Quick Bring Up AnyTone AT-D878UV

Quick Bring Up of AnyTone 868/878

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Introduction

The aim of this document is to help a new Anytone 868/878 owner get his/her new DMR radio up and running quickly. You will learn how register and get a DMR ID, how to load and operate the CPS (Customer Programming Software), read and write to the radio and load a code plug. Many ham clubs that operate DMR repeaters, provide code plugs for users in their local community. The Anytone AT-878UV is used in these examples but much of this is abpplicable to the AT-868 as well.

What you will need

- A PC Running Windows 7 or later
- An Anytone AT-D878UV Radio
  - Fully charged battery
  - USB Programming Cable
- The Radio Software and the USB Driver
  - http://www.connectsystems.com/software/top/D878UV.htm
- A DMR ID: https://www.radioid.net/register#!
- A Code Plug File: www.papasys.com

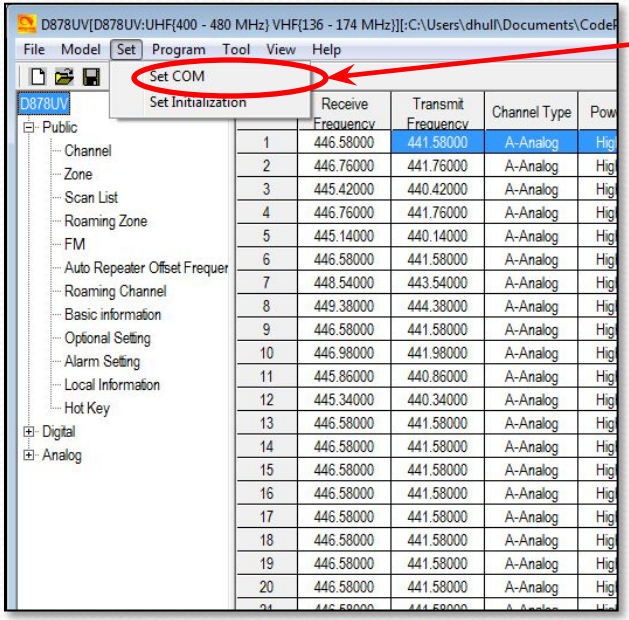
New radio – first steps (1)

- Unpack radio and charge the battery
- Download and install the USB driver (may not be needed for Windows 10)
- Download and install the CPS
- Connect the USB cable to your radio
- Connect the other end to your computer
- Turn on your radio, wait for the computer to acknowledge the USB connection.

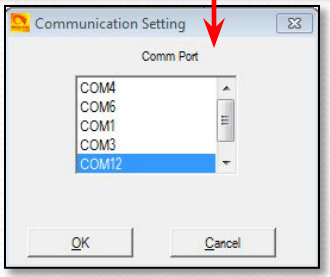
New radio – first steps (2)

- Launch the CPS
- Set your serial port.
- Read the radio and save the Original Code Plug.
- Load the new code plug into the CPS
- Set your DMR ID (you can get a DMR ID at: https://www.radioid.net/register#!)
- See screenshots on following pages

Set your Com Port:

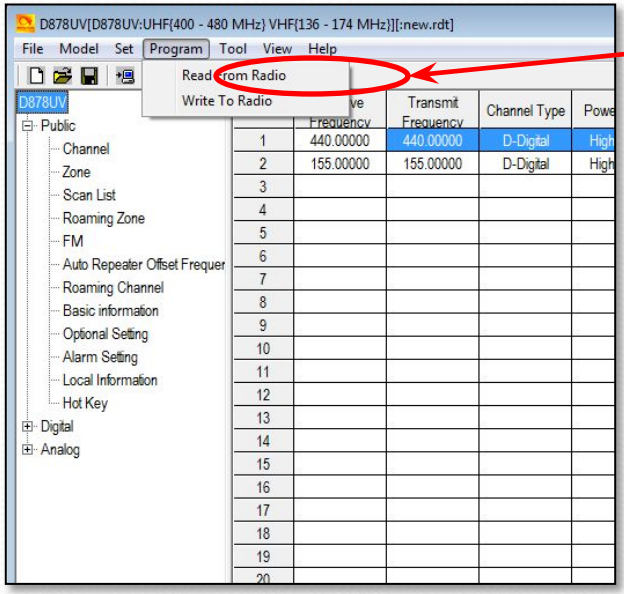


1. Before you can do anything with the UV-878 you have to set up the serial port. Click “Set COM” under the Set Pull-down.
2. Select the com port for your radio from the options provided in the pop-up. Note that your radio needs to be connected and powered up.

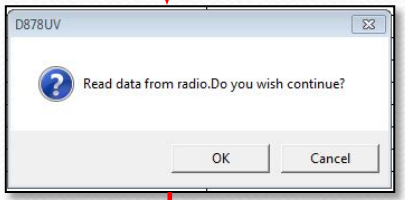


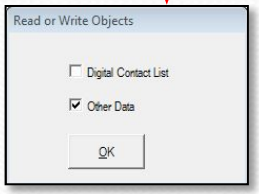
NOTE: Mine is usually COM12 but this will depend on your computer. You may want to try this with your radio off and note the com ports present. Then turn the radio on and do it again. The correct port should be the new one that showed up. You may need to install a driver.

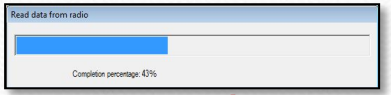
Save your initial code plug:

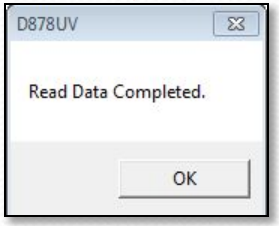


1. In CPS, Click “Read From Radio”
2. Click, OK, and follow the dialogs









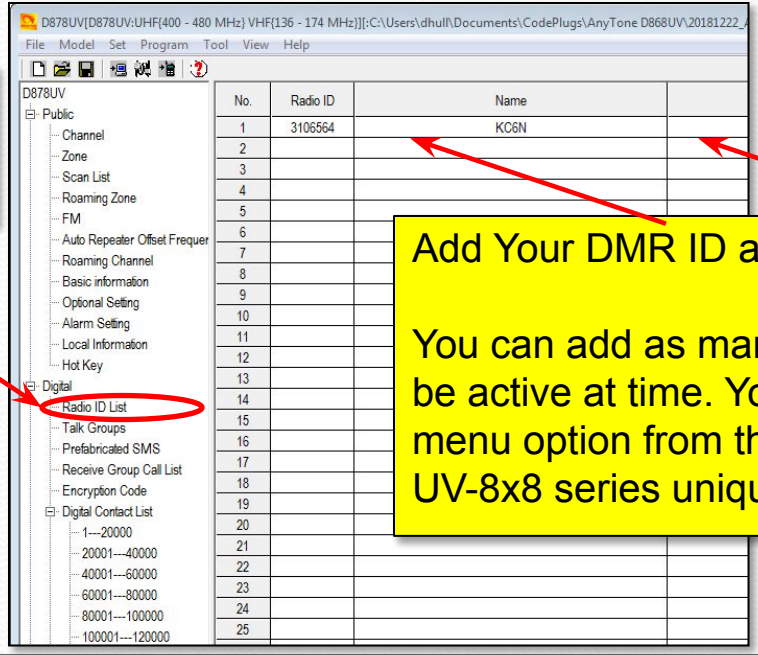
3. Click “File”, “Save As”, give it a name like “20190218_*YourCall*_AT-878_VirginCP”. Now you have a record of the un-programmed code plug for reference.

Load your new code plug

- Locate a code plug that you like
  - Download from a web site
  - From a friend's radio
  - Write from scratch
- The following pages show how to:
- Add your DMR ID
- Save your (now customized) code plug
- Flash the new code plug into the radio.

Add *your* DMR User ID:

Select “Radio ID List” under “Digital” in the tree

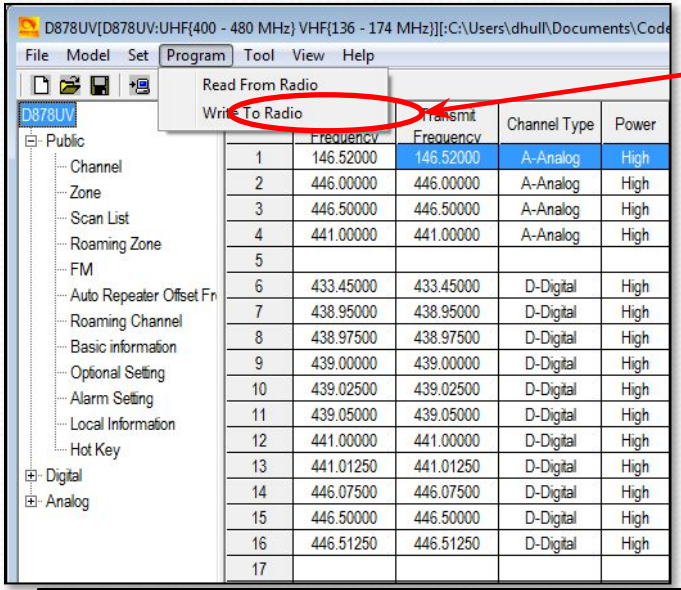


Add Your DMR ID and Call Sign to the list.

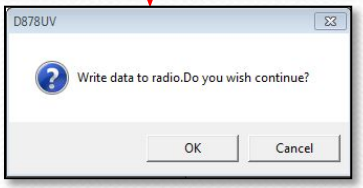
You can add as many as you like, but only one can be active at time. You will select which one via a menu option from the keypad. This is an AnyTone UV-8x8 series unique feature which is sort of nice.

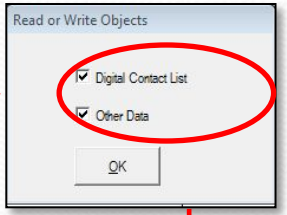
Once you have done this, save your new code plug and write it to your radio as shown on the next slide.

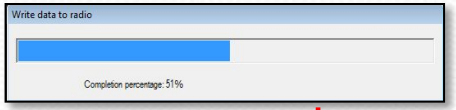
Load your new code plug:

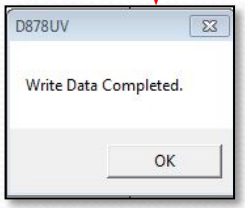


1. In CPS, Click “Write to Radio”
2. Follow the dialogues







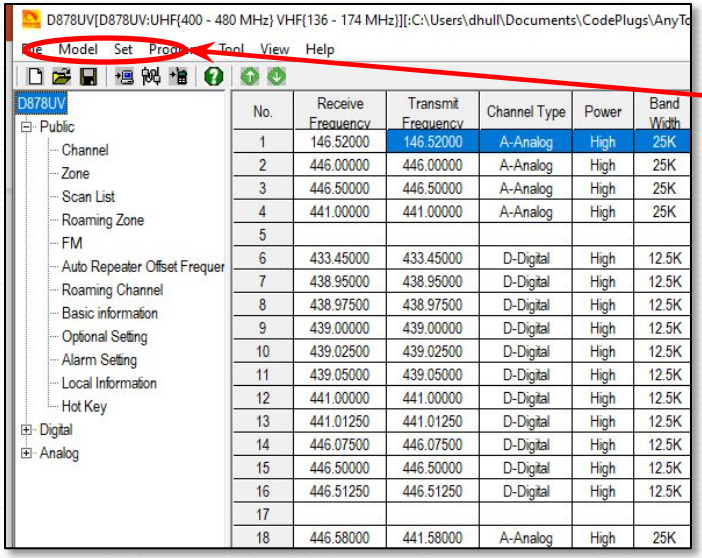


3. Save your new code plug. Give it a name like “20190218_*YourCall*_AT-878”. So you have a copy of the code plug for reference and further customization.

Band Error Issue

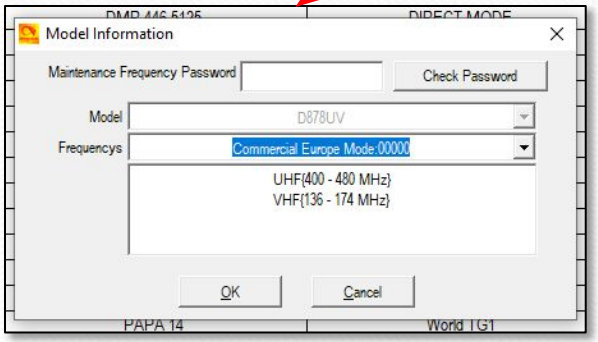
- At this point, you *may* run into the pop-up shown on the right below – not to worry.
- This simply means that the band plan your radio expects to see and the one your code plug was built for are not the same – This is easily fixable as shown on the next couple pages. If you don't get this error, you are good to go.

Read the Code Plug Mode



No.	Receive Frequency	Transmit Frequency	Channel Type	Power	Band Width
1	146.52000	146.52000	A-Analog	High	25K
2	446.00000	446.00000	A-Analog	High	25K
3	446.50000	446.50000	A-Analog	High	25K
4	441.00000	441.00000	A-Analog	High	25K
5					
6	433.45000	433.45000	D-Digital	High	12.5K
7	438.95000	438.95000	D-Digital	High	12.5K
8	438.97500	438.97500	D-Digital	High	12.5K
9	439.00000	439.00000	D-Digital	High	12.5K
10	439.02500	439.02500	D-Digital	High	12.5K
11	439.05000	439.05000	D-Digital	High	12.5K
12	441.00000	441.00000	D-Digital	High	12.5K
13	441.01250	441.01250	D-Digital	High	12.5K
14	446.07500	446.07500	D-Digital	High	12.5K
15	446.50000	446.50000	D-Digital	High	12.5K
16	446.51250	446.51250	D-Digital	High	12.5K
17					
18	446.58000	441.58000	A-Analog	High	25K

Select “Model” and then select “Model Information” from the dropdown. To bring up the information panel shown below.



Make note of what it says in the second row in the “Frequencies” section. In this case it shows that this code plug expects to see a radio in the “Commercial Europe Mode: 00000”

The radio will need to be changed to match. See next page.

Set the radio to match

To change this in the radio you need to put the radio into “test” mode by holding down the “1” and the “PTT” key simultaneously while powering the radio on. If this doesn’t work for you, you will need to use the applet described next.

Continue holding the “PTT” and “1” down until you see the display “DV878UV Test Mode” Release the keys and the screen to the right will display once the boot sequence completes.

Turn the channel select switch (top middle) until the proper mode is displayed. In this case the mode is 00000. Yours may be different. Note that the last digit is blue for some reason.

Once these agree, you should be able to load the code plug.

Using The Applet

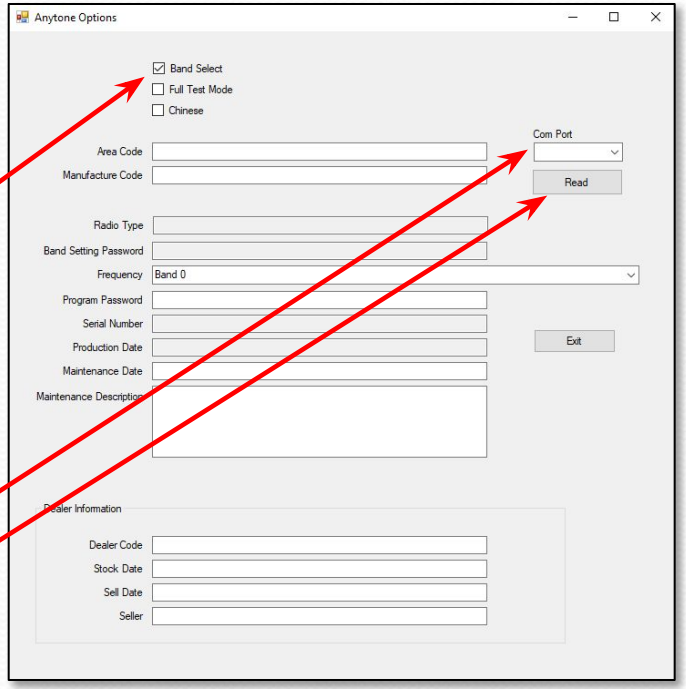
Alternative Method: It may be that in your radio, the test mode is not enabled, in which case there is a software application available from Anytone for this purpose called “At_Options.exe”:

To use this, run the application to get the screen in the adjacent image

Set band select mode

Select the correct COM Port using the “Com Port” drop down

Click “Read” to read the radio



Applet Link:
https://www.dropbox.com/sh/8lw64h82po80gd4/AAAHVDJSG52z_GMGiK3hhBbXa?dl=1

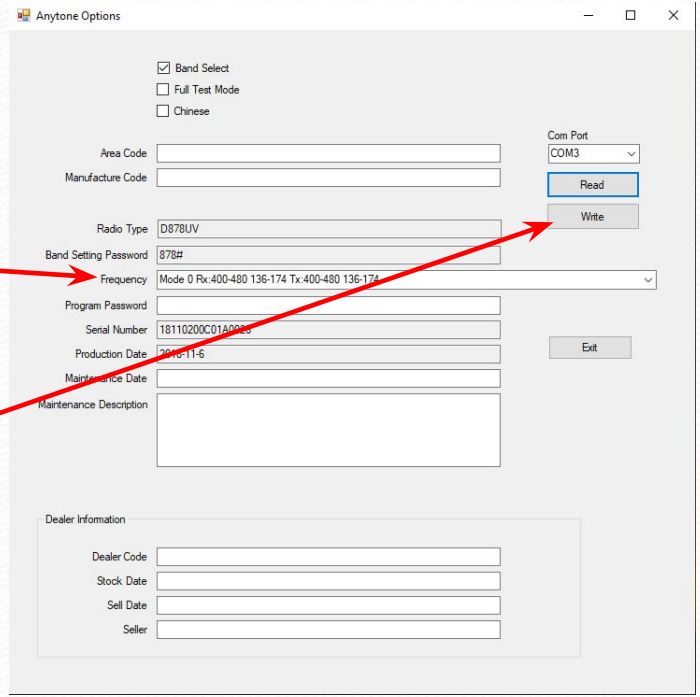
Band Error Issue (4)

The fields will now be populated with some information about the radio.

You are going to want to set the correct band and frequency ranges using the “Frequency” pull down. This needs to match the frequency “Mode” of the code plug.

Once you have selected the right Frequency mode click “Write” to write this data to the radio.

Click “Exit” and proceed to load your code plug.



You should be good to go

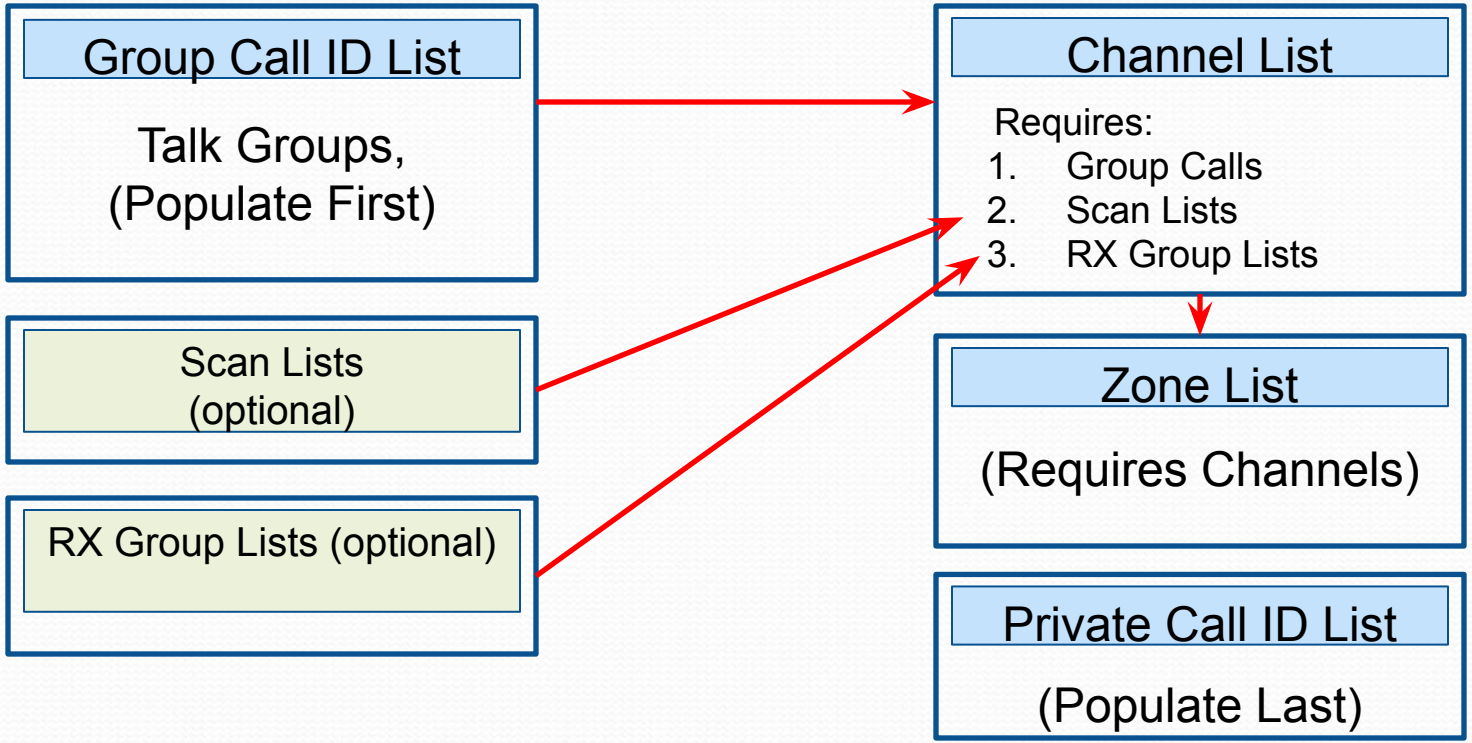
- Make sure your analog channels work
- Pop onto California (or other active talk group) and ask for a radio check.
- If you have loaded a pre-built code plug, then you are done – enjoy your radio!
- Here is the link to the applet again:
- https://www.dropbox.com/sh/8lw64h82p080gd4/AAAHVDJSG52z_GMGiK3hhBbXa?dl=1

Break Marker

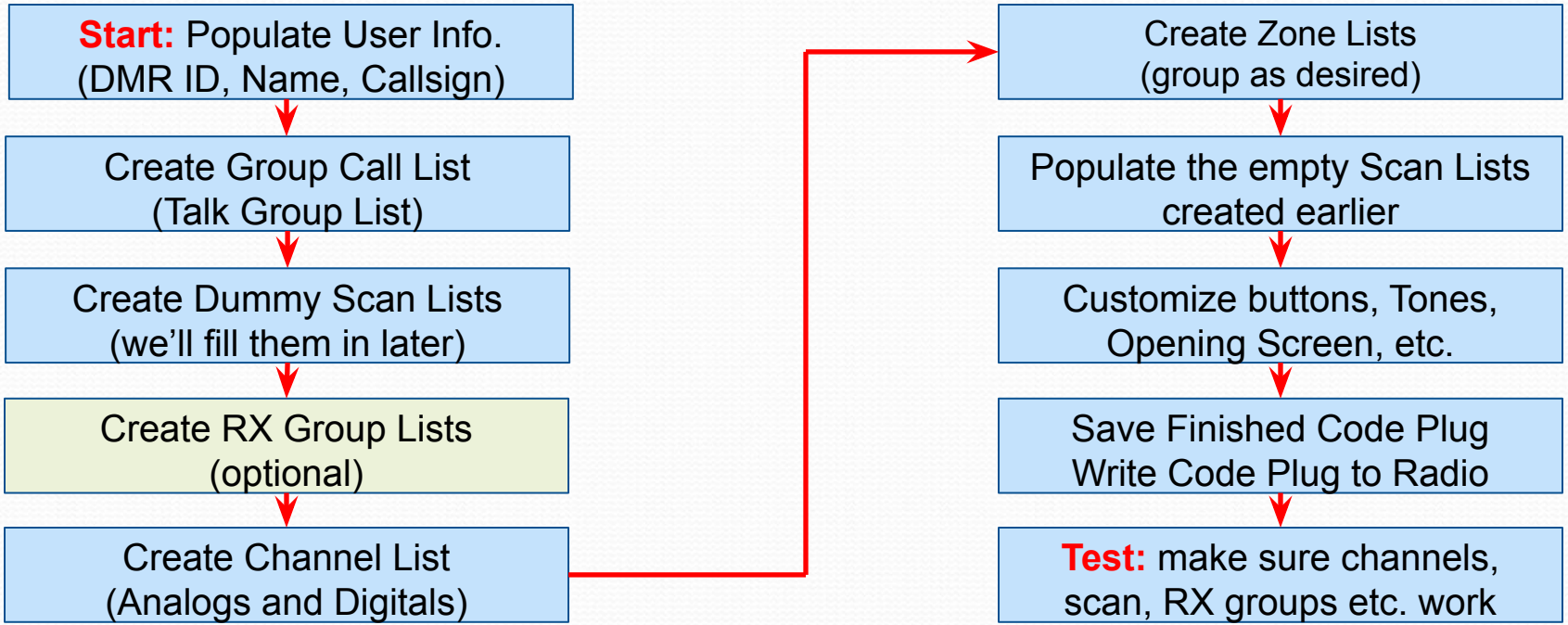
Part II

Code Plug management concepts

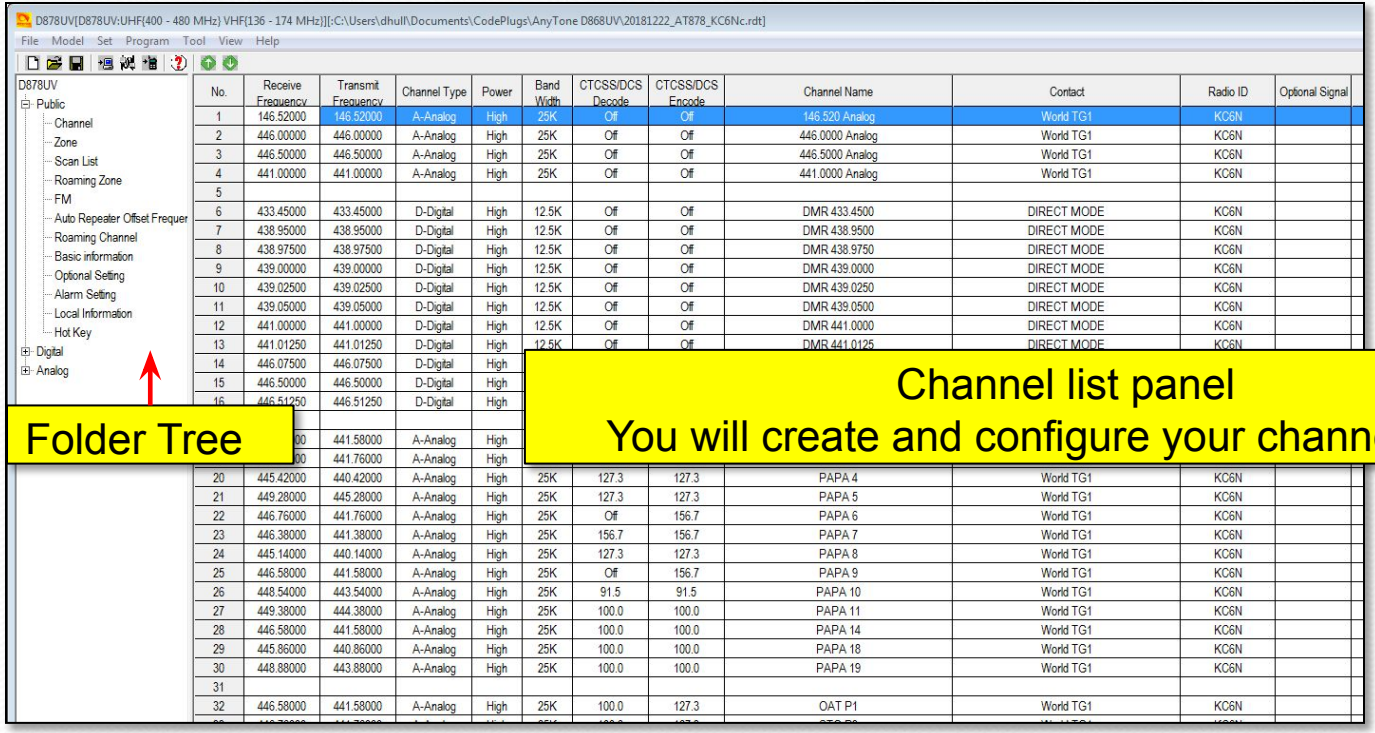
Database relationships



DMR Code Plug Workflow

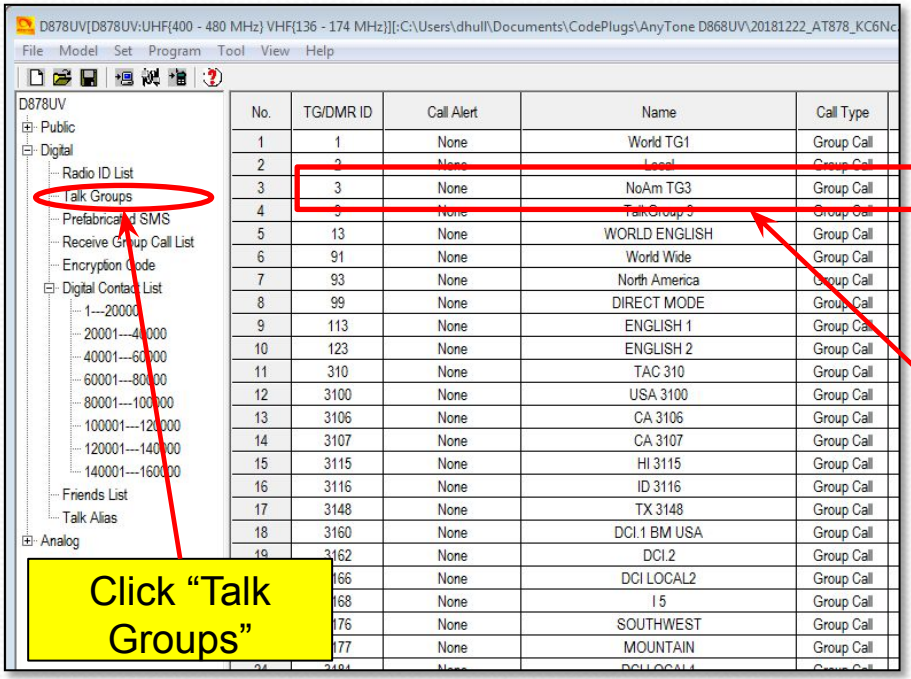


AnyTone CPS opening Screen



No.	Receive Frequency	Transmit Frequency	Channel Type	Power	Band Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID	Optional Signal
1	146.52000	146.52000	A-Analog	High	25K	Off	Off	146.520 Analog	World TG1	KC6N	
2	446.00000	446.00000	A-Analog	High	25K	Off	Off	446.0000 Analog	World TG1	KC6N	
3	446.50000	446.50000	A-Analog	High	25K	Off	Off	446.5000 Analog	World TG1	KC6N	
4	441.00000	441.00000	A-Analog	High	25K	Off	Off	441.0000 Analog	World TG1	KC6N	
5											
6	433.45000	433.45000	D-Digital	High	12.5K	Off	Off	DMR 433.4500	DIRECT MODE	KC6N	
7	438.95000	438.95000	D-Digital	High	12.5K	Off	Off	DMR 438.9500	DIRECT MODE	KC6N	
8	438.97500	438.97500	D-Digital	High	12.5K	Off	Off	DMR 438.9750	DIRECT MODE	KC6N	
9	439.00000	439.00000	D-Digital	High	12.5K	Off	Off	DMR 439.0000	DIRECT MODE	KC6N	
10	439.02500	439.02500	D-Digital	High	12.5K	Off	Off	DMR 439.0250	DIRECT MODE	KC6N	
11	439.05000	439.05000	D-Digital	High	12.5K	Off	Off	DMR 439.0500	DIRECT MODE	KC6N	
12	441.00000	441.00000	D-Digital	High	12.5K	Off	Off	DMR 441.0000	DIRECT MODE	KC6N	
13	441.01250	441.01250	D-Digital	High	12.5K	Off	Off	DMR 441.0125	DIRECT MODE	KC6N	
14	446.07500	446.07500	D-Digital	High							
15	446.50000	446.50000	D-Digital	High							
16	446.51250	446.51250	D-Digital	High							
	00	441.58000	A-Analog	High							
	00	441.76000	A-Analog	High							
20	445.42000	440.42000	A-Analog	High	25K	127.3	127.3	PAPA 4	World TG1	KC6N	
21	449.28000	445.28000	A-Analog	High	25K	127.3	127.3	PAPA 5	World TG1	KC6N	
22	446.76000	441.76000	A-Analog	High	25K	Off	156.7	PAPA 6	World TG1	KC6N	
23	446.38000	441.38000	A-Analog	High	25K	156.7	156.7	PAPA 7	World TG1	KC6N	
24	445.14000	440.14000	A-Analog	High	25K	127.3	127.3	PAPA 8	World TG1	KC6N	
25	446.58000	441.58000	A-Analog	High	25K	Off	156.7	PAPA 9	World TG1	KC6N	
26	448.54000	443.54000	A-Analog	High	25K	91.5	91.5	PAPA 10	World TG1	KC6N	
27	449.38000	444.38000	A-Analog	High	25K	100.0	100.0	PAPA 11	World TG1	KC6N	
28	446.58000	441.58000	A-Analog	High	25K	100.0	100.0	PAPA 14	World TG1	KC6N	
29	445.86000	440.86000	A-Analog	High	25K	100.0	100.0	PAPA 18	World TG1	KC6N	
30	448.88000	443.88000	A-Analog	High	25K	100.0	100.0	PAPA 19	World TG1	KC6N	
31											
32	446.58000	441.58000	A-Analog	High	25K	100.0	127.3	OAT P1	World TG1	KC6N	

Talk Groups(group call list):



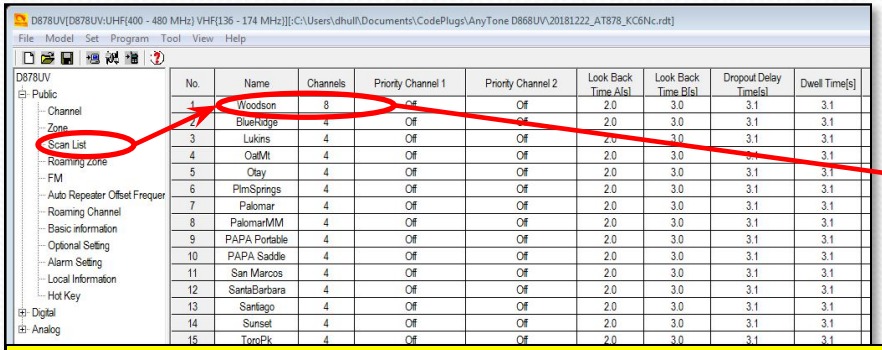
Click “Talk Groups” in the menu tree as shown and add your group call ID’s as shown to the left. If your radio is un-programed you will need to add the ones you need. Otherwise it will have some entries as shown here. You will reference this list when you program your channels.

Example: Group Call North America, Call ID (TG)=3

Scan Lists:

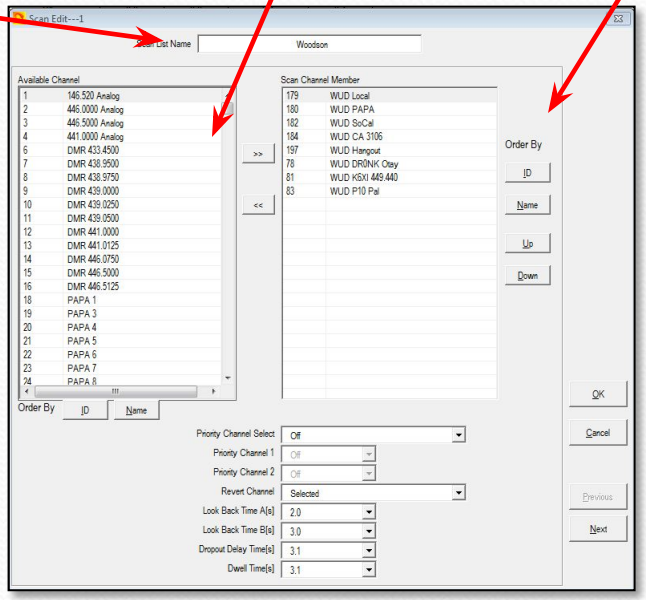
Available Channels

Included in Woodson "Scan Group"



Each channel ***may*** reference a scan list (but doesn't have to). A scan list is a list of channels that will be scanned when a channel referencing that list is selected (and "scan" is enabled).

A scan list generally scans a collection of channels within a specific zone and can include both analog and digital channels and a mix of channels from different repeaters. Most of the time it will pick up channels from a given repeater as shown here for PAPA Woodson. There may be a limit to how many channels your radio can have in a given scan group (16 is not uncommon).

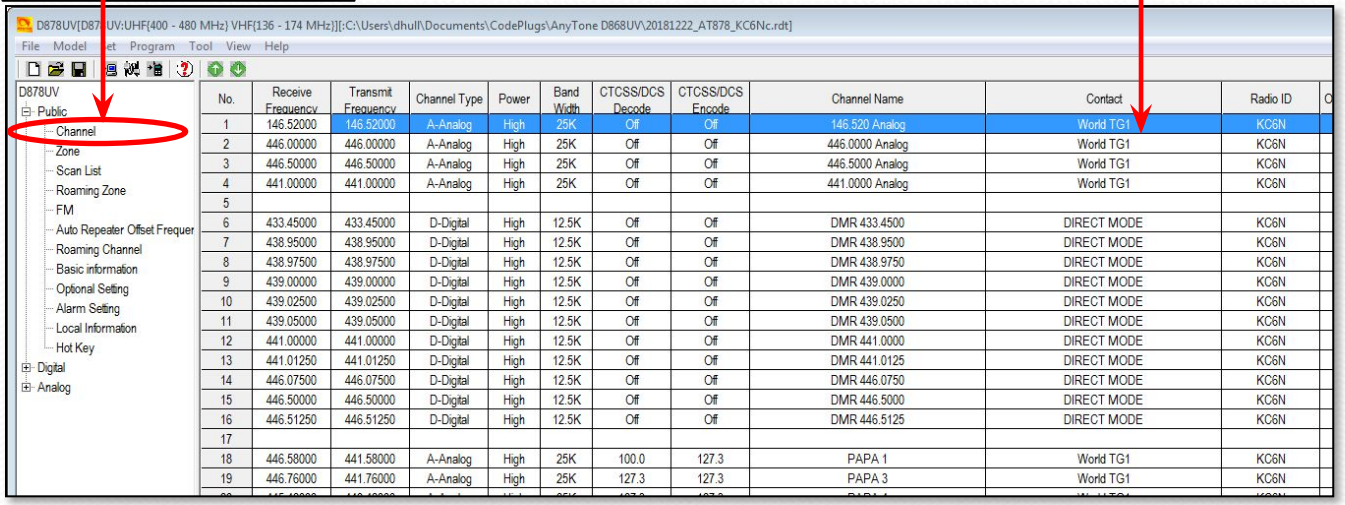


Channels:

Channels are displayed in spreadsheet form in the AnyTone CPS. A channel definition pop-up will appear if you double click on a line in the channel table. If the line is blank, you may create a new channel, if it is populated, you may edit the information for that channel. This will be shown on the next two pages.

Click Channel

Double Click channel entry to open edit window



No.	Receive Frequency	Transmit Frequency	Channel Type	Power	Band Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID
1	146.52000	146.52000	A-Analog	High	25K	Off	Off	146.520 Analog	World TG1	KC6N
2	446.00000	446.00000	A-Analog	High	25K	Off	Off	446.0000 Analog	World TG1	KC6N
3	446.50000	446.50000	A-Analog	High	25K	Off	Off	446.5000 Analog	World TG1	KC6N
4	441.00000	441.00000	A-Analog	High	25K	Off	Off	441.0000 Analog	World TG1	KC6N
5										
6	433.45000	433.45000	D-Digital	High	12.5K	Off	Off	DMR 433.4500	DIRECT MODE	KC6N
7	438.95000	438.95000	D-Digital	High	12.5K	Off	Off	DMR 438.9500	DIRECT MODE	KC6N
8	438.97500	438.97500	D-Digital	High	12.5K	Off	Off	DMR 438.9750	DIRECT MODE	KC6N
9	439.00000	439.00000	D-Digital	High	12.5K	Off	Off	DMR 439.0000	DIRECT MODE	KC6N
10	439.02500	439.02500	D-Digital	High	12.5K	Off	Off	DMR 439.0250	DIRECT MODE	KC6N
11	439.05000	439.05000	D-Digital	High	12.5K	Off	Off	DMR 439.0500	DIRECT MODE	KC6N
12	441.00000	441.00000	D-Digital	High	12.5K	Off	Off	DMR 441.0000	DIRECT MODE	KC6N
13	441.01250	441.01250	D-Digital	High	12.5K	Off	Off	DMR 441.0125	DIRECT MODE	KC6N
14	446.07500	446.07500	D-Digital	High	12.5K	Off	Off	DMR 446.0750	DIRECT MODE	KC6N
15	446.50000	446.50000	D-Digital	High	12.5K	Off	Off	DMR 446.5000	DIRECT MODE	KC6N
16	446.51250	446.51250	D-Digital	High	12.5K	Off	Off	DMR 446.5125	DIRECT MODE	KC6N
17										
18	446.58000	441.58000	A-Analog	High	25K	100.0	127.3	PAPA 1	World TG1	KC6N
19	446.76000	441.76000	A-Analog	High	25K	127.3	127.3	PAPA 3	World TG1	KC6N

Analog Channel detail:

RX Frequency

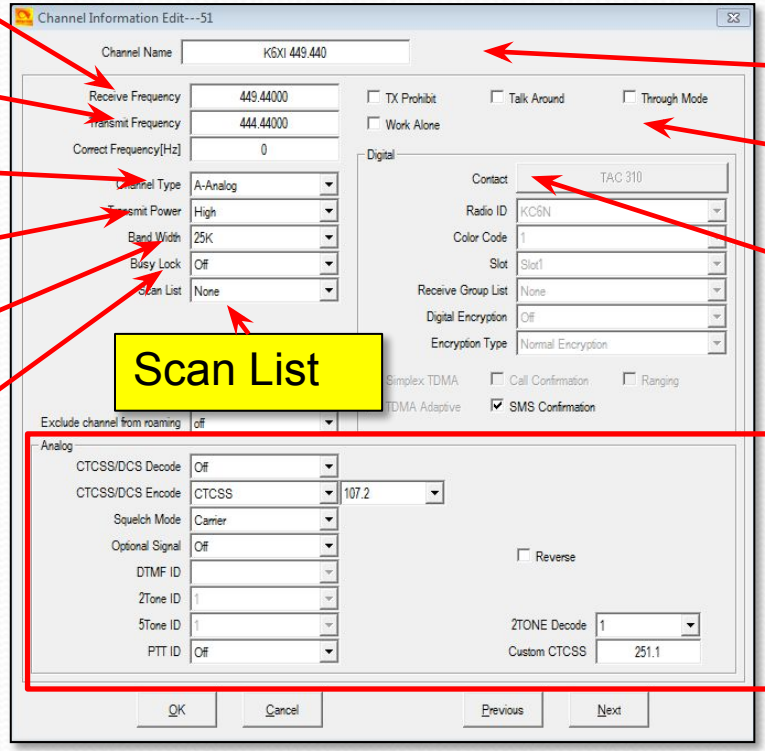
TX Frequency

Channel Type

TX Power Level

Channel BW

Admit Criteria



Scan List

Double click on a populated channel in the channel list and This dialog will appear.

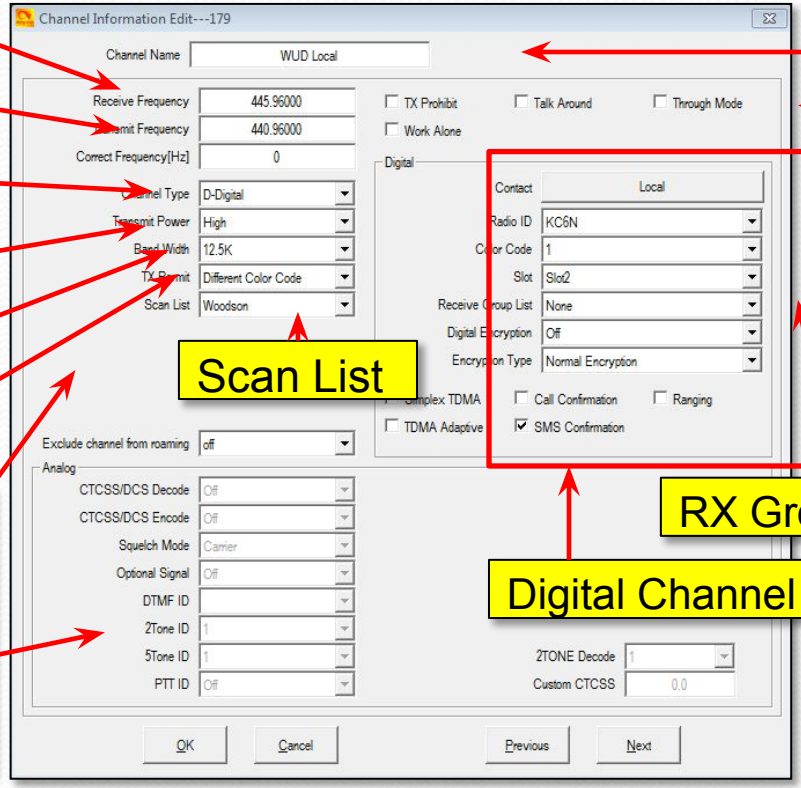
Channel Name

TX Prohibit, Talk-around, etc.

Area pertaining to digital channels is grayed out

CTCSS (PL) setup Info.

Digital Channel detail:



RX Frequency

TX Frequency

Analog/Digital

TX Power Level

Bandwidth

Admit Criteria

Scan List

Channel Name

Talk Around

TX Contact (Talk Group)

DMR ID or User

Repeater Color Code

Channel Timeslot

RX Group List

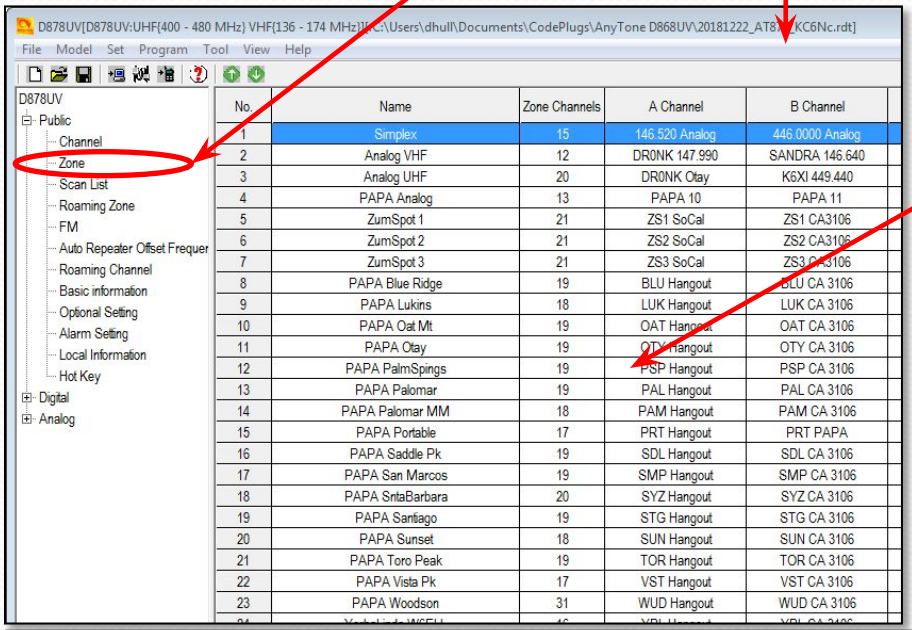
Digital Channel Info

Double click on a digital channel to bring up this dialog.

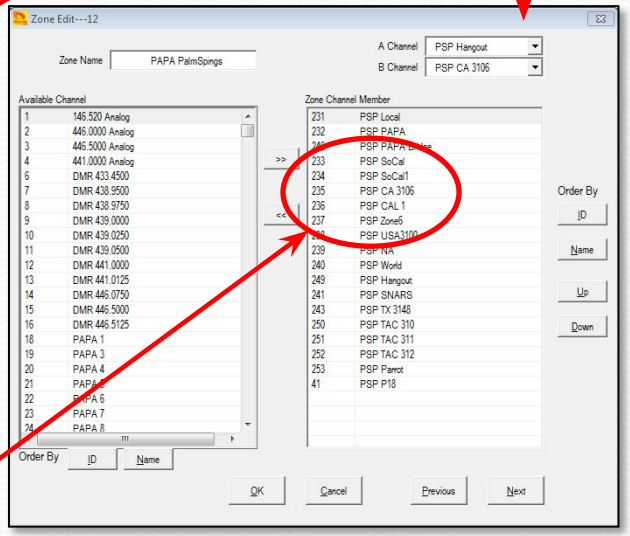
Note that the Analog Channel Specifics are greyed out for digital Channels.

Zones:

Click “Zone” in the folder tree to bring up the zone list as shown



Double click on a zone to bring up the “Zone Edit” dialog, PAPA Edom (Palm Springs) is shown below



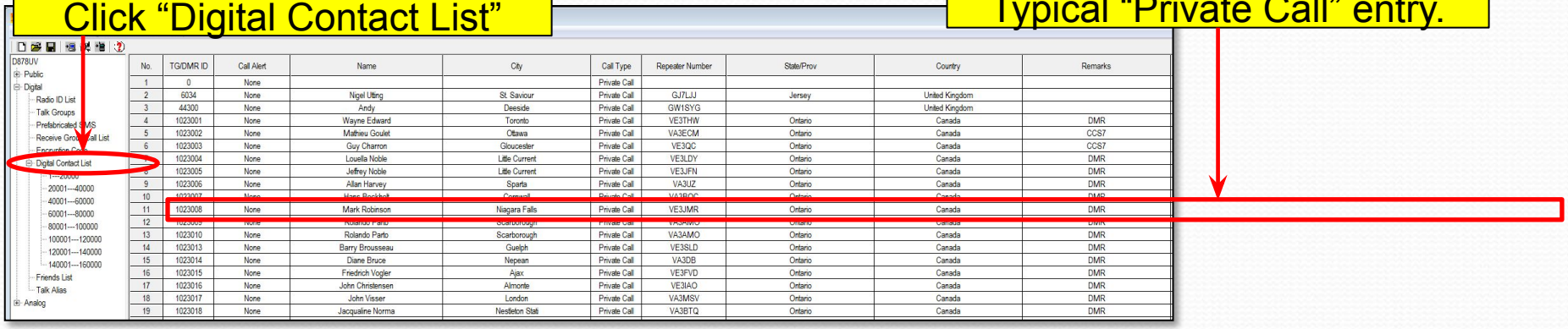
Highlight items in the available channels list on the right and use these arrows to move channels to the zone list and back

Digital Contact List:

The AnyTone AT D878 is unique in that it separates Group Calls (Talk Groups) and Private Calls (Radio ID's) into separate databases. Private calls associate a radio ID with a call sign (and other information) as shown below. This radio can hold up to 160,000 private call ID's which is quite a lot. Obviously, you cannot enter all these by hand so an automated methodology is required (and exists). However, you can add, move and edit by hand if need be. Use of this list is optional. If you don't care to see caller ID info, you can leave it empty – many users do.

Click "Digital Contact List"

Typical "Private Call" entry.



No.	TG/DMR ID	Call Alert	Name	City	Call Type	Repeater Number	State/Prov	Country	Remarks
1	0	None			Private Call				
2	6034	None	Nigel Utting	St. Saviour	Private Call	GJ7LJU	Jersey	United Kingdom	
3	44300	None	Andy	Deeside	Private Call	GW1SYG		United Kingdom	
4	1023001	None	Wayne Edward	Toronto	Private Call	VE3THW	Ontario	Canada	DMR
5	1023002	None	Mathieu Goulet	Ottawa	Private Call	VA3ECM	Ontario	Canada	CCS7
6	1023003	None	Guy Charron	Gloucester	Private Call	VE3QC	Ontario	Canada	CCS7
7	1023004	None	Louella Noble	Little Current	Private Call	VE3LDY	Ontario	Canada	DMR
8	1023005	None	Jeffrey Noble	Little Current	Private Call	VE3JFN	Ontario	Canada	DMR
9	1023006	None	Allan Harvey	Sparta	Private Call	VA3UZ	Ontario	Canada	DMR
10	1023007	None	Hans Rockhoff	Cornwall	Private Call	VA3ROC	Ontario	Canada	DMR
11	1023008	None	Mark Robinson	Niagara Falls	Private Call	VE3JMR	Ontario	Canada	DMR
12	1023009	None	Rolando Parlo	Scarborough	Private Call	VA3AMO	Ontario	Canada	DMR
13	1023010	None	Rolando Parlo	Scarborough	Private Call	VA3AMO	Ontario	Canada	DMR
14	1023013	None	Barry Brousseau	Guelph	Private Call	VE3SLD	Ontario	Canada	DMR
15	1023014	None	Diane Bruce	Nepean	Private Call	VA3DB	Ontario	Canada	DMR
16	1023015	None	Friedrich Vogler	Ajax	Private Call	VE3FVD	Ontario	Canada	DMR
17	1023016	None	John Christensen	Almonte	Private Call	VE3IAO	Ontario	Canada	DMR
18	1023017	None	John Visser	London	Private Call	VA3MSV	Ontario	Canada	DMR
19	1023018	None	Jacqualine Norma	Nestleton Stati	Private Call	VA3BTQ	Ontario	Canada	DMR

AT D878 CodePlug 101

Part III

Code Plug management concepts

Code Plug Creation

- The workflow for code plug creation is:
  - Enter your User ID (Section II)
  - Enter the contact data (specifically the talk-groups). Private calls are optional.
  - Create a blank Scan List and a blank Zone
  - Create the channels for the zone
  - Populate the Zone and Scan Lists
  - Configure the programmable buttons
  - *Remember to save periodically*

AT D878 CodePlug 101

Part IIIa

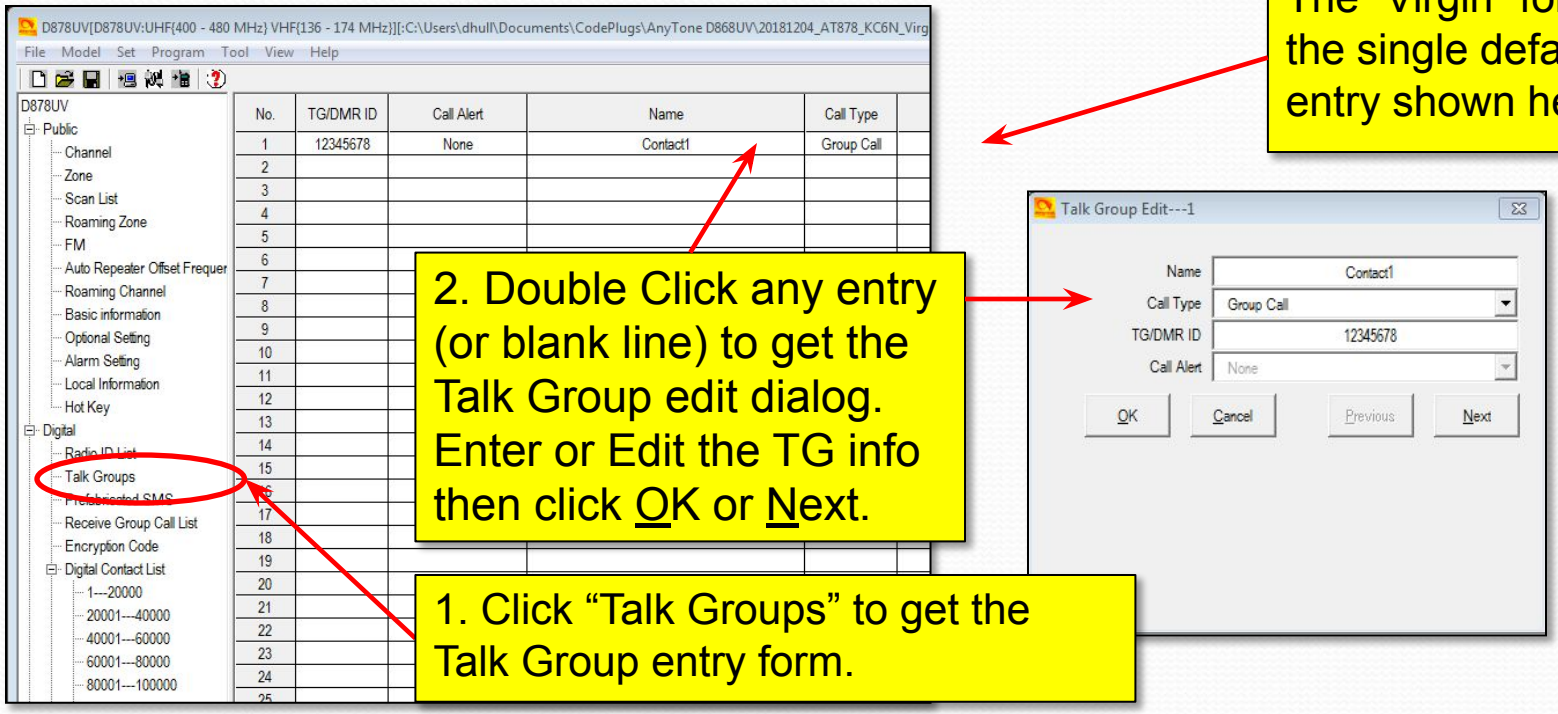
Code Plug Management Concepts

(Creating and Managing Group ID's)

Contact Basics

- Contact information determines how your radio interacts with the DMR network
- Contacts come in four flavors:
  - **Private Call:** Calls to (or from) single radios (your "Contact List")
  - **Group Call:** Calls to Groups of users (your selection of Talk Group ID's)
  - **All Call:** Not *usually* used in Ham Radio
  - **Broadcast Call:** Not used in Ham Radio

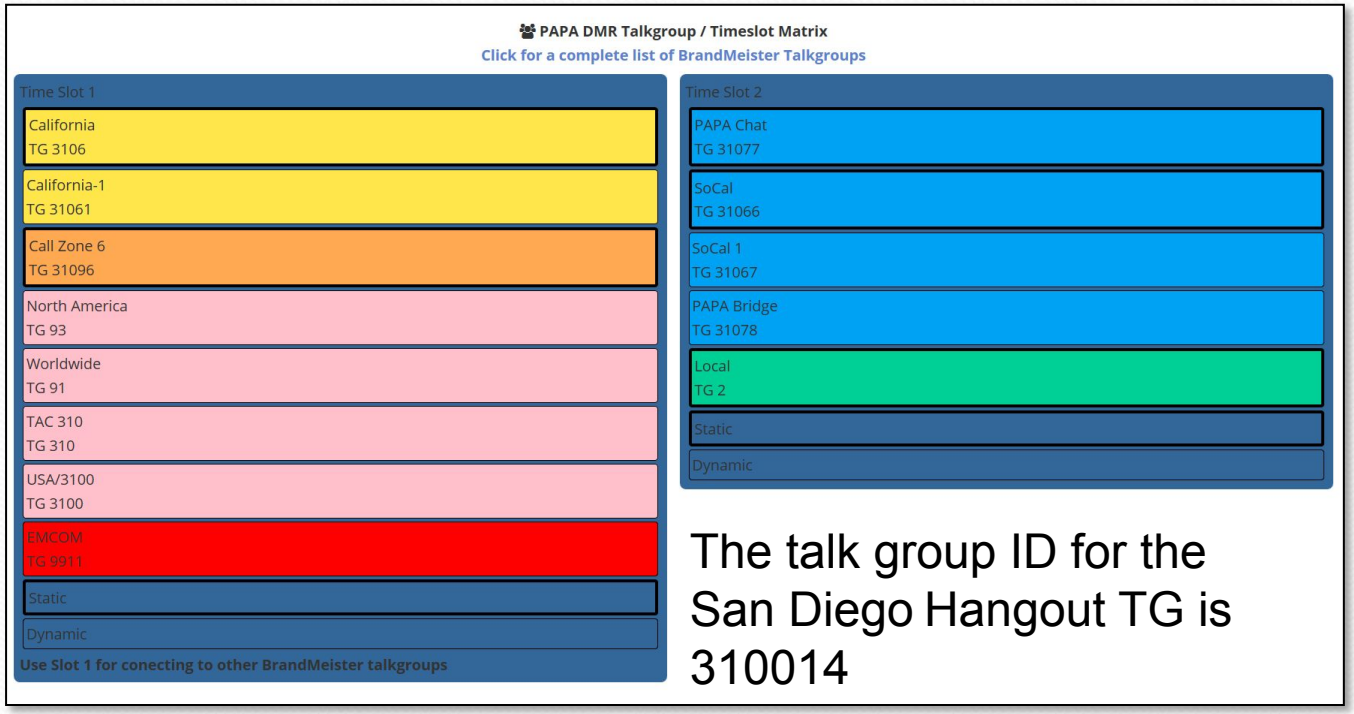
Contacts (group/private Calls):



Adding contacts

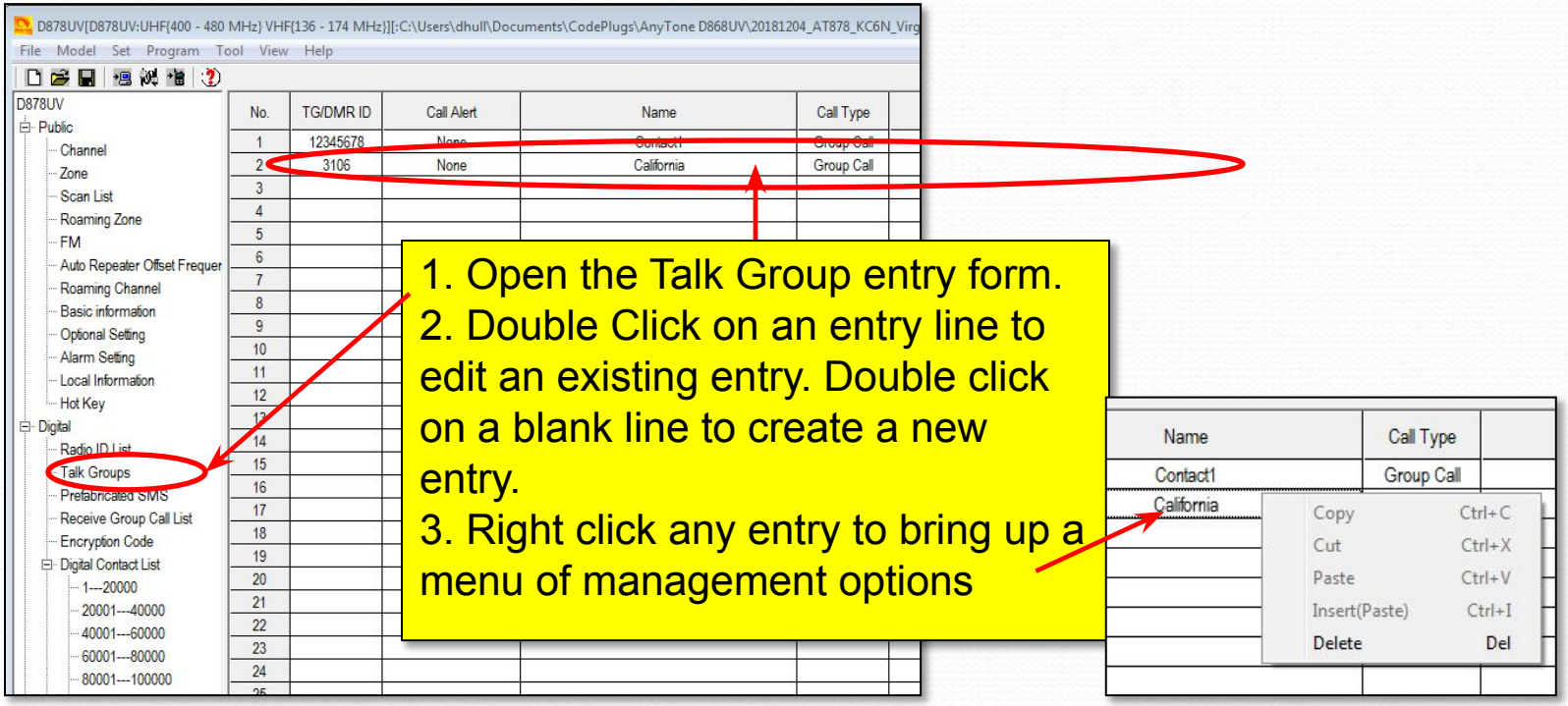
- We will add the following contacts to a “virgin” code plug:
  - Talk Groups: Local, PAPA, SoCal, SoCal1, Cal 3106, CA 1, Zone6, Bridge, NoAmer, World, TAC310, BM Parrot GC, Direct 99 and San Diego Hangout.
- This will allow us to create Channels, as well as Scan and Zone Lists
- We will use the PAPA system TG profiles

PAPA Group Lineup

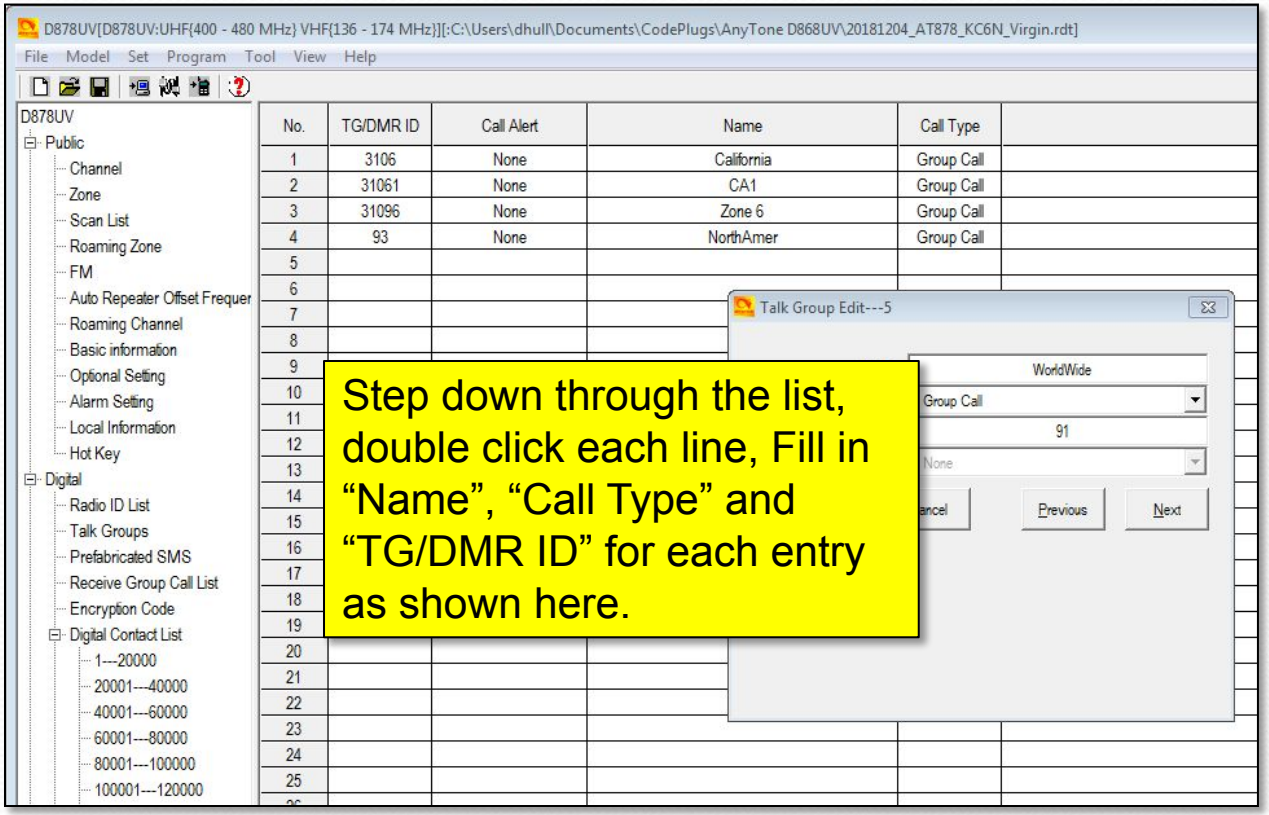


The talk group ID for the San Diego Hangout TG is 310014

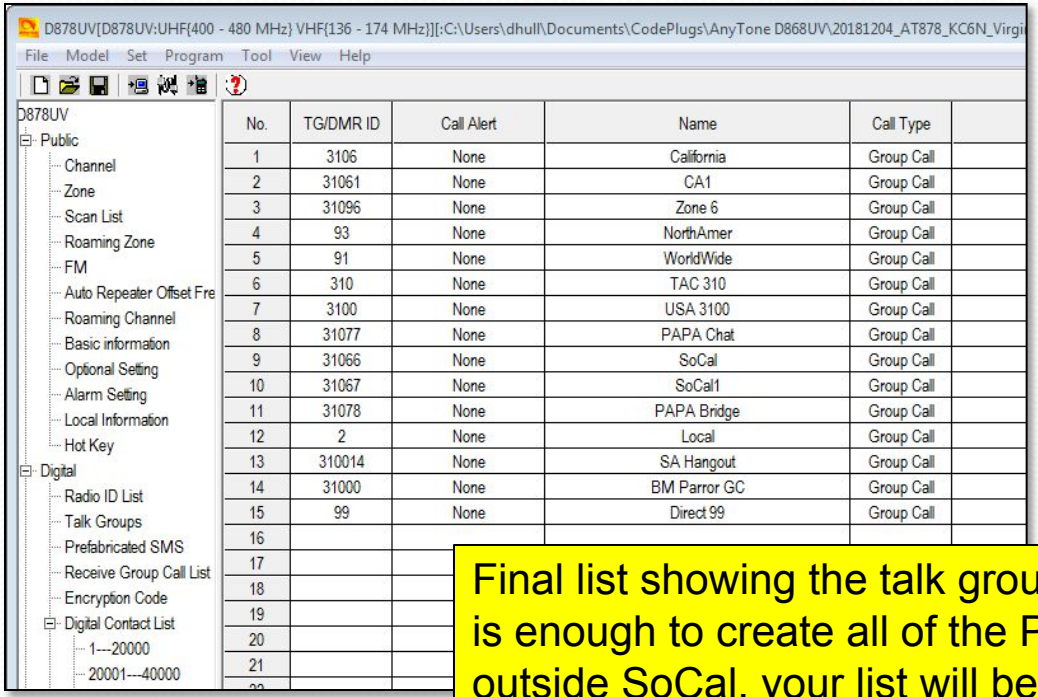
Contacts (group Calls):



Populate the Group Call List:



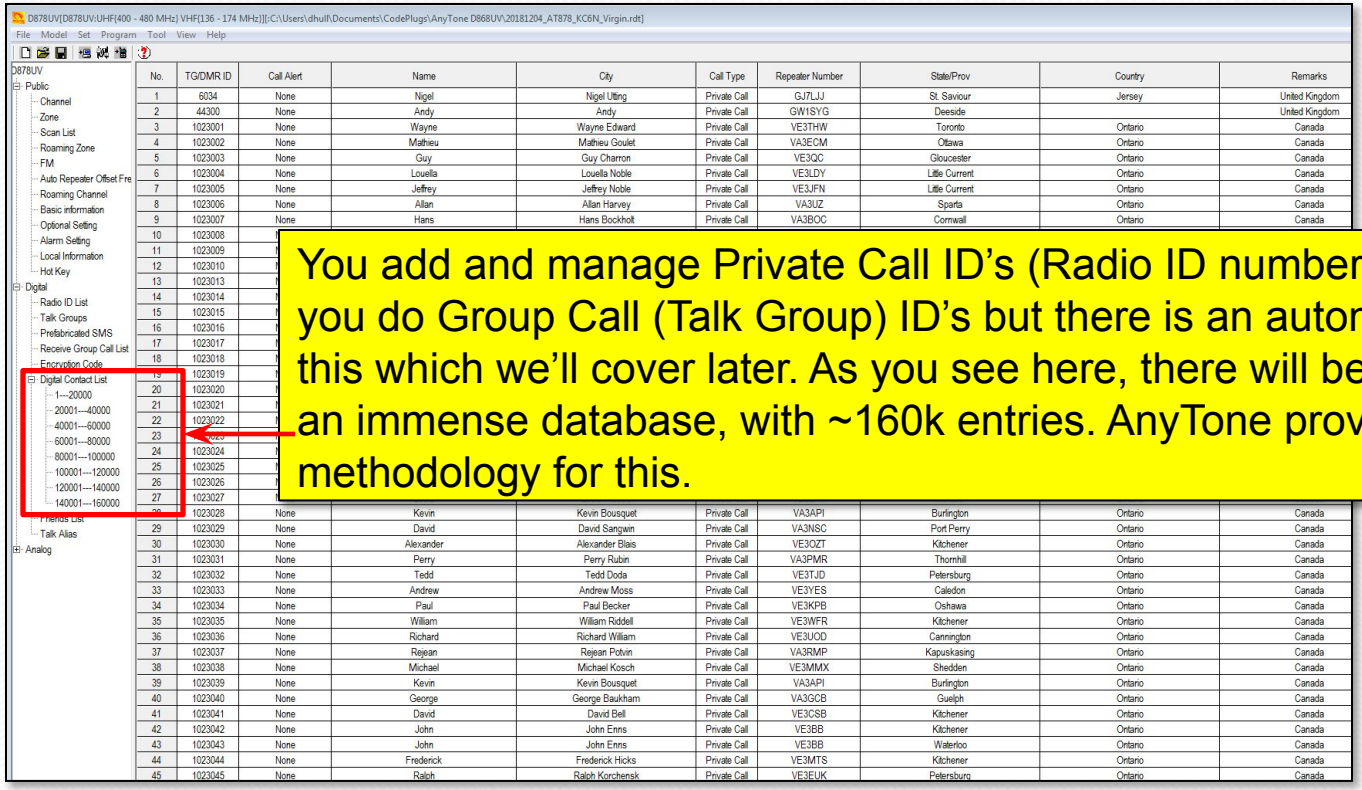
Final Populated Group Call List:



No.	TG/DMR ID	Call Alert	Name	Call Type
1	3106	None	California	Group Call
2	31061	None	CA1	Group Call
3	31096	None	Zone 6	Group Call
4	93	None	NorthAmer	Group Call
5	91	None	WorldWide	Group Call
6	310	None	TAC 310	Group Call
7	3100	None	USA 3100	Group Call
8	31077	None	PAPA Chat	Group Call
9	31066	None	SoCal	Group Call
10	31067	None	SoCal1	Group Call
11	31078	None	PAPA Bridge	Group Call
12	2	None	Local	Group Call
13	310014	None	SA Hangout	Group Call
14	31000	None	BM Parror GC	Group Call
15	99	None	Direct 99	Group Call
16				
17				
18				
19				
20				
21				

Final list showing the talk groups to be used in this exercise. This is enough to create all of the PAPA repeater zones. If you are outside SoCal, your list will be different. Contact your local club or local repeater owners for the talk group profiles for repeaters in your local area.

“Private Call” ID’s



No.	TG/DMR ID	Call Alert	Name	City	Call Type	Repeater Number	State/Prov	Country	Remarks
1	6034	None	Nigel	Nigel Utting	Private Call	GJ7LJJ	St. Saviour	Jersey	United Kingdom
2	44300	None	Andy	Andy	Private Call	GW1SYG	Deeside		United Kingdom
3	1023001	None	Wayne	Wayne Edward	Private Call	VE3THW	Toronto	Ontario	Canada
4	1023002	None	Mathieu	Mathieu Goulet	Private Call	VA3ECM	Ottawa	Ontario	Canada
5	1023003	None	Guy	Guy Charron	Private Call	VE3QC	Gloucester	Ontario	Canada
6	1023004	None	Louella	Louella Noble	Private Call	VE3LDY	Little Current	Ontario	Canada
7	1023005	None	Jeffrey	Jeffrey Noble	Private Call	VE3JFN	Little Current	Ontario	Canada
8	1023006	None	Allan	Allan Harvey	Private Call	VA3UZ	Sparta	Ontario	Canada
9	1023007	None	Hans	Hans Bockholt	Private Call	VA3BOC	Cornwall	Ontario	Canada
10	1023008	N							
11	1023009	N							
12	1023010	N							
13	1023013	N							
14	1023014	N							
15	1023015	N							
16	1023016	N							
17	1023017	N							
18	1023018	N							
19	1023019	N							
20	1023020	N							
21	1023021	N							
22	1023022	N							
23	1023								
24	1023024	N							
25	1023025	N							
26	1023026	N							
27	1023027	N							
28	1023028	None	Kevin	Kevin Bousquet	Private Call	VA3APJ	Burlington	Ontario	Canada
29	1023029	None	David	David Sangwin	Private Call	VA3NSC	Port Perry	Ontario	Canada
30	1023030	None	Alexander	Alexander Blais	Private Call	VE3OZT	Kitchener	Ontario	Canada
31	1023031	None	Perry	Perry Rubin	Private Call	VA3PMR	Thornhill	Ontario	Canada
32	1023032	None	Tedd	Tedd Doda	Private Call	VE3TJD	Petersburg	Ontario	Canada
33	1023033	None	Andrew	Andrew Moss	Private Call	VE3YES	Caledon	Ontario	Canada
34	1023034	None	Paul	Paul Becker	Private Call	VE3KPB	Oshawa	Ontario	Canada
35	1023035	None	William	William Riddell	Private Call	VE3WFR	Kitchener	Ontario	Canada
36	1023036	None	Richard	Richard William	Private Call	VE3UOD	Cannington	Ontario	Canada
37	1023037	None	Rejean	Rejean Potvin	Private Call	VA3RMP	Kapuskasing	Ontario	Canada
38	1023038	None	Michael	Michael Kosch	Private Call	VE3MMX	Shedden	Ontario	Canada
39	1023039	None	Kevin	Kevin Bousquet	Private Call	VA3APJ	Burlington	Ontario	Canada
40	1023040	None	George	George Baukham	Private Call	VA3GCB	Guelph	Ontario	Canada
41	1023041	None	David	David Bell	Private Call	VE3CSB	Kitchener	Ontario	Canada
42	1023042	None	John	John Enns	Private Call	VE3BB	Kitchener	Ontario	Canada
43	1023043	None	John	John Enns	Private Call	VE3BB	Waterloo	Ontario	Canada
44	1023044	None	Frederick	Frederick Hicks	Private Call	VE3MTS	Kitchener	Ontario	Canada
45	1023045	None	Ralph	Ralph Korchensk	Private Call	VE3EUK	Petersburg	Ontario	Canada

You add and manage Private Call ID’s (Radio ID numbers) the same way you do Group Call (Talk Group) ID’s but there is an automated way to do this which we’ll cover later. As you see here, there will be lots of these. It is an immense database, with ~160k entries. AnyTone provides an automated methodology for this.

AT D878 CodePlug 101

Part IIIb

Code Plug management Concepts

(Adding Channels)

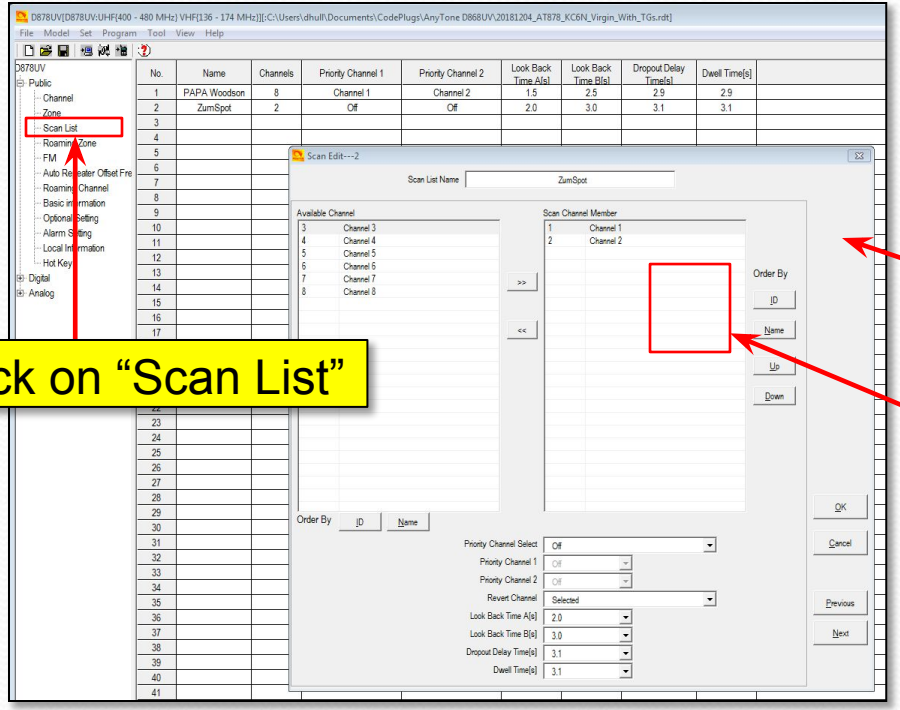
Adding Channels

- We did Group Calls first since we need these for the digital channel definitions
- We do the channels next since they have to be in place in order to define the Zone and to finalize the Scan lists.
- We will create:
  - The PAPA Woodson zone,
  - A Hot Spot zone, and
  - Analog and Simplex Channels

Scan List Place holders

- Before we create the channels, we need to create a placeholder for their scan lists
- We will create the following two scan lists to be populated later:
  - PAPA Woodson
  - ZumSpot
- At this point you should enter your DMR ID as described in Section II

Create two scan groups

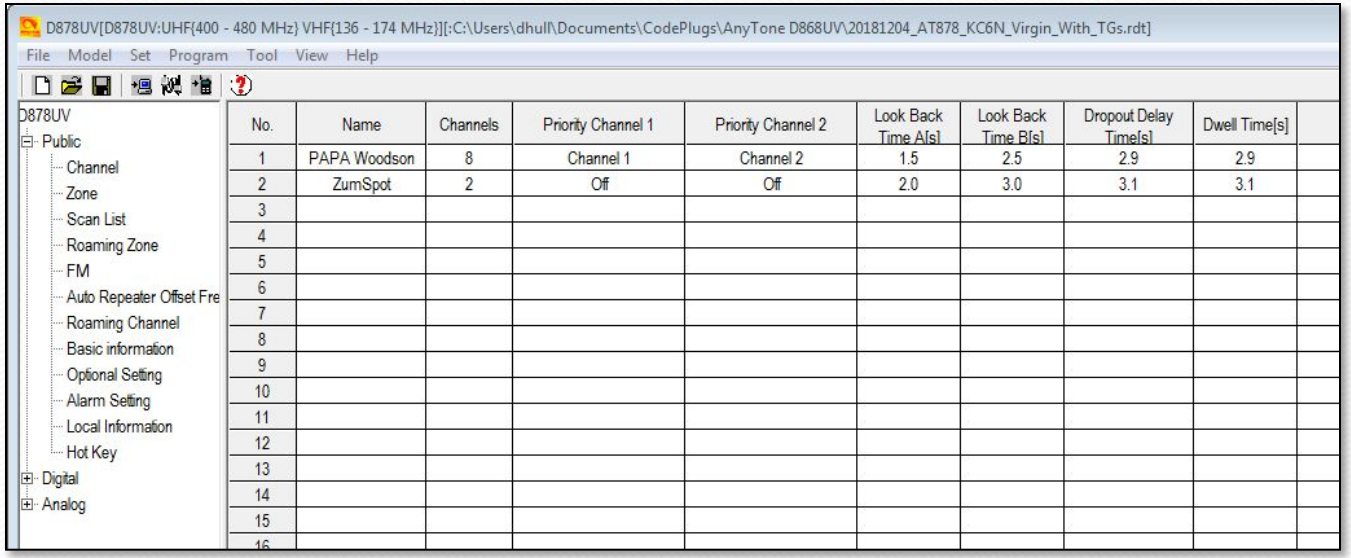


1. Double Click on the default entry and rename it PAPA Woodson
2. Add a second entry and call it ZumSpot

Make sure that there are a couple channels in there (or it won’t save)

Move channels into the “membership list” (and out) using these buttons. It doesn’t matter which at this point.

Create two scan groups



No.	Name	Channels	Priority Channel 1	Priority Channel 2	Look Back Time A[s]	Look Back Time B[s]	Dropout Delay Time[s]	Dwell Time[s]
1	PAPA Woodson	8	Channel 1	Channel 2	1.5	2.5	2.9	2.9
2	ZumSpot	2	Off	Off	2.0	3.0	3.1	3.1
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

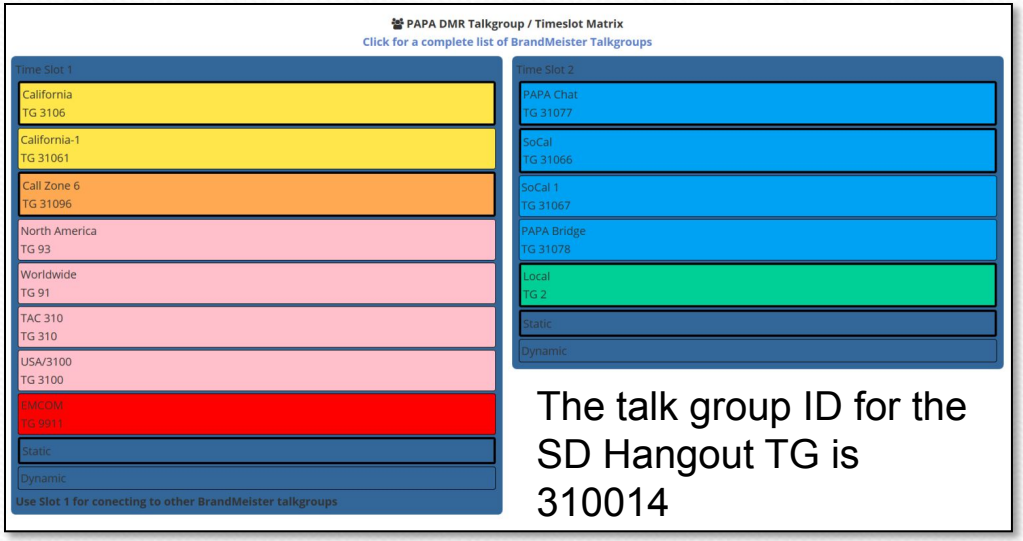
Your scan should now look like this, with two “dummy” scan groups as shown. We will reference these when we create channels and populate them later.

Digital Channels

- We now have a dummy scan list for each zone (but haven't populated them yet)
- We will create channels for two Zones
  - PAPA Woodson (448.520 (-) Color Code 1)
  - HotSpot (438.250 (Simplex) Color Code 1)
- We will then proceed to build the Zone lists and populate the Scan lists that we just created.

Building PAPA Woodson

- The TG Setup for PAPA Woodson is shown in the table below:



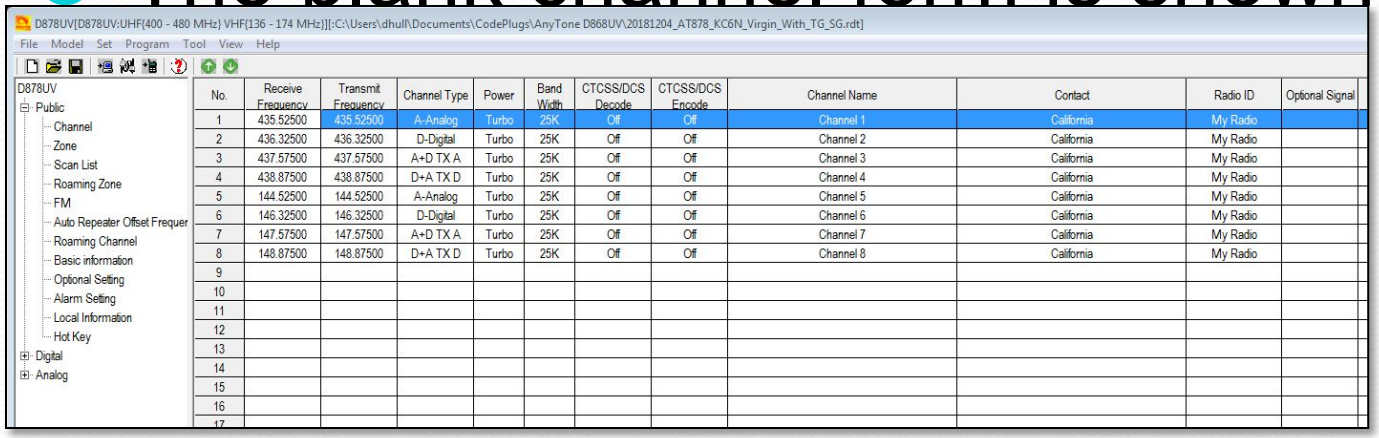
The talk group ID for the SD Hangout TG is 310014

Digital Channel Creation

- We are going to create 14 digital channels for the PAPA Woodson Zone as follows:
  - We will make one master channel which will have the pair Frequencies, Color Code, Scan Group, Power level etc.
  - We will then replicate this “template channel” 13 more times
  - We will then edit each of these channels, to add the Name, Time Slot and TG ID

PAPA Woodson Channels

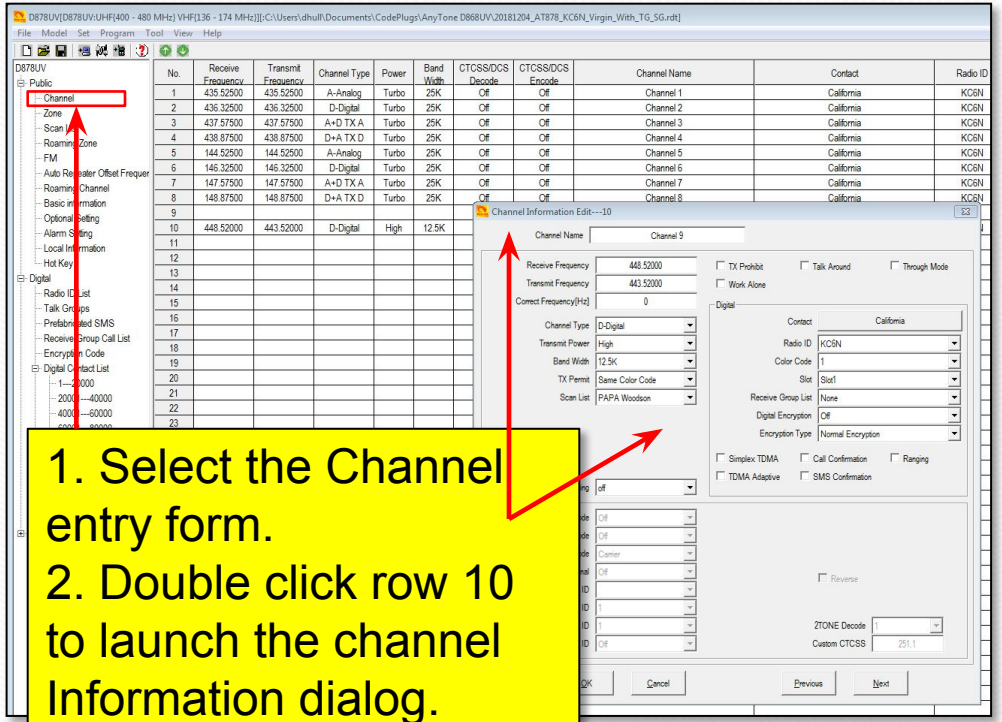
- The blank channel form is shown below



No.	Receive Frequency	Transmit Frequency	Channel Type	Power	Band Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID	Optional Signal
1	435.52500	435.52500	A-Analog	Turbo	25K	Off	Off	Channel 1	California	My Radio	
2	436.32500	436.32500	D-Digital	Turbo	25K	Off	Off	Channel 2	California	My Radio	
3	437.57500	437.57500	A+D TX A	Turbo	25K	Off	Off	Channel 3	California	My Radio	
4	438.87500	438.87500	D+A TX D	Turbo	25K	Off	Off	Channel 4	California	My Radio	
5	144.52500	144.52500	A-Analog	Turbo	25K	Off	Off	Channel 5	California	My Radio	
6	146.32500	146.32500	D-Digital	Turbo	25K	Off	Off	Channel 6	California	My Radio	
7	147.57500	147.57500	A+D TX A	Turbo	25K	Off	Off	Channel 7	California	My Radio	
8	148.87500	148.87500	D+A TX D	Turbo	25K	Off	Off	Channel 8	California	My Radio	
9											
10											
11											
12											
13											
14											
15											
16											
17											

My “virgin” radio already had a few channels populated as shown above. These are examples. You can copy and paste from these or create your own. For the purposes of this discussion we will leave these and create 14 new ones of our own, starting at line 10.

Build Woodson Template

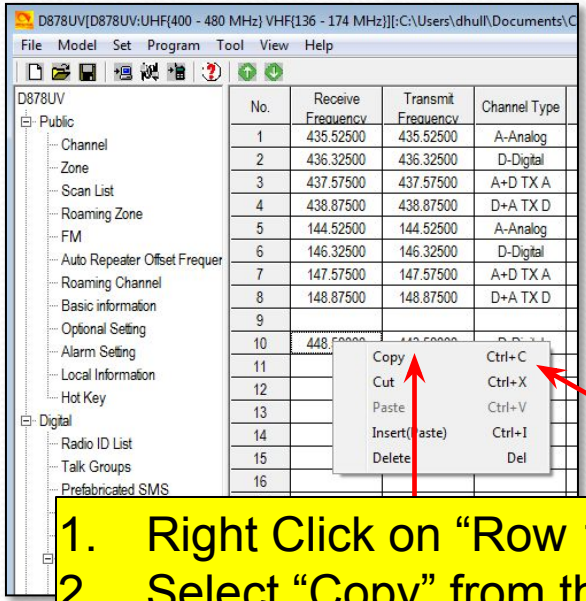


1. Select the Channel entry form.
2. Double click row 10 to launch the channel Information dialog.

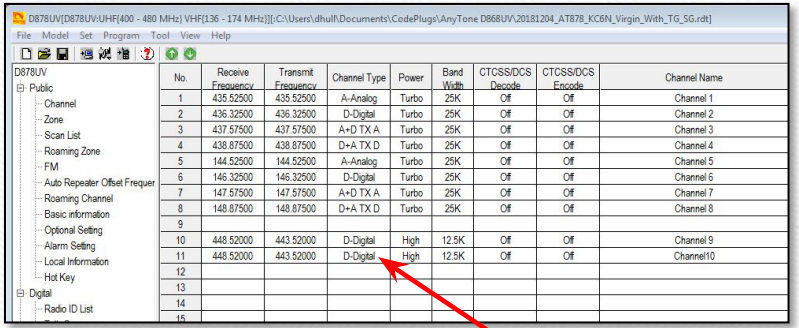
3. Edit the page as shown:
   - Color code = 1
   - Scan List=PAPA WUD
   - RX = 448.520
   - TX = 443.520
   - Power Level = High
   - TX Admit=Color Code
   - Time Out=180 sec
   - Parameters should match here
   - Click “OK”

Replicate the Template

- Add Placeholders for the 14 channels

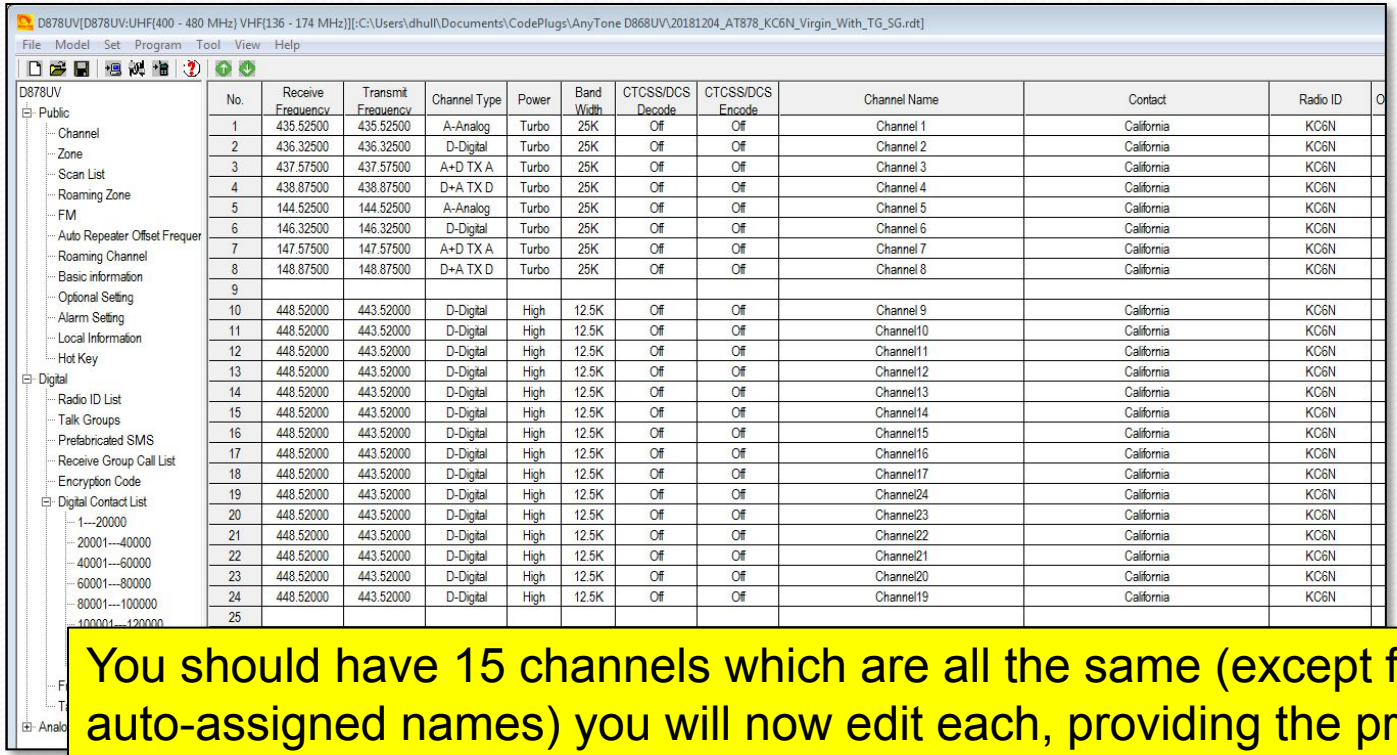


1. Right Click on “Row 10”
2. Select “Copy” from the pulldown



3. Right Click on “Row 11”
4. Click “Insert” to insert a copy of the Row 11 information (the Woodson template)
5. Repeat this until you have 14 rows created as shown on the next page. I added an extra one just in case.

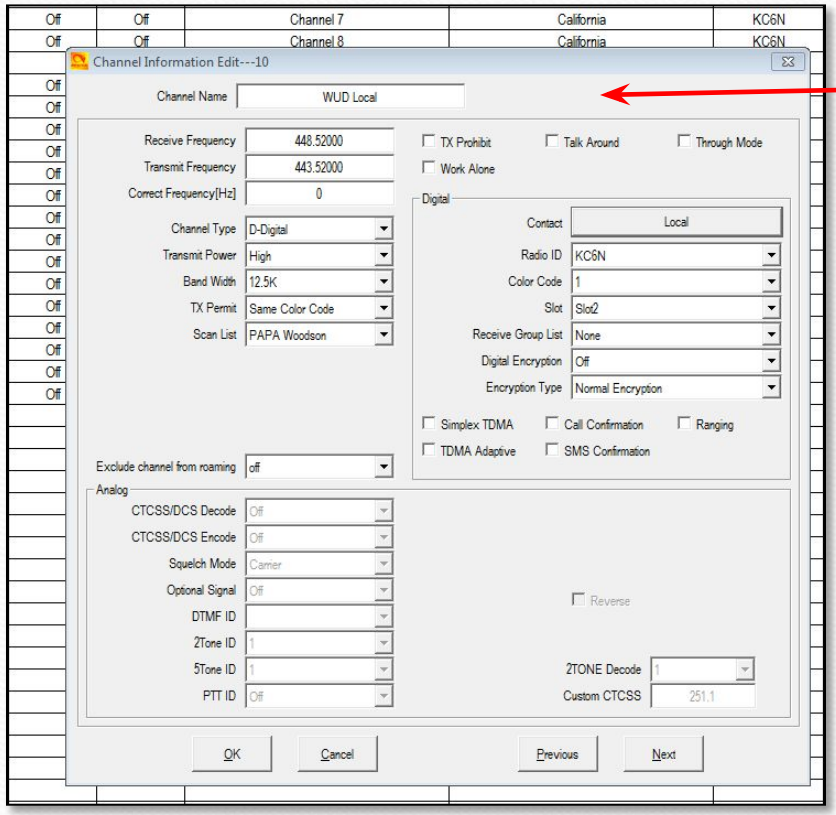
Woodson CH Templates



No.	Receive Frequency	Transmit Frequency	Channel Type	Power	Band Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID	O
1	435.52500	435.52500	A-Analog	Turbo	25K	Off	Off	Channel 1	California	KC6N	
2	436.32500	436.32500	D-Digital	Turbo	25K	Off	Off	Channel 2	California	KC6N	
3	437.57500	437.57500	A+D TX A	Turbo	25K	Off	Off	Channel 3	California	KC6N	
4	438.87500	438.87500	D+A TX D	Turbo	25K	Off	Off	Channel 4	California	KC6N	
5	144.52500	144.52500	A-Analog	Turbo	25K	Off	Off	Channel 5	California	KC6N	
6	146.32500	146.32500	D-Digital	Turbo	25K	Off	Off	Channel 6	California	KC6N	
7	147.57500	147.57500	A+D TX A	Turbo	25K	Off	Off	Channel 7	California	KC6N	
8	148.87500	148.87500	D+A TX D	Turbo	25K	Off	Off	Channel 8	California	KC6N	
9											
10	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel 9	California	KC6N	
11	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel10	California	KC6N	
12	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel11	California	KC6N	
13	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel12	California	KC6N	
14	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel13	California	KC6N	
15	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel14	California	KC6N	
16	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel15	California	KC6N	
17	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel16	California	KC6N	
18	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel17	California	KC6N	
19	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel24	California	KC6N	
20	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel23	California	KC6N	
21	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel22	California	KC6N	
22	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel21	California	KC6N	
23	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel20	California	KC6N	
24	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	Channel19	California	KC6N	
25											

You should have 15 channels which are all the same (except for the auto-assigned names) you will now edit each, providing the proper name, talk group and time-slot to match the PAPA channel profile shown earlier.

PAPA Woodson Channels

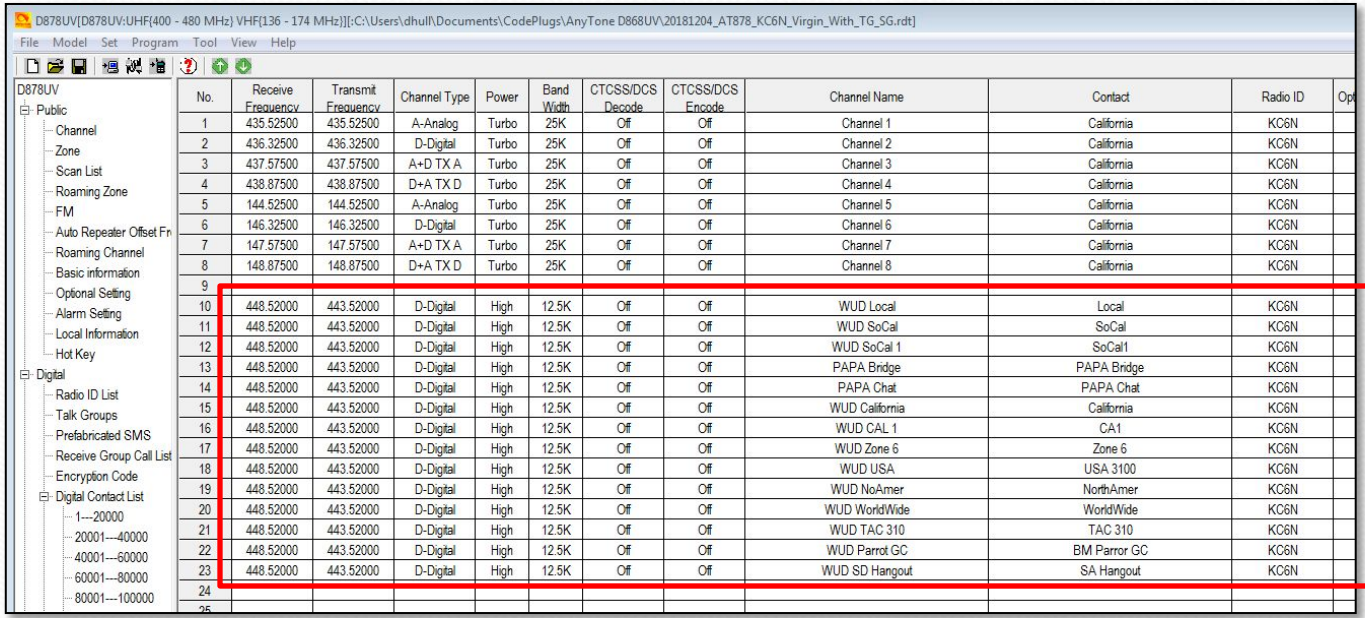


Make Woodson Local:

- Set Channel Name = “Local WUD”
- Set Contact = “Local” (click the button then double click the correct TGID from selections)
- Set Repeater/Time slot = “Slot 2”

Do this for all 15 of the channel place-holders that you created So that each channel has a unique name, references the proper talk group and correct TDMA time slot.

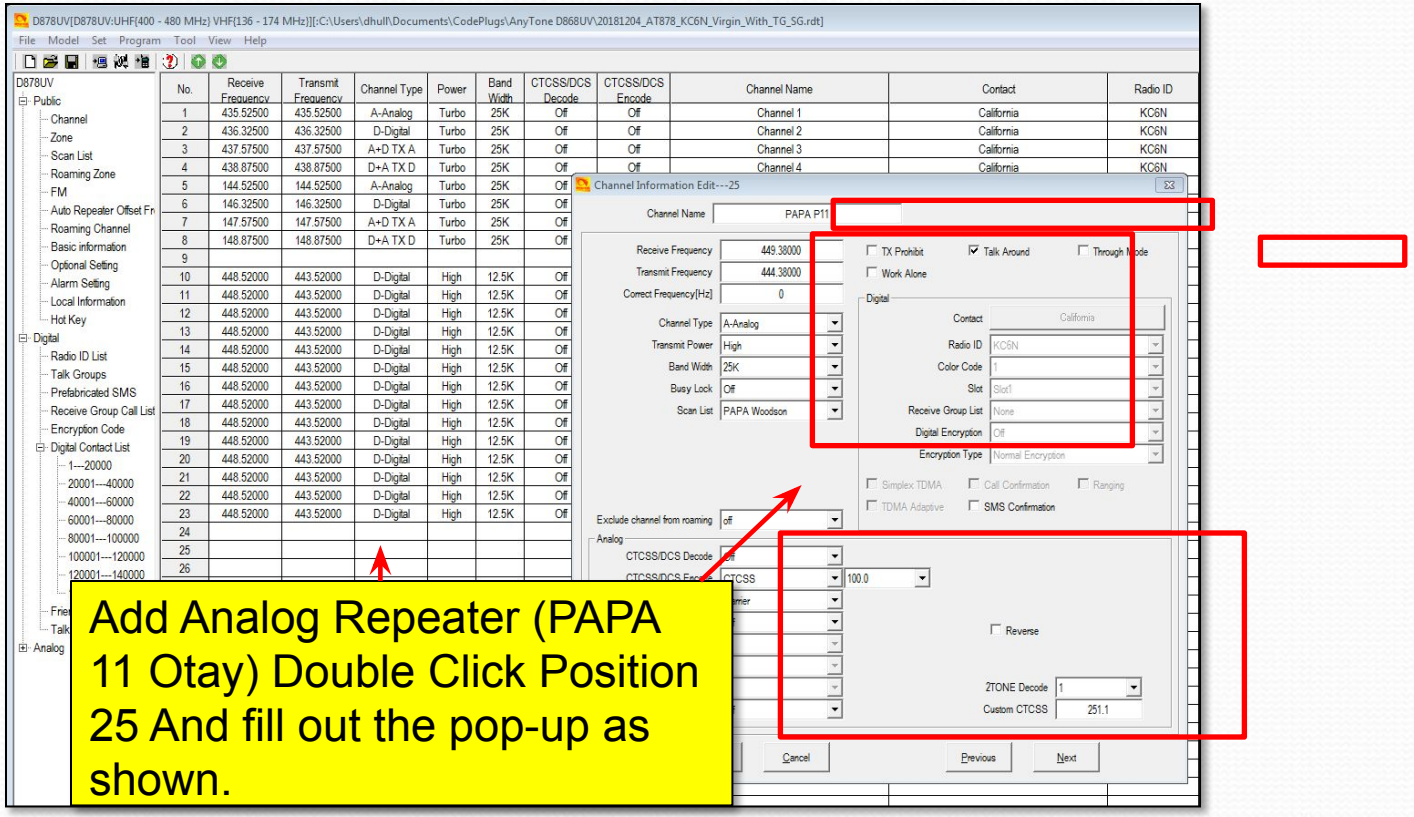
Enter remaining channels



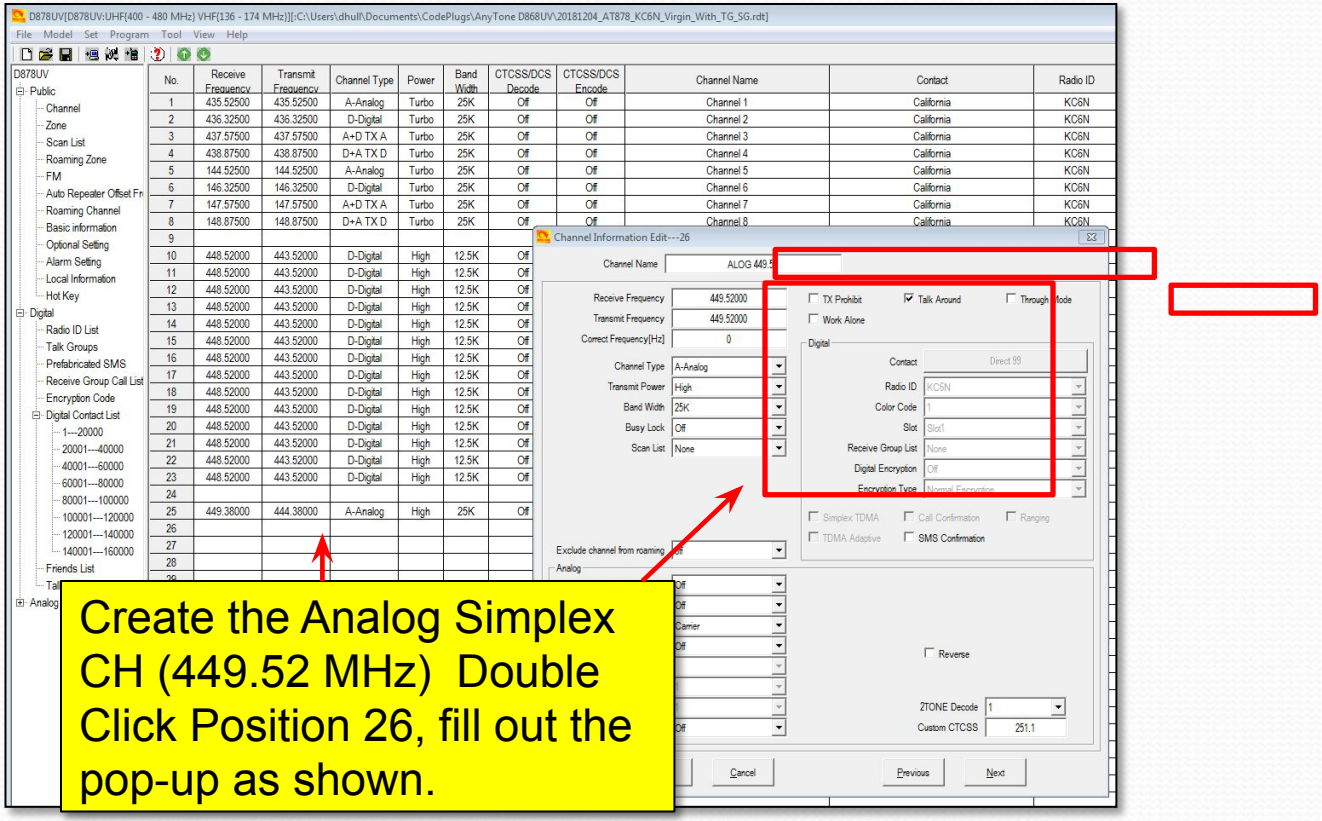
No.	Receive Frequency	Transmit Frequency	Channel Type	Power	Band Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID	Opt
1	435.52500	435.52500	A-Analog	Turbo	25K	Off	Off	Channel 1	California	KC6N	
2	436.32500	436.32500	D-Digital	Turbo	25K	Off	Off	Channel 2	California	KC6N	
3	437.57500	437.57500	A+D TX A	Turbo	25K	Off	Off	Channel 3	California	KC6N	
4	438.87500	438.87500	D+A TX D	Turbo	25K	Off	Off	Channel 4	California	KC6N	
5	144.52500	144.52500	A-Analog	Turbo	25K	Off	Off	Channel 5	California	KC6N	
6	146.32500	146.32500	D-Digital	Turbo	25K	Off	Off	Channel 6	California	KC6N	
7	147.57500	147.57500	A+D TX A	Turbo	25K	Off	Off	Channel 7	California	KC6N	
8	148.87500	148.87500	D+A TX D	Turbo	25K	Off	Off	Channel 8	California	KC6N	
9											
10	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD Local	Local	KC6N	
11	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD SoCal	SoCal	KC6N	
12	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD SoCal 1	SoCal1	KC6N	
13	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	PAPA Bridge	PAPA Bridge	KC6N	
14	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	PAPA Chat	PAPA Chat	KC6N	
15	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD California	California	KC6N	
16	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD CAL 1	CA1	KC6N	
17	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD Zone 6	Zone 6	KC6N	
18	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD USA	USA 3100	KC6N	
19	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD NoAmer	NorthAmer	KC6N	
20	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD WorldWide	WorldWide	KC6N	
21	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD TAC 310	TAC 310	KC6N	
22	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD Parrot GC	BM Parror GC	KC6N	
23	448.52000	443.52000	D-Digital	High	12.5K	Off	Off	WUD SD Hangout	SA Hangout	KC6N	
24											

Your final channel list should look like this. Double check all the channels. Name, TS, TG should be correct. This would be a really good time to *Save your file*

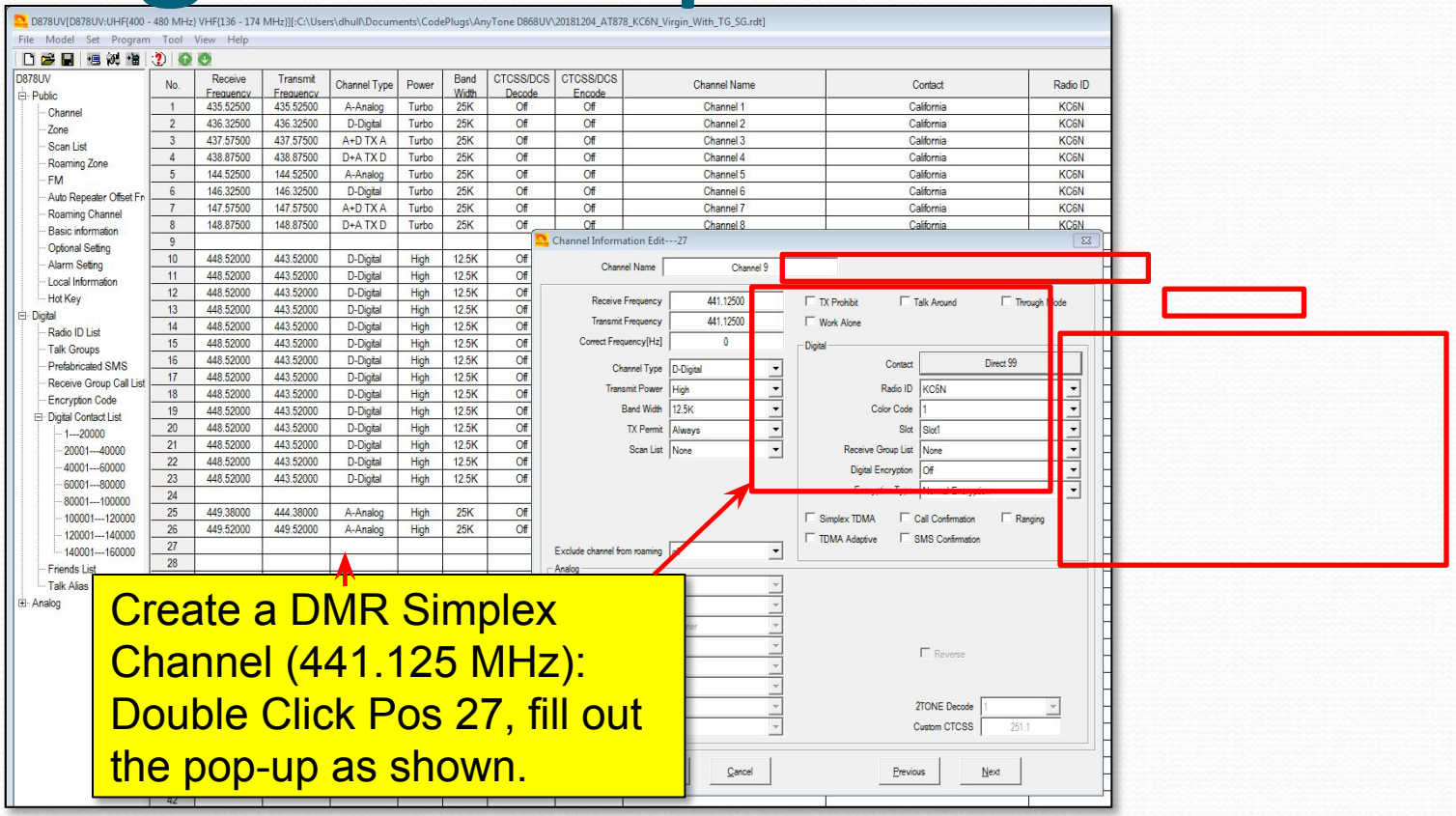
Analog Repeater



Analog Simplex Channel



Digital Simplex Channel



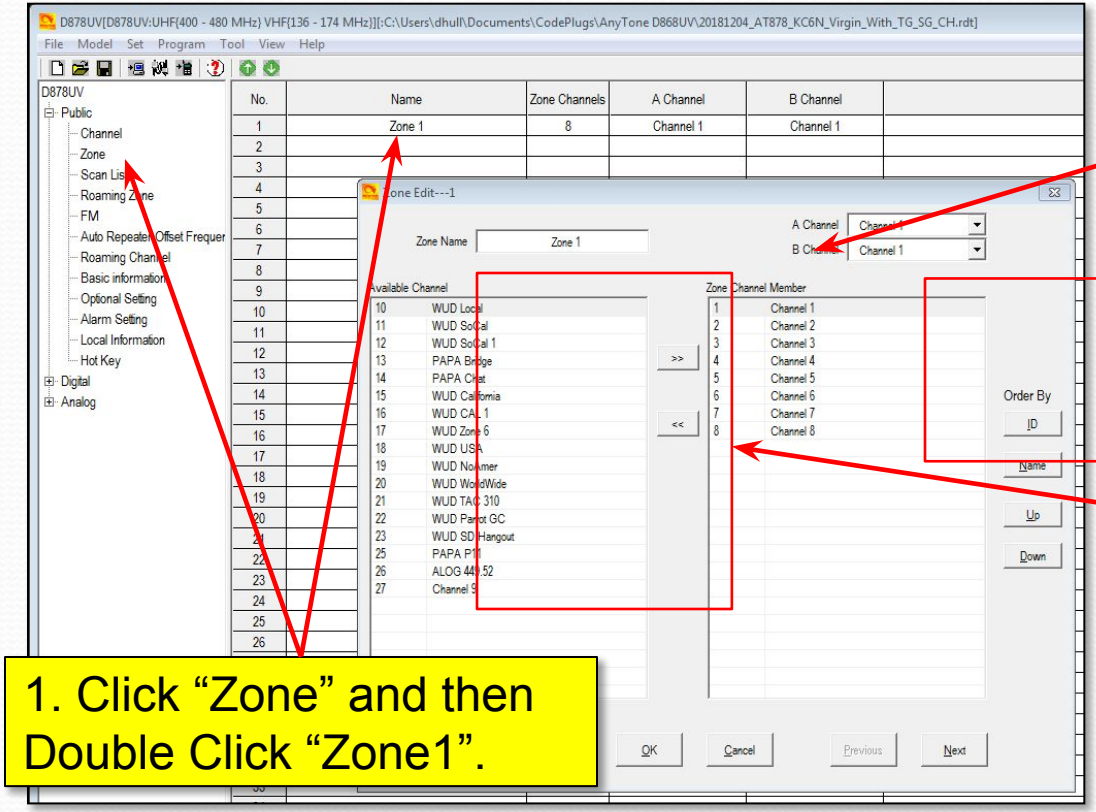
AT D878 CodePlug 101

Part IIIc

Code Plug management Concepts

(Populate the zone and scan lists)

Create Woodson Zone



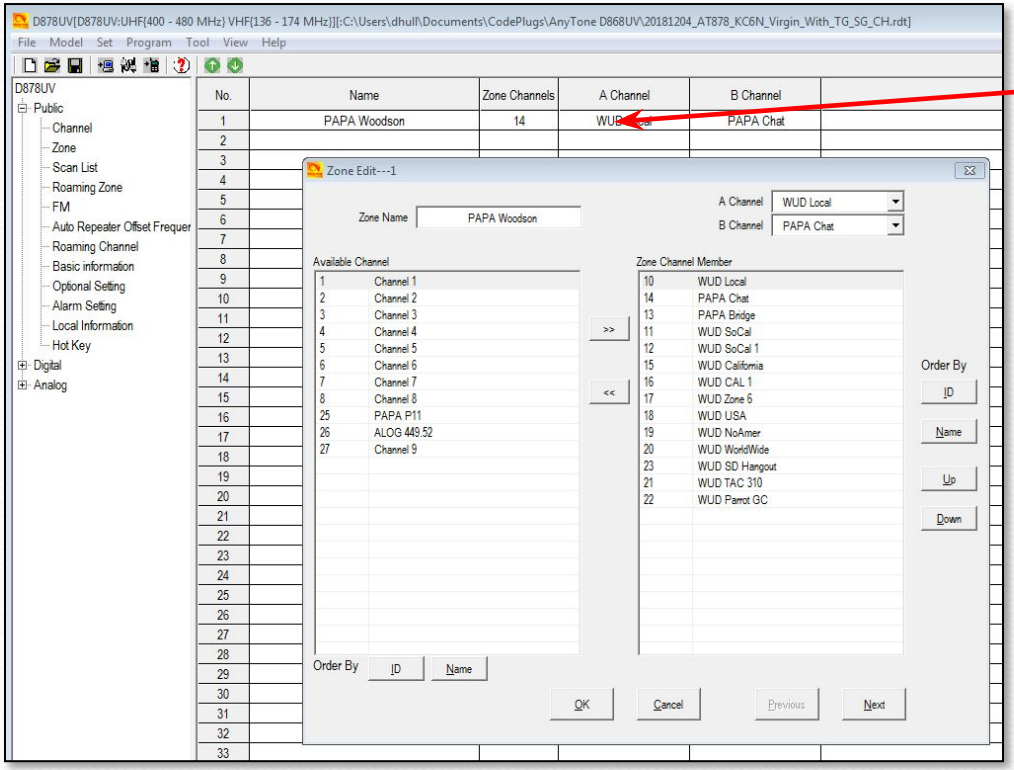
1. Click “Zone” and then Double Click “Zone1”.

2. Rename Zone 1 to PAPA Woodson

3. Highlight and remove the existing channels from the current member list using the “remove” (<<) button.

4. Select each WUD channel and “Add” it to the Woodson Zone using the “Add” (>>) button.

Final Woodson Zone



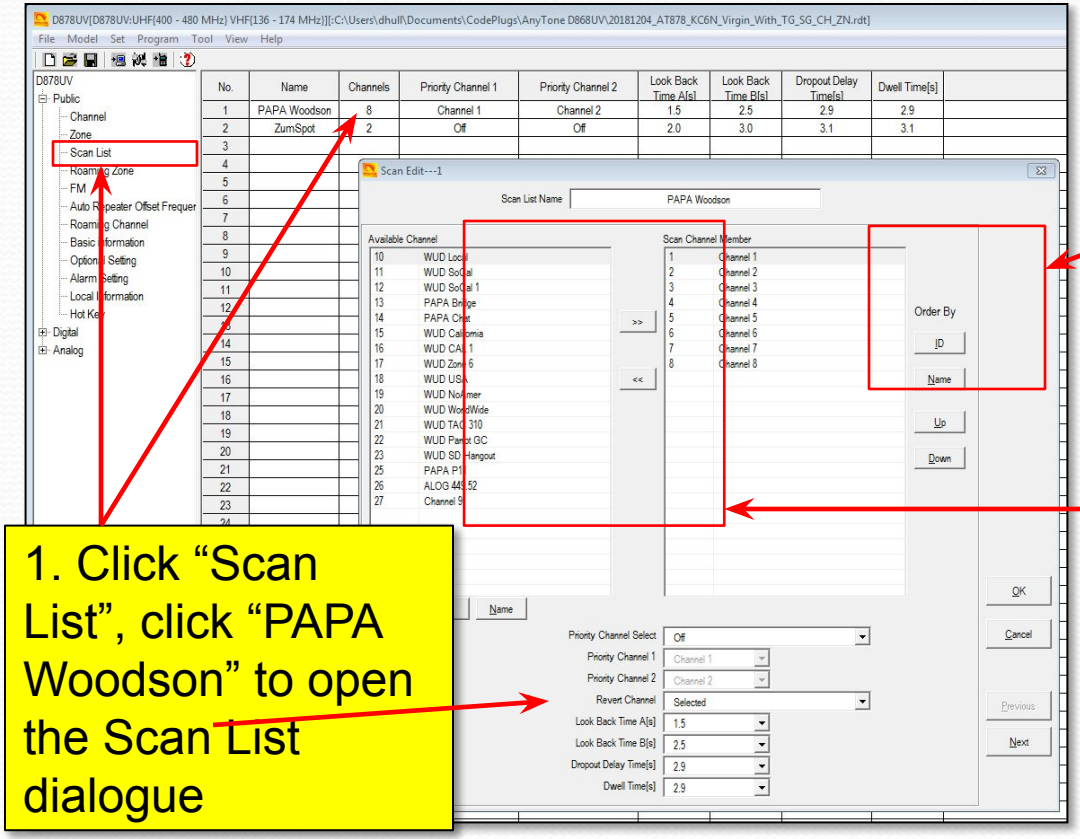
PAPA Woodson Zone

Channel A and B will appear in the main display when the zone is selected

Zone editing tools

Zone Editor showing the final contents of the PAPA Woodson Zone

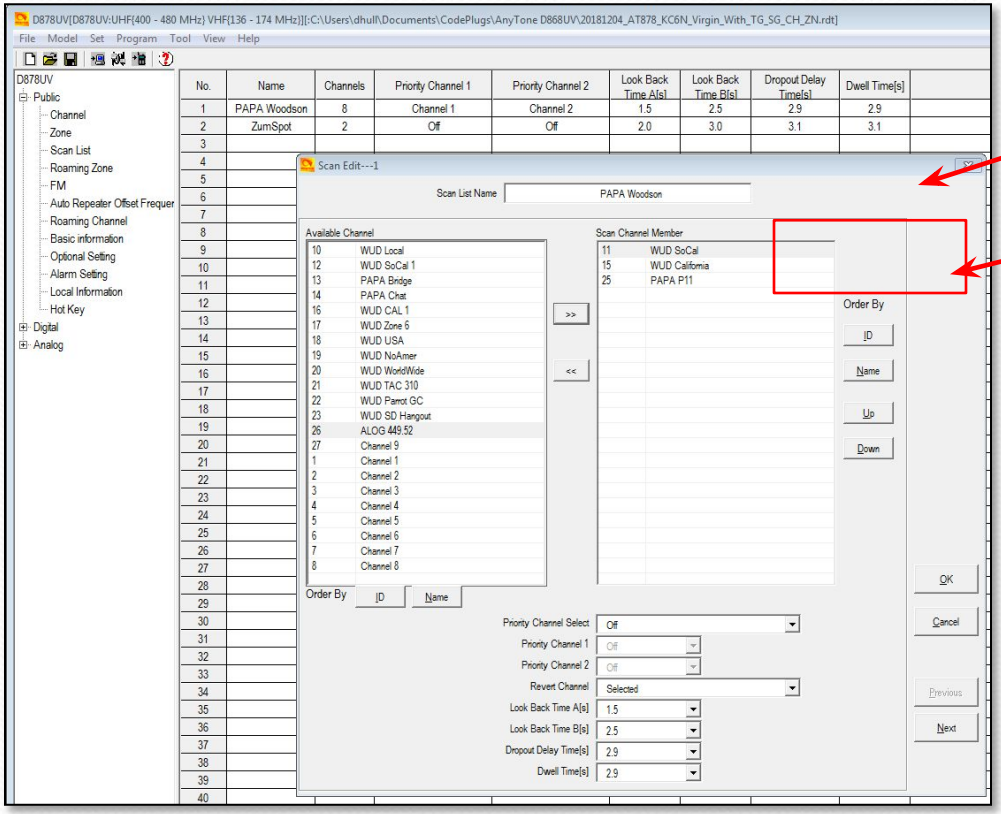
Create Woodson Scan List



1. Click “Scan List”, click “PAPA Woodson” to open the Scan List dialogue

2. Highlight and remove the existing channels from the current member list using the “remove” (<<) button.
3. Select the desired WUD channels and “Add” it to the Woodson Zone using the “Add” (>>) button.

Final Woodson Scan List



1. Scan List name: “PAPA Woodson”

2. Scan Group members here. Note that the order is not important for scan.

Note that there are not too many channels to be scanned – this is on purpose to make it fast.

In the AT UV-878, most of the time you will use the monitor functions rather than scan (IMO).

AT D878 CodePlug 101

Part IIId

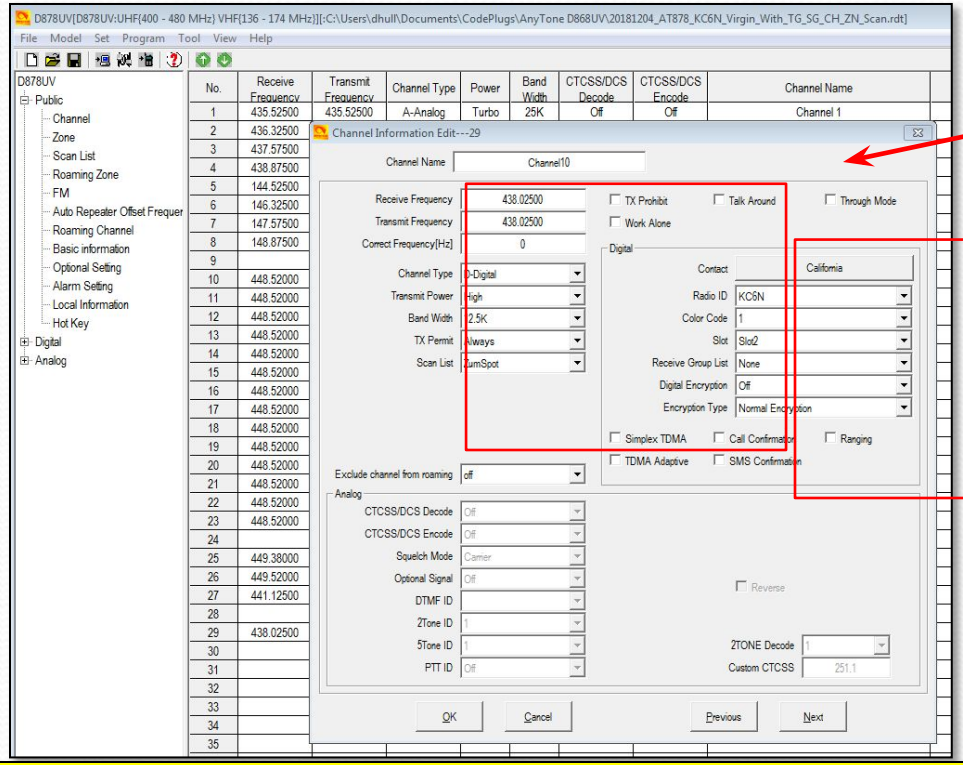
Code Plug management Concepts

(Overview: Adding a hotspot zone)

Creating a HotSpot Zone

- The steps to create a HotSpot zone are the same as for any other zone except:
  - The TX and RX Frequencies are the same.
  - The CC is 1 and the Time slot is “2”
  - You don’t program “Local”
  - You may not want to program “PAPA”
  - You can scan your hot spot zone and have analogs if you like.
- We’ll just show the completed screens

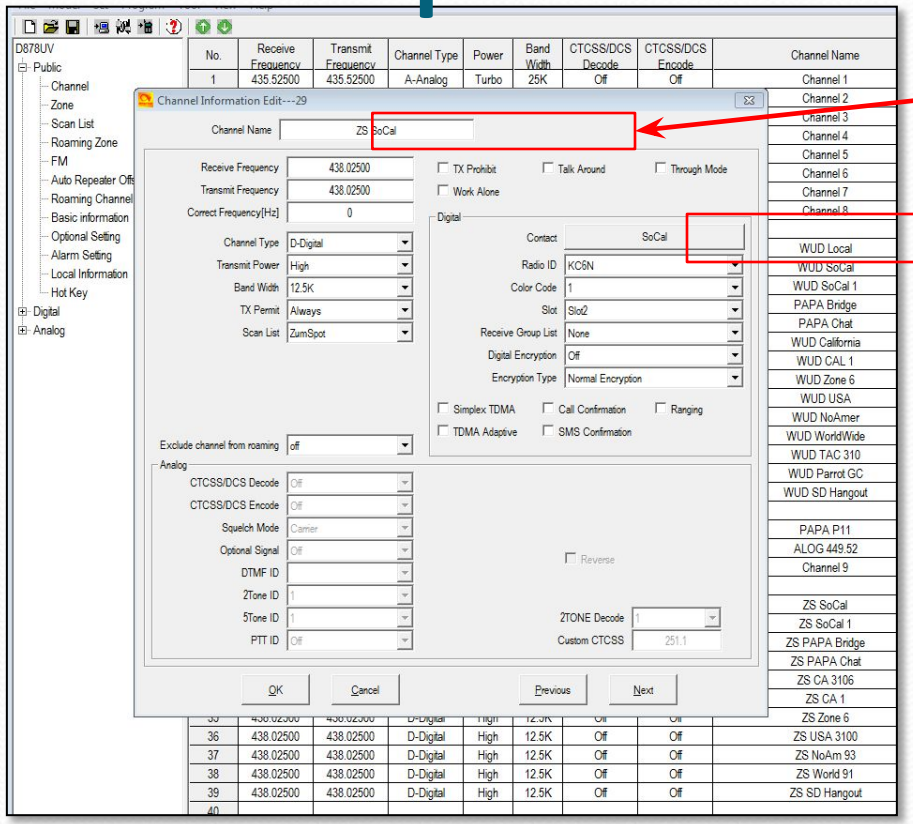
HotSpot CH Template



1. Create a digital channel
2. Set Scan List to “ZumSpot”
3. Power=Low
4. RX and TX Freq to your choice (I chose 438.250)
5. Admit=CC Free
6. Un-check “Talkaround”
7. Set CC=1
8. Set TS=1 or 2*
9. Replicate this as before.

* Note: Check which is best for your brand of HotSpot

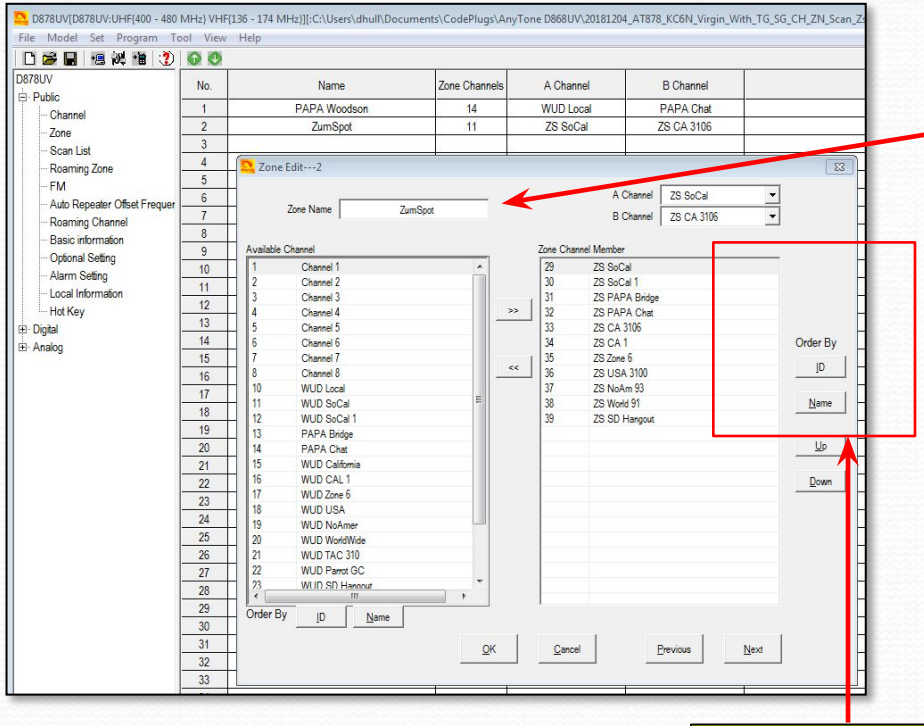
HotSpot SoCal Channel



1. Edit Name: “HS SoCal”
2. Edit TX Contact to: “SNARS”

3. Repeat for all 12 channels with correct name and TG ID

HotSpot Zone List



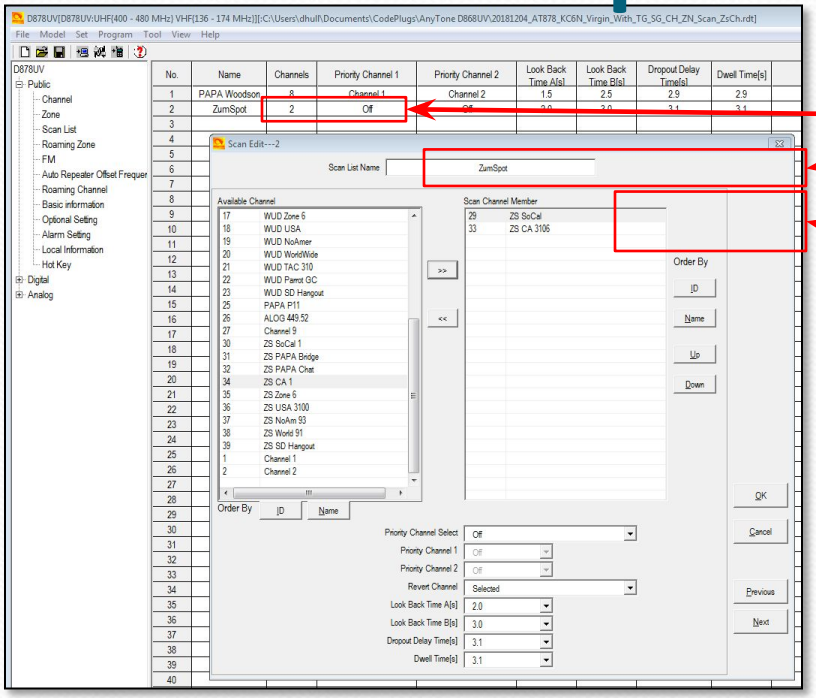
Zone Name: "ZumSpot" appears here

Create and populate a zone for your ZumSpot the same way we did for the woodson zone.

Select the channels to include from the panel on the left and use ">>" to move them over to the member panel on the left. Use the up/down buttons to adjust the order.

Populated Zone List

HotSpot Scan List



Scan List Name: "ZumSpot" appears here (Remember, we created it previously).

Populate the scan list as previously shown. Order isn't important. I usually scan static TG's only (and not very many at that).

Scanning is something that these radios don't really do that well and the monitor function is a very effective alternative.

AT D878 CodePlug 101

Part IIIe

Code Plug management Concepts

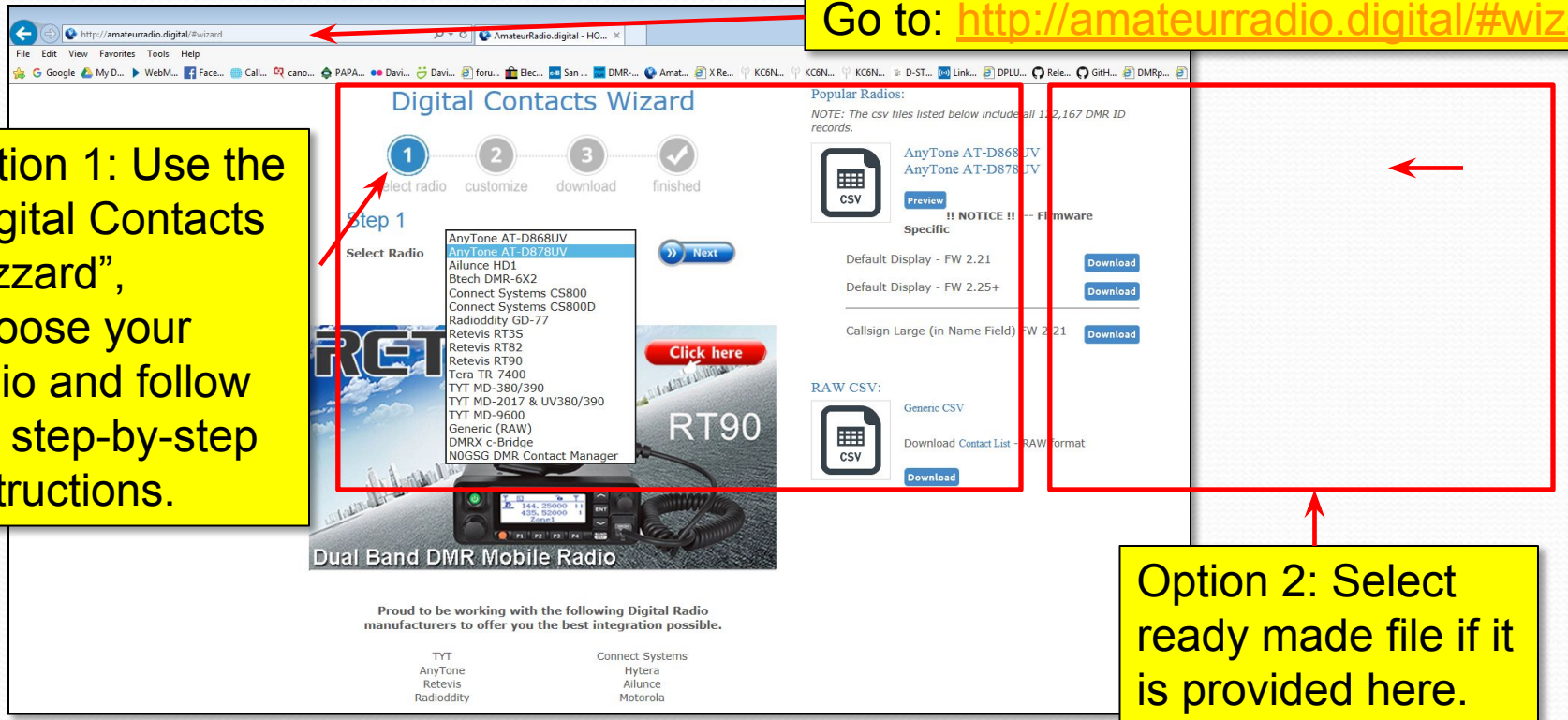
(Contact List Maintinence)

Contact List Operations (1)

- We will populate the Private Call “Contact List” as follows:
  - Go to: http://amateurradio.digital/#wizard
  - Follow the instructions on the site (next page) to generate .csv file You may need to open an account.
  - Import the .csv file into your radio using the tools provided in the CPS.

(2)

Go to: http://amateurradio.digital/#wizard

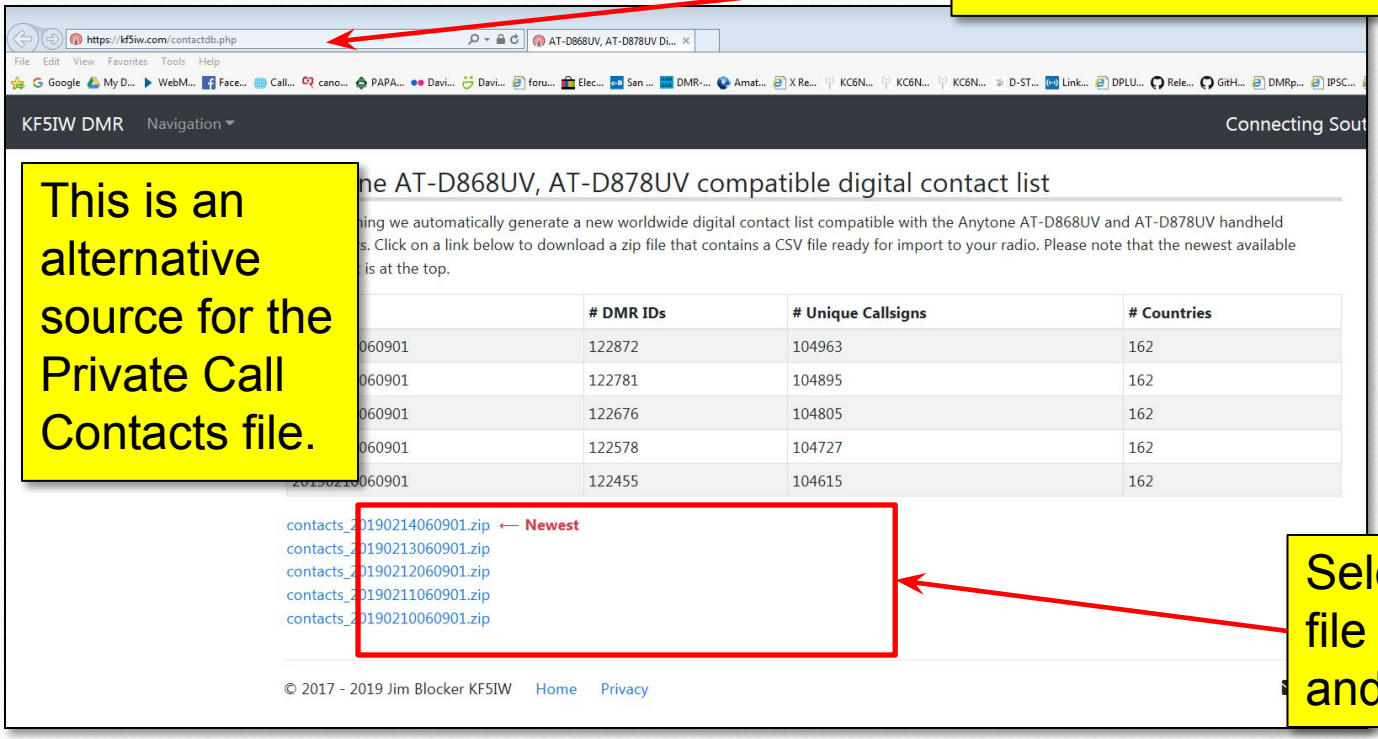


Option 1: Use the "Digital Contacts Wizzard", Choose your radio and follow the step-by-step instructions.

Option 2: Select ready made file if it is provided here.

Alternate database source

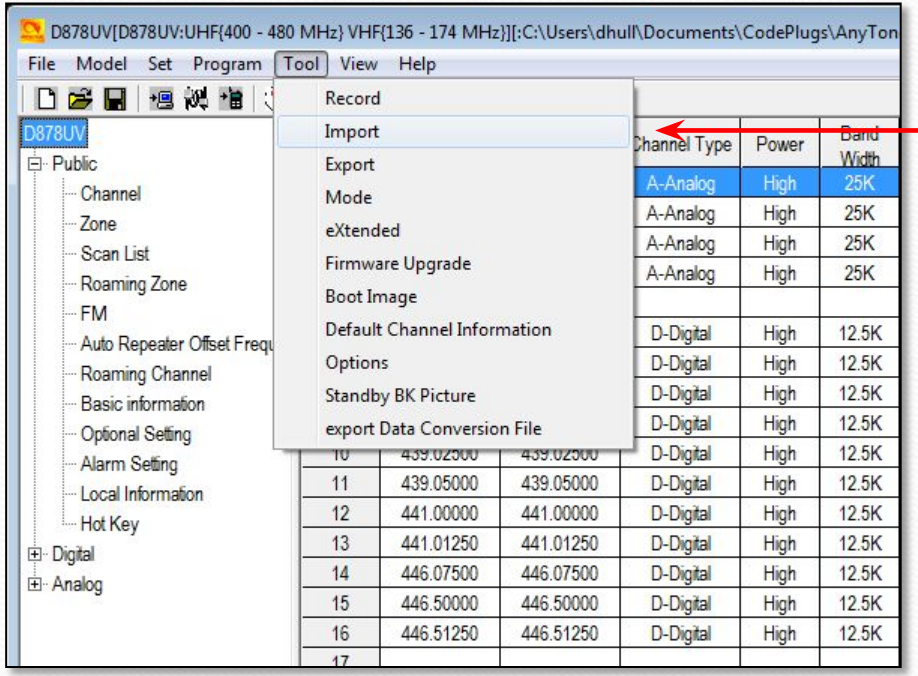
Go to: https://kf5iw.com/contactdb.php



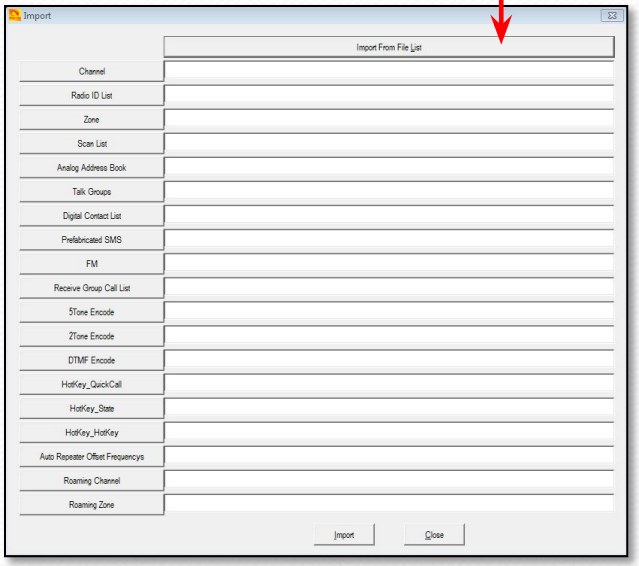
This is an alternative source for the Private Call Contacts file.

Select the newest file here, download and unzip.

(3)

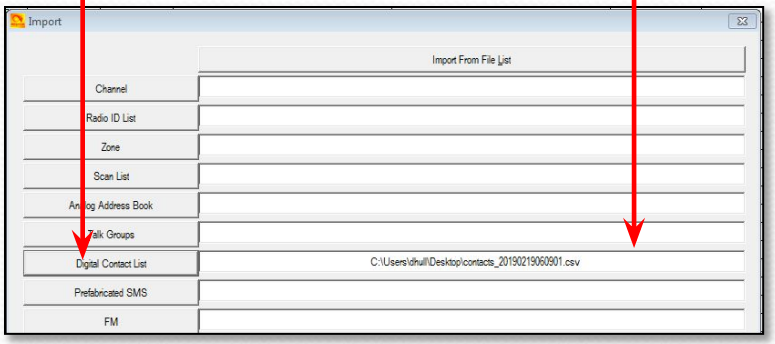


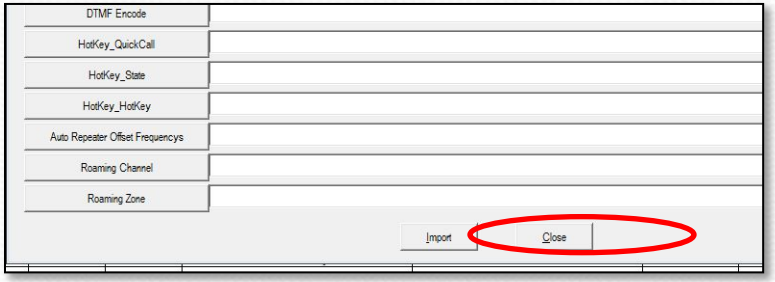
From the “Tools” drop-down, select “Import” to bring up the “Import” dialog.



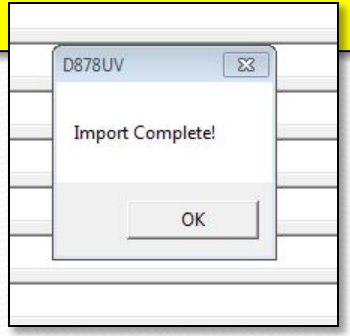
(4)

Click “Digital Contact List” and navigate to the newly created CSV file. It should have a name something like: “contacts_20190219060901.csv”

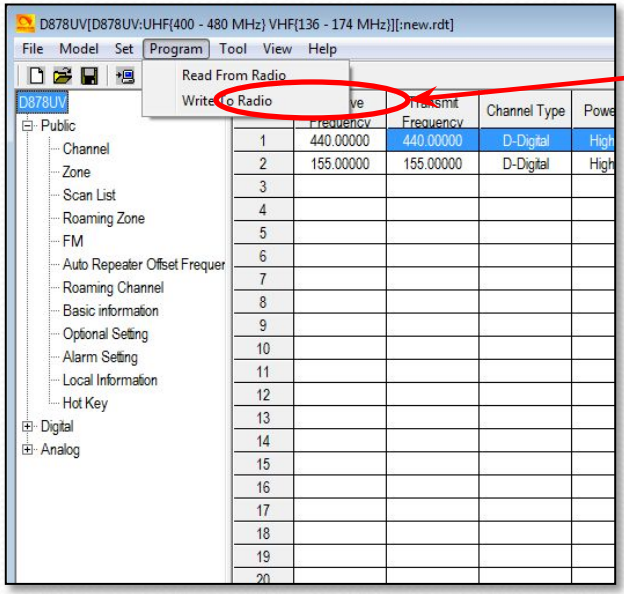




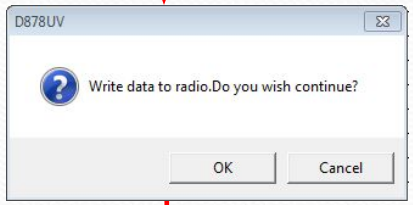
Click the “Import” button at the bottom of the dialog box. And wait for the “Import Complete” pop-up. At which point you are done. You can check the contacts section in the cps to make sure that they are there, if you like. Save your code plug.

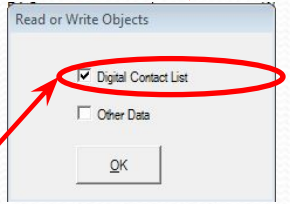


(5)

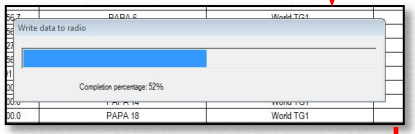


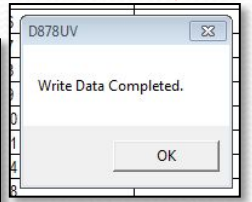
In CPS, Click “Write To Radio” and follow the dialogs





The progress bar will take several minutes for a large contact list





Make sure “Digital Contact List” is checked. This tells the CPS to copy the Digital contacts (which takes a while). Other Data is the code plug info. You can do either or both. In cases where you only care about the code plug, just check “Other Data”. Things will go a lot faster.

AT D878 CodePlug 101

Part IV

Code Plug management Concepts

(Setting up Roaming)

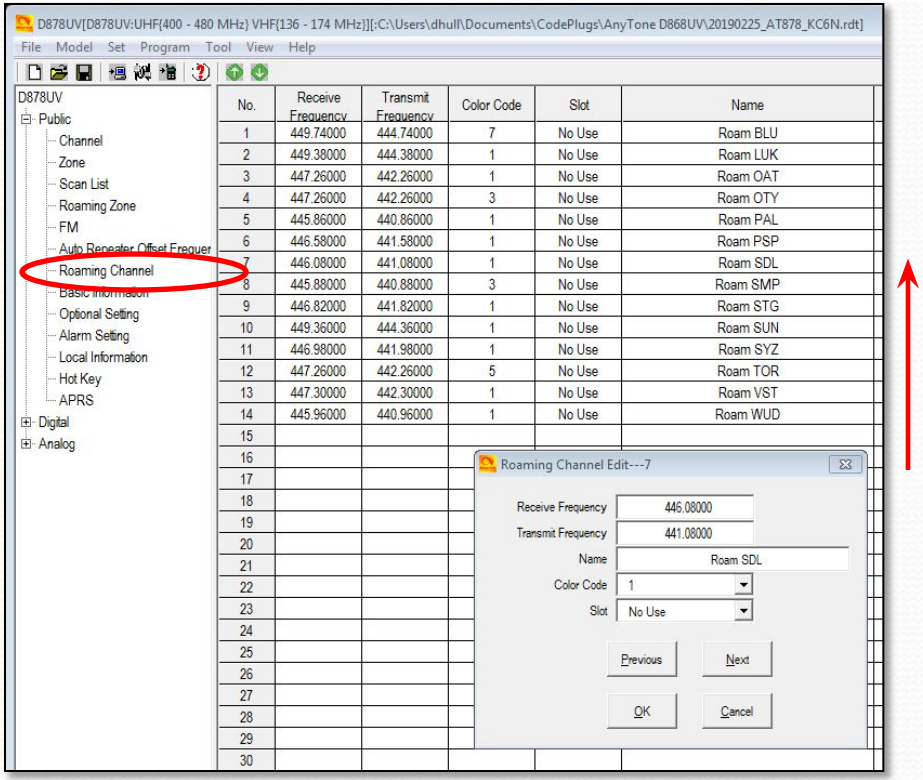
Setting up Roaming

- Identify your roaming area and determine the repeaters you want to roam over
  - Create channels for those repeaters
  - Collect those channels into a roaming zone for that area
- In “Options Settings”, select the “Auto Repeater” tab to configure roaming.
- Your radio will automatically find a usable repeater for you if one is in range.

A word about roaming

- You can have multiple roaming “zones”
- This allows you to implement profiles to support different roaming scenarios.
- For example: you can have a profile for coastal California, another for central California, another for local, etc, etc.
- Here we’ll make a single zone for the PAPA system. But you can create as many roaming zones as you need.

Set up Roaming Channels



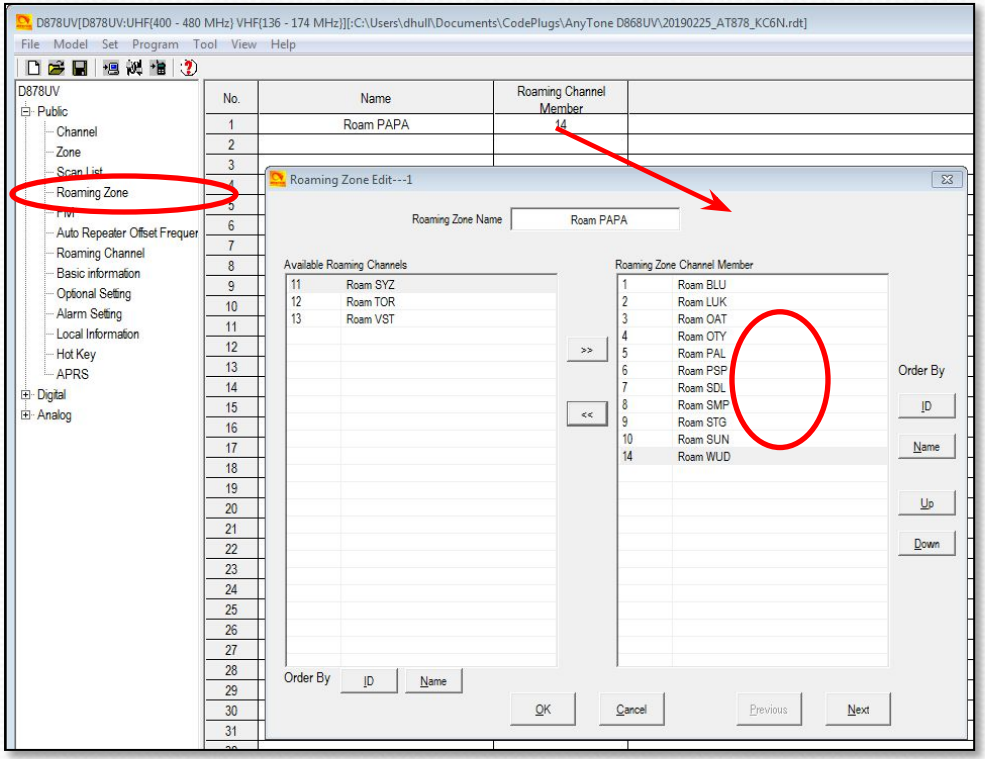
Set up your roaming channels as shown on the left. You will enter the Frequencies, Color Code and Time Slot for a block of repeaters that you want to roam over. Here I have set up the entire PAPA network.

Double click an entry row to bring up the entry dialog.

Note: Setting “Slot” to “No Use” tells the radio to use the slot of the currently selected channel.

Right click any row for the usual management pop-up.

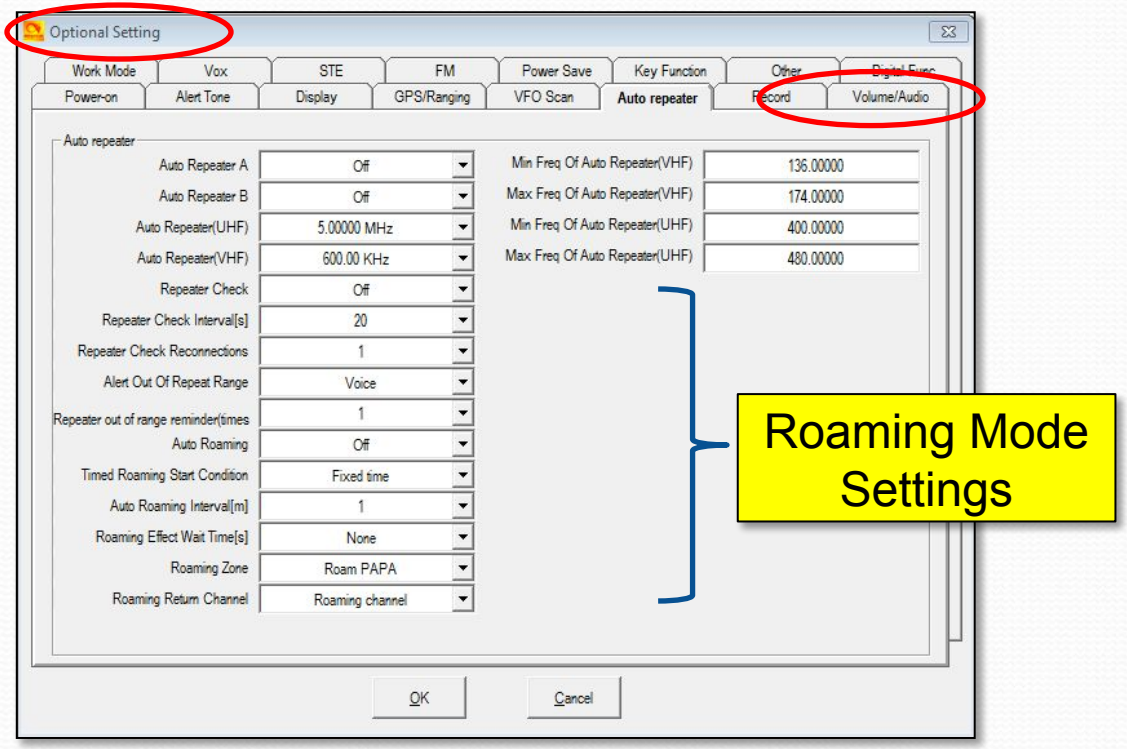
Set up Roaming Zone(s)



Group your roaming channels into a zone as shown. Double click on a row to launch the entry edit dialog shown here.

Highlight desired roaming channels from the list of available channels on the left. Move these into the right hand channel “membership list” using the “>>” key. If you make a mistake use the “<<“ key to move channels back.

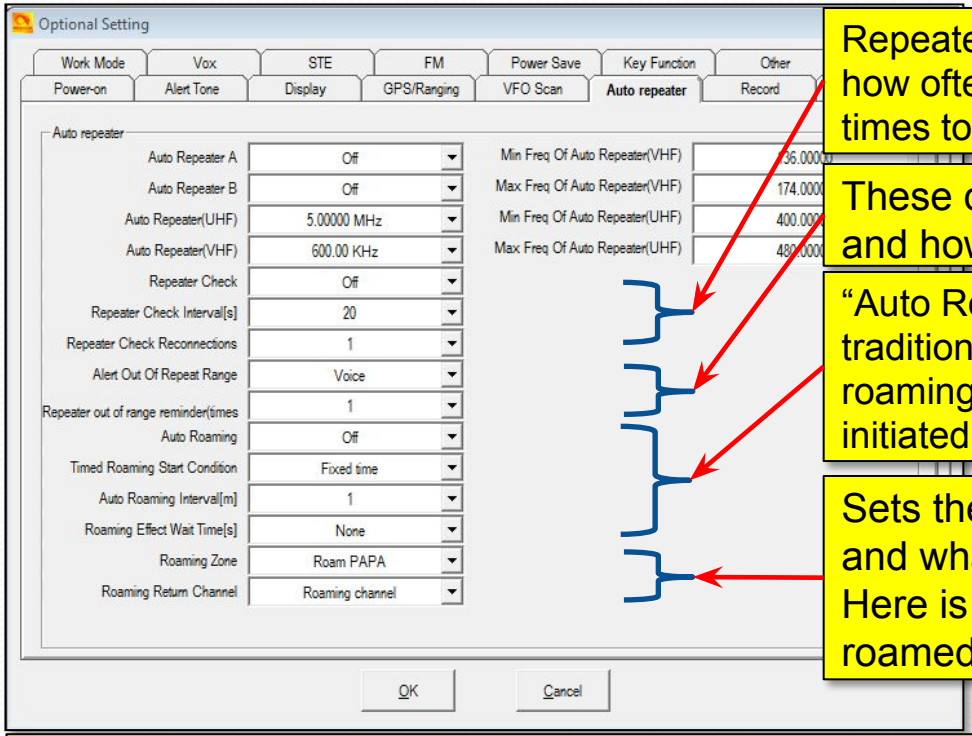
Configure Roaming (1)



The roaming mode settings are found in “Optional Settings” on the “Auto Repeater” tab.

This page shows my recommended settings. You can control most of these from the radio keypad and adjust them to your taste. Note: “Repeater Check” and “Auto Roaming” need to be “ON” (but you’ll do that from the keypad).

Configure Roaming (2)



Repeater Check (must be ON for roaming*), determines how often to check the roamed repeater and the number of times to check it.

These determine how radio alerts you when scan starts and how long the alert stays up.

"Auto Roaming" (must be ON for roaming*) enables traditional roaming. Other settings here determine the roaming start condition and the interval that roaming is initiated etc.

Sets the default zone (can be changed from keypad) and what is displayed when the roam cycle completes. Here is set "Roaming Channel" so I know what it roamed to.

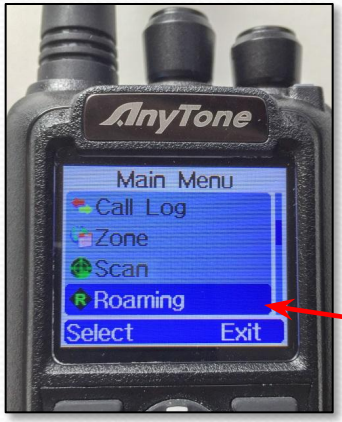
*Note that I leave "Repeater Check" and "Auto Roaming" = "OFF" in the code plug. I will turn them on from the keypad when I want to use roaming.

Using Roaming: One Shot

1. From the menu, select "Roaming"
2. Select "One Time Roam"
3. Wait for the radio to find a channel it can hit.
4. You will see "Search Success" once the radio is done.
5. If the search fails, the radio will tell you that as well.

This is good if you just want to roam once. Or, if your "Return Channel" = "Roaming Channel, it will tell you which repeater is best where you are at.

Continuous Roaming (1):

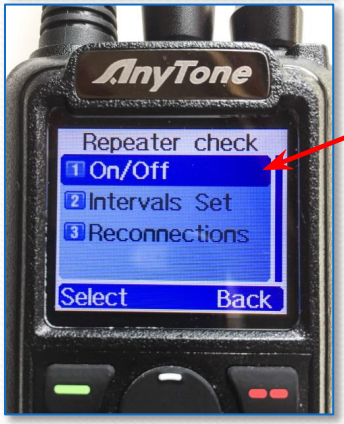


This is how you would normally use roaming as you travel. It will automatically locate the optimal repeater for the channel you have chosen.

1. From the menu, select "Roaming"
2. Select "Auto Roaming" select ON/OFF and turn it "ON"

You will see "Roaming Please Wait" followed by "Search Success" once the radio is done. A green "**R**" will appear in the display status line at the top.

Continuous Roaming (2):



You also need to enable "Repeater Check" so that it will check the "roamed to" repeater periodically to validate it's connection.

1. From the "Roaming" menu, select "Repeater Check". Then "On/Off".
2. Select "ON"

You will see "Roaming Please Wait" followed by "Search Success" once the radio is done. A green "**R**" will appear in the display status line at the top.

How Roaming Works

- The radio periodically (based on the “Repeater Check Interval”) “pings” the chosen repeater, assuming “Repeater Check” is “ON”
- If the “ping” fails, or if the “auto Roaming Interval” expires (depending on the roaming start condition setting), the radio will step through “Roam Zone” channels, pinging each one until it gets a response.

Using Roaming

- You can initiate a single shot “Roam” on any roam zone in the manor shown.
- Once set up, you can enable roaming by turning “ON” both “Auto Repeater” and “Repeater Check”.
- Similarly, you can disable roaming by turning “OFF” both “Auto Repeater” and “Repeater Check”.

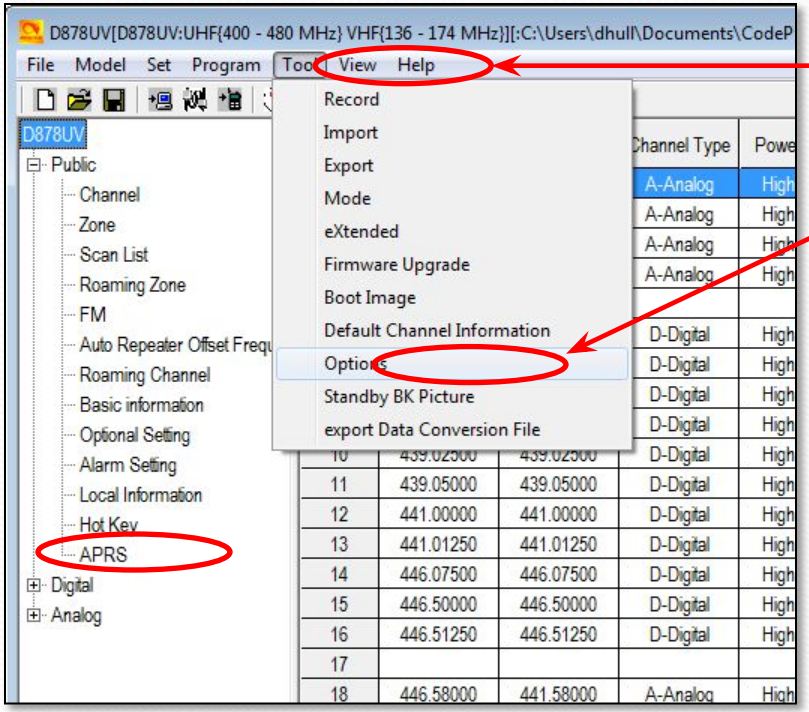
AT D878 CodePlug 101

Part V

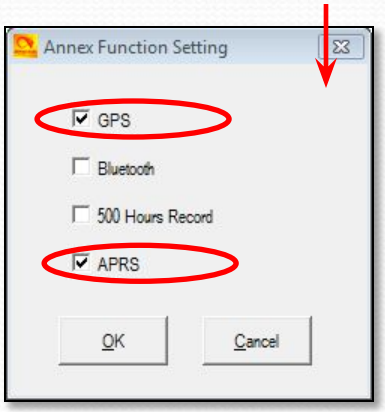
Code Plug management Concepts

(Setting up Digital APRS)

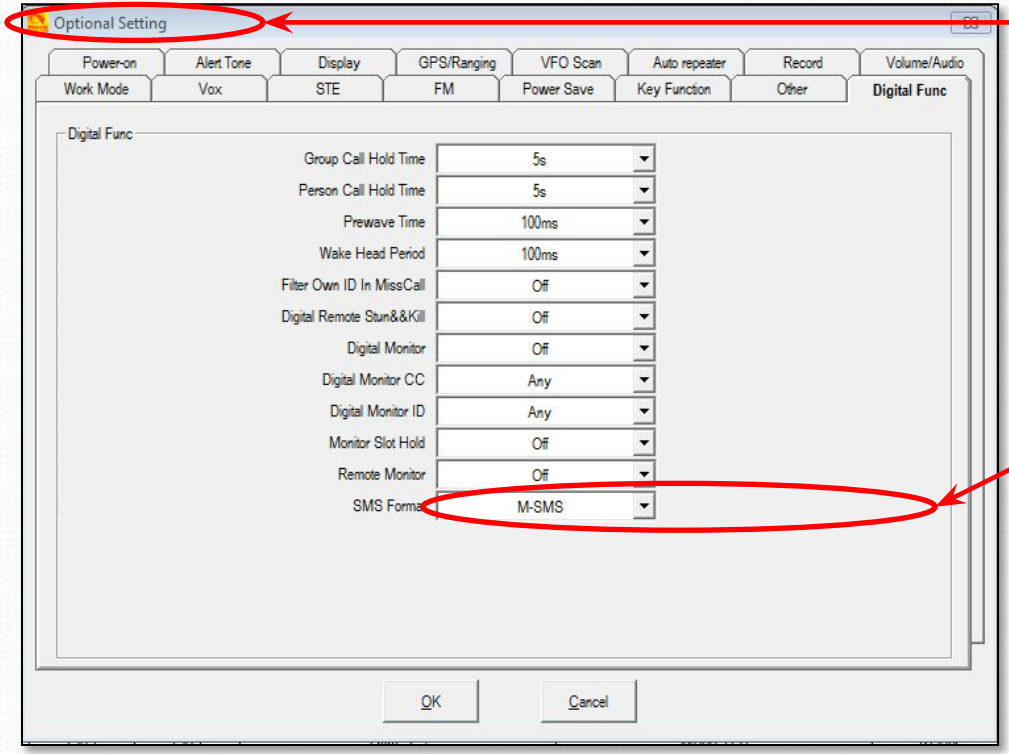
Enable GPS and APRS



1. From the “Tool” pull-down, Click “Options”
2. In the resulting pop-up, make sure that the GPS and APRS boxes are ticked as shown below.
3. Click “OK”. This will add the APRS option to the option tree

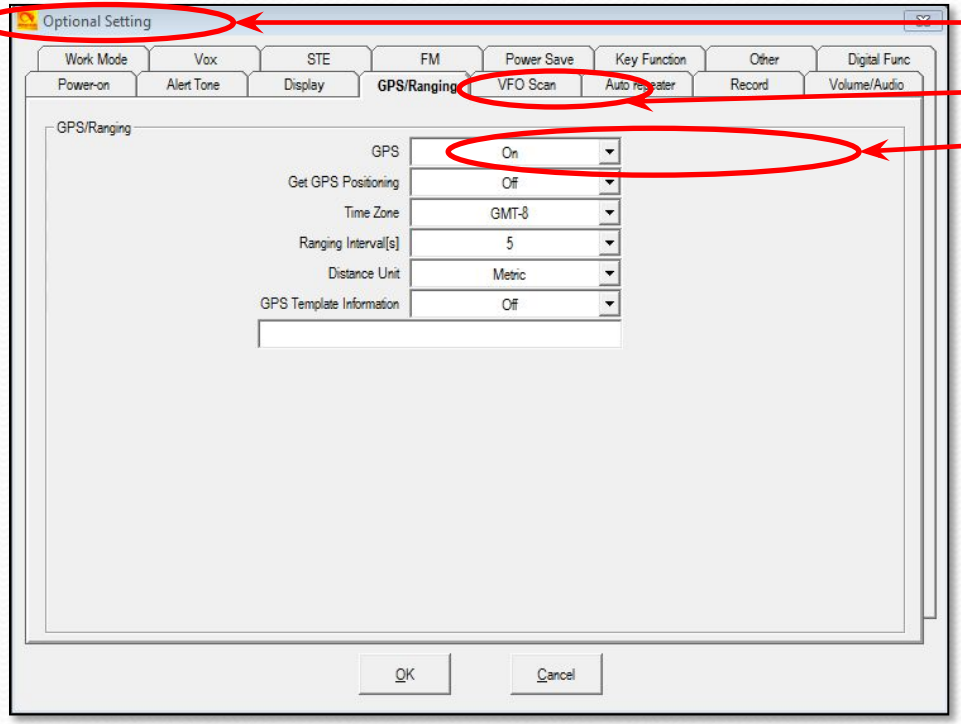


Enable Motorola SMS



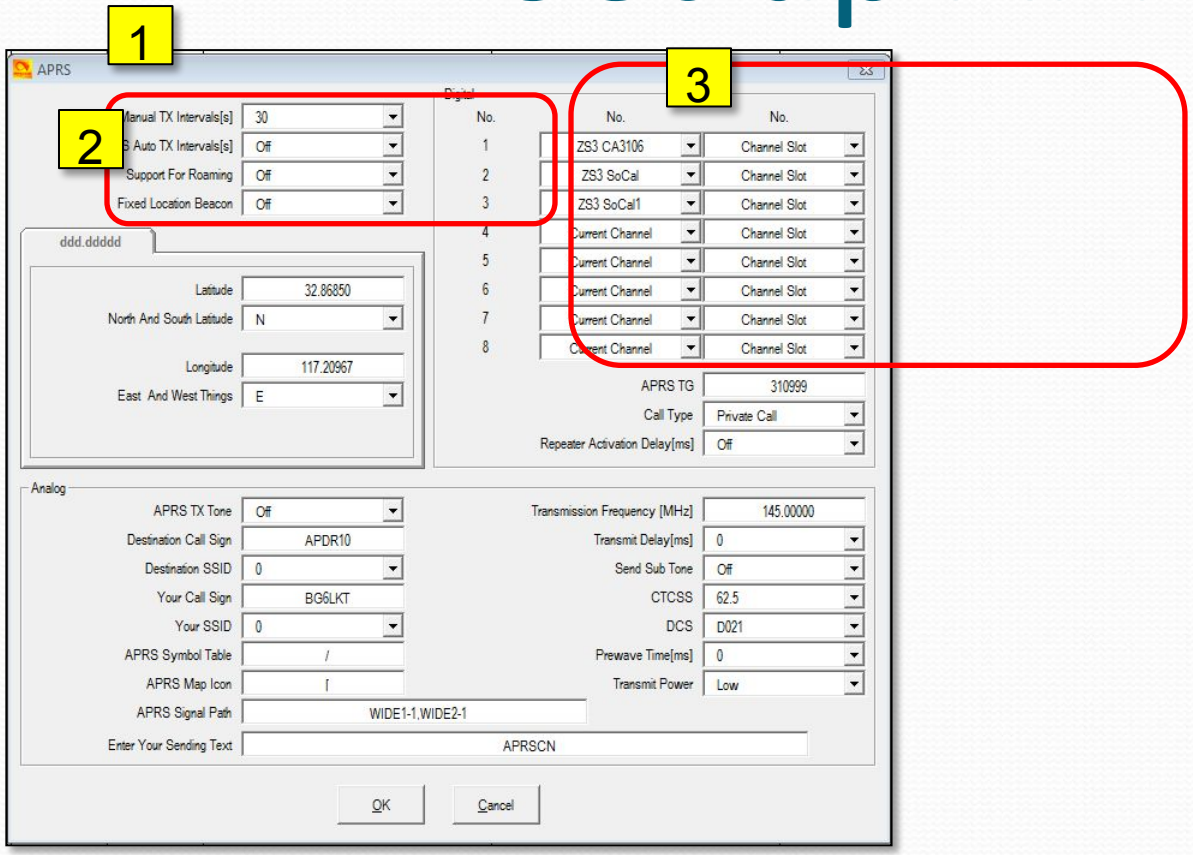
1. Select “Optional Settings” from the tree on the left hand menu tree.
2. Select the “Digital Func” tab.
3. At the bottom of this tab, make sure that SMS Format is set to M-SMS

Turn on the GPS



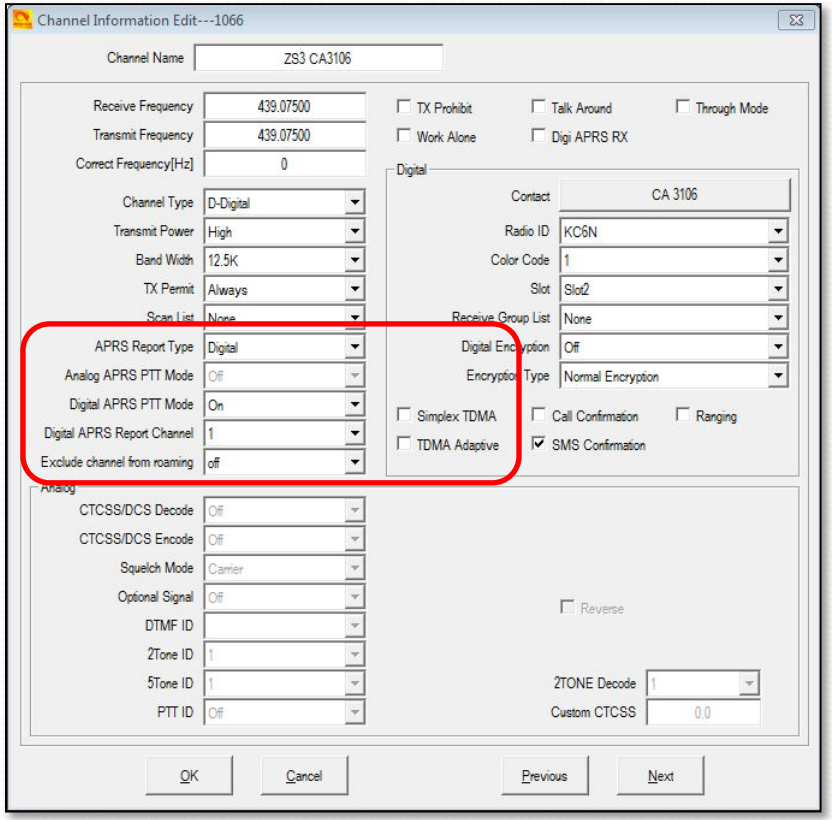
1. While in “Optional Settings”,
2. Select the “GPS Ranging” tab and,
3. Set GPS to “ON”

Set up APRS



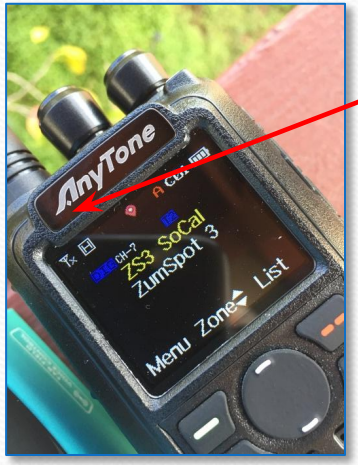
1. Open the APRS configuration dialog shown here from the left hand menu tree.
2. Set “Manual TX Interval” = 30 s, Turn “APRS Auto TX Intervals” to OFF so it doesn’t beacon.
3. Configure at least one channel in the “Digital” section at the top right. You may configure up to 8 of them.
4. Set APRS TG to 310999
5. Set Call Type to “Private Call”

Configure Report Channel

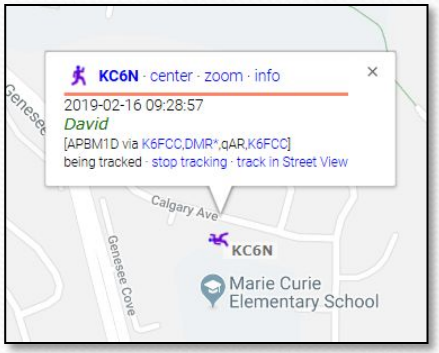


1. Go to the channel you set for reporting channel 1. In this case it was “ZS3 CA3106”
2. Set the APRS Report Type = “Digital”
3. Set Digital APRS PTT Mode = “ON”
4. Set the Digital APRS Report Channel = 1 to reference the setting in the APRS set-up panel.
5. Do this for each channel you set up in the APRS setup.

Verify Operation



1. Verify that your GPS is locked (Icon should be Red). If it is blue you will need to wait for it to find GPS lock. You may need to go outside and walk around or wait a bit.
2. Set your radio to one of the channels set up for APRS.
3. Key your radio and look for the “Sending Digital APRS data…” Response.
4. Check your position at https://aprs.fi



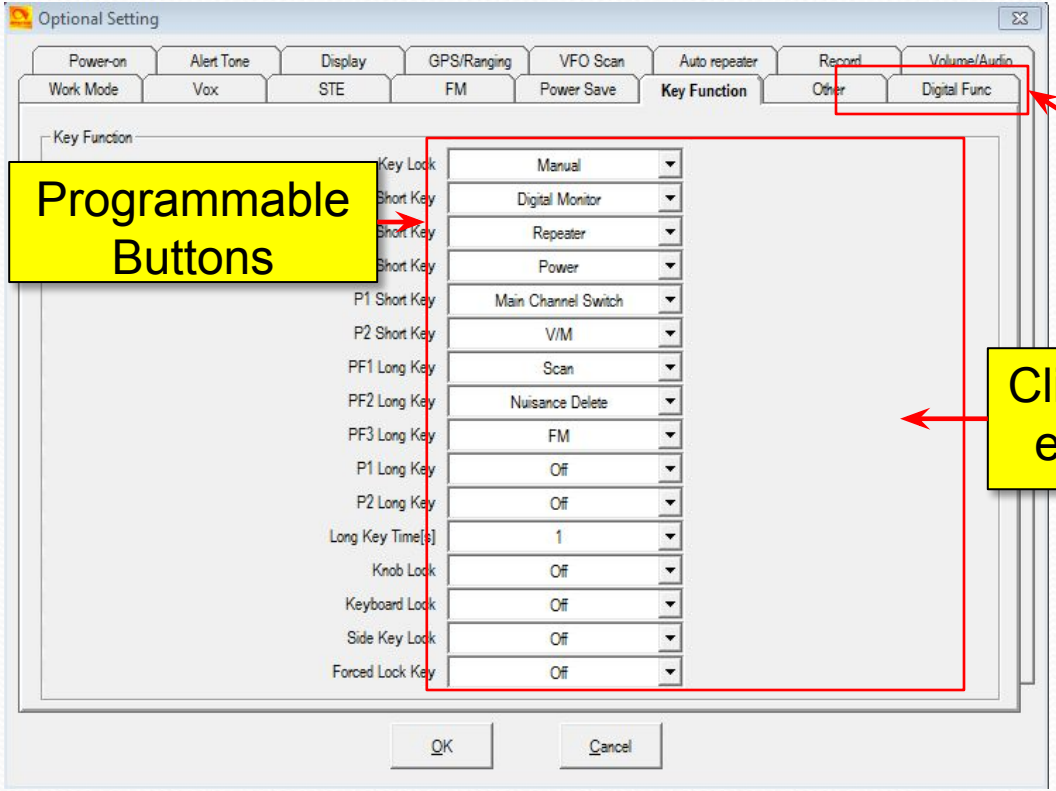
AT D878 CodePlug 101

Part VI

Code Plug management Concepts

(Bells and Whistles)

Programmable Buttons



Programmable Buttons

Key Function

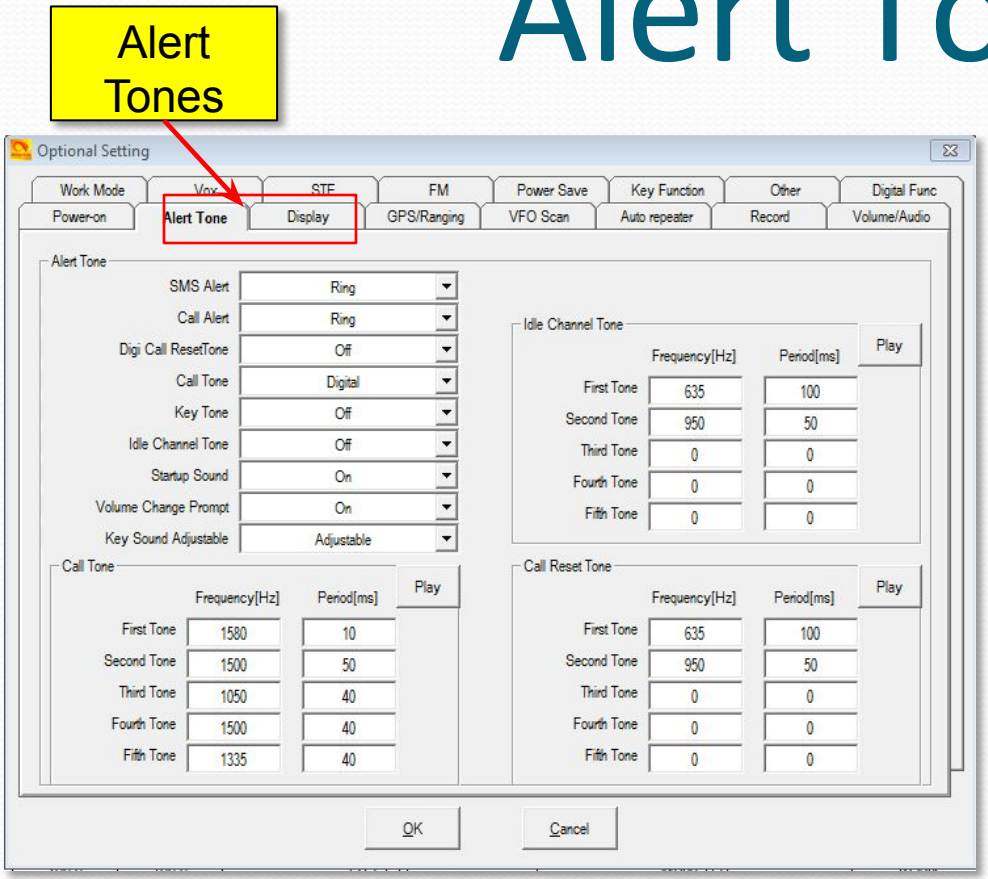
Click pull-down to expose options

Select the “Key Function” tab to set the function of the various buttons on the radio.

This is my setup, but you can do whatever makes sense to you.

Consult the manual for specific button locations.

Alert Tones

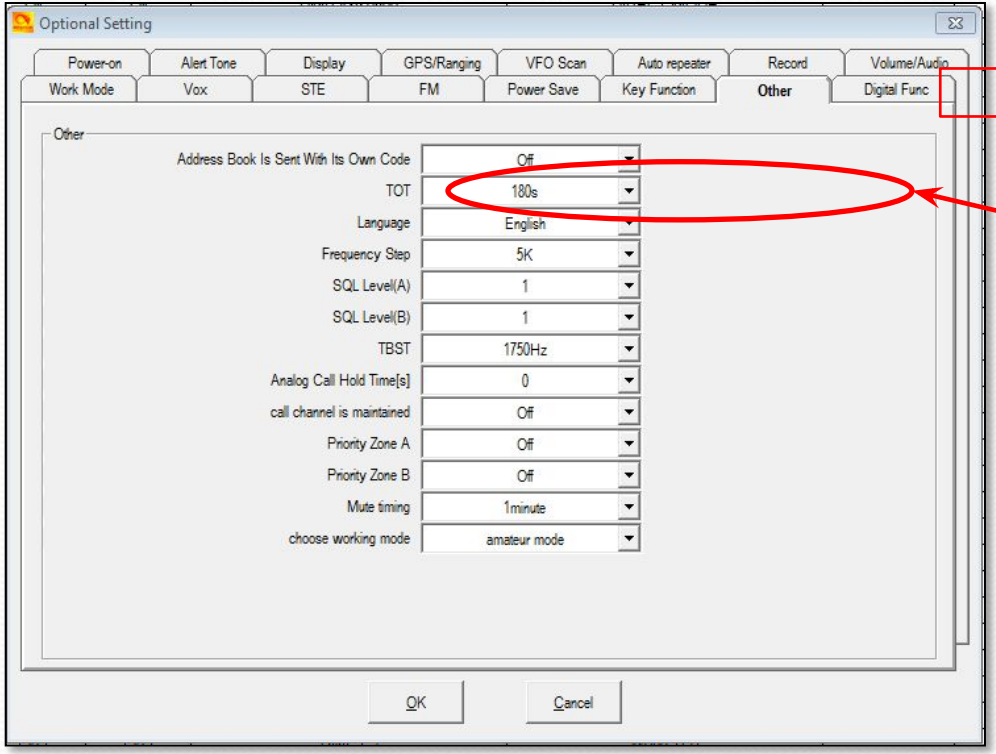


This page allows one to program a different set of alert tones which affect the sounds that the radio makes as it is used.

The setup here makes the AT UV-878 sound like a Motorola XPR7550 (which is nice since it still doesn't "cost" like one).

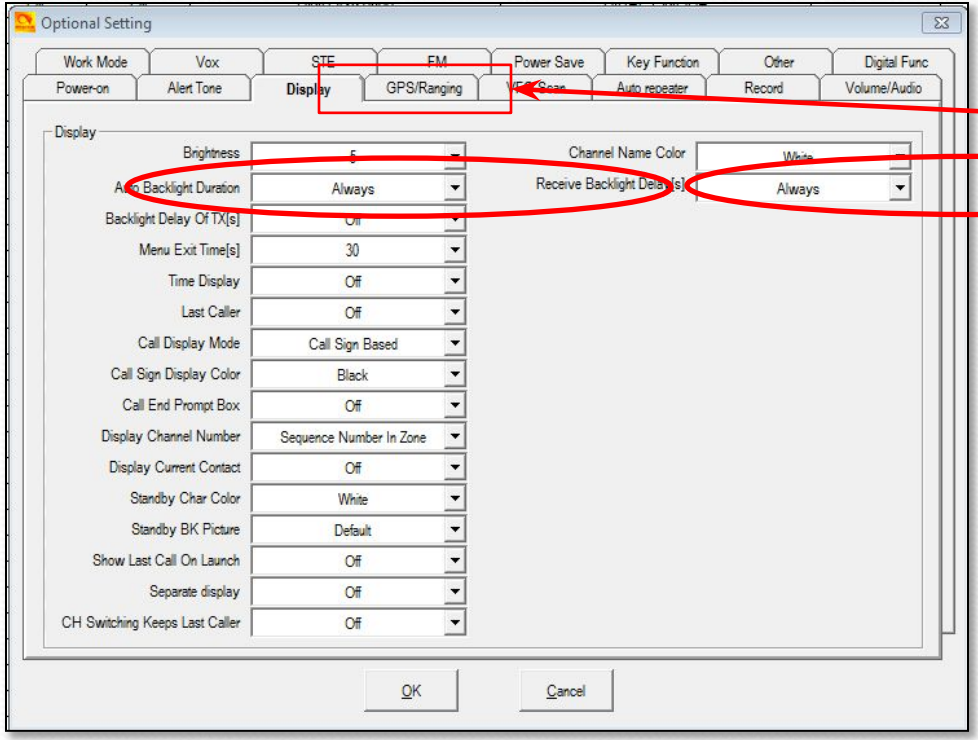
Thanks to Brian, KC2GNV for working this out.

“Blab-Off” Timer



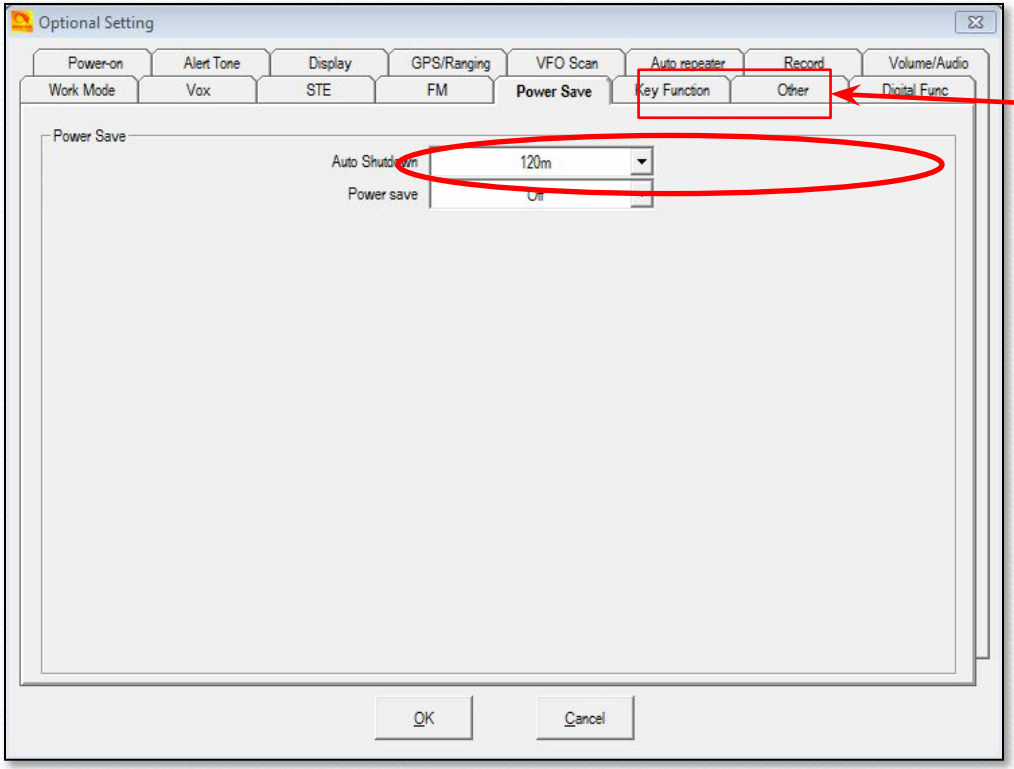
The “Other” tab provides a number of radio functions that you may want to adjust to suit your taste. One of which is the Time Out timer which will cut you off after a predetermined talk time.

Display Options



The “Display” tab provides a number of options allowing you to customize how the radio display operates. I have the backlight delays set to always. There are a lot of things you can twiddle here to customize your display.

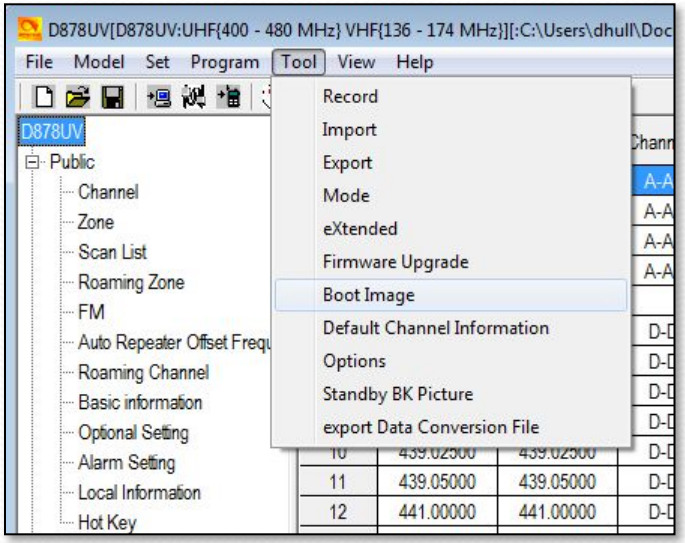
Power Save



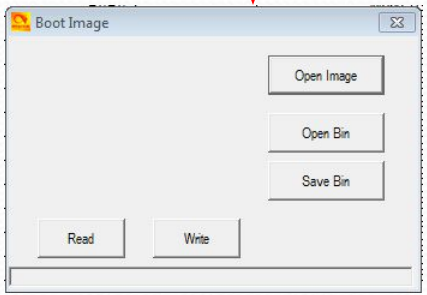
The “Power Save” tab provides an option set your to turn itself off automatically after a predetermined period of inactivity. This is a handy feature not generally provided on “commercial” radios.

You can see that I have this one set to shut off after two hours of inactivity.

Changing Screen Image (1)

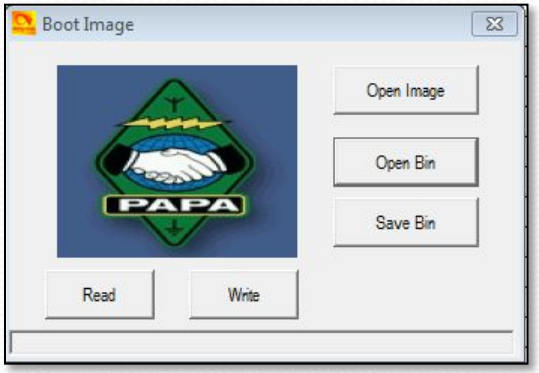


1. Select “Tool”
2. Click “Boot Image”
3. The “pop-up” below will appear



Select “Open Image” to bring up a file browser window. Point this to a JPEG file of an image you want to use as your boot image. Click “Write” to write this image to the radio. You can also use a binary file, in which case you would click “Open Bin” then select “Write” to write this image to the radio. This image will come up whenever you turn your radio on. You can save a standby image as well.

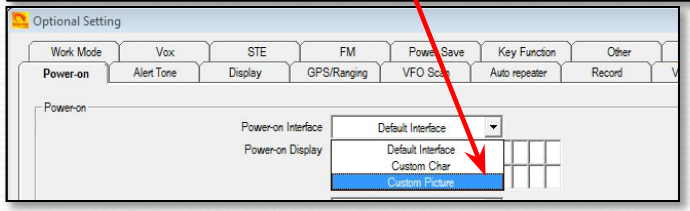
Changing Screen Image (2)



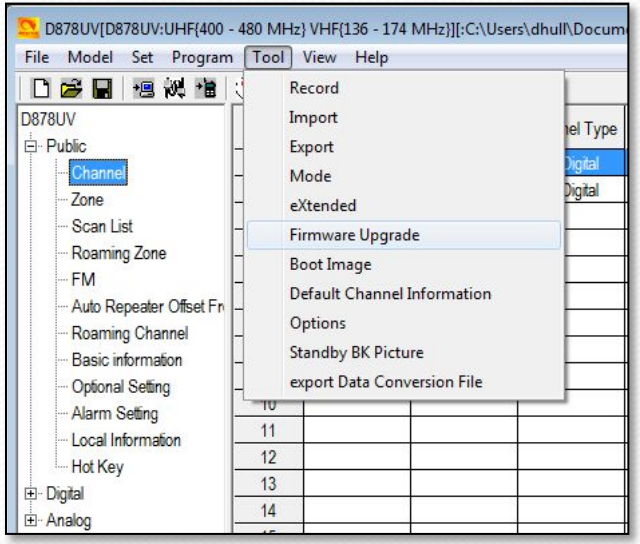
Here is an example of a .bin image available on the PAPA web site.

Here is an example of a .jpg image shot with a Canon 5DIV and worked in Lightroom. If you take this route, crop it to 8x10 landscape to fit the 128x160 pxl screen. There are no limitations as to color.

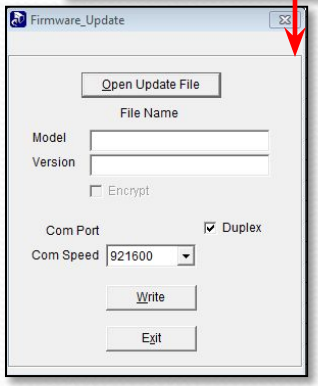
There is one more step, after this which is that you will need to go into “Optional Setting” and on the “Power-on” tab, in the “Power-on Interface” pull down, select “Custom Picture”



Upgrading Firmware



1. Select “Tool”
2. Click “Firmware Upgrade”
3. The “pop-up” below will appear



Note: The radio must be in FW Flash mode for this to work. Hold down the top button and PTT while turning the radio on.

Select “Open Update File” to bring up a file browser window. Point this to the desired FW upgrade file. Something like D878UV_V1.10_2018-12-21.spi. Select the file and click “Open”. The file name, Model and Version will appear in the pop-up window. Make sure these are correct, then click “Write”. Once the write process completes, your radio will re-boot. Verify the new FW version in the radio menu.

That's it !

Thanks and back to Net Control.

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Revision Sheet

- **02/19/19:** Corrected p70 to show contact list csv file import coming from “Digital Contact List” instead of “Radio ID List” as shown in the graphic for the in the original 02/16/19 version.
- **02/26/19:** Extensive revisions to section IV (Roaming) to simplify the scheme and to clarify operation. Added this revision section.
- **04/13/20:** Added Section on the band error issue at the end of part 1.
- **04/14/20:** Rewrote section 1 to read a bit better after including the info on the At_Options.exe applet.