No. on the Channel Menu line for the selected frequency.

Work Alone

Response Time   Select the time for the radio to respond to an Alarm trigger

Warning Time   Select the duration if a warning transmission

Response   Select Key or Voice for a response to reset

Digital Alarm

Emergency Alarm   Select one of 4 options for how to initiate an Alarm

Alarm Time   Select after what time to initiate the Alarm

Duration of TX   Select the duration of the Alarm transmission

Duration of RX   Select the duration of listening mode after an alarm reset

Emergency ENI   Select which channel the Alarm should be sent out on

Emergency Ch.   Select which channel to use

Emergency Cycle   Select Continuous or a time

TG/DMR ID   Enter ID/Talk Group to be contacted

Call Type   Enter Group or Private

Enter OK to save.

LOCAL INFORMATION

Displays the USB COM port information

STEP 13 - HOT KEY

The Hot Key programming offers 3 sub-windows within the Hot Key Edit window.

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Analog Quick Call

The Call ID refers to the DTMF, 2Tone or 5Tone set up under separate menu

State Information

Allows text messages to be entered and made available for digital calls and can be selected when using the Function Keys.

Hot Key

The Hot Key window allows set-up of a keyboard key to access a function. See page 12 in your DMR-6X2 Operating Manual for more details.

Key	Mode	Menu	Call Type	Call Object	Digi Call Type	Content
Hot Key 1	Menu	SMS	Analog	Off	Group Call	Off
Hot Key 2	Call	SMS	Analog	Off	Group Call	Off
Hot Key 3	Call	SMS	Analog	Off	Group Call	Off
Hot Key 4	Call	SMS	Analog	Off	Group Call	Off
Hot Key 5	Call	SMS	Analog	Off	Group Call	Off
Hot Key 6	Call	SMS	Analog	Off	Group Call	Off
Fun Key+0	Call	SMS	Analog	Off	Group Call	Off
Fun Key+1	Call	SMS	Analog	Off	Group Call	Off
Fun Key+2	Call	SMS	Analog	Off	Group Call	Off
Fun Key+3	Call	SMS	Analog	Off	Group Call	Off
Fun Key+4	Call	SMS	Analog	Off	Group Call	Off

STEP 14 - ANALOG PROGRAMMING

To program Analog channels, select A-Analog as the Channel Type. This will block out the digital fields during data entry.
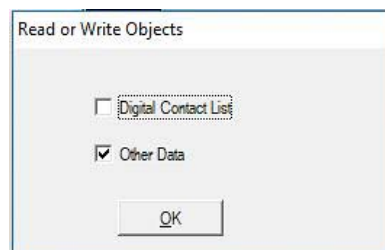
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FINAL STEP - WRITE YOUR CODEPLUG TO YOUR RADIO

The DMR-6X2 radio comes with the necessary programming cable. Most computers will load the necessary driver automatically when inserted into the USB port and radio for the first time. Per note on page 1, update the read and write speed of the driver.

Always save your code plug for future use prior to loading to your radio.
Select Program / Write to Radio from the top selection dropdown. When writing the code plug to the radio, you should only select "Other Data".

2.0 TOOL Pull-down Menu

The pull-down TOOL menu offers several unique features such as listening to all recorded information, importing and exporting file data to an excel format for separate programming, mode function, extended settings, firmware updating, adding a boot image, and default channel settings.

2.1 RECORD

There is a Record option available on the DMR-6X2. This option can be activated via a preprogrammed button, or via a keypad Menu/Tool/Record option.
When selected, the radio can record up to 8 hours of 'on the air' conversations (on transmission at a time).
Recordings can also be played back directly from the radio using a Menu/Tool/Record.

2.2 IMPORT and EXPORT

This feature allow importing to an excel spreadsheet each of the programming features so that all the features of excel can be used to build and enhance a CodePlug. Some details are described above in the Contact Information section.
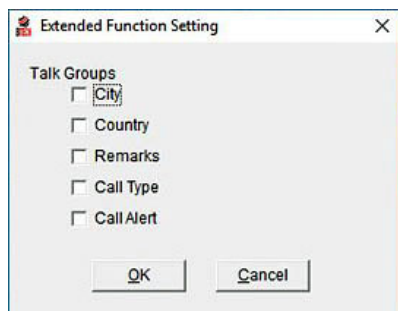
2.3 MODE

The Mode Selection allows the CPS software not to check for Channel names and Contact names to be identical. This feature has been requested by the California Amateur clubs due to the amount of repeaters they cover. Add a check to allow same Contact and Channel numbers.

2.4 EXTENDED TG FUNCTION SETTING

This menu is available under the TOOL pull-down as "Extended", and define which parts of the Talk Group information in Step 1 above will be displayed on the LCD display screen during reception of a call. If nothing is selected, then the Name of the TG is displayed at the bottom of the screen. If any of the items in this menu are selected, those fields will be displayed at the bottom of the LCD.

2.5 FIRMWARE UPDATES

If you have the Firmware Update Software (described in section 4.0 below) installed on your computer, this is a direct way to access this firmware.

2.6 START-UP SCREEN BOOT IMAGE CHANGE

The TOOL menu in the CPS has an option to replace the Boot Image displayed.

- Open Image – accepts JPG images from your photos or files (size not critical as software will re-size)
- Open Bin – opens a .bin image file
- Save Bin – saves the image you opened to a .bin file
- Read – read your loaded image file from the radio (if you loaded one)
- Write – write your new image file to the radio

2.7 DEFAULT CHANNEL INFORM

This TOOL Menu accesses the first channel of your list of channels.
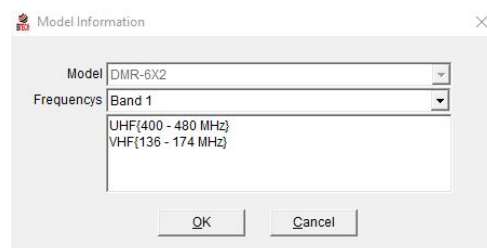
2.8 EXPORT DATA CONVERSION FILE

This function is used to export the codeplug to a format .dcf which can be read by the Contact Manager described in section 6.0 below where it can then be fully manipulated.

2.9 MODEL INFO

The Model pull-down menu shows the 11 possible frequency range options for the radio. Changes can only be done by the manufacturer.

3.0 RADIO LCD DISPLAY

On the top row of the LED display the following

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indications can appear:

- Reception bars left side is showing signal strength
- Within a square "**L/M/H/T**" transmit power levels showing from Low to Turbo
- Speaker = Digital Monitor is turned on for 1 or 2 slots (promiscuous mode)
- Microphone = You have turned On the recording feature of the radio (8 hours)
- GPS symbol **gray** = no GPS signal received, **red** = GPS signal received
- "**A**" indicates a set-up for Automatic Power Off
- **CC11** for Digital reception shows the Color Code for the primary channel
- **DCS** or **CTC** for Analog reception indicates a tone signaling squelch
- The date line changes and shows sequentially date/last heard/current TG
- **DIG/ANA** CH-796 – shows the channel type and number of the channel.
- **T1** or **T2** time slot shown for the digital channel used as "A" and/or "B"
- **R** next to a digital channel = repeater with different RX and TX frequency. A red **R** indicates reversed RX and TX frequencies.

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4.0 DMR-6X2 RADIO FIRMWARE UPDATE

The DMR-6X2 radio is a recently developed DMR radio, and BTech may from time to time issue updates to enhance the operating system (firmware) and add features. The update software is part of the main program and can be accessed from the Tool icon at the top of the main page. (Firmware Upgrade)
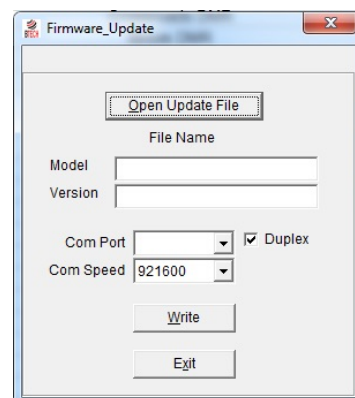
NOTE:
Before performing FW upgrades, always verify that the software version matches the firmware. This information is available at https://baofengtech.com/dmr-6x2

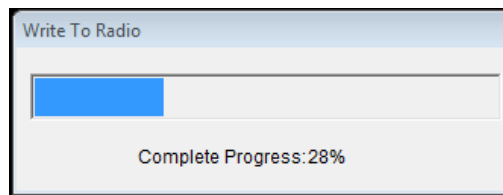Always save your Code Plug before performing any upgrade.

Caution: Do Not attempt to load DMR-6X2 firmware to a different model radio. Loading this firmware to a non-6X2 radio will Not add extra features to that radio and could cause negative effects.

Procedure:

- Select Tool / Firmware Upgrade from the top toolbar.
- Set the COM speed to 921600
- Place a checkmark in the Duplex box.
- Click on "Open Update File"
- Open "**DMR-6X2_xxxxx.spi**" (file downloaded from support site.)
- You will see "**File Open Success**".
- Connect the programming cable to the radio (powered Off) and to the computer USB port.
- Power ON the radio while pressing both the **top orange** and the PTT button.
- The red LED on the top of the radio will start blinking.
- Click "Write" and the firmware will load to the radio.
You will see the progress bar on your computer.
The radio will re-start after the firmware has been updated.

If the update requires a Radio System Reset before continuing – see the procedure below.

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4.1 DMR-6X2 RADIO TOTAL SYSTEM RESET

NOTE: Always save a copy of your current code plug!

If the DMR-6X2 radio becomes inoperative, a Total Reset may be required. This is <u>not recommended</u> if the radio operates properly. It is only used as a final solution for a major issue, or the firmware upgrade requires it.

<u>To reset the radio:</u>
- Power the radio ON while pressing the **PTT** and the **PF1 button** (below the PTT) at the same time.
- If asked to confirm a full reset is desired, reply **Confirm**.
- The radio will Restart displaying start up displaying **"MCU Reset, Please Wait"**
- <u>Do Not</u> turn OFF the radio while restarting.

After a re-start, the radio will display the setting for time zone, the date and the time.
- Use the up-down key to set the current time zone.
- Move to the year by pushing the **P1 key**.
- Set the year, and use the **P1 key** to move forward each step.
- When complete, click the Menu key to save the time zone, date and time.

You may now see the Chinese language. If it starts with Chinese:
- Click Menu
- Scroll down to the grey cogwheel (Settings)
- Select   1   (Radio Set)
- Select 11 (Language)
- Select   1   (English)

The codeplug has also been replaced as part of the system re-set. You will now need to re-load your saved codeplug into the radio. Remember to update your DMR ID number and the start-up display if you use a codeplug from the Internet.

4.2 DMR-6X2 RADIO ICON - Firmware Update

NOTE: This is a very rare update but may be require to be done!

- Download the special firmware files from the BTech website.
- Perform the update procedure described in Section 4.0 above.

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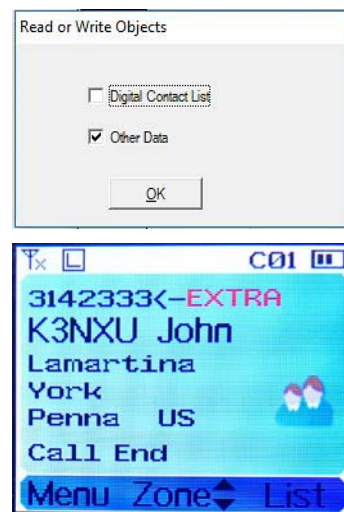
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5.0   CPS Programmer – Programming Software Helper for DMR-6X2

The DMR-6X2 has the ability to hold and display the information on up to 150K DMR stations. One source of the required database information can be obtained from http://www.amateurradio.digital/
By selecting either BTech DMR-6X2 or the D868UV, you will be able to download the entire DMR ID database formatted for direct entry to the radio.

To upload the formatted DMR DB:

- Select Tool / Import from the top menu.
- Select Digital Contact List
- Point the software to the downloaded database file.
- Select Import   This will load the DB to the software image.
Once loaded, you now need to send the DB to the radio.
- Select Program / Write to Radio

- When the Read/Write Objects box appears, Check the Digital Contact List box. This is a large database that will take a few minutes to load. A display sample is shown on the right.

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6.0   Special Functions found in DMR-6X2

Some of the extended features described include:
- Simplex Repeater (Digital Mode)
- Talk Group change (on-the-fly)
- Priority Channel Scanning

6.1   Digital Simplex Repeat

This feature allows the DMR-6X2 to function as a Store and Forward Simplex Repeater.

A Simplex repeater records a transmission and stores it in memory. Immediately after the incoming signal is dropped, the transmitter keys and retransmits the recorded audio on the same frequency.

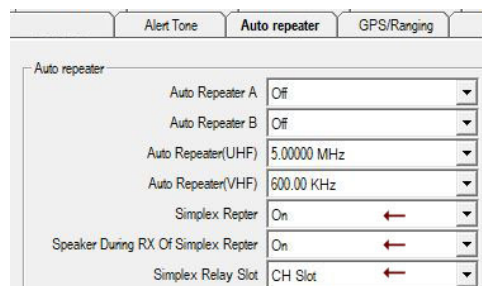The DMR 6X2 also has the capability Cross Band VHF/ UHF repeat.
The repeat combinations can be any of the following:
Simplex   VHF/ VHF   UHF/ UHF   VHF/UHF   UHF/ VHF

Setup Procedure
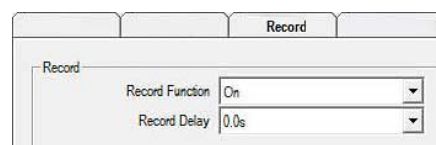Under Optional Settings / Auto Repeater
- Simplex Repeater > ON
- Simplex Relay Slot > CH Slot
- Spkr During RX of Repeater > ON or OFF
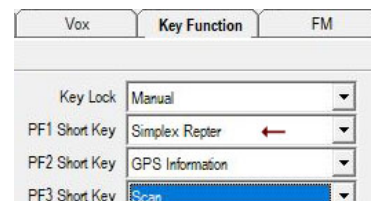Off will mute the radios speaker.

Under Optional Settings / Record
- Assign Record Function to ON

Under Optional Settings / Key Function
- Assign a Programmable Key to "Simplex Repeater".
Pressing the Key will turn the Repeat mode ON/OFF.

Program a channel as a Digital Simplex channel.
-    Frequency   TG = 99   CC = 1   TS = 1

- Do Not turn on Simplex TDMA
- Do Not turn on TDMA Adaptive

Operation
When Digital Simplex is turned on, a light blue icon will appear in the upper bar of the LCD.

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Cross Band repeat is also possible with two channels on alternate frequencies. The image at the right shows setup. If either the A (upper) or B (lower) receives a transmission, it will forward it to the opposing frequency when the transmission is complete.

6.2   On the Fly Talk Group Selection

If you want to switch to a talk group not currently in your code plug. This can be done quickly using the keypad. This is especially useful when using a hotspot.
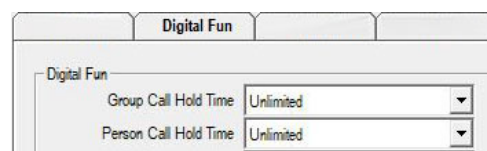
Setup Procedure
Under Optional Settings / Key Function
- Assign a Programmable Key to "Dial"

Under Optional Settings / Digital Func
- Set Group Call Hold Time > Unlimited
- Set Person Call Hold Time > Unlimited

Operation
- Select a channel that is already set to the proper Freq and Time Slot.
- Activate the 'Dial' function (Private ID will appear on the LCD)
- Press the '**#**' key (Group ID will now appear on the LCD)
- Enter the desired Talk Group using the number pad
- Press the PTT switch to activate

The radio will stay on that talk group until a different channel is selected. This is the desired mode for ham operation. There are other Hold Time options that will return the radio to its original channel after a short period of time.

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6.3   Ranging

One of the five programmable key options can assigned as the "Ranging" key. When pressed after receiving a call, the LCD will initially display 2 screens while making a short GPS transmission. After a few seconds it will then display the caller, direction and distance of the incoming caller if both radios are receiving GPS information.

The Optional / Settings tab:
- GPS = ON
- Get GPS Positioning = ON
- Ranging Intervals = 5
- Ranging Display = Feet
- GPS Template Info = ON

6.4   Priority Channel Scanning

When Creating a Scan List, there is an option to select two priority channels. These are channels that scan between each of the normal scan channels. This is useful when specifying a large number of scan channels.

Scan Channel 1
Priority 1
Scan Channel 2
Priority 1
Scan Channel 3
Priority 1