AT-D890UV Programming Guide

INDEX:

The word NXDN is trademarked by JVCKenwood and can not be used until approved by them. This Guide will use the NXDN name just for information until we get full approval to use the name NXDN.

AT-D890UV Programing Guide

INTRODUCTION

The AnyTone AT-D890UV radio released late 2025 is similar to the AT-D868UV and AT-D878UV radios but with more capabilities. This is an advanced one chip digital/analog radio complying with the ETSI Tier I and II specifications and offering 4 inherent power levels of 7W/ 5W/2.5W/0.2W on VHF and 6W/5W/2.5W/0.2W on UHF. The frequency bands include both 136-174 MHz, (220-225 MHz on Band 14 only with reduced power) and 400-520 MHz and can be changed for non-US use. The radio will also receive on 87.6-108 (FM) and 108-145 MHz (AM). If a channel is programmed for digital and analog reception type, the radio will auto-sense digital or analog transmissions and connect accordingly. It offers 4,000 channels as well as VFO tuning and for DMR/NXDN operation and offers 2 channels per frequency. The radio has 10,000 Talk Groups and 500,000 Digital Contacts.

The display is a 1.77 inch TFT color LCD display which allows ease of seeing the many operating modes including icons for a successful connection to a repeater as well as the caller ID and name etc. The LCD also shows signal strength of received signal. The bandwidth is 12.5k or 25k for analog, and 12.5k for digital DMR and 6.25k or 12.5k for NXDN operation. The radio offers text messaging, voice messaging, roaming function, 14 hours of analog and digital voice recording, digital encryption, and ranging between radios are now standard features. Firmware can be user updated. All typical CTCSS/DCS, and DTMF/2TONE/5TONE encode and decode features are also included with the radio. The digital part of the radio allows SMS texting functions via the keyboard and includes a vibrating radio for receipt of messages. You can even talk/listen to satellites with the radio.

This radio offers the following new items compared to a D878UV radio:
New and better Bluetooth device
New Main Control Unit (MCU) chip for dual-mode receiver
New digital protocol for NXDN in addition to DMR
Microphone Automatic Gain Control (AGC) setting
Noice reduction of received channel
Allows U/V digital/analog dual receive

One battery is delivered with the radio and will be a 3,100 mAh Li-ion battery. The radio battery charger included has a 3 pin connection for charging like the D878UV radio. The new battery also has a USB-C connector at the bottom of the battery for charging. When plugged in and charging there is a **red light** on the battery lighting up. **Green** when fully charged. This would allow a standard USB-C charger (used for phones) to be used for charging the battery.

AT-D890UV Programing Guide

With the enhanced capabilities of the radios, this Programming Guide will help users to understand all aspects of how to program and set up the radio for maximum usability. Please note that the AT-D890UV radio may have a locked key-board upon delivery. The FCC requires per 47CFR90.203 that an unauthorized user shall not be able to enter any frequencies and transmit on a frequency not authorized. Frequencies should only be programmed by service (amateurs) or maintenance personnel. This Guide is primarily provided for such service or maintenance personnel. To lock the keyboard - for commercial use tex. - long press the "*" (star key) or see Optional Settings – Key Functions. For a person to open up the keyboard, press the "Menu" key (green bar) and then the "*" (star) key. US radios are set to 144 – 148 MHz, (222 – 225 MHz for Mode 14 only) and 420 – 450 MHz ham band and the key lock is unlocked when delivered. In some cases, dealers request the radios to be shipped with the full band of 136 – 174 MHz and 400 – 480 MHz professional Mode with a locked keyboard. This Mode requires the radio to be set to amateur Mode in the CPS Optional Settings to be able to open the keyboard as per above. The radio also offers regular FM and also AM Air Band reception

The software, which programs the radio frequencies and all other user defined aspects of the operation, 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, that can be loaded into a radio, has been created. The AT-D890UV radio has unique software called Computer Programming Software (CPS) for both creating the codeplug and writing it into the radio for use. When you start creating a new codeplug, many lists and groups are populated with single entries, which may be used as placeholders for initial creation of lists. The programming software (also called CPS) allows "importing" and "exporting" most of the programming parameters for the creation of large amount of input data to the radio – for example large lists of contact names. A codeplug from any other model can be used if first exported from the older radio and then imported to the AT-D890UV radio. Please make sure that the radios have the same Band or Mode so the codeplug can be imported without an error message.

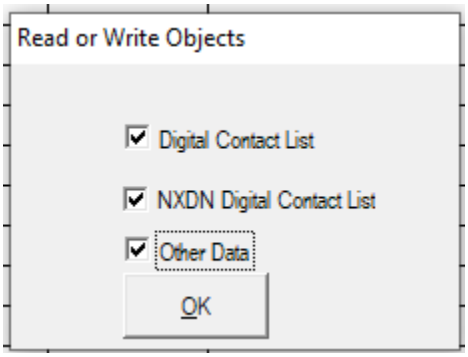
1.0 GETTING STARTED

The programming cable for the AT-D890UV radio is provided by AnyTone. Make sure the computer has the correct driver for the cable – see the Device Manager on your PC and make a note what USB port which the computer uses for the radio.

The **Computer Programming Software (CPS)** for the AT-D890UV radio may be updated from time to time to correspond to the firmware version used for the radio, and the AnyTone website https://www.anytone.net/download (plus many retailer websites) will offer those updates. Do not mix versions of the CPS with non-matching firmware versions.

NOTE: that installing the CPS for the first time may be different that installing most new programs. On the C drive (where you have the folder for the Program Files) make a new

folder and call it **D890UV.** Install the CPS Programming software D890UV_Setup_1.01X.exe on your computer in the newly created folder. Install it by double clicking on it – It should be installed in that folder and not in the Program Files. The shortcut could be anywhere you want to see it. After installation, read software from the radio first so you use the correct set-up. The AT-D890UV radio, used in Europe and other places in the world, compared to the USA, uses different frequency bands. The CPS asks the question if you want to read only the "other data" – which is all programming parameters of the radio - and/or the "Digital Contact List". The DMR contact list could contain up to 500,000 names, and as a result consume up to 5 minutes to read or write to the radio. Make sure you use the correct port the radio is attached to. You should read everything (3 checkmarks below) the first time.



If you are living in an area where you may be the first to have to generate the codeplug with all your local repeater frequencies, or there may be a codeplug for the AT-D890UV radio from another geographical area which has most of the basic data as a starting point. There are typically codeplugs available on the Internet for your location. If those codeplugs are for a different AnyTone radio they still serve as a good starting point. Load a codeplug for example from the AT-D878UV radio and export it in its totality or a AT-D578UV radio and then import it into the AT-D890UV radio CPS and it should work – please note that it requires Optional Settings to be updated in the C890UV. If NXDN programming is not shown in the CPS, connect the programming cable and read "Local Information" on the left in the CPS.

The recommended operation is as described below:
1) Use the AT-D890UV CPS to read the radio, and check the Model (Band) information to understand which frequency mode the radio is.
2) Use the AT-D890UV CPS to open an existing codeplug .rdt file from a D878UV or D578UV codeplug. Check the Mode information to understand which frequency band the codeplug is generated for.
3) If the codeplug has a matched frequency band with the radio's frequency band, then it will work. The user just has to examine the Optional Settings, as they are different, before loading the codeplug into AT-D890UV.
4) If the codeplug has a mismatched frequency Band (or Mode) with the radio's frequency Band, the user needs to change either the frequency Band in the radio or the frequency Band of the codeplug.

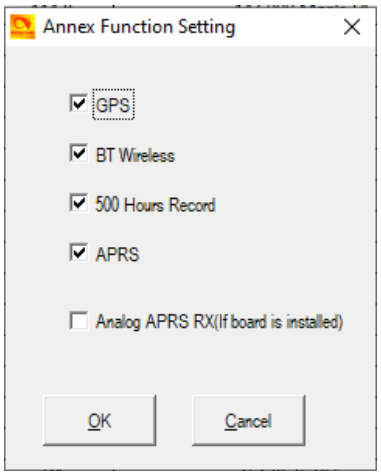
Option A: to change the radio's frequency band to be the same as the codeplug's band or Mode, it can be done by a special program released to dealers only (you must request their help if you want any changes to the band other than for amateur use). This program will open a different frequency band for the radio.

Read the radio first with the special program described above, select the new frequency band and write it into radio so it will change the band to something else than the amateur band. Then you can go back to step 1 to check the radio's frequency band, make sure it is the same as the codeplug's frequency band.

Option B: create a new codeplug using the correct frequency band.
Use the AT-D890UV CPS to open a codeplug, then use "export all" to export the files.
In the AT-D890UV CPS, "Set Initialization" (from the top menu), and then in "Model Information" (top menu), select a frequency band which matches that with the radio's frequency band – no password required. Then use "import all" to import the files.

2.0 TOOL – Options

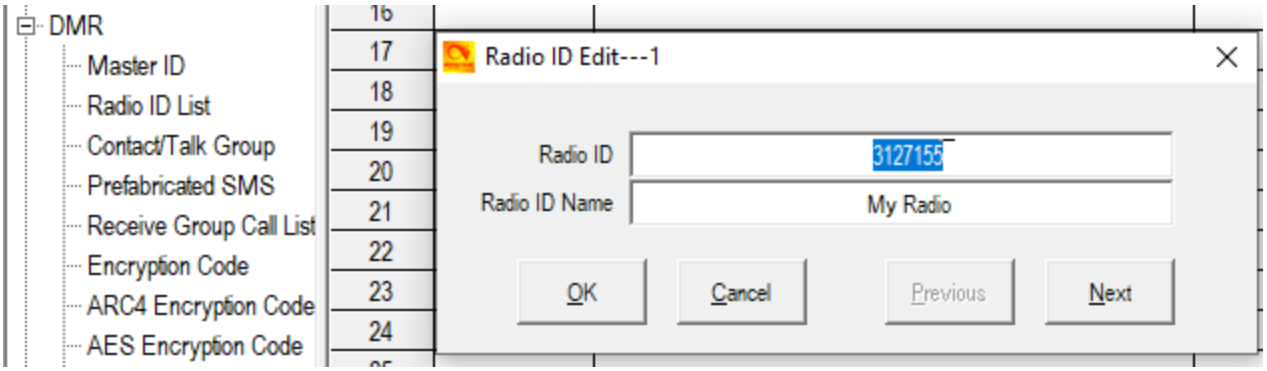
In the CPS under the TOOL menu is a set-up called **Options** and for the D890UV radio most of the options should be checked like below:



This will allow the CPS to display those options and allow you to program them. If they are not highlighted the Options will not be available in the CPS.

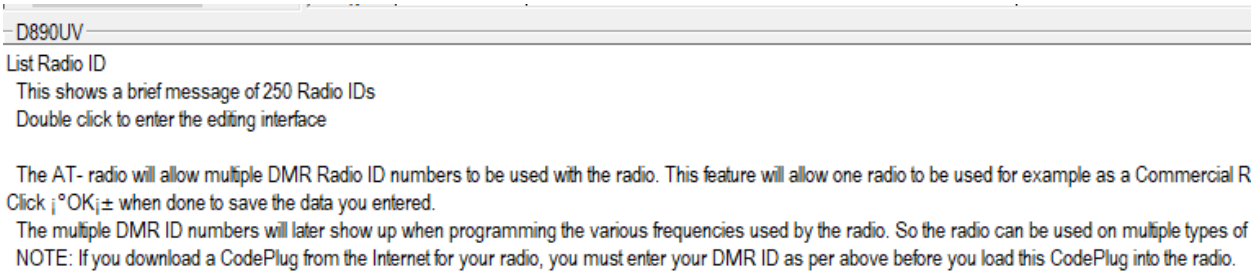
3.0 FIRST THING FIRST – RADIO DMR ID LIST

If you copy a codeplug or build your own the first thing to do is to set **<u>your</u> DMR number** in the radio. To do this you must expand the DIGITAL list on the very left side of your CPS.



You will there see “Radio ID List” which you should open. Double click on the first line and you get a second window like seen above. Fill in your DMR number and click on OK. The Manual goes into further details as you can have several DMR numbers in the radio.

Please note that each page that requires programming have a text field at the bottom of the page. This field can be made taller if so required to read all the text by moving the line separating the text and the upper window. An example of set-up for the radio DMR list is shown below:

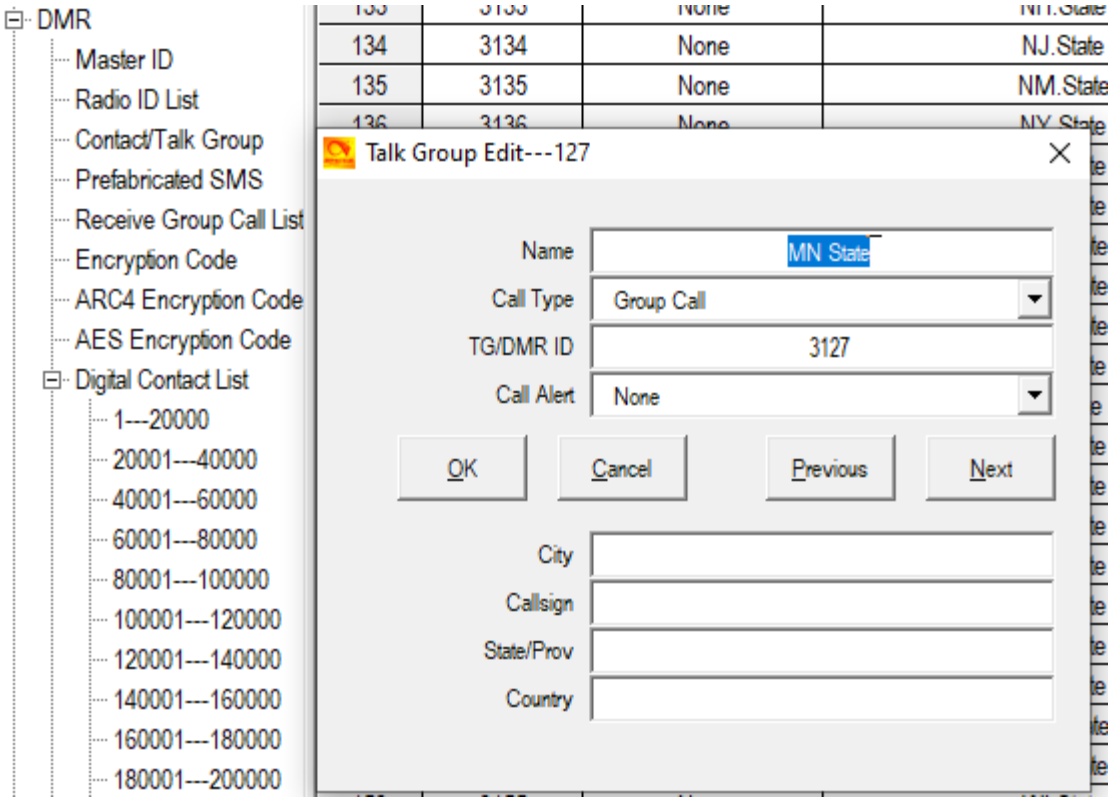


4.0 CONTACT/TALK GROUP (TG) LIST

The second thing is to fill the Contact Talk Group (TG) list you also find under the expanded DMR area to the left of the CPS Program. The AT-D890UV program looks like an excel spreadsheet once opened, and the left side defines the many aspects of programming. Open the **CONTACT/TALK GROUPS** tab on the left side and double click on the first line (Line No. 1). The DMR Contact/Talk Group List typically contains the DMR Talk Groups which the user may want to use.

Talk Groups can be found on the Internet. Start to program all applicable DMR Talk Groups (TG uses Group Call) you which to monitor or talk on. This list of Talk Groups may include up to 100+ different groups. A list of worldwide Talk Groups can be found at

https://w0chp.radio/brandmeister-talkgroups/



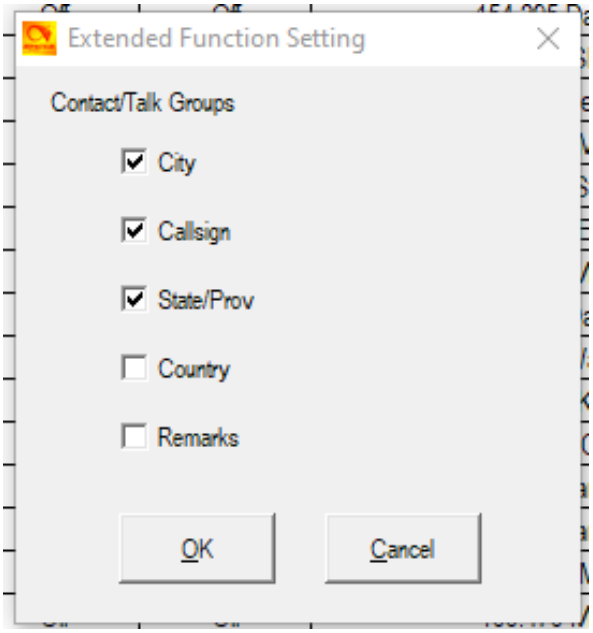
The Talk Group list can also be generated by exporting the original radio Digital Contacts Talk Groups (from an AT-D878UV for example) and then add in to that list in an excel format. In the Programming Software there is “import” and “exports” features in the taskbar – open the TOOL menu and do an “export” where you have the original Talk Groups. This opens up a new screen where you click on “Digital Contact”. A new screen shows up where you define where to save the list on your PC.

In the .csv format you can paste all or your required Talk Groups from the DMR-MARC website into the spread sheet. You get the format from the original radio codeplug you just exported.

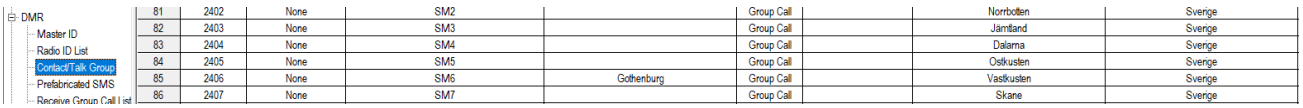
Once all TG’s are entered in the .csv file, the TG List should be “imported” back using the Programming Software for the AT-D890UV radio the same way you exported the file. Click on TOOL menu, and then “import” for TG‘s and in the new window click on Talk Groups and select the .csv file you want imported. Please note that the radio can have up to 10,000 Talk Groups.

5.0 EXTENDED FUNCTION SETTING (TOOL MENU)

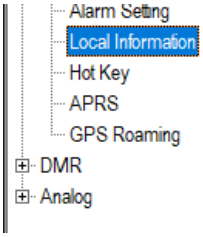
In the TOOL Menu there is a set-up (eXtended) for Contact/Talk Groups (TG) of what the radio should display on the LED display when transmitting on a digital channel. You may see the DMR Contact/TG expand as this function is added. It has 5 additional selections to make as follows and they show up in the Contact/Talk Groups in the CPS:



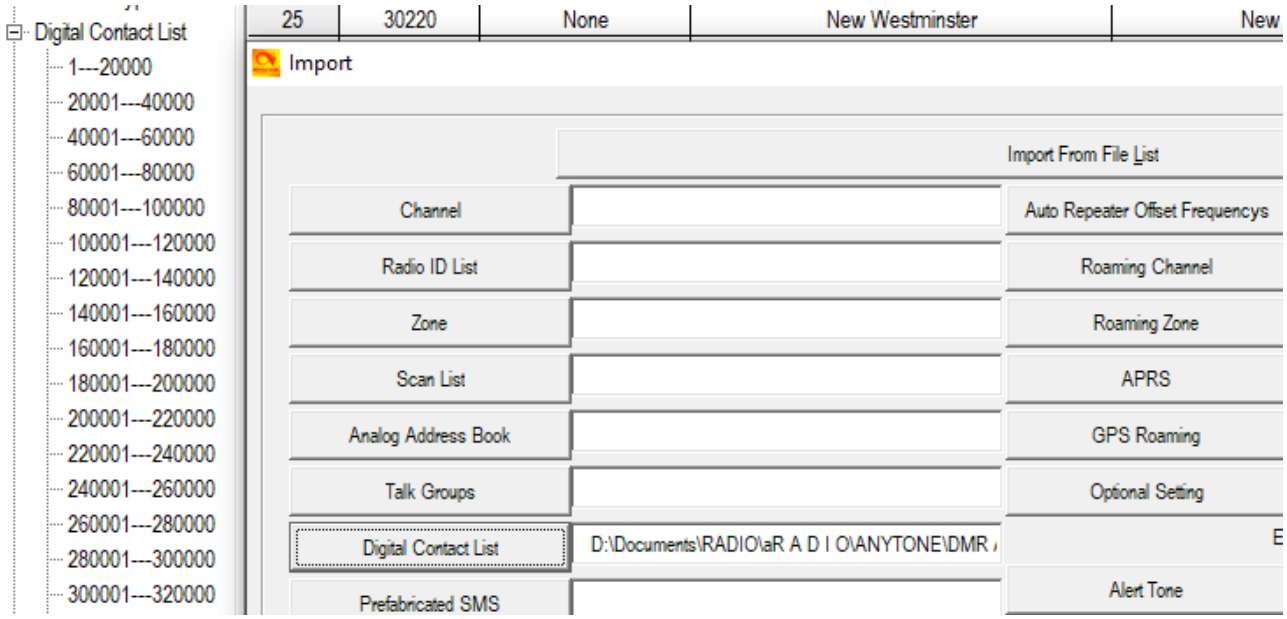
The of City, Callsign, State/Province and Country in the picture above can be left blank but are included to allow the radio LED display to show them upon transmitting a call from that TG. The items will add new columns in the TG set-up as they are clicked in the matrix above to appear. It could be used for example do further describe where the repeater is located that uses that specific TG.



NOTE: If the NXDN programming is not shown to the left in the CPS, you have to have the programming cable attached to the radio and click **Local Information** – See below.



6.0 DIGITAL CONTACT LIST (DMR)

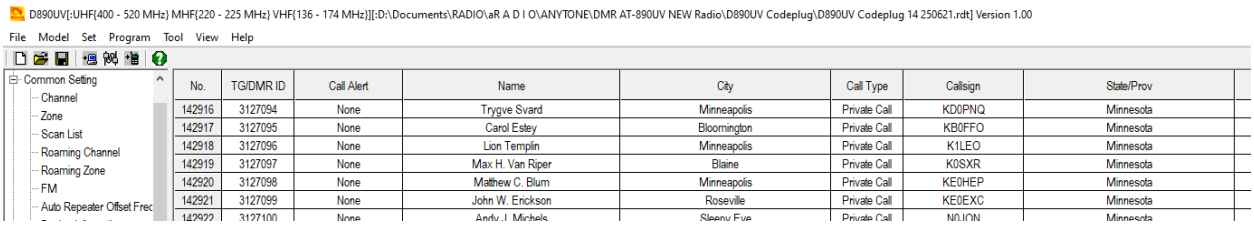


The next step is to fill the radio with all possible digital contacts you may ever encounter. By doing this, the radio will for each contact you make display the name, DMR ID, Call sign etc. of the individual you are connected with instead of just the DMR ID.

The Contact List is a “look-up” table for the radio to display all the details of the contacted person instead of only the DMR ID number. If you do not update the Contact List from time to time you may see the DMR number for new people instead of their name. A master list of DMR contacts is available at the new radioid.net website:

https://www.radioid.net/database/dumps

and select the **“user.csv”** file to download and import to the AT-D890UV radio. This database of contacts must be the.csv format to be used for DMR ID’s and imported into the AT-D890UV radio as required. The radio holds 500,000 names in the look-up table.



In the CPS Programming Software for the old radio, like a AT-D878UV, open the TOOL menu and do an “export”. This opens up a new screen where you click on “DMR ID List” and on the second screen select where you want to save it on your PC. This list is automatically divided

in sections to accommodate up to 500,000 ID's. If your list you work in the .csv format is more than 20,000 names per section, when loaded into the radio, they will split up and be distributed between the several lists in the radio.

So now that you have both the DMR database and the radio original database open, copy the list of DMR ID's you want from the DMR database into the radio .csv file. Then back to the TOOL menu on the AT-D890UV, and "**import**" so you can import the entire .csv DMR ID list into the radio. Note: You have to enter "Private Call" in all the CALL TYPE columns of the radio .csv database before loading it into the radio. The No. column can be left blank.

Note: Any .csv file being loaded back into the AT-D890UV radio must be in the correct format and have no stray information in any cell outside the ones being used by the radio. If the "import" seems to not work – check the .csv for any inconsistency. The Contact database, downloaded is not necessarily correct for each entry and have been found in some cases needing cleanup to work with the radio. Therefore, it may be important to "export" the original list when the radio was new to see the format of the .csv file.

7.0 CHANNEL – FREQUENCY SET-UP

The AT-D890UV radio offers programming of 4,000 channels for UHF and VHF. The channels can be either analog or digital (DMR or NXDN). To start, double click on the first line No.1 to open the Channel Information programming window for that channel as seen on page 13 below.

If you plan to import the channel list from a different radio like a AT-D878UV you need to make sure it is from a radio with the same frequency band. See above description for details of importing date to the new radio AT-D890UV. The NXDN part of each channel will automatically be entered the first time it is used.

You may want to set up the Default Channel Information under TOOL menu to make it easier to program each channel if you start from scratch. You will then get a good start for each channel you want to program.

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.:	Program the frequency in the VHF or UHF band
Transmit Freq.:	Program the frequency in the VHF or UHF band
Correct Frequency:	Program any offset of the TX/RX frequency in Hz for a hot-spot
Channel Type:	Select Analog, Digital, Mixed Analog or Mixed Digital
Transmit Power:	Select one of four levels and to 5W/2.5W/1W/0.2W for VHF, 4.5W/2.2W/0.5W/0.2W for UHF
Band Width:	(not selectable for DMR) 6.25kHz, 12.5 kHz or 25 kHz

TX Permit: Selects PTT transmit criteria of 4 – typically Same Color Code (CC)
Scan List: Select which Scan List to start scanning from (create list first)
APRS Report Type: Select Off, Analog or Digital. (only visible if APRS selected under TOOL)
Analog APRS PTT: Select Off, Start or End of transmission
Digital APRS PTT: Select Off or On
Digital APRS Ch.: Select 1 through 8 (programmed separately)
Excl Ch from roam.: Select On or Off
DMR Mode: Select Repeater for normal mode or simplex, double slot or split. (Simplex and double slot with same time slot between radios but without repeater. Split with repeater and with different time slots between TX and RX)
Analog APRS Freq.: Select 1 through 8
DMR CRC Ignore: Select Off or On
PTT Prohibit: Check if the frequency is a listening channel only
Talk Around (Simpl): Check for RX freq. the same as the TX freq. (Simplex).
When the TX radio and RX radio both are set up with Talk Around on, they can communicate directly without a repeater. The analog channel will use the RX frequency as TX/RX frequency, the RX CTCSS/DCS decode as TX CTCSS/DCS encode.
APRS RX: Receiving APRX on this channel
Idle TX: Transmitting is on idle
Work Alone: Check if the “alone” emergency function should be allowed
Data ACK Disabled: Check to ignore the repeater data service request for a confirmation.
Auto Scan: Sets up automatic scan of that channel
Ana APRS Mute: Check this if APSR signals should be muted from the speaker
Send Talker Alias: Check mark this as it allows your license to be sent with every digital call

7.1 Digital DMR

Please note that you have to set (on page 25 below) if you want DMR or NXDN digital protocols.

Contact/TG: Select the Talk Group you want for this frequency **(very important!)** When you click on this you should see all the TG you have under DMR Contact/Talk Group you programmed under section 4.0 above.
Radio ID: Select which of the DMR ID’s to use for this channel (My Radio)
RX Color Code: Select which Color Code (CC) to use for the channel used.
TX Color Code: Select which Color Code (CC) to use for the channel used.
Slot: Select which slot (1 or 2) applies to this “Channel”
Receive Group List: If programmed select which Talk Groups you want to listen to, or select NONE to listen to only the programmed Talk Group for the transmission (TX and RX TG the same)
Digital Encryption: Select Off or which of 32 numbers to use for encryption (not allowed)
Extend Encryption: Select AES or ARC4
ARC4 Encryption: Select Off

AES Encryption:	Select Off
Multiple Key:	Select Off
Random Key:	Select Off
SMS Forbid:	Select ON or OFF
TX Interrupt:	Check if Off transmit on this frequency / TG
Send Talker Aias:	Check if you want talker alias on this channel
Through Mode:	Check if TX and RX use different frequencies w/o repeater
Call Confirmation:	Check if the receiver has to transmit before accepting private calls.
Ranging:	Check if you want to allow 2 radios to check distance between them.
Slot Suit:	Check if the radio shall ignore the slot setting on this channel
SMS Confirmation:	Check if the radio shall request an SMS confirmation from the RX radio on a private call

7.2 Digital NXDN

This feature allows for Next Generation Digital Narrowband (NXDN) using FSK modulation and uses Frequency-Division Multiple Access (FDMA) technology. Typically, 2 separate voice signals (analog and/or digital) can be used (6.25 kHz) on a 12.5 kHz channel. See page 8 for NXDN programming and page 27 below for additional NXDN setup.

Contact:	Select Talk Groups as set up separately under NXDN Contacts below
Band Width:	Select 6.25 kHz or 12.5 kHz (amateur must select 6.25 kHz)
Optional Signaling:	Select NXDN ID or Off (get your NXDN ID at **www.radioid.net** after logging in go to top right corner and click on the license no. there)
Squelch Mode:	Select RAN or RAN & NXDN ID
TX Busy:	Select Off, Carrier, Error RAN, Correct RAN or Any Ran
PTT ID:	Select On or Off
RAN Encode:	Select 1 and 1 to 63 (Random Access Number similar to CTCSS)
RAN Decode:	Select 1 and 1 to 63 (leaving RAN = 1 will listen to all traffic) (please do not use a “0” if that is allowed or the radio will be silent)
NDXN Encryption:	Select Off
Receive Group Li.:	Select Off
Send Status Info:	Select Off

7.3 Analog

CTCSS/DCS Decode: Select Off or CTCSS or DCS and tone frequency (receiver)
CTCSS/DCS Encode: Select Off or CTCSS or DCS and tone frequency (transmitter)

Squelch Mode:	Select how to use the squelch where “Carrier” is the most common
Optional Signal:	Select Off, DTFM, 2Tone or 5Tone
DTFM ID:	If DTFM ID was selected: Step 1: Analog->DTMF, input the DMTF self ID and DTMF encode. Step 2：Channel->Analog->Optional setting, set to DTMF

Step 3: Channel->Analog->Squelch mode, set to Optional Signal

Step 4: Channel->Analog->DTMF ID, select the DTMF code
Step 5: Optional Setting->Key function, assign a key to Call.
Step 6: Press the Call key to send the selected DTMF ID.

2Tone ID: If 2 Tone ID was selected:
Step 1: Analog->2Tone, complete the settings in Encode page.
Step 2：Channel->Analog->Optional setting, set to 2Tone
Step 3: Channel->Analog->Squelch mode, set to Optional Signal
Step 4: Channel->Analog->2Tone ID, select the 2Tone code
Step 5: Optional Setting->Key function, assign a key to Call.
Step 6: Press the Call key to send the selected 2Tone.

5Tone ID: If 5 Tone ID was selected:
Step 1: Analog->5Tone, input the 5Tone self ID and complete the settings in Encode page.
Step 2：Channel->Analog->Optional setting, set to 5Tone
Step 3: Channel->Analog->Squelch mode, set to Optional Signal
Step 4: Channel->Analog->5Tone ID, select the 5Tone code
Step 5: Optional Setting->Key function, assign a key to Call.
Step 6: Press the Call key to send the selected 5Tone.

PTT ID: Select off, at start, at end or both. To get the PTT ID working, the optional signal shall be set to DTMF or 5Tone, and the EOT/BOT in the DTMF & 5Tone page shall be set up first.
OFF: Select OFF
Start: Select Start, press PTT key to send a series of DTMF codes or 5Tone code.
End: Select End, release PTT key to send a series of DTMF code or 5Tone code.
Start & End: Select Start and End, press and release PTT key to send a series of DTMF code or 5Tone code.

Scramble Set: Select Off or a frequency to offer a more confidential communication while other radios will hear only a noise.

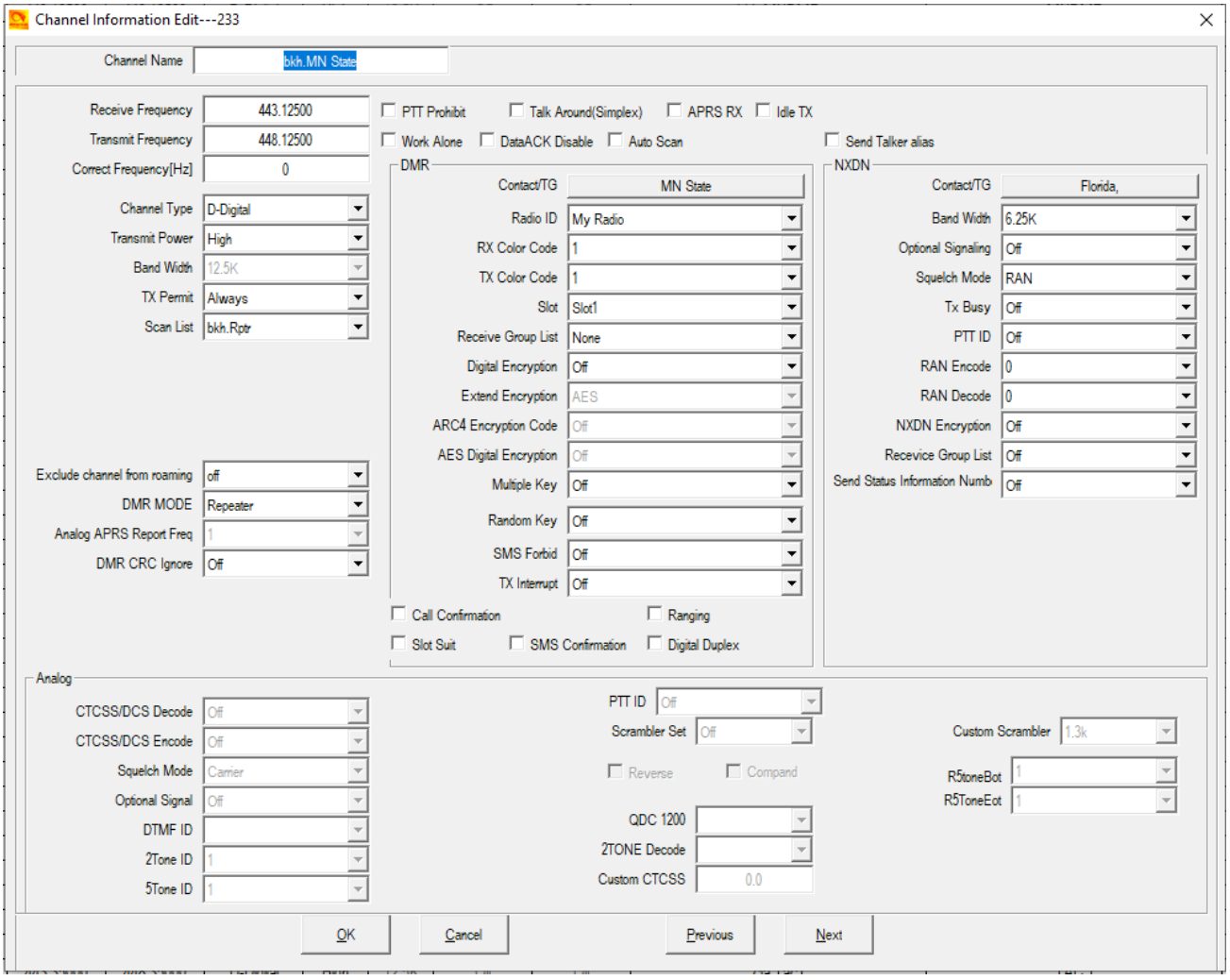
Custom Scramble: Select if you want to add a custom scrambler frequency.

Reverse: Check if you want Reverse TX and RX frequencies on the channel.

Compander: Enable this function to reduce background noise and enhance audio clarity, especially in long range communication.

QDC1200: If the QDC1200 code was selected:
Step 1: Analog->QDC1200, complete the settings in Encode page.
Step 2：Channel->Analog->Optional setting, set to QDC1200
Step 3: Channel->Analog->Squelch mode, set to Optional Signal
Step 4: Channel->Analog->QDC1200, select the QDC1200 code
Step 5: Optional Setting->Key function, assign a key to Call.
Step 6: Press the Call 1 key to send the selected QDC1200.

2 Tone Decode: Write how to decode
Custom CTCSS: Enter value when requiring a custom CTCSS tone
R5 Tone Bot: Select if a R5 tone is to be sent at PTT
R5 Tone Eot: Select if the R5 tone is to be sent at the release of the PTT

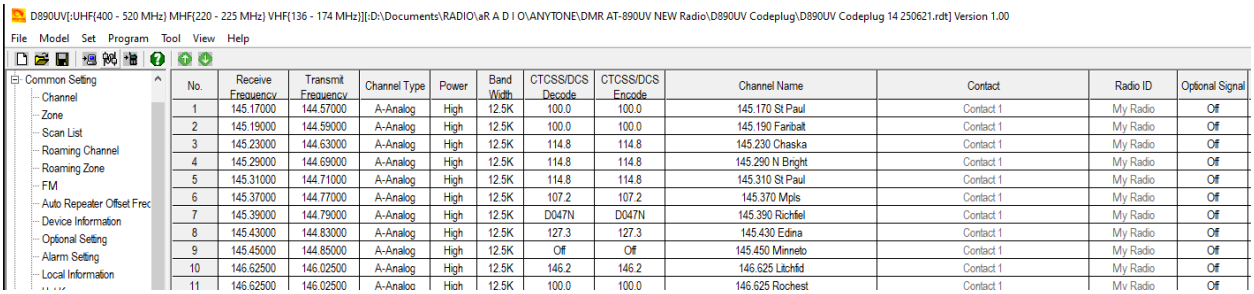


Once completely filled in, click OK to save this Channel. There is also an option to first “export” the channel data into a .csv file, from the original AT-D890UV CPS, where the radio was read to get all the data in the correct format, and then work the entry of most data in the excel format. Then save it and “import” back into the codeplug of the radio. For large channel data entries, this may be the easiest method where copy and paste function will allow easier generation of a lot of channels.

The channel set-up can also be created by first exporting the channel set-up from for example an AT-D878 radio, and then as a .csv excel file edit, copy and paste as many channels and frequencies you need. As each repeater being programmed may have the same Talk Groups,

working all of this in a excel format and then importing it all back into the radio is the most efficient method of building a large channel database for the AT-D890UV radio.

The completed Channel data should look something like below:



No.	Receive Frequency	Transmit Frequency	Channel Type	Power	Band Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID	Optional Signal
1	145.17000	144.57000	A-Analog	High	12.5K	100.0	100.0	145.170 St Paul	Contact 1	My Radio	Off
2	145.19000	144.59000	A-Analog	High	12.5K	100.0	100.0	145.190 Faribalt	Contact 1	My Radio	Off
3	145.23000	144.63000	A-Analog	High	12.5K	114.8	114.8	145.230 Chaska	Contact 1	My Radio	Off
4	145.29000	144.69000	A-Analog	High	12.5K	114.8	114.8	145.290 N Bright	Contact 1	My Radio	Off
5	145.31000	144.71000	A-Analog	High	12.5K	114.8	114.8	145.310 St Paul	Contact 1	My Radio	Off
6	145.37000	144.77000	A-Analog	High	12.5K	107.2	107.2	145.370 Mpls	Contact 1	My Radio	Off
7	145.39000	144.79000	A-Analog	High	12.5K	D047N	D047N	145.390 Richfiel	Contact 1	My Radio	Off
8	145.43000	144.83000	A-Analog	High	12.5K	127.3	127.3	145.430 Edina	Contact 1	My Radio	Off
9	145.45000	144.85000	A-Analog	High	12.5K	Off	Off	145.450 Minneto	Contact 1	My Radio	Off
10	146.62500	146.02500	A-Analog	High	12.5K	146.2	146.2	146.625 Litchfd	Contact 1	My Radio	Off
11	146.62500	146.02500	A-Analog	High	12.5K	100.0	100.0	146.625 Rochest	Contact 1	My Radio	Off

8.0 ZONE LIST CREATION

NOTE: You have to use the AT-D890UV radio with the up/down key (big round center key) arrow button to go between zones.

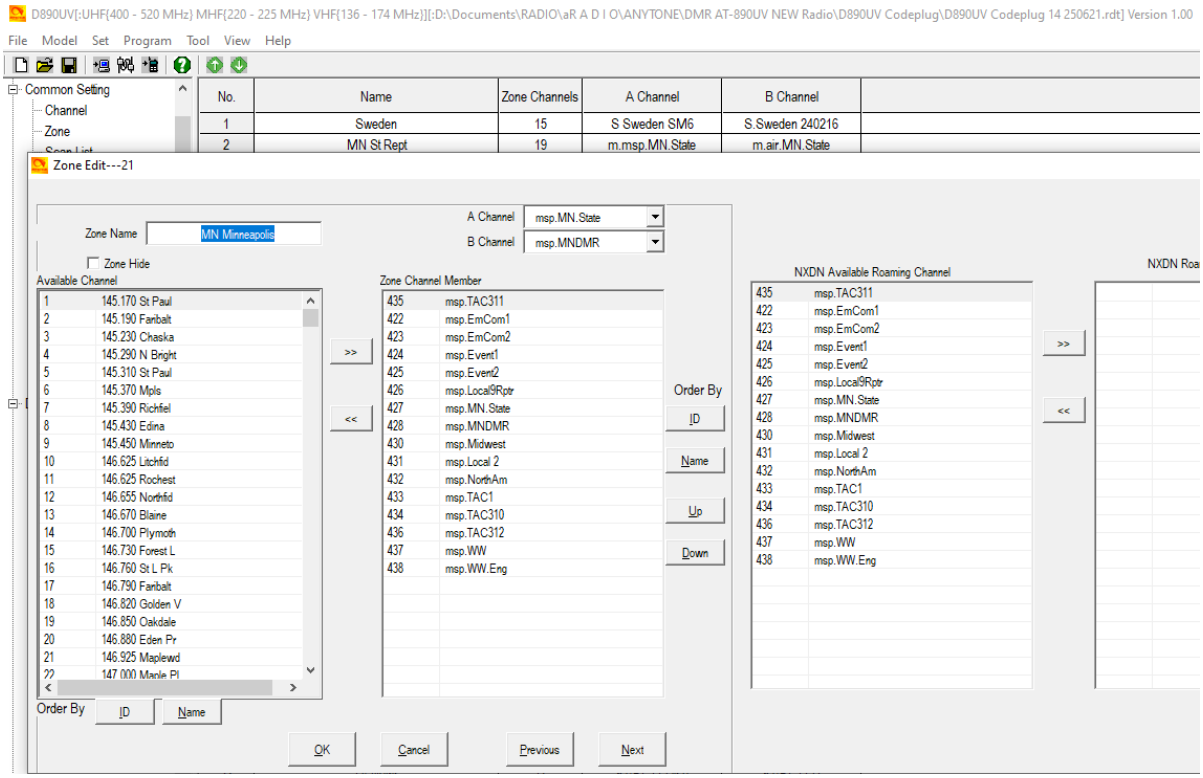
Create a ‘Zone’ name (that relates to the name of the scan list) and insert it for the time being to create a group of channels for example all tied to one repeater. Creating a ‘Zone’ allows you to put your configured ‘channels’ into logical groups. You can use the same ‘name’ for these (as your Scan List names) to help you keep things straight in your mind, however they are in two different sections, so there is no conflict. You will need to create a zone in order to select the group of channels you will be adding. Naming choice is up to you, and the ‘Zones’ do not have a limit of 16 channels on this radio. You can name each zone by the geographical location or any other name you wish. Add your channels in the order you wish them to be accessed by the channel select knob or menu selection. Please note that you are able to sort the order of the channels or move one up or down to better reflect where you want it when turning the channel knob. You may wish to use a name for your zones that relates to its ‘Scan Lists’.

In the Zone menu, double-click on Line No.1 to open the Zone Edit window.
The **green up** and **green down** arrow in the picture below allow re-sorting the Zone list names to achieve a different order. This may help to put them in alphabetical order.

The below sample for MN State allows scanning the same channel but from several different repeaters so that when driving around the city there is always an available connection. Other set-ups for scanning use one repeater and scans all programmed Talk Groups on that repeater.

To create a Zone name you use the repeater name or “UHF Analog”. Then you see all your Channels on the left side of the open window. You have to move with the >> the Channels

you want over to the right side. The A and B Channel visible on top at the right is the opening Channel for that Zone. Please note that you may hide the Zone by clicking the “Hide Zone”.



9.0 SCAN LIST

This set-up is very similar to how the CPS works. You double click on the top channel and see a new window. You name it as you find appropriate. You then drop the channels you want in this scan list by using the >> double arrows to the right to build a list on the right side of the display of the channels you want in the scan list. It is very similar of how you create zone lists. See the page in the radio manual for further descriptions.

Please note that you have selections at the bottom of the page to set up. The Revert Channels has a bit of further explanation here.
When the radio finds a signal during scanning, press Menu key on radio to stay at the channel with the signal permanently. Please note the channel might be from a different zone.
Priority Channel Select: During scanning, press PTT to transmit at the Priority Channel.
Priority Ch. 1: Select which channel you want as the priority channel.
Priority Ch. 2: Select which channel you want as the priority channel.
Revert Ch. : Select what channel you want as the TX channel
Look Back Time A: Select the time you want to stay between 0.5 and 5.0 seconds.
Look Back Time B: Select the time you want to stay between 0.5 and 5.0 seconds.
Dropout Delay Time: Select the time you need for continuing scanning; 0.1 to 5.0 sec.
Dwell Time: Select the time you want to remain on the channel; 0.3 to 5.0 sec.

10.0 AM Air Band

Here you can program frequencies in the air band 108 to 137 MHz. Double click on the first line and enter the frequency and station name and so on. A Zone for the AM Air Band is available and has to be set up for the ability to listen and scan the various airports. Please note that to start a scan first move the scannable channels into “Zone Scan Channel Member” in the CPS under AM Zone. Then start scanning from the radio Menu, where a new menu just for the scanning appears if you are looking at the AM channel.

11.0 FM Band

Here you can program FM stations you may want to listen to between 88 to 108 MHz. As part of programming a frequency you also can add what name the station has. To listen to FM or AM channels on the radio you must go to Menu and Settings and Radio Set and then Other Func finally to AM Air/FM to select where and what you want to listen to.

12.0 OPTIONAL SETTING

The AT-D890UV radio basic configuration set-up is done in the Optional Setting window in the CPS. 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 below window shows all the 18 sub menus available in the Optional Settings. This guide tries to help in programming each of the 18 menus. Recommended settings are from the creator of this programming guide and underlined to help first time users. Please note that on the radio some Exit functions require P2 to be used instead.

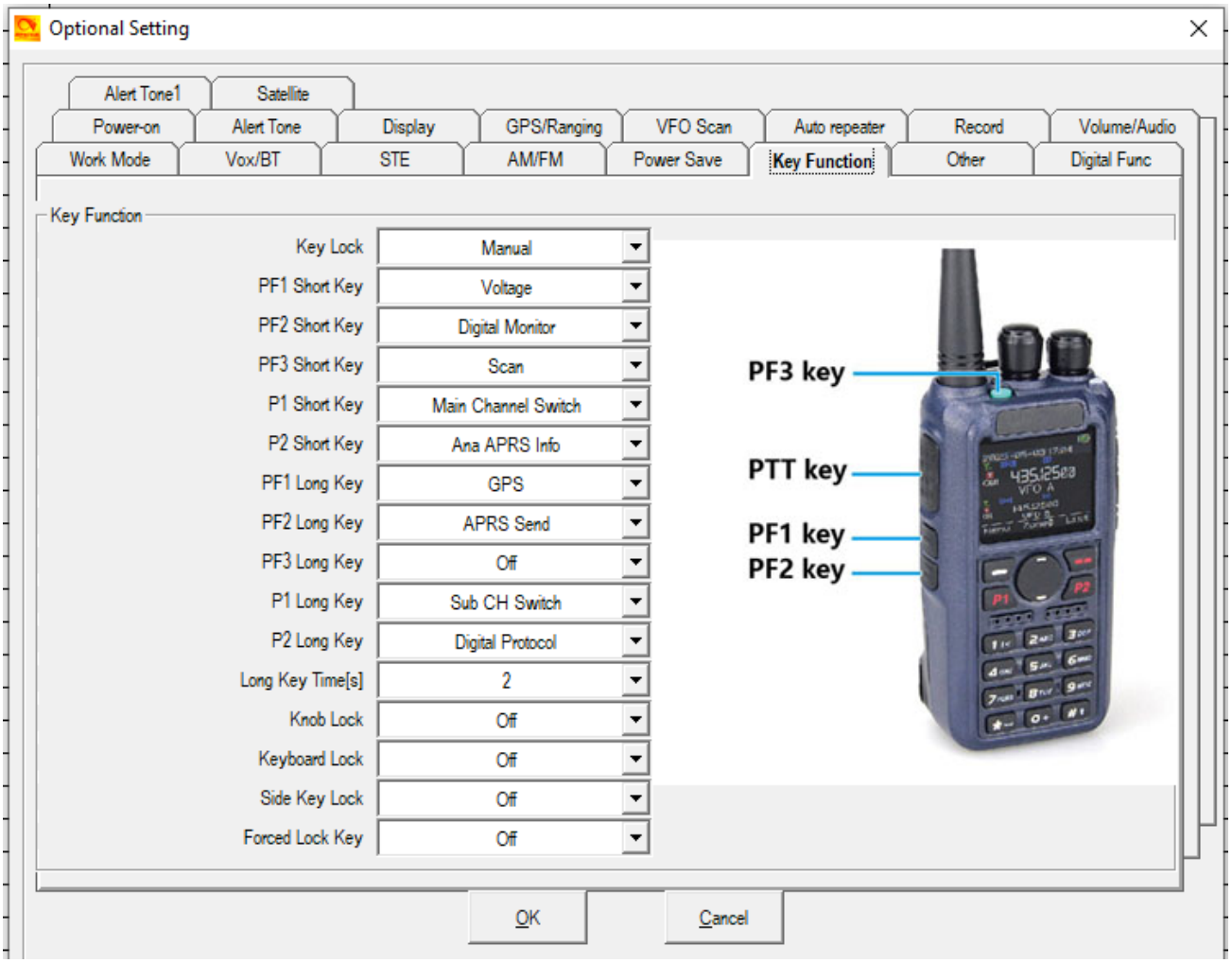
12.1 Alert Tone1

2 tones programmable at up to five tones each. Leave as they are as they don’t need change.

12.2 Power On

Power-on Interface:	Select Default, Custom Char. or Custom Picture at start-up
Power-on Display Char.:	Enter your unique characters for the start-up display (your callsign and name for example)
Power-on Password:	Select On or Off
Power-on Password Ch.:	Write in keyboard characters to unlock the radio
Default Startup Chan.:	Select Off or On
Startup Zone A:	Select which Zone A you want the radio to power on with
Startup Channel A:	Select which Channel in the above Zone you want
Startup Zone B:	Select which Zone B you want the radio to power on with
Startup Channel B:	Select which Channel in the above Zone you want.
Starup GPS Test:	Select Off or On

Startup Reset: Select Off or On should be “on” to allow PTT + PF1 to reset the radio after installing new firmware.



12.3 Alert Tone

Please note that the radio may consume up to 38 mS before it sounds the beginning of a tone. Therefore, make the first choice longer than 38 mS.

SMS Alert: Select which notification you want when receiving an SMS
Call Alert: Select which notification you want when getting a digital call
Dig Call Reset Tone: Select Off or On, 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.
Talk Permit: Select Off, Digital, Analog or both Digital and Analog
Key Tone: Select Off or On if you want a tone for pressing a key

Dig. Idle Channel Tone:	Select Off or one of 3 if you want a tone when a channel is idle (Type 1 selected)
Startup Sound:	Select Off or On if you want a tone when powering on
Tone/Key Sound Adjust:	Select Adjustable (volume knob) or a level from 1 – 15 Ana.
Ana. Idle Channel Tone:	Select Off or On if you want a tone when a channel is idle.
Plug-in Recording tone:	Select On or Off

Call Permit Tone

Call Tone:	Select frequency and duration of this tone if you want one in front of a transmission. You can set if you want the tone above. You can hit the "play" to hear your programming of the tone in the radio.

Idle Channel Tone

Idle Channel Tone:	Select frequency and duration of this tone when a channel is idle

Call Reset Tone

Call Reset Tone:	Select frequency and duration or tones.

12.4 Display

Please note that red color does not show so well in a black background so other colors have been selected as shown below.

Brightness:	Sets the display brightness – 5 is the brightest available
Auto Backlight Duration:	Sets the time the display is on or "Always" for always on
Backlight Delay Of TX:	Select Off or one of 30 times up to 60 seconds.
Menu Exit Time:	Set the time the Menu selection is left on - minimum 5 sec (40)
Time Display:	Select Off or On to show current time at top of LCD screen
Last Caller:	Select Off or what to display on the screen (Show Both)
Call Display Mode:	Select Name or Call Sign Based as primary display
Call Sign Display Color:	Select the color for how to display the call sign shows (**green**)
Display Channel No:	Select how the channel should be displayed (actual Channel)
Display Current Ch.:	Select On or Off
Standby Char Color:	Select the color for this display of characters (**green**)
Standby BK Picture:	Select Default or one of 2 you must load (Default)
Show Last Call Launch:	Select Off or On to show last heard name
Separate Display:	Select On or Off if the display shows 1 or both channels
Ch Switching Last Caller:	Select Off or On to show last caller name and keep last caller

A Ch Name Color:	Select a color (white)
RX Backlight Delay:	Select Always or 1 – 30
B Ch Name Color:	Select a color (white)
Zone Name A:	Select a color (yellow)
Zone Name B:	Select a color (yellow)
Display Ch Type:	Select On or Off
Display Time Slot:	Select On or Off
Display CC:	Select On or Off
Date Format:	Select how the date should be shown (dd/mm/yyyy)
Volume Bar:	Select On or Off

Note: The AT-D890UV if programmed for display of 1 channel the switching will show the second channel. Also note that the channel the transmitter works on if both channels are shown has a larger line under the line so that the word ANA or DIG is bigger than the channel used for listening only.

12.5 GPS/Ranging (set the Options from Section 2.0 above first)

GPS:	Select Off or On
Get GPS Positioning:	Select Off or On
Time Zone:	Set the GMT time zone for the radio (important for satellite reception and CST is -6 or summertime -5)
Ranging Intervals:	Select 5 to 255
Distance Units:	Select Metric or Inch System
GPS Template Info.:	Select Off or On
GPS Mode:	Select GPS (for USA) or any of the other modes offered
GPS Roaming:	Selected as Off (the radio will change Zone to agree with CPS)

Setting up the GPS and the APRS can be done by watching the information available on the interned for example a site made for a UK Anytone radio but changing the frequencies for US use would be a requirement.
https://do1alx.de/2021/getting-analog-aprs-to-work-on-an-anytone-at-878uv-and-at-878uvii/

12.6 VFO Scan

VFO Scan Type:	Select **TO** – 5 sec start after voice completes, **CO** – 2 sec start after voice completes or **SE** stops scan altogether (VFO scan only)
VFO Scan Start UHF:	Set start frequency for a UHF Analog scan
VFO Scan End UHF:	Set stop frequency for a UHF Analog scan
VFO Scan Start VHF:	Set start frequency for a VHF Analog scan
VFO Scan End VHF:	Set stop frequency for a VHF Analog scan

12.7 Auto Repeater

Auto Repeater A:	Select Off, Positive or Negative offset frequency for TX only
Auto Repeater B:	Select Off, Positive or Negative offset frequency for TX only
Auto Repeater1(UHF):	Select Off (program offset in CPS under Common Setting)
Auto Repeater1(VHF):	Select Off (program offset in CPS under Common Setting)
Auto Repeater2(UHF):	Select Off (program offset in CPS under Common Setting)
Auto Repeater2(VHF):	Select Off (program offset in CPS under Common Setting)
Repeater Check:	Select On or Off
Repeater Check Interval:	Select 5 to 50 seconds
Repeater Check Recon.:	Select 1, 2 or 3 times
Rep. Out of Range. Not.:	Select Off, Bell or Voice
Rep. Out of Range Times:	Select 1 to 10 times
Auto Roaming:	Select On or Off
Auto Roam Start Cond.:	Select Fixed Time or Out of Range
Auto Roam at Fixed Time:	Select 1 to 256 minutes
Roaming Effect Wait T.:	Select None up to 30 seconds
Roaming Zone:	Select Zone wanted
Frequencies:	Max and Min frequency based on the Band selected for the repeater under UHF or VHF and repeater A or B.

The D890UV can be used as a cross-band repeater. The radio allows Analog, DMR or NXDN cross band (U to V) repeater or Analog, DMR or NXDN cross band (V to U) repeater. As an example, the A channel is for TX and the B channel for RX or vice versa.

Repeater Mode:	Select On or Off for repeater use (this setting is the basic on/off and is best turned on/off in the radio Menu instead than here)
Rep. CC Limit:	Select Off or Match Channel A or Channel B Color Code
Rep. Slot Path A:	Select Off or Channel A Fixed Time Slot 1 or Slot 2 (see below)
Rep. Slot Path B:	Select Off or Channel B Fixed Time Slot 1 or Slot 2

Turning on the cross-band repeater function will allow the radio to work as a small local repeater. The radio will TX on one channel, RX on the other channel.

Note: Cross-band Analog to NXDN or NXDN to Analog: Must be UHF-VHF, or VHF-UHF cross bands.
Cross-band Analog to DMR or DMR to Analog: Must be UHF-VHF, or VHF-UHF cross bands.
Cross-band Analog to Analog: Must be UHF-VHF, or VHF-UHF cross bands.
When the radio is active as a repeater it is in a locked mode. You have to wait until a call is completed to turn the radio off or stop the repeater mode. An example of how to set up the radio for a single digital frequency is shown below:

*** Please Turn Off Digital Monitor when using the Cross-band repeat function. And the radio has to have both the primary and the sub channel on. Turn on the repeater function in the Menu – Settings – Radio Set - DMR/NXDN Func – Repeater.*

Cross band Repeater Setup

a. To set the channels or frequencies you will want to use with cross band operation, the radio must be set to display both the Main Channel (VFO A) and the Sub-Channel (VFO B).
b. Set the analog channel with simplex or repeater frequency, and set the digital channel with simplex frequency only.
c. Turning the Repeater function ON in the Radio Settings menu (Settings, Radio Set, DMR/NXDN Function, Repeater and select On – it will tell you if the set-up is accepted).

12.8 Record

Record Function:

Select Off or On to record each TX and RX internally from both analog and digital voices sent or received. You could set up PF1 and PF2 to be the start and stop of recording by using Record Switch (enable/disable) and Record (start/stop) not to have to use the radio menu each time. You have the option in the radio to record up to 14 hours of voice and that is every call with the AT-D890UV radio if you have “Record” in the radio menu set to ON. You can listen to all those recordings on the radio, which are the best method, by using the radio menu. Use the round Zone switch on the radio to go forward or backwards when you listen.

You can also listen to the recording on your computer by using the TOOL menu and using the Radio Recording feature which is offered there. Make sure the correct COM port has been selected first. Please note that the CPS must be directly on the C drive and not in Program Files – see the NOTE on page 3 above. “**Get File List**” and follow the bottom clickable questions. If you have long recordings, it may take some time to access them. Note: You may have to increase the computer volume to hear the recording at normal level. Exporting the files may consume up to several minutes and you could open the “temp” folder in the same folder you installed the CPS to find the recordings. A klick on the “close X” of the window will return the radio to normal operation again.

When the radio turns on cross band repeater, the recording function is not working.

12.9 Volume/Audio

Maximum Volume:	Select 1 - 8 for higher max volume – 8 is the max
Min Volume Type:	Select Preset or Minimum
Min Volume:	Select 0 – 15 (5) (for power-on sound level)
Max Headset Volume:	Select Indoor, or 1 - 8 for max volume for a headphone (3)
DMR Mic Gain:	Allows increasing the mic sensitivity from 1 to 5 or Auto.
Enhanced Sound Qual.:	Set to On for increased high pitch voice or Off for normal.
Ana Mic Gain:	Set for analog microphone gain 1 - 5 or Auto.
DRC Dynamic Range:	Set On or Off for Automatic Gain Control (AGC) of strong signals to make overmodulated signals weaker.
NXDN Mic Gain:	Select 1 to 5 or Auto (this is possibly low and then use a 5)

12.10 Work Mode

Display Mode:	Defines what the radio display will show when in receive mode – frequency or channel name
VFO/MEM A:	Select VFO or MEM for the “A” upper channel
MEM Zone A:	Selects any of the programmed Zones to start on power up.
VFO/MEM B:	Select VFO or MEM for the “B” lower channel
MEM Zone B:	Selects any of the programmed Zones
Main Channel Set:	Select A or B for radio startup
Sub-Channel Mode:	Select On or Off (allows both channel A and B to be displayed)
Chose Working Mode.:	Select Amateur or Professional Mode (in professional mode you can lock keys in “Key Function” of Optional Settings)
Weather Alerts:	Select On or Off
Weather Channel:	Select 1 to 10

12.11 VOX / BT (Voice Operated Transmit / Bluetooth if selected under TOOL/Options)

VOX On/Off:	Select Off or On
VOX Delay:	Select how many seconds of delay after a transmission end
VOX Detection:	Select built-in mic or external mic or both
BT On/Off:	Select On, Off or KISS TNC (BT stands for Bluetooth)

Install Mobilinkd TNC Config on your phone and get more info from **https://mobilinkd.s3.amazonaws.com/TNC4/MobilinkdTNC4.pdf** for KISS TNC
(Keep It Simple Stupid = KISS and Terminal Node Controller = TNC)

BT + Int Mic:	Select On or Off
BT + Int. speaker:	Select On or Off
BT Mic Gain:	Select 1 through 5 (3)
BT Speaker Gain	Select 1 through 5 (5)
BT Hold Time:	Select Off or 1 through 15 or Infinite (10 Sec.)
BT RX Delay:	Select 30 mS to 5.5 sec. (1.5 sec.)
BT PTT Hold	Select On or Off

BT PTT Sleep Time:	Select Infinity to 4 minutes (1)
BT Nr Before:	Select Off or 1 through 5 (Nr = Noice Reduction)
BT Nr After:	Select Off or 1 through 5

12.12 STE (Squelch Tail Eliminate) for simplex radio to radio in analog mode only

STE Type CTCSS:	Select Off, Silent or a selected tone phase shift
STE When No Signal:	Select Off or 55.2 Hz or 259.2 Hz
STE Time:	Set the time for analog and note recommendation (250 mS)

12.13 AM/FM

AM/FM Function:	Select Off, FM, AM(A) or AM(B) which must be on for other functions below to work. (A and B are the top or the bottom receiver). Please note that you must select AM or FM to get the below items to work.
FM VFO/MEM:	Select VFO or Memory
FM Work Channel:	Select the FM channel to listen to (after set-up done)
FM Monitor:	When in FM mode select On if the radio shall receive calls
AM VFO/MEM:	Select VFO or Memory
AM Work Zone:	Select the AM channel to listen to (after set-up is done)
AM Offset:	Select Positive or Negative
AM Squelch Level:	Select Off or 1 through 5

12.14 Power Save

Auto Shutdown:	Select Off or 10 to 120 minutes before auto shut-down
Power Save:	Select Off or 1:1 or 2:1 for saving power
Auto Shutdown Type:	Select Is or Not affected by call

12.15 Key Functions

Key Lock:	Select “Manual” or “Auto” (auto = keys will lock automatically)
PF1 Short Key:	Select Off or one of many functions listed below (quick key)
PF2 Short Key:	Select Off or one of many functions listed below (see above)
PF3 Short Key:	Select Off or one of many functions listed below (see above)
P1 Short Key:	Select Off or one of many functions listed below (see above)
P2 Short Key:	Select Off or one of many functions listed below (see above)
PF1 Long Key:	Select Off or one of many functions listed below (1 sec and a beep is heard)
PF2 Long Key:	Select Off or one of many functions listed below (see above)
PF3 Long Key:	Select Off or one of many functions listed below (see above)
P1 Long Key:	Select Off or one of many functions listed below (see above)

P2 Long Key:	Select Off or one of many functions listed below (see above)
Long Key Time:	Select 1 – 5 seconds for holding the PF1, PF2 and PF3
Knob lock:	Select On or Off (used for professional mode)
Keyboard Lock:	Select On or Off (used for professional mode)
Side Key Lock:	Select On or Off (used for professional mode)
Forced Lock Key:	Select On or Off (set ON to prevent keys from being unlocked)

The choices for PF1 and PF2 are many and are listed below:
Off, Voltage, Power, Talk Around, Reverse, Digital Encryption, Call, VOX, V/M, Scan, AM/FM, Record Switch, Record, SMS, Dial, Main Channel Switch, Hot Key 1 – 6, Work Alone, Nuisance Delete, Digital Monitor, Sub CH Switch, Priority Zone, VFO Scan, MIC Sound Quality, Last Call Reply, Channel Type Switch, Ranging, Roaming, Max Volume, Slot Switch, Zone Select, Timed Roaming Set, Mute Timing, CTC/DCS Set, Bluetooth Wireless, GPS, Ch. Name, CDT Scan, APRS Send, Analog APRS Info, GPS Roaming, DIM Shut, Satellite Predicting, Squelch Level, WX Alarm, CH Setting, RX NR, TX NR, Relay Mode, Digital Protocol, and Freq. Sync.

12.16 Other

Address Book…:	Select On or Off
TOT:	Max Total Time of Transmit (TOT) or Off (no time limit on TX)
Language:	Select English or Germain
Frequency Step:	In VFO mode, selects the frequency steps (5 kHz)
SQL Level A:	Set the squelch level for the “upper” channel – set at 1
SQL Level B:	Set the squelch level for the “down” channel – set at 1
TBST:	Tone Pulse Freq. Selection to open certain repeaters – to initiate this tone push the PTT + PF1 key below the PTT together to send tone! (1000 Hz)
Analog Call Hold Time:	Select how long a call is held for Analog reception. (0)
Call Channel Maintained:	Set to Off or On to allow a transmit on the sub-channel B if done within 5 seconds after the call carrier was dropped
Priority Zone A:	Select Off or which zone should become priority
Priority Zone B:	Select Off or which zone should become priority
Mute Timing:	Select 1 minute to 256 minutes
Encryption Type:	Select Common or AES/ARC4
TOT Predict:	Select On or Off as the radio beeps 5 sec before the TOT time
TX Power AGC:	Select On or Off and the transmitter will send with a lower power level if the received signal is strong

12.17 Digital Function

Group Call Hold Time:	Select hang time for a Group Call (1 to 30 sec, 30 min or infinite)
Person Call Hold Time:	Select hang time for a Private Call (1 to 30 sec, 30 min or infinite)
Manual Dial – Group:	Select hold time for group TG 1 sec to 30 min (Infinite)
Manual Dial- Private:	Select hold time for private TG 1 sec to 30 min (Infinite)
Voice Header Repetition:	Select 2 to 8 (3) allows you to set the voice header repeat time
TX Preamble Duration:	Select time and note the suggestion (120 mS)
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 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 Format:	Select SMS format as option is given below:

Select M-SMS (Motorola) or H-SMS (Hytera) or DMR Standard format for SMS message

Dig Protocol:	Select DMR or NXDN **(important setting)** This change can also be made from the radio under MENU Settings (Radio Set, Other Func., Protocol which is 33)
Reset Digi. Protocol:	Select Off, DMR or NXDN (when resetting the radio it will start in the here selected protocol)

12.18 Alert Tone 1

Call End Tone:	Program as you like and test with Play
Call All Tone:	Program as you like and test with Play

12.19 Satellite

Satellite Location	Select GPS or any of the fixed locations 1 through 8
Sate TX Power	Select the radio power level for satellite communication (Turbo)
Sate Ana Squelch	Select the level of squelch wanted when receiving (0 – 5 0)
Sate AOS Limit	Select 0 – 30 to set up the elevation degrees for the satellite

13.0 APRS SET-UP

The radio offers APRS set up in a window all by itself. We recommend using a web site for local set-up of this page like:

https://pnwdigital.net/wp-content/aprs/aprs-d.html

https://www.m0pqa.com/2020/05/making-aprs-work-on-anytone-at-d878uv.html

D890UV has two receiving path, in radio menu APRS-Analog APRS Info - Decode path, you need to select a path for the analog APRS to do the decoding.

14.0 NXDN PROGRAMMING (Next Generation Digital Narrowband)

First if the radio is to be used for DMR and Analog functions this section can be left alone.

Note that RAN (Random Access Number) for NXDN is similar to CTCSS encoding used for analog systems. Select NXDN in the CPS on the left side and program of the following items (see page 8 above if NXDN is not showing up in the CPS):

NXDN Encryption Code	This page do not normally need any entries
NXDN State MSG	This page do not normally need any entries
NXDN Settings	A new window opens and you need to program the following:
Unit ID (Own)	NXDN ID number (get it from www.radioid.net)
Base ID	Use “NT” as default
Base ID Type	Select Unit ID or Group ID (Unit ID is for individual radios and Group ID is for repeaters)
Unit ID Encode Block	Write 1 – 65519 (65519 is max that can be used)
Air Alias Name	Show your amateur license text in 8 characters max (KD0PNQ)
Alert Tone Restriction…	Select Off
Call Alert Prohibited…	Select Off
Ignore Group Calls…	Select Off
Transmit Busy Wait…	Select 0.5 to 60 sec
Number of Retries	Select 0 to 8 times
Maximum ACK Wait…	Select 0.5 to 60 sec (Acknowledgement that TX reached the RX)
Data Transmission Mod…	Select 0 to 6000 sec
ACK Delay Time	Select 0 to 127 sec (Acknowledgement that TX reached the RX)
Singel Call Req. Tone	Select Off
Call Progress Delay…	Select 0 to 6 sec
Automatic Response	Select Off
Roam Stay Time	Select 1 through 200 sec
NXDN Moni	Select On
NXDN Moni RAN	Select Any or Same (see note about RAN above)
NXDN Moni ID	Select Any or Same
NXDN Receive Group…	This page do not normally need any entries
NXDN Cont./Talk Group:	This is the Talk Groups for NXDN where for example one line should be as below:

ID = 65000, Name = 65000, Tx Forbid = Off, Attribute (Atr) = Group Call (Wide World Talk Group) You can find more NXDN TG’s from the Internet if you do a search.

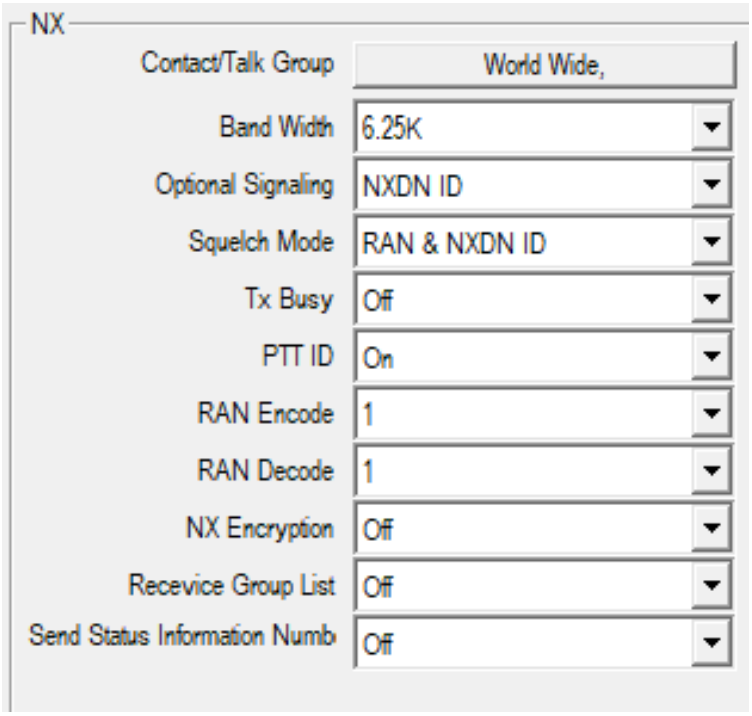
NXDN Digital Cont. List: Import under TOOL the NXDN Digital Contact List available from https://radioid.net/database/dumps as NXDN.csv

Please note that the radio has to be in **NXDN protocol** for importing all NXDN Digital Contacts.

Sometimes the CPS may report error when import the NXDN.csv file, re-save the NXDN.csv file and then import the re-saved file, it will work.

Digital NXDN Channel (under “Channel” on the top left of the CPS)

After the details of using NXDN you need to program other sections in the CPS.
On the **Channel** setting you need to program the NXDN channels that are to be used:



See page 12 for programming suggestions for channel set-up. Please note that 65000 is the Talk Group for Wide World mostly used.

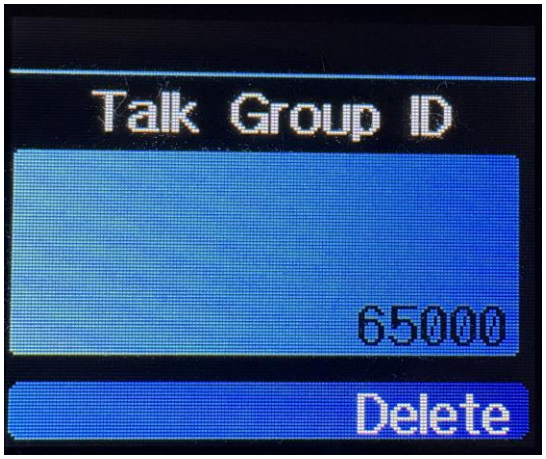
14.1 NXDN Zone

In the Zone you also need to program any NXDN channels. Follow the Zone set-up for DMR and enter a Zone name and then move over the channels you want in each zone.

If you are using NXDN please remember to switch the MENU Protocol from DMR to NXDN.

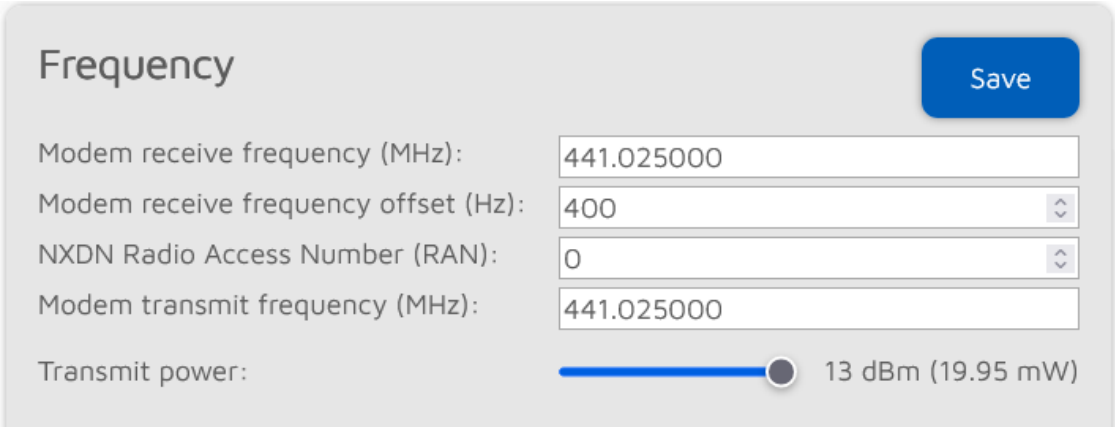
14.2 NXDN Talk Group ID (on the radio)

Talk Group setting is part of the frequency setting as the picture above shows (World Wide). Another way to enter a Talk Group, once the program has been loaded into the radio is to hold the “0” key on the radio till the display shows as below. Enter the TG as shown below. You can then direct start to talk by using the PTT button on the radio thereafter.



NOTE: A local hotspot such as openSPOT or a Pi-Stare may be very sensitive of the frequency setting as NXDN uses such a narrow frequency so that hay have to be adjusted to make NXDN work. The BER (Bit Error Rate) reading on openSPOT or Raspberry Pi should be as close to 0 as possible (use Advanced Mode for openSPOT under Modem to make adjustments).

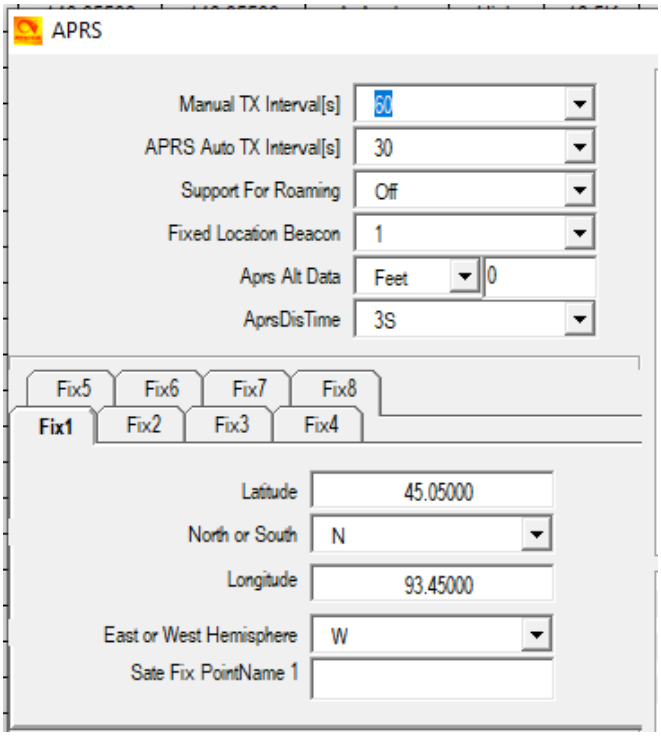
Also please note that setting up a Pi-Star hotspot you should, when using an AnyTone radio, set the Control Software of the Pi-Star as Simplex Node and not try Duplex Repeater, It is easier to get it to work that way.



Please note that when you see “delete” and no way to get back to where you were then **P2** is the key on the radio to use – it becomes the Exit or Back key (see User Manual).

15.0 SATELLITE RECEPTION

The AT-D890UV radios has a new GPS included but you can also use a “fixed” position to instead of a GPS signal (if you are indoors for example) get set-up for satellite reception. To get started first use the menu under TOOL and Options and select APRS to get it to show up as a menu item on the left side under the CPS menu. In the APRS window, that you now can open, look for the latitude and longitude and put in your location (the example below shows a location in Minnesota).



This will place the radio in the correct position related to the satellites. There are 8 such positions available for different radio locations to select for the radio. Make sure the radio time is set correct or your satellite times when to listen may be off.

Also make sure the UTC time (-6.00 hours for Minnesota and -5 hours for summer time) is set correct as part of the **Optional Settings** and **GPS/Ranging** shown in the CPS. Also make sure TX power and squelch is set correctly in this window – see “satellite” set-up below. The TX power is shown in red color in the upper right corner of a satellite display together with the green signal strength bar. The TX power can also be changed during satellite reception by using the “*” button on the front of the radio bottom right.

Satellite Location: Select GPS Beacon or FIX 1 through FIX 8 manual positions being set on the radio itself.

Satellite: After a short while you will see the available satellites on the radio LED display and the time when it passes displayed is UTC time.

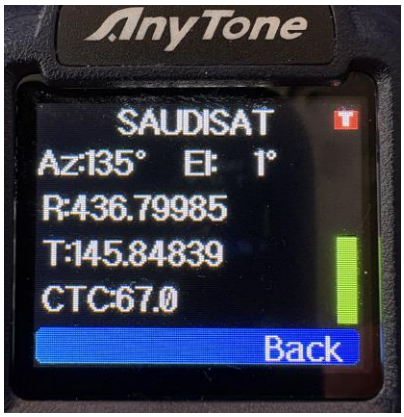
Please note that the magazine QST have an article in the March 2025 issue on page 30 – 32 about satellite reception using a small portable radio. See also the writer's webpage all related to satellite reception: www.deloach.net/satellite

A brief education on azimuth and elevation is given here. Azimuth is 0˚ for direct north, east is 90˚, south is 180˚ and west is 270˚. Elevation is the vertical angel between you (the local horizon) where you are located and the satellite. The radio circle and the red dot should tell you where the satellite is located and if the elevation is negative, it is below the horizon and any communication with the satellite is not possible.

The next step is to go to the radio menu and select "satellite". If there is a good GPS reception of your location use that. You can also select "location" and then "fixed" you will see the latitude and longitude position as you entered it under APRS above – select that instead of the true GPS position. Please make sure it is correct. You also will see your location as a 6-letter version for amateurs called Grid Square Locator (or Maidenhead Locator System) as mine was EN35GB.

Please note that you can send out an APRS transmit under satellite menu by pressing PTT + PF2 button if set up correctly in the APRS set up menu in the CPS and also under TOOL, GPS Satellite Data Update where you set the APRS frequency.

In the menu of the radio, you then can go to "satellite" and it may take a short time during "Predicting" and you will see a list of satellites with the nearest satellite in time are highest up on the list. Once you select a satellite, the picture may look like the ones below:



By using the **Zone button** in the center, you can go between the three pictures shown above. The **channel knob** on top of the radio will control the squelch so you can cancel the squelch function and hear the satellite and with the noise it creates (it is almost required to use no squelch when listening to a satellite). You may hear amateur voices just when the satellite is

in the right position and the red dot is in the center of display to the left above. If you try to transmit (**PTT**) when the satellite is not accessible you will hear the radio beep at you.

The middle picture above describes when in UTC time when the satellite will pass at what elevation and for how long. The third display above tells the current azimuth and elevation the satellite is as well as the transmit and receiver frequencies and any CTC code required.

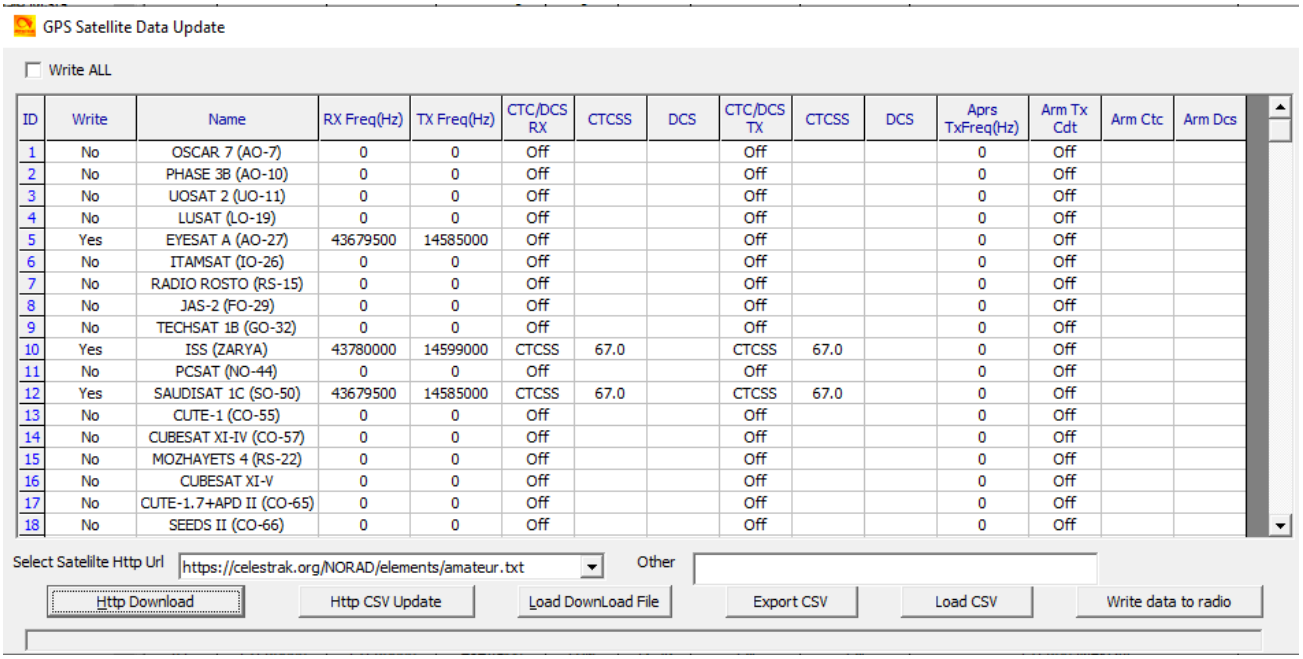
When you are on the second picture above the round ZONE key will show the different passes when the satellite will pass in your area. The times in UTC will also be shown so you may know how long you have to wait for other passes.

Wait for the time displayed to go to 0. It also will show the signal strength with the green bar on the right. Use the PTT to transmit to the satellite when the satellite is in position and you have the indication that you can do so. It is only a short time for each satellite. When you transmit it will show how many seconds you do it on the display and the frequency you transmit on (145.84698MHz in the example below and varies a little due to the doppler effect) – as shown below. Wait and see if you hear another amateur from the satellite you just transmitted to. A different antenna (directional) is required to give a result like the one shown in this YouTube video with voices via satellites on an AnyTone radio:

https://www.youtube.com/watch?v=QvBr44P02_4

The satellite data (new data as the satellites are updated) can be accessed from the TOOL menu and there under “Satellite Data Updating”. New satellite data can be downloaded from the website indicated in an amateur.txt format as shown below as “Select Satellite http URL”.

By clicking on “HTTP Download” the display is updated with the current data from the web in a TLE format. A few more options are given. The radio is updated with the correct and most current data from the website by clicking on “Write Data to Radio”.



ID	Write	Name	RX Freq(Hz)	TX Freq(Hz)	CTC/DCS RX	CTCSS	DCS	CTC/DCS TX	CTCSS	DCS	Aprs TxFreq(Hz)	Arm Tx Cdt	Arm Ctc	Arm Dcs
1	No	OSCAR 7 (AO-7)	0	0	Off			Off			0	Off		
2	No	PHASE 3B (AO-10)	0	0	Off			Off			0	Off		
3	No	UOSAT 2 (UO-11)	0	0	Off			Off			0	Off		
4	No	LUSAT (LO-19)	0	0	Off			Off			0	Off		
5	Yes	EYESAT A (AO-27)	43679500	14585000	Off			Off			0	Off		
6	No	ITAMSAT (IO-26)	0	0	Off			Off			0	Off		
7	No	RADIO ROSTO (RS-15)	0	0	Off			Off			0	Off		
8	No	JAS-2 (FO-29)	0	0	Off			Off			0	Off		
9	No	TECHSAT 1B (GO-32)	0	0	Off			Off			0	Off		
10	Yes	ISS (ZARYA)	43780000	14599000	CTCSS	67.0		CTCSS	67.0		0	Off		
11	No	PCSAT (NO-44)	0	0	Off			Off			0	Off		
12	Yes	SAUDISAT 1C (SO-50)	43679500	14585000	CTCSS	67.0		CTCSS	67.0		0	Off		
13	No	CUTE-1 (CO-55)	0	0	Off			Off			0	Off		
14	No	CUBESAT XI-IV (CO-57)	0	0	Off			Off			0	Off		
15	No	MOZHAYETS 4 (RS-22)	0	0	Off			Off			0	Off		
16	No	CUBESAT XI-V	0	0	Off			Off			0	Off		
17	No	CUTE-1.7+APD II (CO-65)	0	0	Off			Off			0	Off		
18	No	SEEDS II (CO-66)	0	0	Off			Off			0	Off		

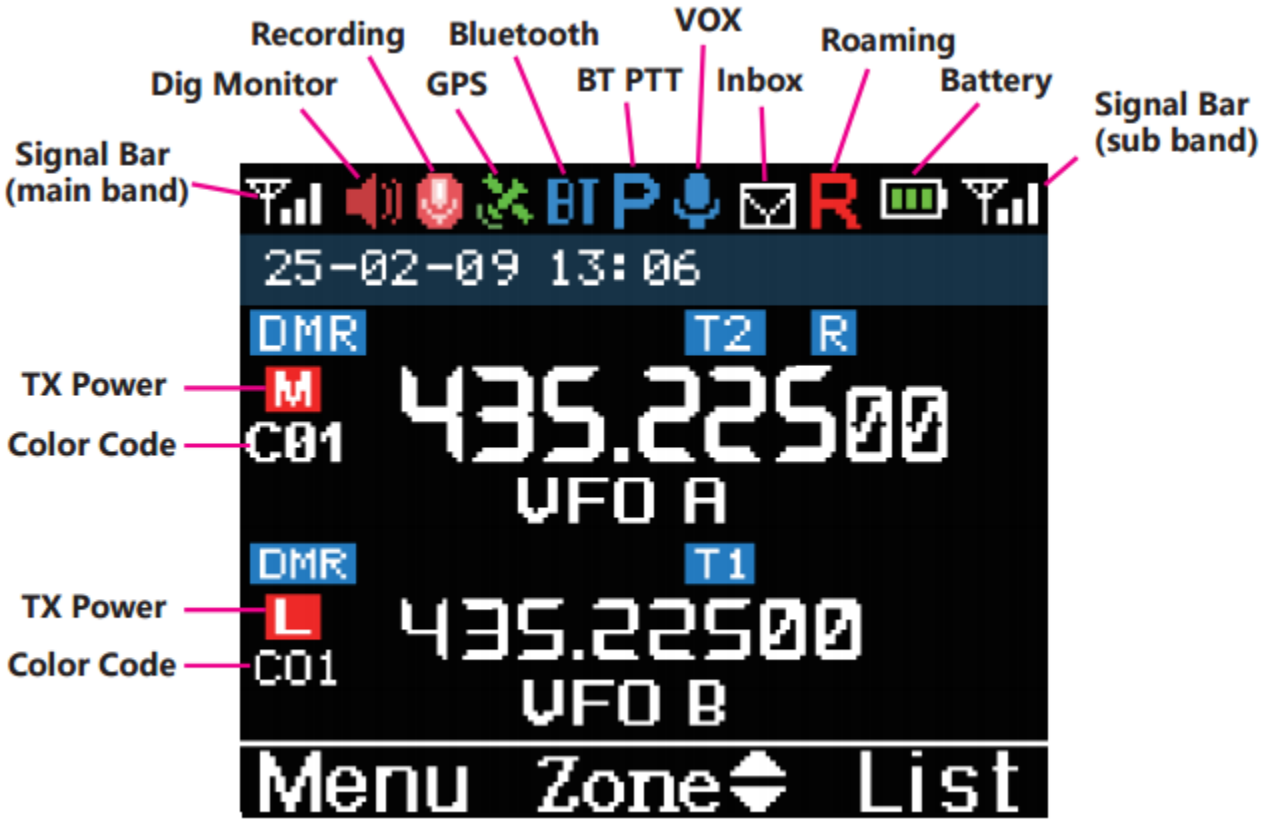
Please note that in the Optional Settings you can program Key Functions of either PF1, PF2 or PF3 to be “Satellite Prediction” so you can access that easy instead of going through the menu on the radio and down to Satellite and so on.

If you are looking for a phone application to monitor all the amateur satellites with a repeater onboard you may try **Satellite Tracker** by Star Walk which has a subscription fee of $0.99 per month. There you can see where the satellite is in comparison to you location.

The website https://celestrak.org/NORAD/elements/amateur.txt and what each line of a satellite means can be found on https://celestrak.org/columns/v04n03/#FAQ01 and another clarification on https://celestrak.org/NORAD/elements/table.php?GROUP=amateur&FORMAT=tle. You can also use site www.amsat.org/tle/dailytle.txt for the .txt file as it seems to be updated more frequent than the celestrak list.

16.0 DISPLAY CHARACTERS

The LED display uses many special characters and here is an explanation of them.



Please note that a **gray** symbol may indicate that the function is on but has not yet locked on – for example the GPS function being **gray** instead of **green** indicates that a GPS signal is not yet registered by the radio.

The radio has Bluetooth and APRS capabilities which are not covered by this Programming Guide as those functions are not part of getting the radio to work. The radio User Manual should be the go-to document for those functions as well as all the other functions not part of getting the radio to operate as a regular ham radio.

17.0 FINAL STEP - WRITE YOUR CODEPLUG TO YOUR RADIO

The first thing to do is to check that your Comm Port is selected correctly. You can do that on the sign between reading from and sending to the radio. See below for the picture of checking the Comm Port. You can also use “Set” and “Set COM” on the top line for doing the same.

In the worst case you have to right-click “This PC” on your computer and open “Manage” and then “Device Manager” to make sure the cable you have works correctly – take it off and on to see what Port (COM & LPT) it opens.

The AT-D890UV radio comes with a standard programming cable. Select if you want to write just the “Other Data” (all radio parameters) and/or Digital Contact List when loading the CodePlug into the radio. Write the file to your radio. Save also the file to your PC with a name that you will remember. You may wish to use version numbers in your file naming to help you with progressive updates. At some point you may ‘break’ your CodePlug by setting something differently and this may affect the radio operation. It helps to be able to ‘go back’ to an earlier working version. Some CodePlug Programming Software (CPS) may also require that you update the clock in the radio by another function, be sure to do this if you want an accurate time display!

Please note that the AT-D890UV radio offers many more set-ups but those are best described in the Manual that comes with the radio. The Manual also talks about how to safely use the battery. Note, that even with the LCD display on the radio lit up all the time (“Always” in the display setting) the radio has battery power for several days before requiring recharging. What has been covered in this Programming Guide are those parameters most important to get the radio up and running.

Please note that the satellite reception in the D168UV radios is very similar to what is described here for the D890UV radio (Firmware 4.0 stopped using satellite reception due to a memory limitation in the D878UV radio).

Please also remember to save the codeplug on your computer so you have a back-up.

We do not condone any changes to the radio but want to reference 3 sites with a lot of data:
https://anytonetechzone.byethost7.com/878techmods.htm?i=2
https://www.hamradiosouthernrepeaters.co.uk/anytone-dmr.html/
and for checking the DMR sound use the PLAYER in the top right corner of the following site:
https://hose.brandmeister.network/?subscribe=2406

18.0 SATELLITE EXPLANATION

Satellite		Norad No.	uplink	downlink
LILACSAT	CAS-3H	NORAD ID 40908	145.825	144.390
AO-27	EYESAT-1	NORAD ID 22825	145.850	436.795
ISS	SPACE STATION			
SO-50	SAUDISAT 1C	NORAD ID 27607	145.850	436.795
AO-91	FOX-1B	NORAD ID 43017	435.250	145.960
PO-101	DIWATA-2	NORAD ID 43678	437.500	145.900
AO-7	OSCAR 7	NORAD ID 7530	432.125-432.175	145.975-145.925
AO-10	OSCAR-10	NORAD ID 14129	435.0	145.0
UO-11	OSCAR 11	NORAD ID 14781		145.825
LO-19	OSCAR-19	NORAD ID 20442	145.840-145.900	437.125/437.150
IO-26	OSCAR-26	NORAD ID 22826	145.875-145.950	435.822/435.867
FO-29	OSCAR-29	NORAD ID 24278	145.900-146.000	435.900-435.800
IO-86	OSCAR-86	NORAD ID 40931	145.880/145.825	435.880/145.825
AO-73	FUNcube-1	NORAD ID 39444	435.130-435.150	145.970-145.950
JO-97	JY1Sat	NORAD ID 43803	CW only	
XW-2B	CAS-3B	NORAD ID 40911	435.090-435.110	145.750-145.730
MO-122	OSCAR-122	NORAD ID ?	145.910-145.940	435.810-435.840

More data for amateur satellite data and frequencies can be found on this site:

https://www.amsat.org/amateur-satellite-index/