



Motorola and Kenwood Radio Programming Lab

RMHAM University

01-08-2022

James – KIØKN

&

Mark – N7CTM



Agenda

- **Some Review**
- **Code Plug Planning – Getting Started**
- **Commercial Radios**
- **Motorola Radio Models**
- **Kenwood Commercial NX-Series**
 - **NX-Series Model Review**
 - **Programing Software – Walk-Through**
 - **Programming Examples**
- **Lab**



MIKE'S DMR DOCTRINE

DMR is a commercial radio protocol.

It was never designed nor intended for Amateur Radio use.

Some things about DMR are not going to make sense.

Accept this. It will make your life easier.



For more on DMR Basics, download Mike's presentation

[Mike's DMR Presentation](#)



Some Review

- **Mike's DMR Doctrine – Not just for DMR ☺**
- **Some Terms**
 - Code Plug – a file that contains radio programming information including frequencies, access control and other operating parameters that is uploaded to the radio
 - Analog Access Control (These terms are used interchangeable but are the same thing).
 - CTCSS – Continuous Tone – Coded Squelch System
 - 67.0 Hz to 254.1 Hz (in steps of 0.1 Hz)
 - DCS – Digital Coded Squelch
 - D000N to D777N, D000I to D777I (4-digit octal number + Normal or Invert) (in steps of 1)
 - PL – Private Line, TPL – Tone Private Line, TPL – Tone Private Line (Motorola)
 - QT – Quiet Talk, DQT – Digital Quiet Talk (Kenwood)
 - None, CSQ – Carrier Squelch
- **Radio Programming Software**
 - Microsoft Windows Based
 - Have had success running under a Windows Virtual Machine (Do at your own risk!!)
 - CPS - Customer Programming Software (Motorola)
 - FPU - Field Programming Unit (Kenwood KPG-DxN)



Some Review (cont.)

Programming - Needed Information	FM Analog	DMR - Repeater	DMR Simplex	P25
Receive Frequency (MHz)	449.050	446.9875	446.3000	438.5500
Transmit Frequency (MHz)	444.050	441.9875	446.3000	438.5500
Bandwidth (KHz) *Wide or Narrow Band	12.5 or *25.0	12.5	12.5	12.5
Time Slot		TS 1 or TS 2	TS 1 or TS 2	
CTCSS/DCS Encode	NONE/CTCSS/DCS			
CTCSS/DCS Decode	NONE/CTCSS/DCS			
Digital Color Code		Value 1-15	Value 1-15	
NAC Encode (293 Default)				XXX
Nac Decode (293 Defaul)				XXX
TX Group (TX Contact Name, TG ID, Selcall on PTT)		Talk Group	ALL CALL	Talk Group
RX Group		Talk Group/Implied	ALL CALL/Implied	Talk Group/Implied
Admit Criteria, Busy Channel Lockout (BCL)	Always/No	Color Code Free/Correct Color Code	Always/No	Correct NAC
In-Call Criteria		Follow Admit Criteria/Follow BCL	Follow Admit Criteria/Follow BCL	

* Most Amateur FM analog channels are Wide Band. The programming software defaults to narrow band!!



Code Plug Planning – Getting Started

- **Radio ID's**
 - Where to Get Yours
 - Find Other's ID's – Contact List
- **Finding channel programming information**
 - RMHAM Sample Code Plugs
 - Open and existing Code Plug
 - Use an Export from a Chinese Radio Programming Software
 - Copy / Paste this information – Excel can be your friend
 - RMHAM Site Information
 - RMHAM Repeaters
 - RMHAM Talk Groups
 - Example
 - CCARC – Colorado Council of Amateur Radio Clubs
 - Coordinated Repeater List
 - Colorado Hot Spot Frequencies
 - Wyoming DMR information
 - Amateur Radio Club WEB sites
 - Repeater Book – Mileage may Vary
- **Putting it all together**



DMR Radio ID's (Contact List)

RadioID - Home

https://www.radioid.net/#!

Database

Contacts

FAQ

Support

Log In / Sign Up

Click to go back, hold to see history

Instructions

Contacts List

Radio Formats

Generate Files

Brandmeister TG's

Today:

- 44 New DMR ID's
- 3 New NXDN ID's
- 0 New Repeaters ID's

In total:

- We have a global network of 209663 DMR ID's
- We have issued 5332 NXDN ID's
- There are 8729 repeaters world wide

Days:

- New DMR ID's
- NXDN ID's
- Repeaters ID's

Last 30 days:

- 1822 New DMR ID's
- 115 New NXDN ID's
- 43 New Repeaters ID's

This is 3029003

We can help with that...

DMR CONTACT GENERATOR ONLY AT [HTTPS://WWW.RADIOID.NET](https://www.radioid.net)

3029003???

(((9)))

777777 1111

Try out our new Contact Generator!

- Easily generate as many personalized lists as you like and associate them with different radio formats.
- Include the latest Brandmeister TG's in your generated lists.
- No radio Format! No Problem! We have a custom formatter so you can generate any kind of format you like!
- As the Database size grows, it will be more important than ever to have the ability to trim your contact lists.

Just click on the "Contacts" menu link, Make that new radio function how it was intended.

Check out our new Live Database Map

- Showing almost all repeaters in our system with Coordinates
- Talk Group info is available in the pins
- Zoom in to your desired region
- Data from The repeater Owners Directly
- Data also derived from RFinder TG Project

Click the map image to the right to view in real time.

Map

Satellite

Map data ©2022 - Terms of Use

Privacy Policy | Terms and Conditions | Cookie Policy | Acceptable Use Policy © RadioID Inc

<https://www.radioid.net/generator>

[Radio Id's](https://www.radioid.net)

7



RMHAM Sample Codeplugs

Home - Rocky Mountain Ham Radio

<https://www.rmham.org>

DMR SITE INFORMATION SAMPLE CODEPLUGS DMR HARDWARE LISTING BRANDMEISTER AMATEUR MICROWAVE NETWORK

Rocky Mountain Ham Radio

Teach ... Learn ... Operate ... Support. Be part of the team.

HOME BUSINESS NM TECHFEST RMHAM UNIVERSITY BECOMING A HAM CALENDAR ABOUT US WHY DONATE???

LATEST ARTICLES

Featured



RMHAM-U DMR Programming

November 9, 2021


Featured



The Swapfest 2022!

October 25, 2021

Featured



RMHAM University UHF & VHF DX

Featured



Leadville and Vail Repaired!

Rocky Mountain Ham Radio is an ARRL Affiliated Club

Support RMHAM

Donate to RM Ham using smile.amazon.com. [Get Started TODAY!](#)

Amazon Smile is now on the Amazon Shopping App! [Learn more Here!](#)

Support RMHAM Through King Soopers/City Market

Rocky Mountain Ham Radio is now enrolled in the King Soopers Community Rewards



Codeplug Samples

Sample Codeplugs - Rocky Mo x

https://www.rmham.org/sample-codeplugs/

Comments, and questions, please contact the individual codeplug maintainers directly.

Manufacturer	Codeplug	Last Update	Maintainer(s)	Notes
Anytone	AT-D868UV / AT-D878UV / AT-D578UV	March 9, 2021	K0NGA Mike (k0nga@arrl.net)	Corrected the "DMR Mode" setting on all repeater and hotspot DMR channels. Added upcoming RMHAM Boulder Lee Hill Repeater
Connect Systems	CS580 / CS700 / CS750 / CS800 / Channels Export	March 9, 2021	K0NGA Mike (k0nga@arrl.net)	Added upcoming RMHAM Boulder Lee Hill Repeater
Hytera	AR482G	March 9, 2021	K0NGA Mike (k0nga@arrl.net)	Added upcoming RMHAM Boulder Lee Hill Repeater
Motorola	XPR4550 Low Power	Nov 08 2021	KI0KN James (james.m.cizek@gmail.com)	Updated Grand Junction ColorCode to 5
Motorola	XPR4550 High Power	Nov 08 2021	KI0KN James (james.m.cizek@gmail.com)	Updated Grand Junction ColorCode to 5
Motorola	XPR5550 Low Power	Nov 08 2021	KI0KN James (james.m.cizek@gmail.com)	Updated Grand Junction ColorCode to 5
Motorola	XPR5550 High Power	Nov 08 2021	KI0KN James (james.m.cizek@gmail.com)	Updated Grand Junction ColorCode to 5
Motorola	XPR5550e High Power	Nov 08 2021	KI0KN James (james.m.cizek@gmail.com)	Updated Grand Junction ColorCode to 5
Motorola	XPR6550	Nov 08	KI0KN James	Updated Grand Junction ColorCode to 5



RMHAM Site Information

Home - Rocky Mountain Ham Radio

https://www.rmham.org

DMR SITE INFORMATION ▾ SAMPLE CODEPLUGS DMR HARDWARE LISTING BRANDMEISTER ▾ AMATEUR MICROWAVE NETWORK

Intro to DMR
Repeater Map by KONGA


Rocky Mountain Ham Radio

Teach ... Learn ... Operate ... Support. Be part of the team.

HOME BUSINESS ▾ NM TECHFEST RMHAM UNIVERSITY ▾ BECOMING A HAM CALENDAR ABOUT US WHY DONATE??? ▾


LATEST ARTICLES

Featured

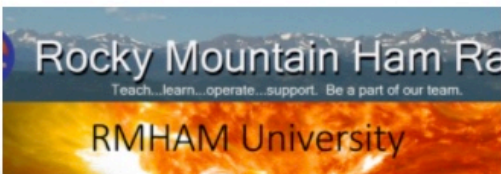


RMHAM-U DMR Programming
November 9, 2021

Featured

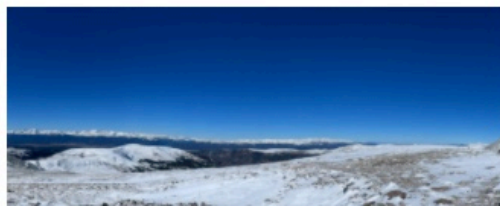


The Swapfest 2022!
October 25, 2021



RMHAM University
VHF/UHF DX
operations, over-the-horizon communications, meteor

https://www.rmham.org/dmr-site-information/



Rocky Mountain Ham Radio is an ARRL Affiliated Club

Support RMHAM

Donate to RM Ham using smile.amazon.com. [Get Started TODAY!](#)

Amazon Smile is now on the Amazon Shopping App! [Learn more Here!](#)

Support RMHAM Through King Soopers/City Market



RMHAM DMR Repeater

DMR Site Information - Rocky | x

https://www.rmham.org/dmr-site-information/

[Return to Intro](#)

Name	Site	Sponsor	Repeater Input	Repeater Output	Color	Repeater Status	IP Link Status
Akron	Akron	NEAHR	443.1750 MHz	448.1750 MHz	7	Operational	Operational
Albuquerque NM	Sandia Crest	RMHAM-KA8JMW	447.9000* MHz	442.9000* MHz	7	Operational	Operational
Fairplay	Badger Mountain	RMHAM-N0SZ	441.7625 MHz	446.7625 MHz	7	Operational	Operational
Boulder South	Eldorado	RMHAM-N0SZ	441.9875 MHz	446.9875 MHz	7	Operational	Operational
Boulder - Lee Hill Coming Soon	Lee Hill	RMHAM-N0SZ	440.0500 MHz	445.0500 MHz	8	Coming Soon	Operational
Breckenridge/Summit Co	Baldy	RMHAM-N0SZ	440.0875 MHz	445.0875 MHz	7	Operational	Operational
Burlington Coming Soon	Burlington	RMHAM-N0SZ	440.0500 MHz	445.0500 MHz	6	Coming Soon	Coming Soon!
Canon City	Fremont Peak	RMHAM-K0JSC	441.7375 MHz	446.7375 MHz	7	Operational	Operational
Cheyenne WY RMHR	Cheyenne WY	RMHAM-K7PFJ	444.9375 MHz	449.9375 MHz	7	Operational	Operational



RMHAM DMR Talk Groups

DMR Site Information - Rocky

https://www.rmham.org/dmr-site-information/

Rocky Mountain Ham Radio Talk Groups

We will be using the following talk groups on the RMHAM Network. Note that we ONLY support these talkgroups on our statewide network.
No push to talk talkgroup selection is available on the RMHAM network.

Talk Group	Timeslot	Description
505	TS2	New Mexico (All New Mexico and Durango/Mancos Repeaters) NEW!
700	TS1	Rocky Mountain Wide
705	TS2	Eastern (Configured for Data and Text Testing - Manual Station Identification is required.)
710	TS1	Denver Local (Lookout Mountain UHF repeater only)
711	TS2	Devilshead Local (Devilshead UHF repeater only)
713	TS2	Sandia Local (Sandia/Albuquerque repeater only)
714	TS2	Pajarito/Los Alamos Local (Los Alamos repeater only)
715	TS2	Taos Local (San Antonio Repeater Only)
716	TS2	Limon Local (Limon Repeater Only) NEW!
718	TS2	Southeastern Region (future use - not yet implemented)
719	TS2	Southern Colorado Regional
720	TS2	Central Regional
721	TS2	Northern Colorado Regional

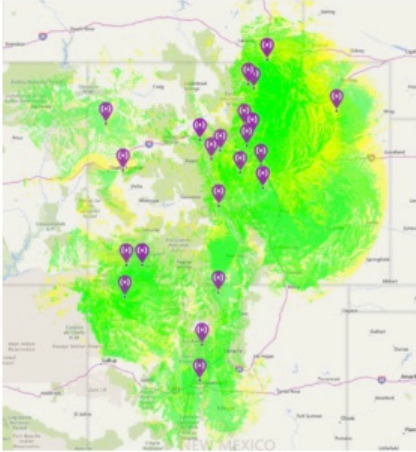


RMHAM DMR Wide Network

DMR Site Information - Rocky | X +

https://www.rmham.org/dmr-site-information/

Rocky Mountain Wide Network – Talk Group 700



[Return to Intro](#)

The Rocky Mountain Wide network will provide extremely wide area coverage across much of Colorado. No Data, Texting or locations services are allowed. No Brandmeister Connectivity. Repeaters supporting this talk group are:


Name	Site	Repeater Input	Repeater Output	Color Code	Time Slot	Status
Akron	Akron	443.1750 MHz	448.1750 MHz	7	1	Operational-Linked
Albuquerque	Sandia Crest	447.9000 MHz	442.9000 MHz	7	1	Operational-Linked
Boulder South	Eldorado	441.9875 MHz	446.9875 MHz	7	1	Operational-Linked
Breckenridge	Baldy	440.0875 MHz	445.0875 MHz	7	1	Operational-Linked
Burlington	Burlington	440.0500 MHz	445.0500 MHz	6	1	Coming Soon
Canon City	Fremont Peak	441.7375 MHz	446.7375 MHz	7	1	Operational-Linked
Chuvy RMHR	South Cheyenne	441.9375 MHz	446.9375 MHz	7	1	Operational-Linked



CCARC WEB Site

The screenshot shows the CCARC website in a web browser. The address bar shows <https://www.ccarc.net> with a red box and callout 1. The navigation menu includes: Main, Meetings, Getting Coordination from CCARC, Coordination Web Portal, Use Plans & Hot Spots, Membership, Constitution and Bylaws, and Contact Us. A dropdown menu for 'Existing Coordinations Info' is open, showing options: Colorado Public Repeater Info (callout 3), Proposed De-coordinations, Overdue Coordinations, and Freq Coord Policies (callout 2). The main banner reads 'Colorado Council of Amateur Radio, Inc. Colorado's Coordination and Support'. Below the banner is a section titled 'Fall 2021 Meeting: October 23rd' with a profile picture of Chris Keller, dated October 5, 2021. The text of the message reads: 'Dear CCARC Delegates, I hope this finds you all safe and healthy. It is time again for another CCARC meeting. Since the at the last meeting there was vast agreement to continue on-line meetings, this meeting will be held via Zoom. You will be able to join with video from your computer, tablet, or smart phone. You can also dial in from any phone for an audio only connection.'

Fall 2021 Meeting: October 23rd


Chris Keller
October 5, 2021

Dear CCARC Delegates,

I hope this finds you all safe and healthy.

It is time again for another CCARC meeting. Since the at the last meeting there was vast agreement to continue on-line meetings, this meeting will be held via Zoom. You will be able to join with video from your computer, tablet, or smart phone. You can also dial in from any phone for an audio only connection.

CCARC IS AN ARRL AFFILIATED ORGANIZATION

CCARC is the umbrella coordination body made up of many clubs across the State of Colorado to oversee Amateur Frequency Coordination and policies for the State of Colorado.

All clubs are welcome to join.

<https://coordination.ccarc.net/cgi-bin/ccarc/fcpub?OPT=LIST>



70cm Coordinated Repeaters

CCARC Web Portal

https://coordination.ccarc.net/cgi-bin/ccarc/fcpub

Colorado Council of Amateur Radio Clubs Web Portal

Filter:

70cm (440 MHz) FM Wideband Analog Voice Coordinated - On Air

Location Callsign

Apply

Reset

70cm (440 MHz) & FM Wideband Analog Voice

Click on headers to sort. Click on entries for more information.

CID	Call	Output	Input	Location	Status	Type	Mode	Access	Last Update
213	KB0SW	447.0000	442.0000	Loma	Coordinated - On Air	Open	FM Wide	CTCSS 107.2	2021-04-21
214	KF0WF	447.0250	442.0250	Colorado Springs	Coordinated - On Air	Open	FM Wide	CTCSS 123.0	2021-04-05
220	W0CRA	447.1500	442.1500	Denver	Coordinated - Off Air	Open	FM Wide	CTCSS 107.2	2021-08-03
225	W0UPS	447.2750	442.2750	Fort Collins	Coordinated - On Air	Open	FM Wide	CTCSS 100.0	2021-04-27
228	K0IRP	447.3500	442.3500	Colorado Springs	Coordinated - On Air	Open	FM Wide	CTCSS 151.4	2021-04-05
235	NX0G	447.4750	442.4750	Colorado Springs	Coordinated - On Air	Open	FM Wide	CTCSS 107.2	2021-01-29
237	N0OWY	447.5000	442.5000	Denver	Coordinated - On Air	Open	FM Wide	CTCSS 88.5	2021-03-23
239	KB5ITS	447.5250	442.5250	Silverton	Coordinated - On Air	Open	FM Wide		2021-04-04
240	WA6IFI	447.5500	442.5500	Colorado Springs	Coordinated - On Air	Open	FM Wide	CTCSS 123.0	2021-04-20
242	K0RV	447.6000	442.6000	Glenwood Springs	Coordinated - On Air	Open	FM Wide	CTCSS 156.7	2021-11-22
249	K0NR	447.7250	442.7250	Monument	Coordinated - On Air	Open	FM Wide	CTCSS 100.0	2021-02-08
250	N0SZ	447.7500	442.7500	Boulder	Coordinated - On Air	Open	FM Wide	CTCSS 141.3	2021-11-22
251	WD0EKR	447.7500	442.7500	Canon City	Coordinated - On Air	Open	FM Wide	CTCSS 103.5	2021-04-26
257	WB0TPT	447.9000	442.9000	Denver	Coordinated - On Air	Closed	—	—	2021-02-06
258	K0FEZ	447.9250	442.9250	Denver	Coordinated - On Air	Open	FM Wide	CTCSS 100.0	2021-04-03
259	W0PHC	447.9500	442.9500	Pueblo	Coordinated - On Air	Open	FM Wide,DMR	Color 1,CTCSS 88.5	2021-10-23
262	KC0CVU	448.0000	443.0000	Colorado Springs	Coordinated - On Air	Open	FM Wide	CTCSS 107.2	2021-04-20
263	W0UPS	448.0250	443.0250	Loveland	Coordinated - On Air	Open	FM Wide,Fusion	CTCSS 100.0	2021-04-27
265	W0IG	448.0750	443.0750	Denver	Coordinated - On Air	Open	FM Wide	CTCSS 123.0	2021-11-22
266	KC0CVU	448.1000	443.1000	Colorado Springs	Coordinated - On Air	Open	FM Wide	CTCSS 107.2	2021-04-20
267	N0PYY	448.1250	443.1250	Golden	Coordinated - On Air	Open	FM Wide	CTCSS 107.2	2021-10-05
269	W0GJT	448.1500	443.1500	Grand Junction	Coordinated - On Air	Open	FM Wide	CTCSS 107.2	2021-04-04



Hotspots (Colorado)

popular digital voice modes (DMR, D-STAR, Fusion, etc.) as well as analog FM voice.

The CCARC Frequency Coordinator recommends that hotspots be deployed in the 70 cm band using one of the following frequencies:

Hotspot Channel	Frequency
1	438.4500 MHz
2	438.4750 MHz
3	438.5000 MHz
4	438.5250 MHz
5	438.5500 MHz
6	438.5750 MHz
7	438.6000 MHz
8	438.6250 MHz
9	438.6500 MHz
10	438.6750 MHz

Coordination and policies for the State of Colorado.

All clubs are welcome to join.

These frequencies are intended for short distance operation using low power (<1W) devices. Use of high-power transmitters, amplifiers and high-gain antennas are discouraged to minimize conflicts with other



Wyoming DMR Information

WY-DMR-RPT-May2020Repe... x +

← → ↻ <https://shywyarc.net/wp/wp-content/uploads/2020/11/WY-DMR-RPT-May2020Repeater-Frequency-List.pdf> ☆ M

WY-DMR-RPT-May2020Repeater-Frequency-List.pdf 1 / 1 100% + -

1

WyDMR Repeater Frequency List

Updated May 2020
Arranged alphabetically by City

Nearest City	Site	Output Frequency	Input Frequency	Color Code
Buffalo, WY	Johnson County Airport	445.050	440.050	CC11
Casper, WY	Casper Mtn.	449.9875	444.9875	CC11
Cheyenne, WY	Archer Complex	449.975	444.975	CC11
Fort Collins, CO	Buckhorn Mtn.	446.9625	441.9625	CC11
Gillette, WY	Antelope Butte	447.1125	442.1125	CC11
Laramie, WY	Summit – Sherman Hill	447.225	442.225	CC11
Lovell, WY	Medicine Mtn	446.925	441.925	CC11
Rawlins, WY	R-Hill	445.050	440.050	CC11
Rock Springs, WY	Wilkins Peak			CC11
Shoshoni, WY	Copper Mtn	446.825	441.825	CC11
Sheridan, WY	Red Grade Ridge	446.725	441.725	CC11
Ten Sleep, WY	Meadowlark	446.625	441.625	CC11
Wheatland, WY	Cherry Knoll	446.9875	441.9875	CC11
WyDMR Portable Repeater	N/A	445.0125	440.0125	CC11

All WyDMR repeaters use CC11; Talk Group TG3156 on TS1 and Talk Group 100 on TS2.

NOTES:



Amateur Radio Club WEB Sites

NCARC Repeaters - WØUPS/R, WØUPS-5

Not Secure | http://ncarc.net/?q=node/2

Northern Colorado Amateur Radio Club

Home Page | Our Club | Hamfest 2022 | Repeaters | Newsletters | Photo Albums | Resources

Report Interference | Nets | "Become a Ham" | E-Mail Reflector | For Sale Items | Club For Sale Items

NCARC currently maintains and operates 8 repeaters. These repeaters are kept operational through the guidance of the Technical Committee Chair and club members. The repeaters are located in four different locations. Take a look at the other repeaters in the area. [Other Repeaters](#)

Repeater Frequencies

Frequency Offset	CTCSS/Tone (In / out)	Call / Location	Equipment
2 Meter			
144.390		Horsetooth Mtn.	TinyTrak4/Alinco DR1200 / APRX iGate/Digi
145.115 -	100.0/100.0	Horsetooth Mtn.	Kenwood TKR-750 repeater, RTCM/Asterisk Controller, 100W amplifier
146.850 -	100.0/100.0	UNC Campus – Greeley	Kenwood TKR-750 repeater 25 watt, RTCM/Asterisk Controller
146.625 -	100.0/100.0	Buckhorn Mtn.	Kenwood TKR-750 repeater 25 Watt, RTCM/Asterisk Controller
1.25 Meter			
224.520 -	100.0/100.0	Horsetooth Mtn.	BridgeCom BCR-220 repeater, 100 Watt
70 Centimeter			
447.275 -	100.0/100.0	Horsetooth Mtn.	Motorola SLR5700 repeater, 50 watts, EchoLink RTCM/Asterisk ARES R3D2 Linked to 447.750 repeater on Lee Hill courtesy of RMHam
447.700 -	100.0/100.0	Buckhorn Mtn.	Kenwood TKR-850, 100 watt Amplifier, RTCM/Asterisk Controller Yaesu DR-1X Fusion repeater, 30 watt, Auto

QRZ callsign lookup: Callsign lookups by qrz.com

Our Hamfest Sponsors

Fort Collins
rt SYSTEMS
Poudre Valley REA

User login
Username *

[NCARC Repeaters](#)

LARC Repeater System - LARC

https://w0eno.org/larc-repeater-system/

Club is to promote, support, and lead amateur radio activities in a manner that honors and exemplifies the radio amateur's code, builds camaraderie within our membership, and serves our community's needs.

LARC Repeater System

VHF: 147.270 MHz (+) 100 Hz CTCSS tone (req'd and xmitted)
UHF: 448.800 MHz (-) 88.5 Hz CTCSS tone (req'd and xmitted)
(repeaters are always linked together)
EchoLink: WØENO-R (node 8305)

Report Repeater Issues: technical@w0eno.org

Nets
Hamlet Net (Tuesday nights at 7pm)
Thursday Night Net (Thursday nights at 8pm)

LARC maintains two linked repeaters - one on 2m and one on 70cm, located at the Longmont Safety and Justice center. The 2m repeater also has a microwave-

Sponsors
ALPHA ANTENNA

28 DEC 7:00 pm - 8:00 pm
TUESDAY NIGHT "HAMLET" NET

Tuesday
EVENT DETAIL

[LARC Repeaters](#)



Another Option

Mileage May Vary!!

Colorado Amateur Radio Repeaters

223 repeaters found in Colorado

+ = On-Air ✖ = Off-Air ● = Testing ○ = Unknown

Click on the frequency for additional details.
Click on a header to sort. **Note:** Sorting does not carry through to exports!

Frequency	Offset	Tone Up / Down	Location	County	Call	Use	Modes	
423.0000	+820 MHz		Boulder	Boulder	W0BTV	OPEN	ATV	+
442.3750	+5 MHz	100.0	Mancos, Caviness Mountain	Montezuma	KB5ITS	OPEN	FM	+
444.0000	+5 MHz	67.0	Silverton, Hazelton	San Juan	KB5ITS	OPEN	FM	+



Putting It All Together

CodePlug_prep_2

Search Sheet

Share

Home

Insert

Page Layout

Formulas

Data

Review

View

Calibri (Body)

12

A

A

Wrap Text

General

\$

%

0.00

0.00

0.00

0.00

Normal

Bad

Good

Neutral

Calculation

Check Cell

Insert

Delete

Format

AutoSum

Fill

Clear

A

Z

Sort & Filter

Office Update

To keep up-to-date with security updates, fixes, and improvements, choose Check for Updates.

Check for Updates

R22

fx

Always

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	No.	Zone_Name	Channel Name	Length	Receive F	Transmit	Channel T	Band Wid	Color Cod	Slot	Transmit	SS/DCS	SS/DCS E	Contact	Contact	Contact	Busy Lock/In Call (KNWD)	Admit Criteria/In Call	Scan List	length	
2	1	RMHAMCntrlEast	Thorodin Rk M	13	446.8000	441.8000	DMR	12.5	7	1	High	NONE	NONE	Rocky Mountain	Group Call	700	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
3	2	RMHAMCntrlEast	Thorodin Ctrl	13	446.8000	441.8000	DMR	12.5	7	2	High	NONE	NONE	Central	Group Call	720	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
4	3	RMHAMCntrlEast	Squaw Rk Mtn	12	446.9375	441.9375	DMR	12.5	7	1	High	NONE	NONE	Rocky Mountain	Group Call	700	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
5	4	RMHAMCntrlEast	Squaw Central	13	446.9375	441.9375	DMR	12.5	7	2	High	NONE	NONE	Central	Group Call	720	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
6	5	RMHAMCntrlEast	Lookout Ctrl	12	446.8375	441.8375	DMR	12.5	7	2	High	NONE	NONE	Central	Group Call	720	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
7	6	RMHAMCntrlEast	Lookout Local	13	446.8375	441.8375	DMR	12.5	7	1	High	NONE	NONE	Lookout Local	Group Call	710	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
8	7	RMHAMCntrlEast	Westcreek Rk M	14	446.8750	441.8750	DMR	12.5	6	1	High	NONE	NONE	Rocky Mountain	Group Call	700	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
9	8	RMHAMCntrlEast	Westcreek Ctrl	14	446.8750	441.8750	DMR	12.5	6	2	High	NONE	NONE	Central	Group Call	720	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
10	9	RMHAMCntrlEast	Burlington RkM	14	445.0500	440.0500	DMR	12.5	6	1	High	NONE	NONE	Rocky Mountain	Group Call	700	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
11	10	RMHAMCntrlEast	Burlington Ctl	14	445.0500	440.0500	DMR	12.5	6	2	High	NONE	NONE	Central	Group Call	720	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
12	11	RMHAMCntrlEast	Genoa Rk Mtn	12	446.7375	441.7375	DMR	12.5	8	1	High	NONE	NONE	Rocky Mountain	Group Call	700	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
13	12	RMHAMCntrlEast	Genoa Central	13	446.7375	441.7375	DMR	12.5	8	2	High	NONE	NONE	Central	Group Call	720	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
14	13	RMHAMCntrlEast	Devils Local	12	446.9250	441.9250	DMR	12.5	8	2	High	NONE	NONE	Devils Local	Group Call	711	Correct CC/Follow BCL	Follow Admit/Follow BCL	Cntrl E Scan	12	
15	14	SX Analog	446.000 SX	10	446.0000	446.0000	Analog	25			High	None	None				Analog_BCL_NO	Always	SX Analog	9	
16	15	SX Analog	446.000 141.3	13	446.0000	446.0000	Analog	25			High	141.3	141.3				Analog_BCL_NO	Always	SX Analog	9	
17	16	SX Analog	446.025 SX	10	446.0250	446.0250	Analog	25			High	None	None				Analog_BCL_NO	Always	SX Analog	9	
18	17	SX Analog	446.025 141.3	13	446.0250	446.0250	Analog	25			High	141.3	141.3				Analog_BCL_NO	Always	SX Analog	9	
19	18	SX Analog	446.050 SX	10	446.0500	446.0500	Analog	25			High	None	None				Analog_BCL_NO	Always	SX Analog	9	
20	19	SX Analog	446.050 141.3	13	446.0500	446.0500	Analog	25			High	141.3	141.3				Analog_BCL_NO	Always	SX Analog	9	
21	20	SX Analog	446.075 SX	10	446.0750	446.0750	Analog	25			High	None	None				Analog_BCL_NO	Always	SX Analog	9	
22	21	SX Analog	446.075 141.3	13	446.0750	446.0750	Analog	25			High	141.3	141.3				Analog_BCL_NO	Always	SX Analog	9	
23	22	SX Analog	446.100 SX	10	446.1000	446.1000	Analog	25			High	None	None				Analog_BCL_NO	Always	SX Analog	9	
24	23	SX Analog	446.100 141.3	13	446.1000	446.1000	Analog	25			High	141.3	141.3				Analog_BCL_NO	Always	SX Analog	9	
25	24	SX Analog	446.125 SX	10	446.1250	446.1250	Analog	25			High	None	None				Analog_BCL_NO	Always	SX Analog	9	
26	25	SX Analog	446.125 141.3	13	446.1250	446.1250	Analog	25			High	141.3	141.3				Analog_BCL_NO	Always	SX Analog	9	
27	26	SX Analog	446.150 SX	10	446.1500	446.1500	Analog	25			High	None	None				Analog_BCL_NO	Always	SX Analog	9	
28	27	SX Analog	446.150 141.3	13	446.1500	446.1500	Analog	25			High	141.3	141.3				Analog_BCL_NO	Always	SX Analog	9	
29	28	SX Analog	446.175 SX	10	446.1750	446.1750	Analog	25			High	None	None				Analog_BCL_NO	Always	SX Analog	9	
30	29	SX Analog	446.175 141.3	13	446.1750	446.1750	Analog	25			High	141.3	141.3				Analog_BCL_NO	Always	SX Analog	9	
31																					
32																					
33																					
34																					
35																					
36																					
37																					
38																					
Ready																					100%



Why Commercial? (Pros / Cons)

- Pros:
 - Rugged / Dependable
 - RX (Front end) designed to be tight and interference free in complicated environments
 - There's a reason Public Safety uses them (reliable!)
 - Roaming (although one Chinese mfg now supports too)
 - Part 90 compliant (Auxcomm and for-profit event support)
 - Fake Part 90 certs
 - Timeslot violation / signal cleanliness



Why Commercial? (Pros / Cons)

- Cons:
 - CPS not usually free (but has been made pretty affordable to hams)
 - Usually spend a few more \$'s if you want more bands (IE, must have more radios)
 - Single band (at least for VHF / UHF)



Commercial radios programming tips

- Best to use OEM cables (though there are a few trusted 3rd party that work “BlueMax49ers”)
- Use caution when buying cable (serial vs USB)



Motorola Radios - DMR

- Radio Models (XPR, SL, etc.)
- Batteries – Impress (smart) vs. Non-Impress
- Programming (OTA, WiFi, Cable, Bluetooth, Through-Charger)
- Ignition sense!



Motorola Radios - DMR





Motorola Radios – P25





Motorola Radios - DMR





Motorola Radios – P25





Motorola Radios

MOTOTRBO KEY FEATURES BY TIER



	Commercial		Entry	Enhanced	
	Voice		Voice Basic Systems	Voice Data Enhanced Apps	
	CP 200d MSRP: \$482-\$600	SL300 MSRP: \$550-\$633	XPR 3000 Series MSRP: \$575-\$675	XPR 7000 Series MSRP: \$1040-\$1165	SL Series MSRP: \$1,165
Display	N/A	Optional	Monochrome -1 line	Color – 5 lines	Color – 5 Lines
# of Channels	16	2 or 99	128	1,000	1,000
Bluetooth Data	N/A	N/A	N/A	Optional	Optional
Bluetooth Audio	N/A	N/A	N/A	Yes	Yes
Intrinsically Safe	N/A	N/A	N/A	Optional	No
GPS	N/A	N/A	N/A	Yes	No
Expansion Card/ Applications	N/A	N/A	N/A	Integrated	Integrated
Text Messaging	N/A	N/A	Yes	Yes	Yes
IP Rating	IP54	IP54	IP55	IP57	IP54
Intelligent Audio	N/A	N/A	Yes	Yes	Yes
Systems Capable	N/A	N/A	Optional	Yes	Yes
Enhanced Privacy	N/A	N/A	Optional	Yes	Yes
Emergency	N/A	Yes (No Button)	Yes (No Button)	Yes	Yes
Digital Mode	Optional	Yes	Yes	Yes	Yes
Voice Announcement	Yes	Yes	Yes	Yes	Yes



Motorola Radios – ACC





Motorola Radios – ACC





Motorola Radios – older analog

Sidetrack



Motorola Radios – older analog



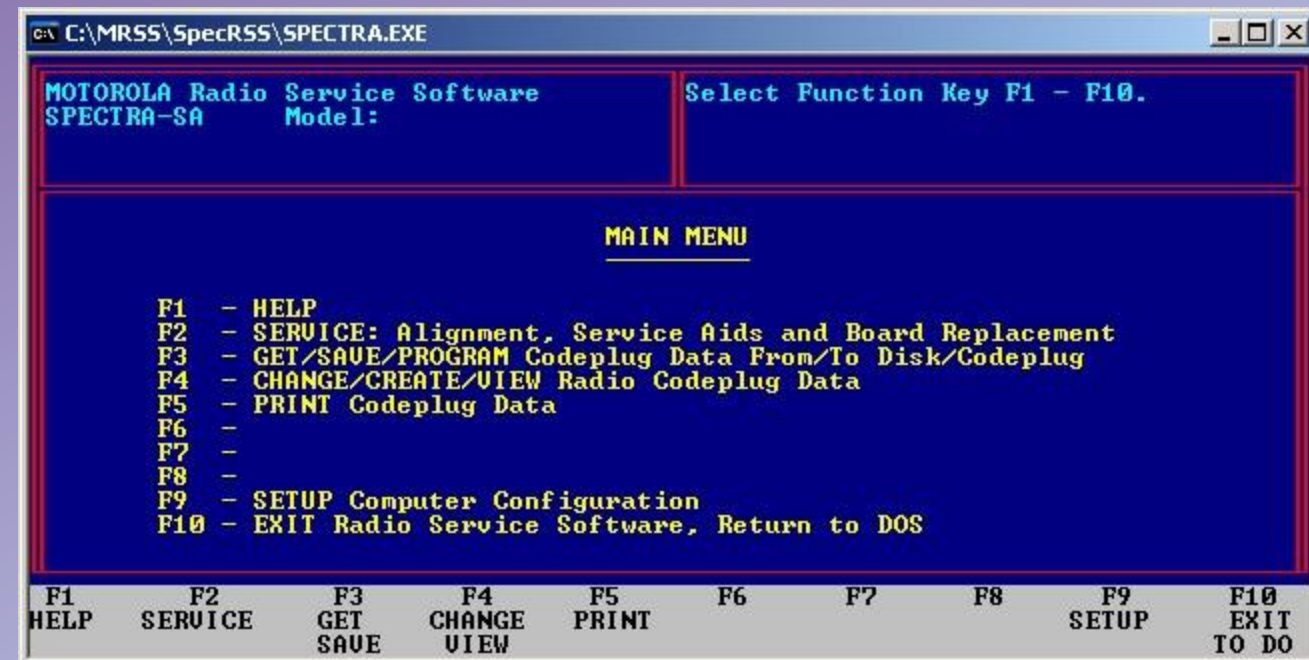


Motorola Radios – older analog



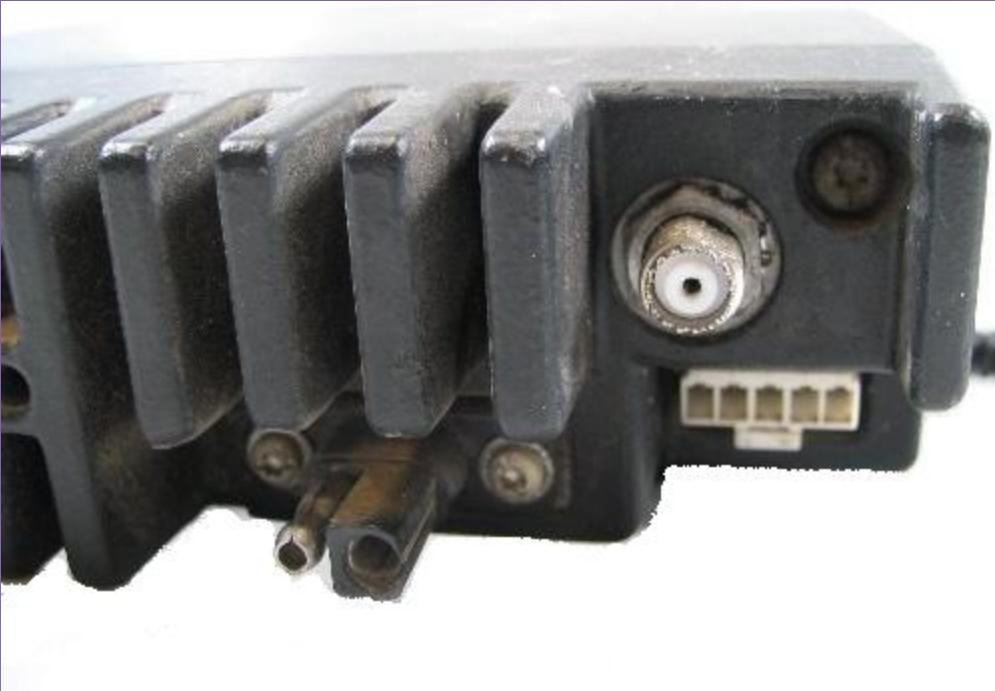


Motorola Radios – older analog



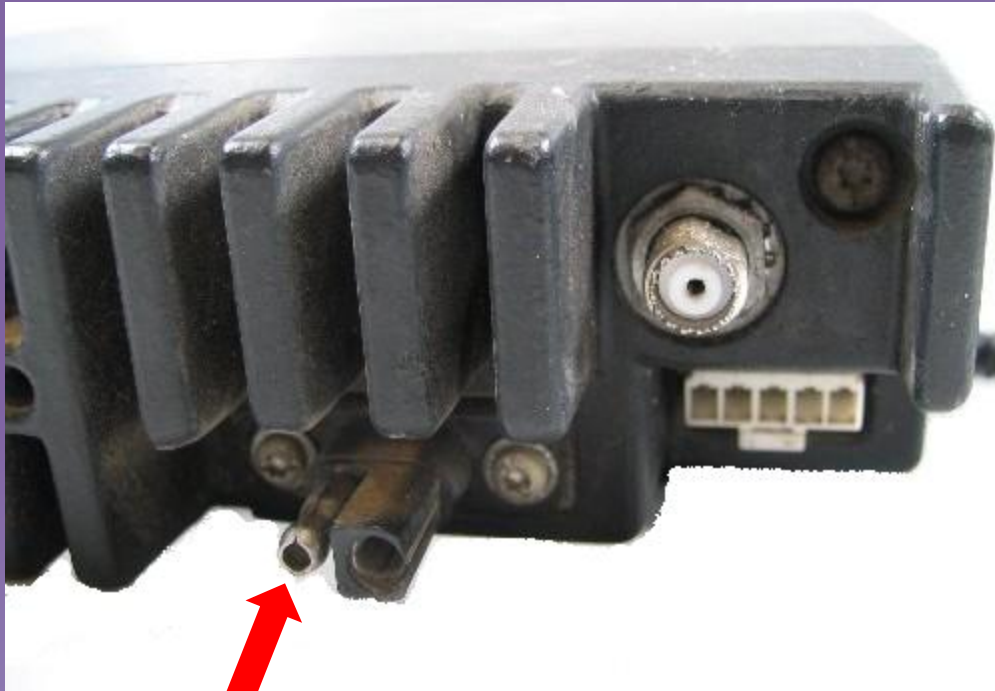


Motorola Radios – older analog





Motorola Radios – older analog



+





Motorola Radios – older analog

[Back to Home](#)

The Motorola® Index Page

Maintained by [Robert Meister WA1MIK](#)

This page has undergone a major reorganization.
Everything is all still here; items just got moved.
Use your browser's SEARCH function
to find things, as they're now sorted better.



Motorola was split into two different companies early in 2011. There is still some confusion out there as to what products are handled by which company:

Motorola Solutions - effectively the old Motorola: deals with land mobile / two-way radio equipment, Canopy wi-fi systems, and some other things that are radio related. If you go to www.motorolasolutions.com you are viewing the Motorola two-way (etc) company.

Motorola Mobility - essentially everything that is not land mobile / two-way radio: cable TV boxes, cellphones and some other things. This is the part Google offered to buy in August 2011 for \$12.5 billion. If you go to www.motorola.com you are viewing the Motorola Mobility web site. That web site has no concept of land mobile / two-way radio - not even a courtesy pointer.

Note: Any Motorola parts or manual prices mentioned on this page (or on any page at this web site) should be taken only as a rough guideline. Motorola adjusts prices quarterly, and offers one set of prices to their dealers/service shops (the so called "National Service Organization" (or "NSO") Pricing), a "self-maintaining" fleet customers (i.e. those that have their own radio shops... cities, counties, police departments, fire departments, etc) and a third set of prices on their telephone order desk (i.e. retail sales). For these reasons readers should use the prices mentioned in an article only as a rough indication. I appreciate an emailed update if you discover a major price change on any item.

Note: Many articles on this page (or on any page at this web site) mention manual product numbers. Those manuals were available at the time the article was written but may no longer be available today. Motorola usually discontinues support for radio products that are over ten (10) years old. This means parts and no more manuals. If you need a manual for a radio, call Motorola and see if it's still available. If not, you'll have to look for a used one being sold privately or on the popular auction sites.

General Information Pages and Articles:

It's probably wise to read some of this first, because it will answer a lot of questions that may pop up as you navigate to other pages and read other articles.

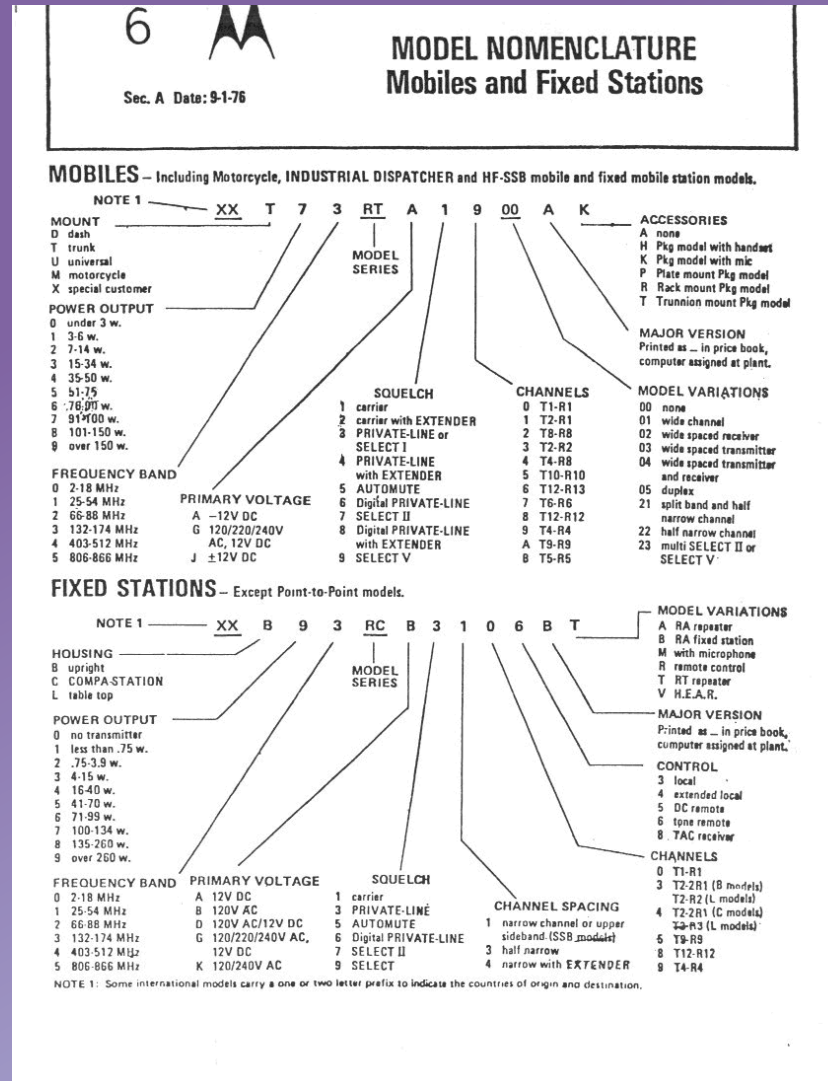
- [How to order manuals or parts from Motorola](#) by Mike Morris WA6ILQ.
Some of the tricks I've picked up over the years...
- [Figuring out what you have](#) by Mike Morris WA6ILQ.
Cracking the model / ID number... with explanations of power levels, frequency bands, and a suffix table.
- [Deciphering the three-letter-and-four-digit part numbers](#) by Mike Morris WA6ILQ.
A web page compilation the number breakdown table. The data is combined from four different vintage of old Motorola Buyer's Guide publications.
- [Deciphering the first two digits of part numbers](#) by Robert Meister WA1MIK.
A list of the parts categories from a 1976 publication.
- [Accounting Product Code \(APC\) List](#)
Decodes the first three digits of many two-way product serial numbers.
- [Translating the battery date code](#) by Mike Pugh KA4MKG
- [Determining Date of Manufacture from the Serial Number](#)
- [Touch Up Paint Colors](#) by Mike Morris WA6ILQ.
For years Moto has offered spray cans of color matched paint in their parts catalog. This is a list of the colors and part numbers that I know of, the usage and a few notes on alternate methods of color matching. Corrections and additions to the paint color table are quite welcome.
- [Radio Service Software \(RSS\) and the Radio Interface Box \(RIB\)](#)
Some problems and some solutions... Compiled from information provided by several knowledgeable folks. Includes schematics of various RIBs.
- [The Motorola Test Equipment Page](#) Radio test equipment made by or for Motorola.
- [The Motorola Portable Test Set Page](#) Radio test sets, metering kits and accessories.
Information on several vintage including the P-8501, TU546, S1056, S1057, S1058, S1059 series, R1033, RTX4005 and several base station / repeater test sets. Also has several portable radio test and programming cables.

Radio-Specific Pages and Articles:

http://repeater-builder.com



Motorola Radios – older analog



<http://repeater-builder.com>



Motorola Radios

Now, back to DMR programming.....



Motorola CPS

- 16.0 vs. 2.0
 - 16.0 Build 828
 - 2.0 (Between 2.0 and 2.10)
- Firmware
- Hardware vs. Software features (EID entitlements)
 - Wideband keys, Audio keys



Motorola CPS

MOTOTRBO Customer Programming Software

File Edit View Device Features Remote Window Help

RM Open Save Reports Delete Cut Copy Paste Search Read Write Clone Bluetooth 192.168.11.1

RMHAM-Generic_UHF_5550e-High_Power-REV21_6.ctb

XPR 5550e

- General Settings
- Accessories
- Buttons
- Text Messages
- Telemetry
- Menu
- Security
- Network
- Announcement
 - Job Tickets
 - Templates
 - Options
- Signaling Systems
 - MDC
 - Syst1
 - Quik-Call II
 - Syst1
 - Digital Emergency
 - Syst1
 - Capacity Plus Emergency
 - Syst1
 - Phone
 - Syst1
- Contacts
 - MDC
 - Call1
 - Quik-Call II
 - Call1
 - Digital
 - 4CORNERS
 - Al Call
 - BoulderLCL
 - CENTRAL
 - CSU LCL
 - DEVILSHEAD LCL
 - LOOKOUT LOCAL
 - LOS ALAMOS LCL
 - NEW MEXICO
 - NORTH COLO
 - ROCKY MOUNTAIN
 - SANDIA LCL
 - SOUTH COLO
 - TAOS LCL
 - WyLOCAL
 - WyWIDE
 - Capacity Plus
 - Call1
 - Phone
- RX Group Lists
 - Digital
 - ALLCALL
 - ROCKY MOUNTAIN
 - CENTRAL
 - LOOKOUT LOCAL
 - NORTH COLO
 - SOUTH COLO
 - DEVILSHEAD LCL
 - NEW MEXICO
 - SANDIA LCL
 - LOS ALAMOS LCL

Device Information

[To](#) [Device Fea](#) [Language Pack Mem](#)

Model Nu M29QPN9WA1AN
Tanapa Nu PMUE3649BK
Serial Nu 511TSP3360
Physical Serial Number 7E528BA42AF81E99381AD07AF361492A80F
3F030C7A1F3FE568FA643CD40AFA4
Firmware ID 0C78E1B906C54D3A8F264CE5C4F0E80F
Frequency Rang 403.000000-470.000000
Power Range (20.0-48.0
Firmware V R02.07.03.0000
Codeplug V 11.00.19
Bootloader V R02.07.02.0000
Last Programmed Date 12/30/2018 6:46 AM

Device Features

Feature	Status
Digital	Free
- IP Site Connect	Free
- Capacity Plus - Single Site	Free
- Enhanced Privacy	Free
- Transmit Interrupt	Free
- Digital Phone Patch	Free
- Capacity Plus - Multi-Site	Free
- Data Services via Bluetooth	Available for Pu...
- Digital Emergency	Free
- Radio Inhibit	Free
- Mute Mode	Available for Pu...
- Extended Text Messages	Free
- Indoor Location Tracking	Available for Pu...

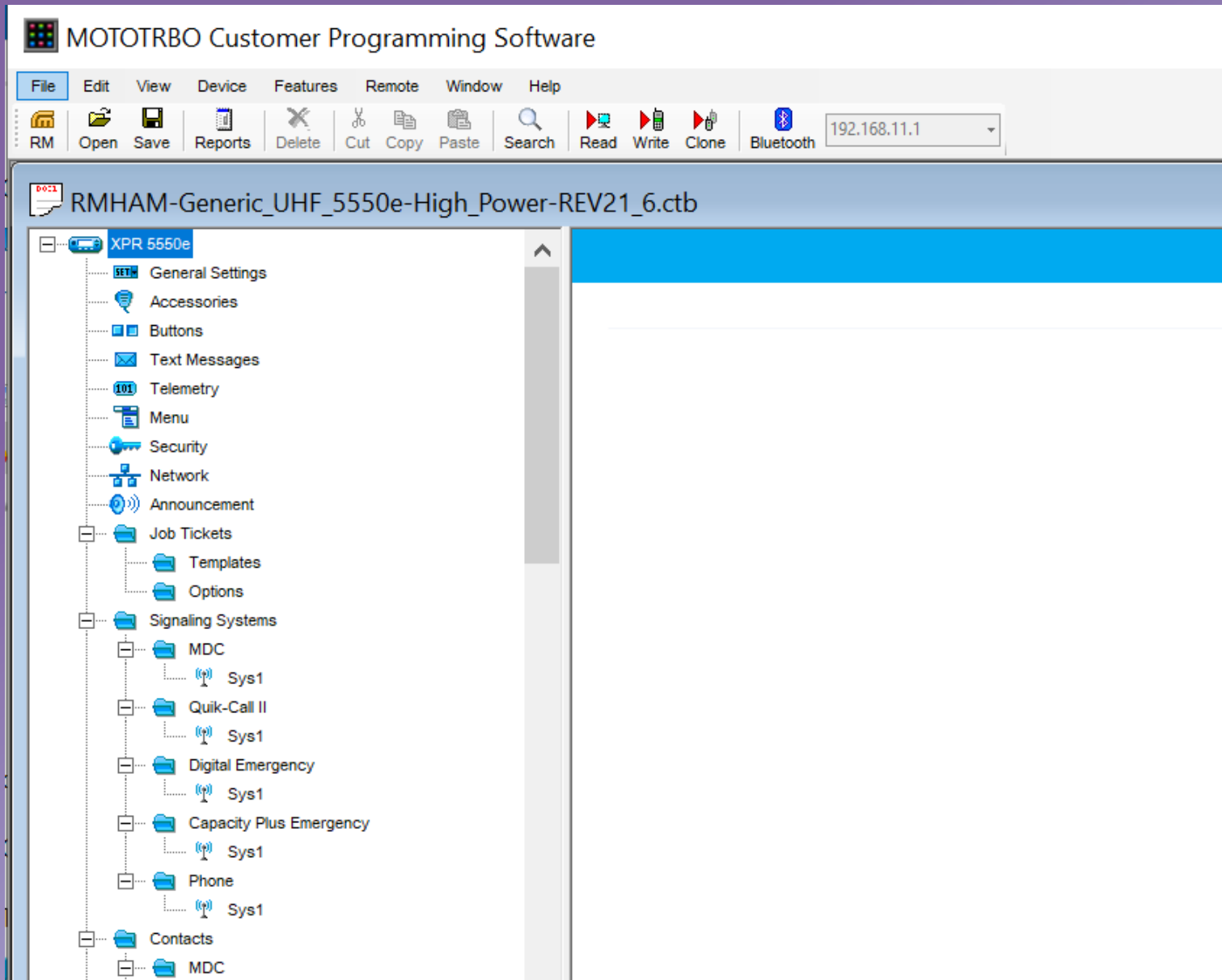
XPR 5550e

Expert View

NUM



Motorola CPS





Motorola CPS

K10KN-Truck-11-20-21-VHF-5550e-HighPower.ctb2 - MOTOTRBO CPS 2.0

FileDeviceLicensesToolsHelp

Open

Save

Read

Write

Clone

Clone Express

Update

Register

Activate

K10KN-Truck-11-20-21-VHF-5550e-HighPower

Set Categories

Configuration

Device Information

General

Job Tickets

Systems

Contacts

RX Group Lists

Zone/Channel Assignment

Scan Lists

Capacity Plus Lists

Feature Sets

Product FamilyMOTOTRBO 2.0 Subscribers

Feature Sets

	Feature Name	Status
>	Digital	Free & Used
>	- Capacity Plus - Single Site	Free
>	- Enhanced Privacy	Free
>	- Transmit Interrupt	Free
>	- Capacity Plus - Multi-Site	Free
>	- Indoor Location Tracking	Free
>	- Data Services via Bluetooth	Free
>	- Bluetooth Audio and Radio Programming	Free
>	- Digital Emergency	Free
>	- Radio Inhibit	Free
>	- Authenticated Radio Disable & Remote Monitor	Free
>	- Extended Text Messages	Free
>	- Mute Mode	Free
>	- IP Site Connect	Free & Used
>	- Digital Phone Patch	Free & Used
>	Connect Plus	Available for Purchase

24 items found (0 currently selected).

Validation ResultsWarning MessagesSearch ResultsHelp

Ready

45

Serial Number: 5111WC1878



Motorola CPS

KI0KN-Truck-11-20-21-VHF-5550e-HighPower.ctb2 - MOTOTRBO CPS 2.0

FileDeviceLicensesToolsHelp

Open

Save

Read

Write

Clone

Clone Express

Update

Register

Activate

KI0KN-Truck-11-20-21-VHF-5550e-HighPower

Set Categories

Configuration

Device Information

General

Job Tickets

Systems

Contacts

RX Group Lists

Zone/Channel Assignment

Scan Lists

Capacity Plus Lists

Feature Sets

	Feature Name	Status
▶	Digital	Free & Used
▶	- Capacity Plus - Single Site	Free
▶	- Enhanced Privacy	Free
▶	- Transmit Interrupt	Free
▶	- Capacity Plus - Multi-Site	Free
▶	- Indoor Location Tracking	Free
▶	- Data Services via Bluetooth	Free
▶	- Bluetooth Audio and Radio Programming	Free
▶	- Digital Emergency	Free
▶	- Radio Inhibit	Free
▶	- Authenticated Radio Disable & Remote Monitor	Free
▶	- Extended Text Messages	Free
▶	- Mute Mode	Free
▶	- IP Site Connect	Free & Used
▶	- Digital Phone Patch	Free & Used
▶	Connect Plus	Available for Purchase

24 items found (0 currently selected).

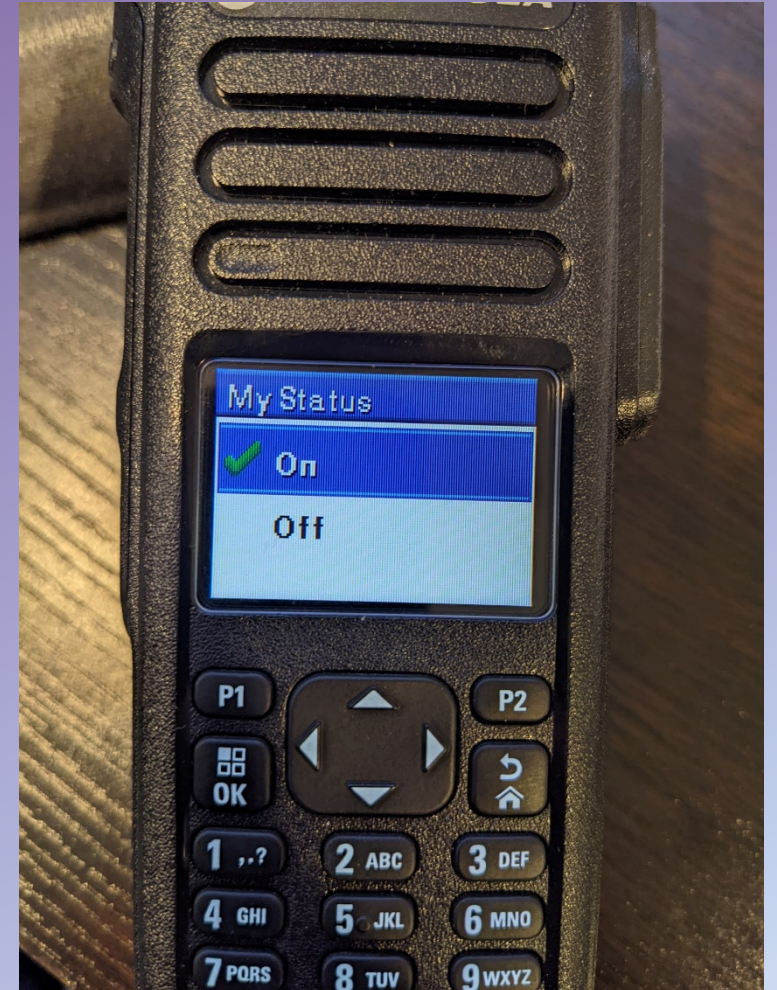


Motorola CPS – Bluetooth!





Motorola CPS – Bluetooth!



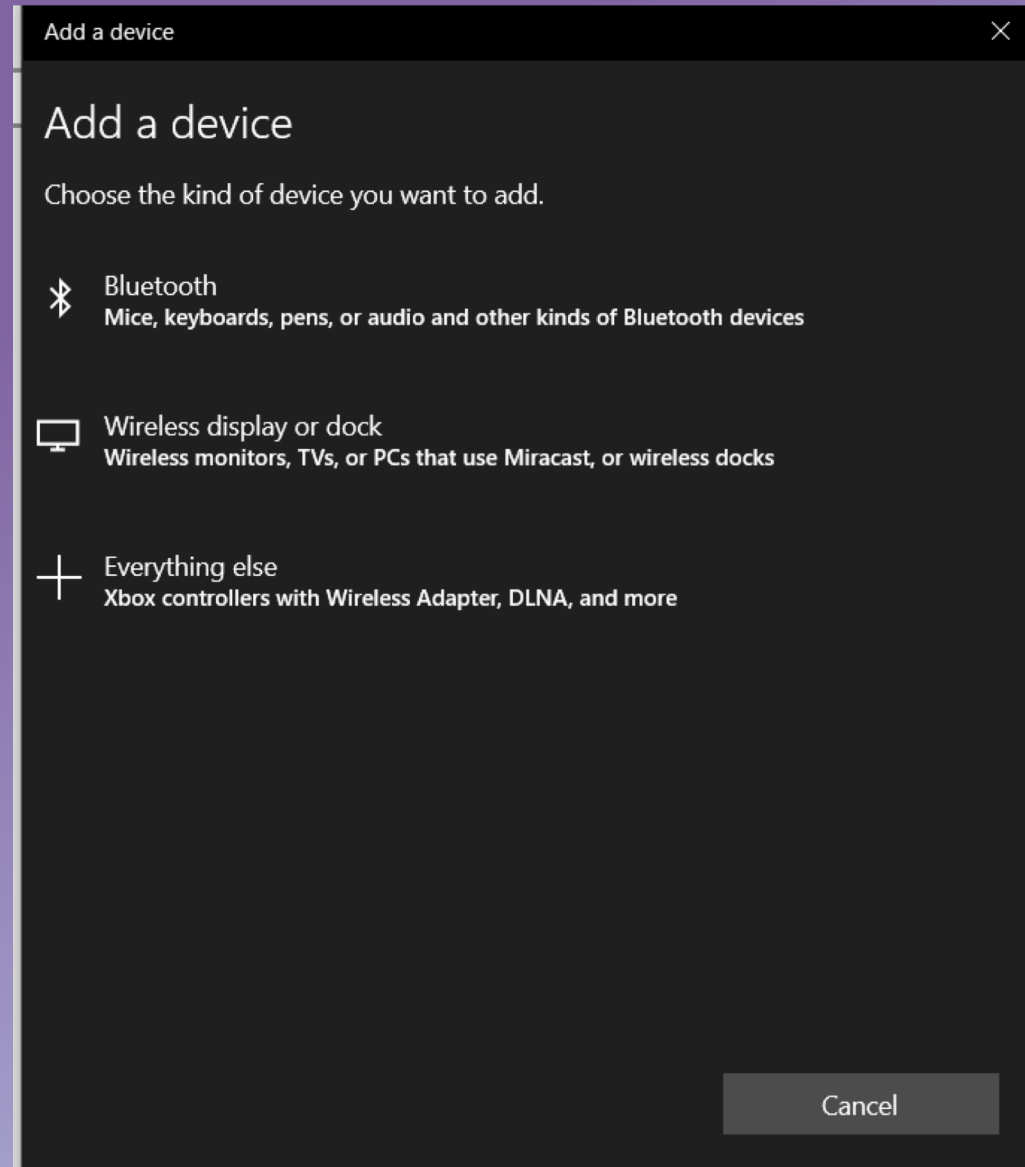


Motorola CPS – Bluetooth!

A screenshot of the Windows Settings application, specifically the "Bluetooth & other devices" page. The left sidebar shows the "Settings" title and a list of categories: Home, Find a setting, Devices, Bluetooth & other devices (selected), Printers & scanners, Mouse, Typing, Pen & Windows Ink, AutoPlay, and USB. The main content area is titled "Bluetooth & other devices" and contains a large button labeled "Add Bluetooth or other device". Below this, there are sections for "Mouse, keyboard, & pen" (showing a Logitech Unifying Receiver), "Audio" (showing a 1080p Pro Stream Webcam and two LG Ultra HD monitors), and "Other devices" (showing an ELAN:Fingerprint sensor). At the bottom, there is a checkbox for "Download over metered connections" with explanatory text. On the right side, there are links for "Turn on Bluetooth even faster", "Related settings" (Devices and printers, Sound settings, Display settings), "Help from the web" (Reinstalling Bluetooth drivers, Fixing Bluetooth connections, Sharing files over Bluetooth), "Get help", and "Give feedback".

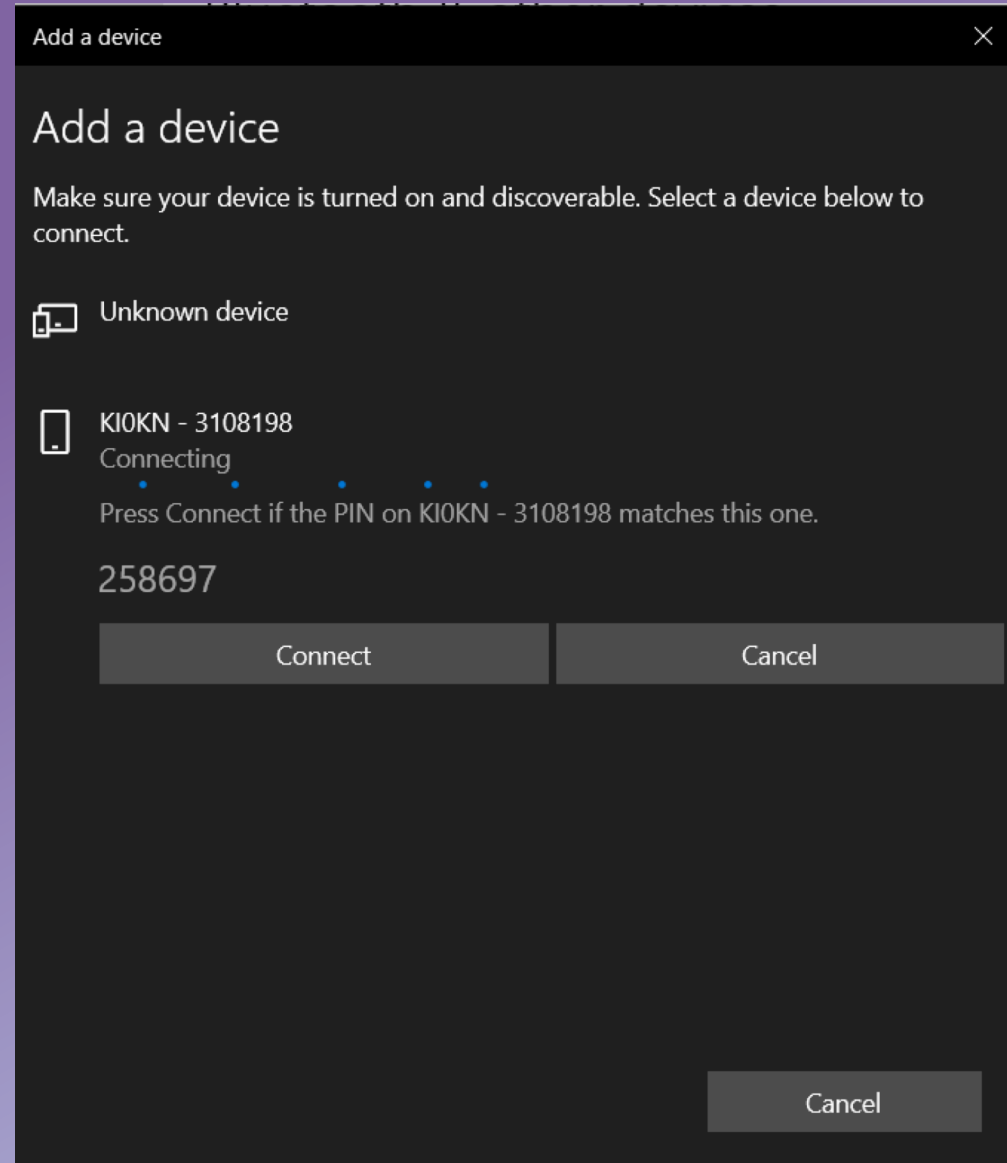


Motorola CPS – Bluetooth!



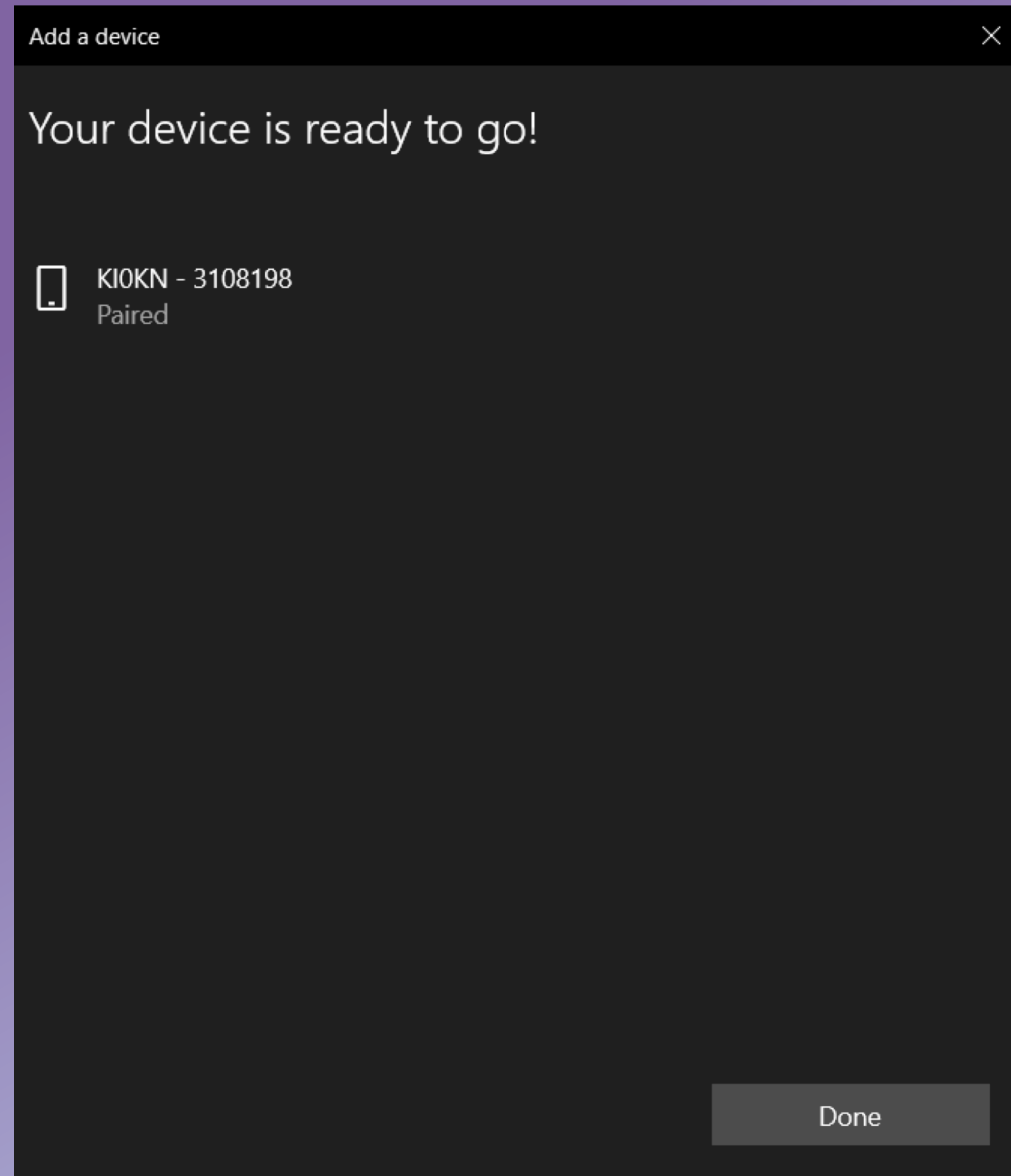


Motorola CPS – Bluetooth!



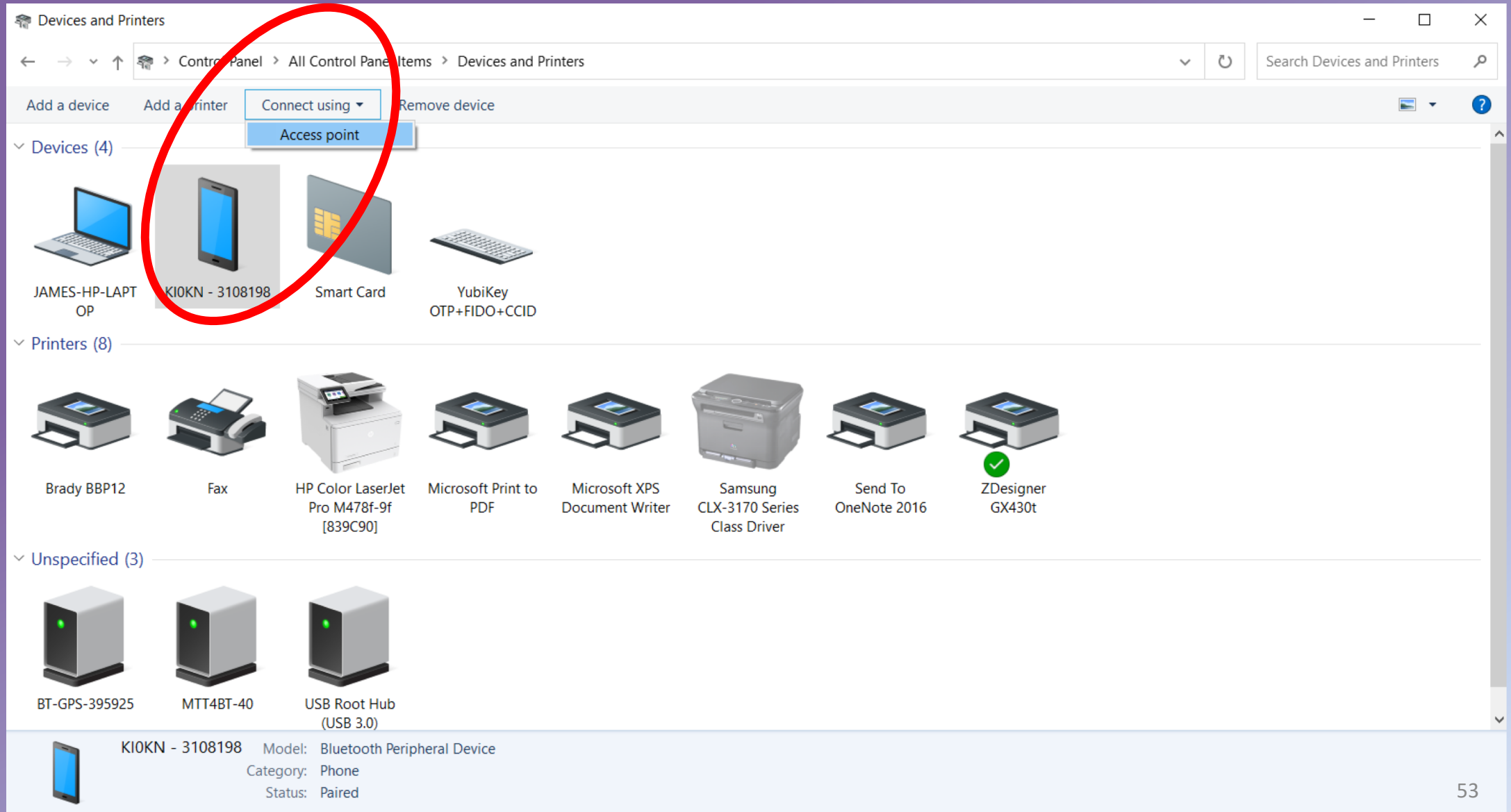


Motorola CPS – Bluetooth!





Motorola CPS – Bluetooth!



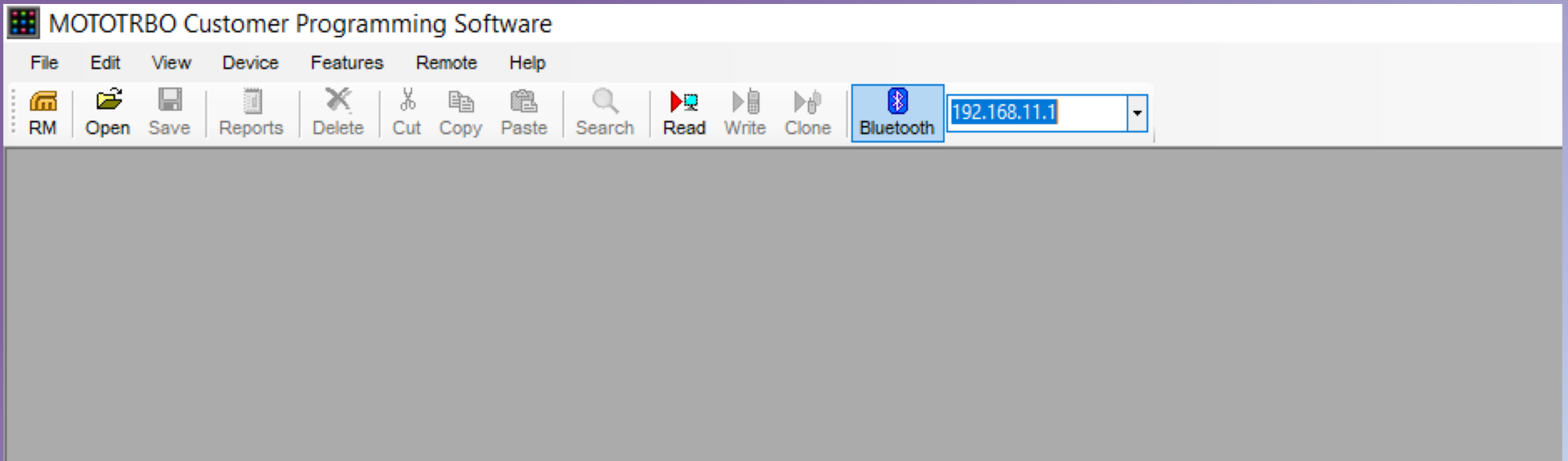


Motorola CPS – Bluetooth!





Motorola CPS – Bluetooth!



Read / Write / Clone (No firmware, no EID)



Motorola Codeplug - Basics

- General settings
 - Radio ID
 - AGC
 - Talk permit
 - Power
- Accessories
 - Ignition sense
- Buttons
- Contacts / RX Groups / Channels / Scan / Roam



Motorola Codeplug – Talking points

- Firmware – update – difference 16.0 vs 2.0
- Wideband entitlements (EID)
 - Software vs Hardware
 - Audio features
 - Features worth licensing (RX audio leveling)
 - Careful, can lose entitlement on radio that doesn't support it!



Motorola Codeplug – Talking points

- General settings
 - Radio name
 - Radio ID
 - High/Low Power
 - Codeplug password
 - Audio profile (Adjust to preference)
 - Microphone (AGC enabled)
 - Talk permit (analog, digital and A+D)



Motorola Codeplug – Talking points

- Accessories
 - Ignition sense
 - Gains (Optimized in RMHAM plugs)
 - GPIO pins



Motorola Codeplug – Talking points

- Buttons
 - Live demo of buttons on HT / Mobiles



Motorola Codeplug – Talking points

- Menu
 - Show / remove items in the radio menu
 - Live demo of radio menu items



Motorola Codeplug – Talking points

- Security
 - Not allowed for HAM, useful for Part 90
 - RAS key can bite you! Make sure it's removed!
 - Defaults to “enabled” in CPS 2.0, but without a value so programming fails.



Motorola Codeplug – Talking points

- Network
 - Mostly for repeaters
 - Bluetooth enable
 - Mic routing



Motorola Codeplug – Talking points

- Contacts
 - Only section – Digital
 - Group contact / Individual contact
 - Must have group contact for each talkgroup
 - Where you enter TG id number
 - Individual contacts
 - Can cut/paste for other plugs
 - Cannot use CSV
 - Tool exists to import CSV
 - » Legality questionable since opening proprietary Codeplug file



Motorola Codeplug – Talking points

- RX Group lists
 - Must have one “group” list for each TG
 - Group membership should only be digital contact for that TG



Motorola Codeplug – Talking points

- Channels
 - Zones are collection of channels
 - Can be Digital, Analog, or combo
 - Analog channels:
 - Make sure channel bandwidth 25 (very low audio if not)
 - Scan/roam can be set here, easier in top zone view
 - Allow talkaround (explain talkaround vs. reverse)
 - Frequency entry (offset button, make sure ALL data is correct to copy)
 - TPL reverse (reverse burst)
 - Power level
 - TOT set (180 default for sample codeplugs)



Motorola Codeplug – Talking points

- Channels
 - Digital channels:
 - Set Color Code
 - Set timeslot
 - Allow talkaround (explain talkaround)
 - Make sure IP Site connect checked for repeater channels
 - Make sure RX Group set
 - best to set RX Group list for TG, otherwise will hear nothing/everything
 - Make sure TX Contact set
 - Radio will not TX without this!
 - Use “Allcall” for simplex channels
 - TOT set (180 default)
 - Allow interrupt set (can override from repeater if needed)
 - Enhanced channel access set (helps doubling)
 - SOME radios allow same ID reception



Motorola Codeplug – Talking points

- Channels (cont'd)
 - Admit criteria
 - Color Code free (Queries repeater to see if free, make talk permit tone work)
 - Always (Used for analog channels, repeater will keep you from transmitting until it's PTT dropped if this is not set right)



Motorola Codeplug – Talking points

- Channel Pools
 - Use 1 channel + roam
 - Lots more channel than 99 channel radios
 - Use remaining channels for simplex, analog, etc.



Motorola Codeplug – Talking points

- Scan
 - Scan lists are collections to scan when scan feature is on
 - Button assignment for scan
 - Pitfall of scan when scanning North/Wide, South/Wide etc.
 - Scan hold time



Motorola Codeplug – Talking points

- Roam
 - Radio will “roam” to anything in list based on RSSI of beacon
 - RSSI threshold level important
 - Does not work like cell phone, only when beacon received
 - Radio stays on selected channel until THAT channel drops below RSSI threshold, even if another channel RSSI is stronger
 - Recommend RSSI be set to -91 for RMHAM
 - Don’t add roam list to standard Zone! Radio will not stay put!
 - Generate separate “Roam” zone with 1 channel



Motorola Codeplug – Wrapping up

- Basics to getting a single digital channel working
 - Set radio ID
 - Add digital contact for each talk group
 - Add RX group list for each Talkgroup
 - Assign associated digital contact ID to that RX group list
 - Add channel info
 - Set Color Code
 - Set time slot
 - Check “IP Site connect” and “Talkaround”
 - Set frequencies, Group list, Contact name
 - Set Power Level
 - Set TOT
 - Check “Allow interrupt”
 - Set Admit Criteria to “Color Code Free”
 - Check “Enhanced channel access”



Motorola Codeplug – Wrapping up

- Basics to getting a single analog channel working
 - Add channel info
 - Set Channel Bandwidth to 25
 - Check “Allow talkaround”
 - Enter frequency and CTCSS info
 - Set Power Level
 - Set TOT
 - Set Admit Criteria to “Always”



Motorola Codeplug – Wrapping up

- To write the plug, you have to use “clone” if serial number is different.
 - Has to be exact matching model number though, can’t work around that!
- Naming conventions
 - If name is too long, display will scroll (can be distracting)
 - Field length varies on model, and on display (Front vs. HHCH)
- Remember that the RMHAM plugs are “starters”. We encourage you to use them as a launching point to create your own personal plug!



Kenwood NX Series Model Review

- **Radio Models & Some Specific Factoid ☺**
 - NX-1000 Series
 - NX-3000 Series
 - NX-5000 Series
- **Programming Cables**
 - Multiple cables for the different series
 - Portable / Mobiles
 - Not all aftermarket cables are the same !!
 - Want a high speed cable with UART for high speed code plug transfer
 - Serial only cables will cause frustration with 12+ minutes to download Code Plug
- **Programming Software**
 - Runs on Microsoft Windows Only
 - Have had success running Software on Windows in Virtual Machine on Mac
 - Try at you own risk!!
 - NOT RECOMMENDED to upload Radio License Keys to Radio!!
 - Kenwood Firmware Loader
 - Kenwood License Manager
 - Software
 - Radio
 - **Kenwood calls Software - Field Programming Unit**
 - KPG-D6N (NX-1000 Series), KPG-D3N (NX-3000 Series), KPG-D1N (Nx-5000 Series)



Kenwood NX-1000 Series

- Several Portable Configuration Options to choose from
- VHF and UHF Models
- Supports FM Analog
- Support Digital NXDN OR DMR
 - Digital mode option decided at time of purchase
 - Can purchase feature to change Digital Mode





Kenwood NX-3000 Series



- Several Portable and Mobile Configuration Options to choose from
- VHF and UHF Models
- Supports FM Analog
- Supports NXDN and DMR
- Will support only one digital mode at a time
- 1000 support requires an additional license key



Kenwood NX-5000 Series

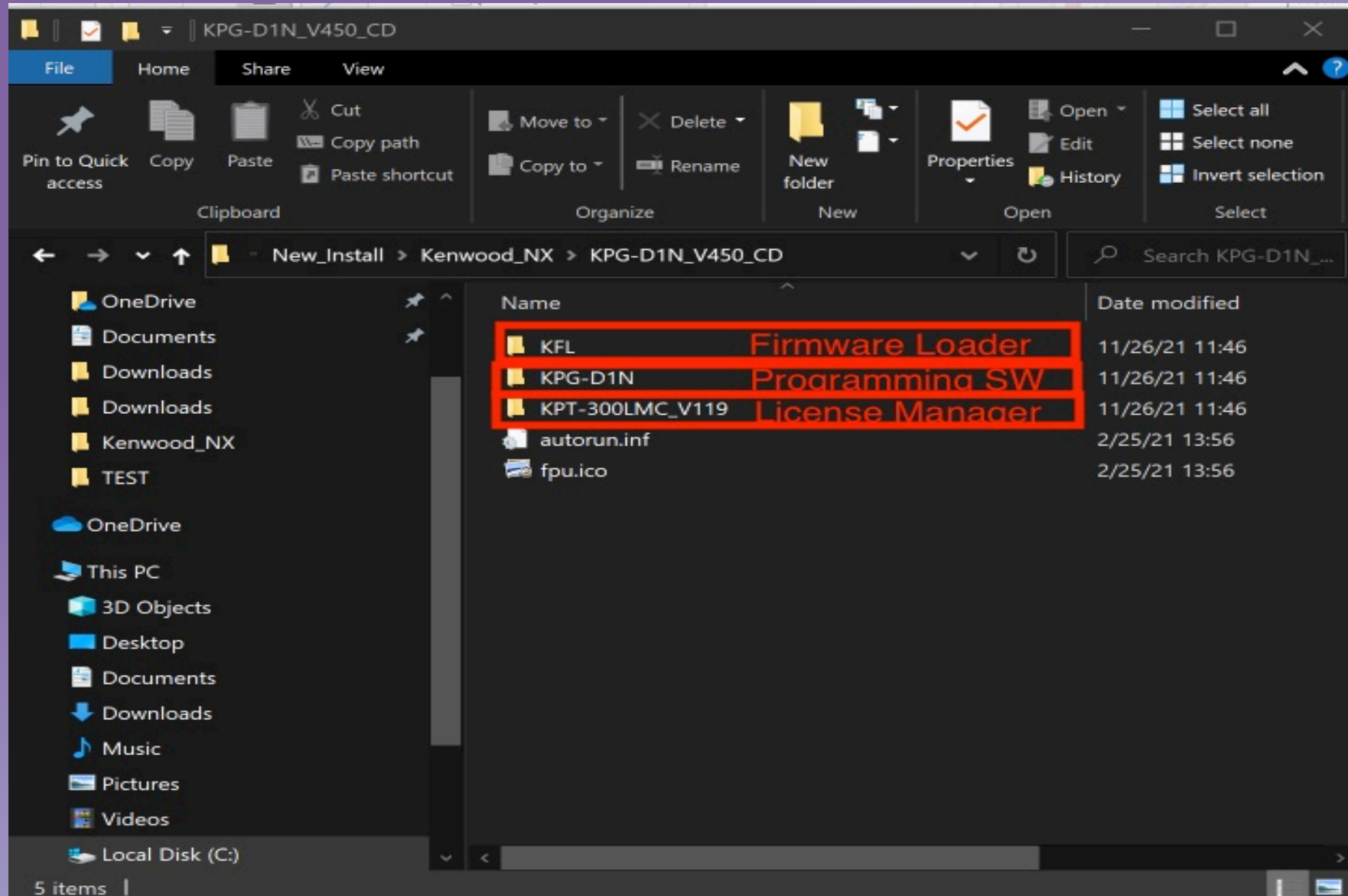
- MANY Portable and Mobile Configuration Options to choose from
- VHF and UHF Models
- Supports FM Analog
- Supports NXDN , DMR and P25
- Will support two digital modes at a time
- Comes standard with NXDN
- DMR and P25 requires an additional license key
- 4000 support requires an additional license key





Kenwood Programming Software

(Field Programming Unit)





License Management - Software

License Management Client - Online -

FileAuthenticationHistoryCancellationSetupHelp

RadioSoftware

+

License Entry

×

License Delete

🌐

Online

Refresh

🌐▶💻

Software Authentication

License Key :

	Model	M.Code	Description	Days Allowed	Quantity
<input type="checkbox"/>	KAS-12	K	Dealer		1/1
<input type="checkbox"/>	KPG-D1N	W	Dealer		0/1
<input type="checkbox"/>	KPG-D3N	W	Dealer		0/1
<input type="checkbox"/>	KPG-D6N	W	Dealer		0/1

Local Authentication

Field Activation

Model	M.Code	Description	Days Left
KPG-D1N	W	Dealer	
KPG-D3N	W	Dealer	
KPG-D6N	W	Dealer	



License Management - Radio

License Management Client - Online -

FileAuthenticationHistoryCancellationSetupHelp

RadioSoftware

RefreshLicense SplitLicense EntryLicense DeleteOnline

Account Nickname : mskelto
Customer Account Number :

KENWOOD

Radio Authentication

COM4

License Key : 8090d9d5-xxxx-xxxx-xxxx-xxxxxxxxxxxx

Invoice No.	Invoice Date	Model	Description	Radio	M.Code	Quantity
<input type="checkbox"/> 425707	2021-01-22	KWD-5003BT	Bluetooth Data			0/4
<input type="checkbox"/> 455291	2021-07-12	KWD-5500EE	ENHANCED ENCRYPTION			0/2
<input type="checkbox"/> 455291	2021-07-12	KWD-5500EE	ENHANCED ENCRYPTION			0/1

AuthenticationField Activation

Radio Serial No. NX-5300/K6/B8810043

Model	Description	Radio	M.Co
KWD-5003BT	Bluetooth Data	NX-5300	K6
KWD-5006DE	DES 4 Keys	NX-5300	K6
KWD-5300CV	DMR Conventional	NX-5300	K6
KWD-5500EE	ENHANCED ENCRYPTION	NX-5300	K6
KWD-5001FP	Front Panel Program	NX-5300	K6
KWD-5200CV	NXDN Conventional	NX-5300	K6
KWD-5204AP	NXDN OTAP	NX-5300	K6
KWD-5201TR	NXDN Type-C Trunking	NX-5300	K6
KWD-5100CV	P25 Conventional	NX-5300	K6
KWD-5104AP	P25 OTAP	NX-5300	K6
KWD-5005AE	SCM Board Control	NX-5300	K6

81



Firmware Loader

KFL

Firmware

File name
NX-5400K2_FIRM_SH01_REL50.KEX

Version
K 4.51.00

Checksum
421C

Configuration

COM port
COM9

Baud rate
Auto

Program

Address 0%

Write

Cancel

Exit About...



NX-Series Programming Software (FPU)

- NX-Series Factoids
- Not going to review NX-1000 series
 - Ask questions if you have them
- NX-3000 Series FPU Live Walk-Through (KPG-D3N)
- NX-3000 Series FPU Live Example (KPG-D3N)
 - Needed Code Plug Information & Programming Steps
- NX-5000 Series FPU Live Walk-Through (KPG-D1N)
- NX-5000 Series FPU Live Example (KPG-D1N)
 - Needed Code Plug Information & Programming Steps



NX-Series Factoids

	NX-1000	NX-3000	NX-5000
Programming SW	KPG-D6N	KPG-D3N	KPG-D1N
Max Number of Zones	128	128	128
*Max Channels per Radio	260	260/1000	1000/4000
Max Channels per Zone/Personality	250	250/512	512
Number of Characters per Zone Name	8	12	16
Number of Characters per Channel Name/Per	8	14	14
Number of Characters for ID lists	8	14	14
Max Number of Systems		32	32
Max number of Characters / system name		14	14
Total Number of ID Allocation	1000	1500	1500

* feature for additional channels can be added



NX-3000 Series FPU Live Walk-Through (KPG-D3N)

KPG-D3N kpgd3n.dat NX-3820HG [Mobile]: K2/F2 400-470 MHz

Radio Configuration ID Management Read/ Write Tools Preferences ?

Radio Definition
Product Information

System Properties
Systems
ID/Status List

Zone/Channel
Zone/Channel

Global Options
Basics
Scan
Emergency
Security
Button Assignment
External Device

Protocol Options
DMR
LTR
MDC-1200
FleetSync
DTMF
2-tone

Special Settings
Customization
Digital Profiles
Maintenance

Systems

No.	System Name
1	A System 1

General Analog Personalities

System
Protocol: Analog Conventional
Signaling Type: MDC-1200

ID/Status List
MDC-1200
ID List Number: 1

Other Options

RX
Squelch Level: 5
Battery Saver: Off

TX
☐ BCL Override
Time-out Timer
Time-out Timer (TOT) [s]: 60
TOT Pre-alert [s]: Off
TOT Rekey Time [s]: Off
TOT Reset Time [s]: Off

COM9 DMR ID Format :Decimal Number of Editing Item :4



CodePlug_prep_2

HomeInsertPage LayoutFormulasDataReviewView

Cut

Copy

Paste

Format

Calibri (Body)

12

<



NX-3000 Programming Steps – High Level

1. Create System(s)
2. Input Radio ID(s)
3. Add Talk Groups
4. Add and Configure Channels for each system
5. Create Zone(s)
6. Select Desired Channels to each Zone
7. Save Configuration



NX-3000 Programming Steps

1. Configure Comm Port
2. Read Radio
3. Save Configuration
4. Select Configuration Under Product Information
5. Select Systems
6. Add a DMR system – Name It
7. Select ID Management
8. Add Your Radio ID
9. Select ID/Status List



NX-3000 Programming Steps (cont.)

10.Partition Group ID'S as Desired

11.Type in Planned Group ID's

- I am going to Copy/Paste from My Excel Spreadsheet

12.Partition DMR Individual ID's as Desired

13.Type in Planned Individual ID's

- I am going to Copy/Paste from My Excel Spreadsheet

14.SAVE and SAVE Often!!

15.Select Systems



NX-3000 Programming Steps (cont.)

16. Add additional Systems as Desired

17. Select Personalities TAB – There are Two Input Modes

- a. Table – Channel and Options Can be Input Manually or Copy/Paste
- b. Individually – Channel and Options are Input Manually

18. Input Desired Channels

– I will Paste from my Spreadsheet in Table Mode – 17a

19. Select Zone/Channel

20. Add and Name Desired Zones



NX-3000 Programming Steps (cont.)

21.SAVE FILE!!

22.Select Desired Input Mode

- a. Table Mode – Manual Entry or Copy/Paste
- b. Individual Mode – Entry is Manual for Each Channel

23.Add Desired Channels to each zone

- I will Paste from my Spreadsheet in Table Mode – 22a (Non Roam Zones)
- In Roam Zones, only one channel from the system needs to be added

24.SAVE FILE!!

25.Write Code Plug to the Radio



NX-3000 Programming Steps

KPG-D3N kpgd3n.dat NX-3820HG [Mobile]: K2/F2 400-470 MHz

Radio Configuration ID Management Read/ Write Tools Preferences

Radio Definition Product Information System Properties Zone/Channel Global Options Protocol Options Special Settings

Product Information

Model Name NX-3820HG [Mobile]: K2/F2 Configuration Alias

Frequency 400-470 MHz Configuration Tag

Read Product Information

NXDN

- ☐ NXDN Conventional (KWD-3500CV)
- ☐ NXDN Conventional (KWD-3200CV)
- ☐ NXDN Type-C Trunking (KWD-3501TR)
- ☐ NXDN Type-C Trunking (KWD-3201TR)

DMR

- ☒ DMR Conventional (KWD-3500CV)
- ☐ DMR Conventional (KWD-3301CV)
- ☐ S-Trunking (KWD-3501TR)
- ☐ S-Trunking (KWD-3301CV)
- ☐ DMR Tier III Trunking (KWD-3302TR)
- ☐ Fleet Dialing Plan


Security

- ☐ AES/DES Advanced Encryption (KWD-3503AE)
- ☐ DES Encryption (KWD-3505DE)
- ☐ Enhanced Encryption (KWD-3502EE)

Features

- ☐ 1000 Channel(KWD-3000CH)
- ☐ Bluetooth Data (KWD-3002BT)
- ☐ Remote Control (KWD-3504RC)
- ☐ Front Panel Program (KWD-3001FP)
- ☐ OTAP

Selected Model Image



OK Cancel

COM9 DMR ID Format :Decimal Number of Editing Item :0



NX-3000 Programming Steps (cont.)

KPG-D3N kpgd3n.dat NX-3820HG [Mobile]: K2/F2 400-470 MHz

Radio Configuration ID Management **7** Read/ Write Tools Preferences ?

Radio Definition
Product Information

System Properties
Systems **5**
ID/Status List

Zone/Channel
Zone/Channel

Global Options
Basics
Scan
Emergency
Security
Button Assignment
External Device

Protocol Options
DMR
LTR
MDC-1200
FleetSync
DTMF
2-tone

Special Settings
Customization
Digital Profiles
Maintenance

Systems

System List

No.	System Name
1	DMR_Analog 6

General DMR Analog GPS Personalities

System

Protocol DMR Conventional **6**

Signaling Type MDC-1200

ID/Status List

DMR

Individual ID List Number 1

Group ID List Number 1

Status List Number 1

MDC-1200

ID List Number 1

Other Options

RX

Squelch Level 5

Battery Saver Off

TX

☐ BCL Override

Time-out Timer

Time-out Timer (TOT) [s] 60

TOT Pre-alert [s] Off

TOT Rekey Time [s] Off

TOT Reset Time [s] Off

COM9 DMR ID Format :Decimal Number of Editing Item :1



NX-3000 Programming Steps (cont.)

KPG-D3N kpgd3n.dats NX-3820HG [Mobile]: K2/F2 400-470 MHz

Radio Configuration ID Management Read/ Write Tools Preferences ?

Configuration Alias:
Configuration Tag:

Target List Add Add Multiple Copy Paste to Last Delete

View
☐ Hide Non-Global ID Help

No.	Transceiver Alias	Global ID		System 1				Transceiver Serial No.	Firmware Version	Last Wr
		DMR (Conventional)		MDC-1200		MDC-1200				
		ID	ID Name	ID	ID(Group)	ID	ID(Group)			
1	Mark	<input checked="" type="checkbox"/> 3108874	<input checked="" type="checkbox"/> N7CTM Mark	<input type="checkbox"/> 0001	111	0001	111			

COM9 DMR ID Format :Decimal Number of Editing Item :1



NX-3000 Programming Steps (cont.)

KPG-D3N Class_kpgd3n.dats NX-3820HG [Mobile]: K2/F2 400-470 MHz

Radio Configuration ID Management Read/ Write Tools Preferences ?

Radio Definition
Product Information

System Properties
Systems
ID/Status List 9

Zone/Channel
Zone/Channel

Global Options
Basics
Scan
Emergency
Security
Button Assignment
External Device

Protocol Options
DMR
LTR
MDC-1200
FleetSync
DTMF
2-tone

Special Settings
Customization
Digital Profiles
Maintenance

ID/Status List

Total Number of ID: 1254/1500

List Type Selection

Type	Number of Lists	IDs
DMR Group ID 10	1	250
DMR Individual ID	1	1000
DMR Status	1	1
MDC-1200 ID	1	1
FleetSync ID	1	1
FleetSync Status	1	1

DMR Group ID List
Number of Lists: 1/32

No.	ID Allocation	Setup No.
1	250 10	12
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

Editing List No.: 1
Total: 12/250 11

No.	ID	ID Name	Type	Alert Tone	Alert L
1	ALL	All Call	TX and RX	Protocol Common	Protocol C
2	505	505 NM Wide	TX and RX	Protocol Common	Protocol C
3	700	700 Colo Wide	TX and RX	Protocol Common	Protocol C
4	705	705 CO Eastern	TX and RX	Protocol Common	Protocol C
5	710	710 Lout LcL	TX and RX	Protocol Common	Protocol C
6	711	711 Devils LcL	TX and RX	Protocol Common	Protocol C
7	713	713 ABQ LCL	TX and RX	Protocol Common	Protocol C
8	715	715 TAOS LCL	TX and RX	Protocol Common	Protocol C
9	718	718 East	TX and RX	Protocol Common	Protocol C
10	719	719 South	TX and RX	Protocol Common	Protocol C
11	720	720 Central	TX and RX	Protocol Common	Protocol C
12	721	721 North	TX and RX	Protocol Common	Protocol C
13					
14					
15					
16					
17					
18					
19					
20					

COM9 DMR ID Format :Decimal Number of Editing Item :2



NX-3000 Programming Steps (cont.)

KPG-D3N Class_kpgd3n.dat NX-3820HG [Mobile]: K2/F2 400-470 MHz

Radio Configuration ID Management Read/ Write Tools Preferences

14

Radio Definition

Product Information

15 System Properties

Systems

ID/Status List

Zone/Channel

Zone/Channel

Global Options

Basics

Scan

Emergency

Security

Button Assignment

External Device

Protocol Options

DMR

LTR

MDC-1200

FleetSync

DTMF

2-tone

Special Settings

Customization

Digital Profiles

Maintenance

ID/Status List

Total Number of ID: 1254/1500

ID/Status List

List Type Selection

Type	Number of Lists	IDs
DMR Group ID	1	250
DMR Individual ID	1	1000
DMR Status	1	1
MDC-1200 ID	1	1
FleetSync ID	1	1
FleetSync Status	1	1

DMR Individual ID List

Number of Lists: 1/32

No.	ID Allocation	Setup Max. No.
1	1000	10
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

Editing List No.: 1

Total: 10/1000

No.	ID	ID Name	Type	Individual Call	
				Alert Tone	Alert LE
1	9990	BM Parrot	TX and RX	Protocol Common	Protocol Com
2	3108231	AC0KQ Willem	TX and RX	Protocol Common	Protocol Com
3	3108476	AC0KQ Willem	TX and RX	Protocol Common	Protocol Com
4	3108108	K2AD Doug	TX and RX	Protocol Common	Protocol Com
5	3108109	K2AD Doug	TX and RX	Protocol Common	Protocol Com
6	3108874	N7CTM Mark	TX and RX	Protocol Common	Protocol Com
7	3108927	N7CTM Mark	TX and RX	Protocol Common	Protocol Com
8	3108149	W0VG John	TX and RX	Protocol Common	Protocol Com
9	3108380	W0VG John	TX and RX	Protocol Common	Protocol Com
10	3108381	W0VG John	TX and RX	Protocol Common	Protocol Com
11					
12					
13					
14					
15					
16					
17					
18					

COM9 DMR ID Format :Decimal Number of Editing Item :2



NX-3000 Programming Steps (cont.)

Radio Configuration ID Management Read/ Write Tools Preferences

Radio Definition

- Product Information
- System Properties** 15
 - Systems 16
 - ID/Status List
- Zone/Channel**
 - Zone/Channel
- Global Options**
 - Basics
 - Scan
 - Emergency
 - Security
 - Button Assignment
 - External Device
- Protocol Options**
 - DMR
 - LTR
 - MDC-1200
 - FleetSync
 - DTMF
 - 2-tone
- Special Settings**
 - Customization
 - Digital Profiles
 - Maintenance

Systems

No.	System Name
1	DMR_Analog
2	RMH Wide Roam
3	RMH Central

General

Protocol: DMR_Conventional
Signaling Type: MDC-1200

Personality List

Total: 5/512

No.	Personality Name
1	Thorodin Rk M

Personalities 17

17b Edit Personality Number 1

General

RX Frequency [MHz] 446.800000
TX Frequency [MHz] 441.800000
Channel Type DMR
Transmit Mode DMR
Transmit Power High
☒ Allow Talk Around
☐ Auto Scan
Emergency
☐ Lone Worker

Analog

QT/DQT D
QT/DQT Er
Channel Sp
Busy Chan
Optional S

PTT ID
PTT ID
☐ PTT
☐ PTT

DMR

Color Code 7
Slot Selection 1
☐ Dual Slot Direct Mode
Busy Channel Lockout Correct CC
In-call Busy Channel Lockout Follow BCL
Digital Profile None
Selcall on PTT
Call Type Group Call
Number on ID List 3: 700 Colo Wide

Uncheck this for compatibility mode

COM9 DMR ID Format :Decimal Number of Editing Item :3



NX-3000 Programming Steps (cont.)

Radio Configuration ID Management Read/Write Tools Preferences

Radio Definition
Product Information
System Properties 15
ID/Status List
Zone/Channel
Zone/Channel 19
Global Options
Basics
Scan
Emergency
Security
Button Assignment
External Device
Protocol Options
DMR
LTR
MDC-1200
FleetSync
DTMF
2-tone
Special Settings
Customization
Digital Profiles
Maintenance

Systems
System List
No. System Name
1 DMR_Analog 16
2 RMH Wide Roam
3 RMH Central

General DMR Analog GPS Personalities 17

Protocol: DMR Convention 17a
Signaling Type: MDC-1200

Personality Table Total: 62/512

No.	Personality Name	RX Frequency [MHz]	TX Frequency [MHz]	Channel Type	Transmit Mode	Transmit Power	Allow Talk Around	Auto Scan
1	Thorodin Rk M	446.800000	441.800000	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Thorodin Ctrl	446.800000	441.800000	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Squaw Rk Mtn	446.937500	441.937500	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Squaw Central	446.937500	441.937500	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Lookout Ctrl	446.837500	441.837500	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Lookout Local	446.837500	441.837500	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Westcreek Rk M	446.875000	441.875000	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Westcreek Ctrl	446.875000	441.875000	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	Burlington RkM	445.050000	440.050000	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10	Burlington Ctl	445.050000	440.050000	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11	Genoa Rk Mtn	446.737500	441.737500	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12	Genoa Central	446.737500	441.737500	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13	Devils Local	446.925000	441.925000	DMR	DMR	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14	446.000 SX	446.000000	446.000000	Analog	Analog	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15	446.000 141.3	446.000000	446.000000	Analog	Analog	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16	446.025 SX	446.025000	446.025000	Analog	Analog	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17	446.025 141.3	446.025000	446.025000	Analog	Analog	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18	446.050 SX	446.050000	446.050000	Analog	Analog	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
19	446.050 141.3	446.050000	446.050000	Analog	Analog	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20	446.075 SX	446.075000	446.075000	Analog	Analog	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>

COM9 DMR ID Format :Decimal Number of Editing Item :3



NX-3000 Programming Steps (cont.)

KPG-D3N Class_kpgd3n.dats NX-3820HG [Mobile]: K2/F2 400-470 MHz

Radio Configuration ID Management Read/Write Tools Preferences

21

Radio Definition
Product Information

System Properties
Systems
ID/Status List

Zone/Channel
Zone/Channel

Global Options
Basics
Scan
Emergency
Security
Button Assignment
External Device

Protocol Options
DMR
LTR
MDC-1200
FleetSync
DTMF
2-tone

Special Settings
Customization
Digital Profiles
Maintenance

Zone/Channel
Zone/Channel Information Zone Parameters

Quick Edit

Zone List Channel Total: 1/512

No.	Zone Name	Ch
1	RMHCntrlEast	1
2	SX Analog	0
3	RkMI-25 Roam	0
4	Central Roam	0
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		

20

Channel List Total: 1/250

No.	Channel Name
1	Thorodin Rk M
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	

22b

Select Zone and Channel Number to Edit

Editing Zone Number 1

Editing Channel Number 1

Personality Assignment

System 1: DMR_Analog

Personality 1: Thorodin Rk M

Personality Info

- 1: Thorodin Rk M
- 2: Thorodin Ctrl
- 3: Squaw Rk Mtn
- 4: Squaw Central
- 5: Lookout Ctrl
- 6: Lookout Local
- 7: Westcreek Rk M
- 8: Westcreek Ctrl
- 9: Burlington RkM
- 10: Burlington Ctl
- 11: Genoa Rk Mtn
- 12: Genoa Central
- 13: Devils Local
- 14: 446.000 SX
- 15: 446.000 141.3
- 16: 446.025 SX
- 17: 446.025 141.3
- 18: 446.050 SX

Channel Information

Channel Name

Scan

☒ Scan Add

Scan List

Emergency Profile

Button Assignment

Voice Announcement

COM9 DMR ID Format :Decimal Number of Editing Item :3



NX-3000 Programming Steps (cont.)

KPG-D3N Class_kpgd3n.dats NX-3820HG [Mobile]: K2/F2 400-470 MHz

Radio Configuration ID Management Read/ Write Tools Preferences

Radio Definition
Product Information

System Properties
Systems
ID/Status List

Zone/Channel
Zone/Channel

Global Options
Basics
Scan
Emergency
Security
Button Assignment
External Device

Protocol Options
DMR
LTR
MDC-1200
FleetSync
DTMF
2-tone

Special Settings
Customization
Digital Profiles
Maintenance

Zone/Channel
Zone/Channel Information Zone Parameters

Quick Edit

Zone List Channel Total: 31/512

No.	Zone Name	Ch
1	RMHCntrlEast	13
2	SX Analog	16
3	RkMI-25 Roam	1
4	Central Roam	1
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		

Only one channel from the Roam needs to be added to the Zone. All Defined channels in the System will be used. Just select one channel manually.

Channel Table Total: 16/250

Ch	System	Personality	Protocol
1	1: DMR_Analog	14: 446.000 SX	DMR Conventional
2	1: DMR_Analog	15: 446.000 141.3	DMR Conventional
3	1: DMR_Analog	16: 446.025 SX	DMR Conventional
4	1: DMR_Analog	17: 446.025 141.3	DMR Conventional
5	1: DMR_Analog	18: 446.050 SX	DMR Conventional
6	1: DMR_Analog	19: 446.050 141.3	DMR Conventional
7	1: DMR_Analog	20: 446.075 SX	DMR Conventional
8	1: DMR_Analog	21: 446.075 141.3	DMR Conventional
9	1: DMR_Analog	22: 446.100 SX	DMR Conventional
10	1: DMR_Analog	23: 446.100 141.3	DMR Conventional
11	1: DMR_Analog	24: 446.125 SX	DMR Conventional
12	1: DMR_Analog	25: 446.125 141.3	DMR Conventional
13	1: DMR_Analog	26: 446.150 SX	DMR Conventional
14	1: DMR_Analog	27: 446.150 141.3	DMR Conventional
15	1: DMR_Analog	28: 446.175 SX	DMR Conventional
16	1: DMR_Analog	29: 446.175 141.3	DMR Conventional
17			
18			
19			
20			

COM9 DMR ID Format :Decimal Number of Editing Item :4



NX-3000 Programming Steps (cont.)

Radio Configuration ID Management Read/ Write Tools Preferences ?

Radio Definition Zone/Channel 25

Write Configuration

Configuration Alias:
Configuration Tag:

CSV Export

Target List

Write By: Wired Port: COM9

Help

No.	Transceiver Alias	Transceiver Serial No.	Bluetooth Device Name	Bluetooth Device Address	Bluetooth Status	ID (Own) Overwrite	Audio/GPS Data Erase	Time Adjustment	La: Wi
1	Mark	B8B11745				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2022/0

Write Configuration

Write Data List No. 1

Data Writing... Block 15851/15851

0 15851

Write Data

Writing completed.

OK

COM9 DMR ID Format :Decimal Number of Editing Item :4



NX-5000 Needed Code Plug Information

[illegible]



NX-5000 Programming Steps – High Level

Zone Channel Format

Personality Format

1. Create System(s)
2. Input Radio ID(s)
3. Add Talk Groups
4. Add and Configure Channels for each system
5. Create Zone(s)
6. Select Desired Channels to each Zone
7. Save Configuration

Channel Table Format

1. Create System(s)
2. Input Radio ID(s)
3. Add Talk Groups
4. Create Zones
5. Add and Configure Channels for each Zone
6. Save Configuration



NX-5000 Programming Steps

1. Configure Comm Port
2. Read Radio
3. Save Configuration (first time, do a save as)
4. Select Model and then Product Information
 - Configure Options
 - Select Zone-Channel Format
5. Select "New" to Clear All Current Data (to start from scratch)
6. Select desired System Type for Default System
7. Add Your Radio ID (can use global to apply to all systems)



NX-5000 Programming Steps (cont.)

8. To add additional systems, Highlight System Info and Select add
9. SAVE FILE!!
10. Partition Group/Individual ID's as Desired
11. Type in Planned Group ID's
 - I am going to Copy/Paste from My Excel Spreadsheet
12. Type in Planned Individual ID's
 - I am going to Copy/Paste from My Excel Spreadsheet
13. SAVE and SAVE Often!!



NX-5000 Programming Steps (cont.)

14. Under Zone/Channel

- a. Select Default Zone (1)
- b. Add Additional Zones as needed using the “Add” Button

15. Add Channels

- a. Select Zone/Channel Information for Table Format. Not all Data can be input here. It will have to be done manually under Channel Edit. Input Channel information and “SOME” Options Manually or Copy/Paste. DMR TG will need to be Input under Channel Edit.
- b. Use Channel edit to Manually input Channel Configuration and missing options from Zone/Channel Information.



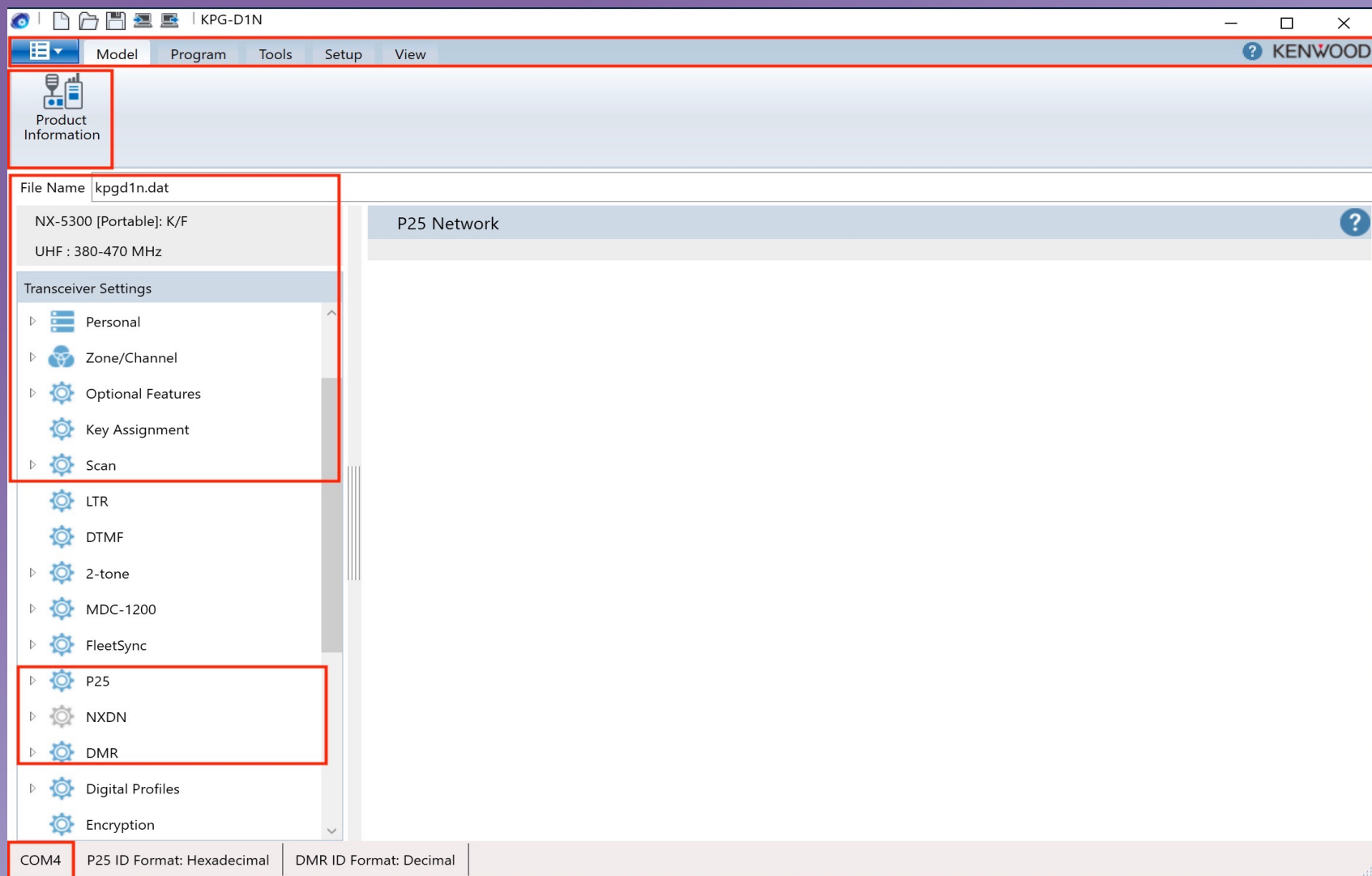
NX-5000 Programming Steps (cont.)

16.SAVE FILE!!

17.Write Code Plug to the Radio



NX-5000 Series FPU Live Walk-Through (KPG-D1N)





Nx-5000 Programming Steps (cont.)

The screenshot shows the KPG-D1N software interface with the following elements:

- Top Menu Bar:** Model, Program, Tools, Setup (labeled 1).
- Toolbar:** COM port (labeled 1a), Language, Security, Key Setting for System, License Selection, ID Format.
- File Name:** kpgd1n.dat
- Transceiver Settings:** NX-5300 [Portable]: K/F, UHF : 380-470 MHz.
- Left Sidebar:** Personal (selected), Zone/Channel, Optional Features, Key Assignment, Scan, LTR, DTMF, 2-tone, MDC-1200, FleetSync, P25, NXDN, DMR, Digital Profiles, Encryption.
- Personal Settings Dialog:**
 - Communication Method:** Programming Cable.
 - Programming Cable:**
 - Port:** COM4 (labeled 1b).
 - Speed:** High.
 - Bluetooth SPP:** Device List, Bluetooth Device Name, Bluetooth Device Address.
 - Buttons:** OK (labeled 1c), Cancel, Help.
- Bottom Status Bar:** COM4 | P25 ID Format: Hexadecimal | DMR ID Format: Decimal.

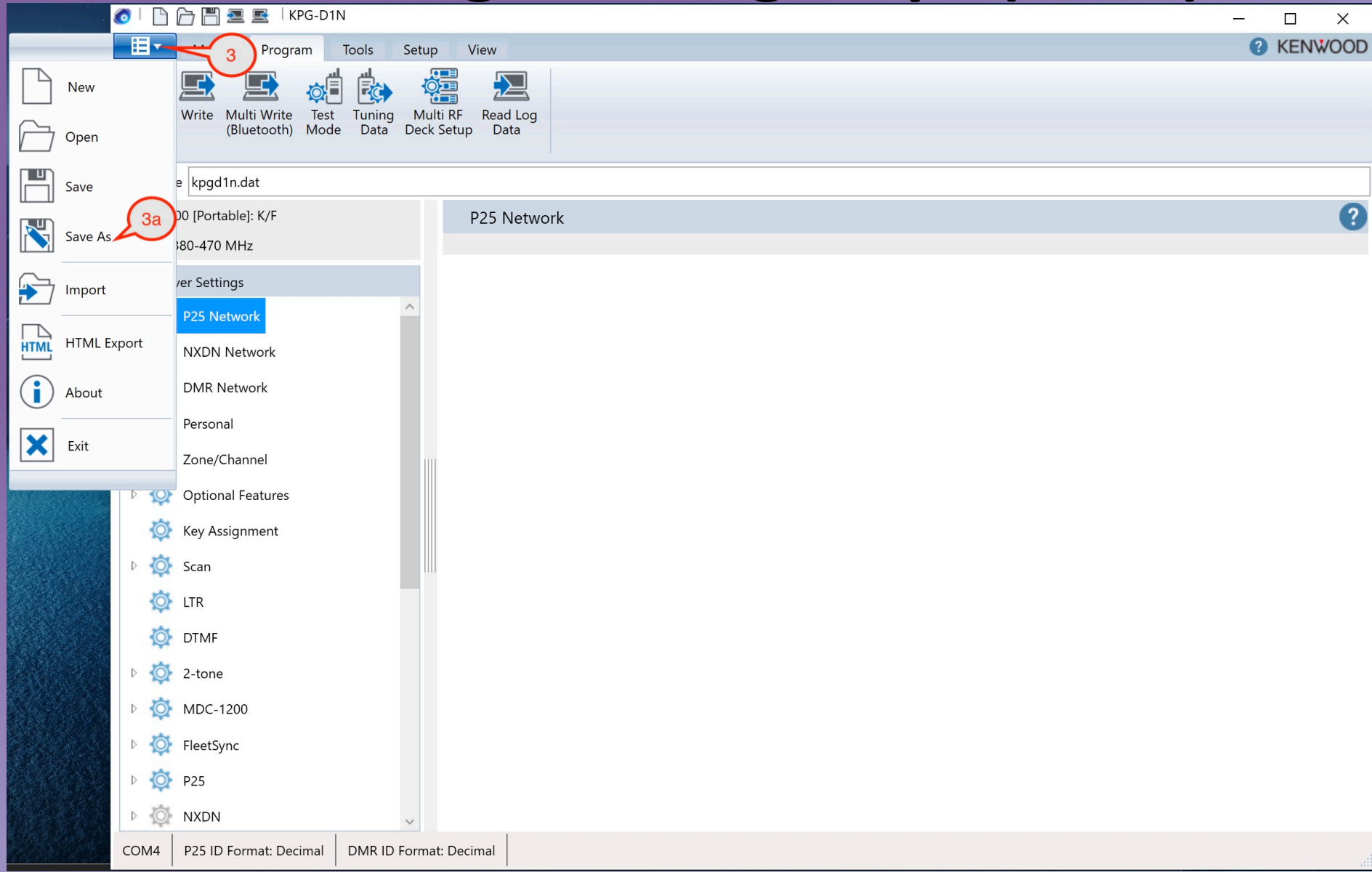


NX-5000 Programming Steps (cont.)

The screenshot shows the KENWOOD KPG-D1N software interface. The 'Program' tab is selected, indicated by a red circle with the number '2'. The 'Read' button in the toolbar is highlighted with a red circle and the number '2a'. The 'File Name' field contains 'kpgd1n.dat'. The 'Transceiver Settings' list on the left includes 'Personal', 'Zone/Channel', 'Optional Features', 'Key Assignment', 'Scan', 'LTR', 'DTMF', '2-tone', 'MDC-1200', 'FleetSync', 'P25', 'NXDN', 'DMR', 'Digital Profiles', and 'Encryption'. The 'Personal' setting is selected. A 'Read Data from the Transceiver' dialog box is open, showing 'Block 15876/15876' and a green progress bar. The 'Read' button in this dialog is highlighted with a red circle and the number '2b'. A 'Read Data' dialog box is also open, showing 'Reading completed.' and an 'OK' button, which is highlighted with a red circle and the number '2c'. The status bar at the bottom shows 'COM4', 'P25 ID Format: Hexadecimal', and 'DMR ID Format: Decimal'.



NX-5000 Programming Steps (cont.)





NX-5000 Programming Steps (cont.)

KPG-D1N

Model Tools Setup View

Product Information

File Name: kpgd1n.dat

NX-5300 [Portable]: K/F

UHF : 380-470 MHz

Transceiver Settings

- P25 Network
- NXDN Network
- DMR Network
- Personal
- Zone/Channel
- Optional Features
- Key Assignment
- Scan
- LTR
- DTMF
- 2-tone
- MDC-1200
- FleetSync
- P25
- NXDN

Product Information

Model Name: NX-5300 [Portable]: K/F

Frequency: 380-470 MHz

Zone-channel Format: Channel Table

Feature Selection

Feature Selection		NXDN	
<input type="checkbox"/> 4000 Channel (KWD-5000CH)	<input checked="" type="checkbox"/> P25 Conventional (KWD-5100CV)	<input type="checkbox"/> NXDN Conventional (KWD-5200CV)	
<input checked="" type="checkbox"/> Front Panel Programming (KWD-5001FP)	<input type="checkbox"/> P25 Phase 1 Trunking (KWD-5101TR)	<input type="checkbox"/> NXDN Type-C Trunking (KWD-5201TR)	
<input type="checkbox"/> microSD (KWD-5002SD)	<input type="checkbox"/> P25 Phase 2 Trunking (KWD-5102TR)	<input type="checkbox"/> NXDN OTAP (KWD-5204AP)	
<input checked="" type="checkbox"/> Bluetooth Data (KWD-5003BT)	<input type="checkbox"/> P25 Packet Data (KWD-5106DT)	DMR	
<input type="checkbox"/> Secure Cryptographic Module (KWD-5005AE)	<input type="checkbox"/> P25 OTAR (KWD-5103RK)	<input checked="" type="checkbox"/> DMR Conventional (KWD-5300CV)	
<input type="checkbox"/> DES 4 Keys (KWD-5006DE)	<input type="checkbox"/> P25 Voting Scan (KWD-5105VT)	<input type="checkbox"/> S-Trunking (KWD-5300CV)	
<input type="checkbox"/> Multi RF Deck (KWD-5004MR)	<input type="checkbox"/> P25 OTAP (KWD-5104AP)	<input type="checkbox"/> DMR Tier III Trunking (KWD-5301TR)	
<input type="checkbox"/> Remote Control (KWD-5007RC)	<input type="checkbox"/> P25 Enhanced Encryption (KWD-5107EE)	<input type="checkbox"/> Fleet Dialing Plan	
<input checked="" type="checkbox"/> Enhanced Encryption (KWD-5500EE)		<input type="checkbox"/> DMR OTAP (KWD-5304AP)	

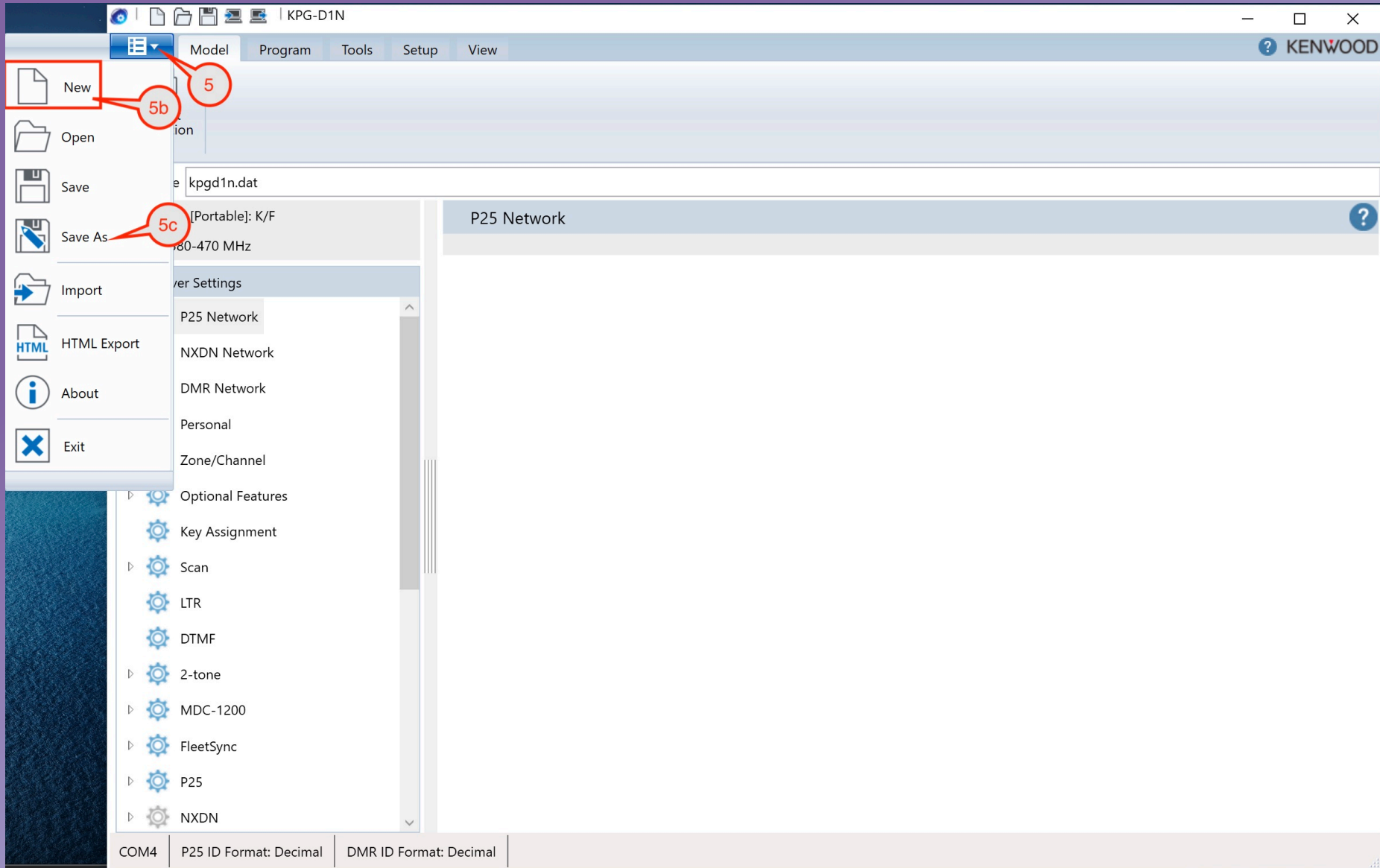
Read Configuration

OK Cancel Help

COM4 | P25 ID Format: Decimal | DMR ID Format: Decimal



NX-5000 Programming Steps (cont.)





NX-5000 Programming Steps (cont.)

KPG-D1N

Model gram Tools Setup View Operation KENWOOD

File Name kpgd1n.dat

NX-5300 [Portable]: K/F
UHF : 380-470 MHz

Transceiver Settings

- P25 Network
- NXDN Network
- DMR Network
 - Personal
 - 1 : DMR_Analog
 - System Information (6)
 - Personal Features
 - 2 : DMR_Roam
 - System Information (8a)
 - Personal Features
 - 3 : P25 Hotspot
 - System Information (8c)
 - Personal Features

System Information

System Number 1 System Name DMR_Analog (6b)

System Type DMR Conventional (6a)

Signaling Type Analog Conventional

ID (MDC-1200)

- P25 Conventional 0001
- DMR Conventional 111
- DMR Site Roaming

☐ Global ID UNCHECK (6c)

Unit ID (Own)

Unit ID 3108927 (7)

☒ Global ID

☐ Over-the-Air Alias

Unit ID Name (Own) N7CTM (7a)

☒ Global ID Name

COM4 P25 ID Format: Decimal DMR ID Format: Decimal

Not recommended if the repeater is going through a C-bridge. You may sound like you are talking with your mouth full of marbles. Seems to work with hotspots. Create an additional system if you want to use it.



NX-5000 Programming Steps (cont.)

KPG-D1N

Group ID List

Model Program Tools Setup View Operation KENWOOD

List Partition

File Name Class_1.kpgd1n.dat

NX-5300 [Portable]: K/F

UHF : 380-470 MHz

Transceiver Settings

- MDC-1200
- FleetSync
- P25
- NXDN
- DMR
 - DMR Information
 - Individual ID List
 - Group ID List
 - Status List
- Digital Profiles
- Encryption
- KMF Profile
- Special Tone
- Audio Profile
- Emergency

List Partition

MDC-1200 FleetSync P25 DMR

Zero out lists that won't be used if additional items are needed.

Individual ID List

No.	Quantity	Setup Maximum Number
1	1000	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0

Group ID List

No.	Quantity	Setup Maximum Number
1	250	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0

Status List

No.	Quantity	Setup Maximum Number
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0

List Quantity Total (Maximum 1500) 1425

OK Cancel Help

COM4 P25 ID Format: Decimal DMR ID Format: Decimal



NX-5000 Programming Steps (cont.)

File Name: Class_1.kpgd1n.dat

NX-5300 [Portable]: K/F
UHF : 380-470 MHz

Transceiver Settings

- P25
- NXDN
- DMR
 - DMR Information
 - Individual ID List
 - Group ID List** 11
 - Status List
- Digital Profiles
- Encryption
- KMF Profile
- Special Tone

DMR - Group ID List

List Number 1 ↑ ↓ Total 12/ 150

No.	ID	ID Name	ID Mode	Alert Tone	Alert LED Color
1	ALL	All Call	Transmit/Receive	Common	Common
2	505	505 NM Wide	Transmit/Receive	Common	Common
3	700	700 Colo Wide	Transmit/Receive	Common	Common
4	705	705 CO Eastern	Transmit/Receive	Common	Common
5	710	710 Lout LcL	Transmit/Receive	Common	Common
6	711	711 Devils LcL	Transmit/Receive	Common	Common
7	713	713 ABQ LCL	Transmit/Receive	Common	Common
8	715	715 TAOS LCL	Transmit/Receive	Common	Common
9	718	718 East	Transmit/Receive	Common	Common
10	719	719 South	Transmit/Receive	Common	Common
11	720	720 Central	Transmit/Receive	Common	Common

COM4 | P25 ID Format: Decimal | DMR ID Format: Decimal



NX-5000 Programming Steps (cont.)

Individual ID List

File Name: Class_1.kpgd1n.dat

NX-5300 [Portable]: K/F
UHF : 380-470 MHz

Transceiver Settings

- P25
- NXDN
- DMR
 - DMR Information
 - Individual ID List**
 - Group ID List
 - Status List
- Digital Profiles
- Encryption
- KMF Profile
- Special Tone

DMR - Individual ID List

List Number: 1 Total: 10/ 1000

	ID			Alert Tone				
No.	ID	ID Name	ID Mode	Individual	Individual Call Incoming	Paging	Individual	Ind
1	9990	BM Parrot	Transmit/Receive	Common	Common	Common	Common	Comr
2	3108231	AC0KQ Willem	Transmit/Receive	Common	Common	Common	Common	Comr
3	3108476	AC0KQ Willem	Transmit/Receive	Common	Common	Common	Common	Comr
4	3108108	K2AD Doug	Transmit/Receive	Common	Common	Common	Common	Comr
5	3108109	K2AD Doug	Transmit/Receive	Common	Common	Common	Common	Comr
6	3108874	N7CTM Mark	Transmit/Receive	Common	Common	Common	Common	Comr
7	3108927	N7CTM Mark	Transmit/Receive	Common	Common	Common	Common	Comr
8	3108149	W0VG John	Transmit/Receive	Common	Common	Common	Common	Comr
9	3108380	W0VG John	Transmit/Receive	Common	Common	Common	Common	Comr

COM4 | P25 ID Format: Decimal | DMR ID Format: Decimal



NX-5000 Programming Steps (cont.)

KPG-D1N

Zone/Channel Information

Model Program Tools Setup View Operation

File Name: Class_1.kpgd1n.dat

NX-5300 [Portable]: K/F
UHF : 380-470 MHz

Transceiver Settings

- Zone/Channel
 - 1 : RMHAMCtrlEast
 - Zone/Channel Information** (14a)
 - Zone Edit
 - Channel Edit
 - 2 : SX Analog
 - Zone/Channel Information
 - Zone Edit
 - Channel Edit
 - 3 : RMH Wide Roam
 - Zone/Channel Information** (14c)
 - Zone Edit
 - Channel Edit
 - 4 : RMHAM Ctrl Roam
 - Zone/Channel Information
 - Zone Edit
 - Channel Edit

Zone/Channel Information

Zone Number: 1 Zone Name: RMHAMCtrlEast

System Number: 1 System Name: DMR_Analog

System Type: DMR Conventional Signaling Type: MDC-1200

Total: 43 / 1024

No.	RX Frequency	TX Frequency	Ch Type	TX Mode	TX Power	QT/DQT Dec	QT/DQT Enc	Color Code	Slot Selection	Ch Spacing	Channel Name	Sc
1	446.800000	441.800000	DMR	DMR	High	None	None	7	1	12.5 (Narrow)	Thorodin Rk M	
2	446.800000	441.800000	DMR	DMR	High	None	None	7	2	12.5 (Narrow)	Thorodin Ctrl	
3	446.937500	441.937500	DMR	DMR	High	None	None	7	1	12.5 (Narrow)	Squaw Rk Mtn	
4	446.937500	441.937500	DMR	DMR	High	None	None	7	2	12.5 (Narrow)	Squaw Central	
5	446.837500	441.837500	DMR	DMR	High	None	None	7	2	12.5 (Narrow)	Lookout Ctrl	
6	446.837500	441.837500	DMR	DMR	High	None	None	7	1	12.5 (Narrow)	Lookout Local	
7	446.875000	441.875000	DMR	DMR	High	None	None	6	1	12.5 (Narrow)	Westcreek Rk M	
8	446.875000	441.875000	DMR	DMR	High	None	None	6	2	12.5 (Narrow)	Westcreek Ctrl	
9	445.050000	440.050000	DMR	DMR	High	None	None	6	1	12.5 (Narrow)	Burlington RkM	
10	445.050000	440.050000	DMR	DMR	High	None	None	6	2	12.5 (Narrow)	Burlington Ctl	
11	446.737500	441.737500	DMR	DMR	High	None	None	8	1	12.5 (Narrow)	Genoa Rk Mtn	
12	446.737500	441.737500	DMR	DMR	High	None	None	8	2	12.5 (Narrow)	Genoa Central	
13	446.925000	441.925000	DMR	DMR	High	None	None	8	2	12.5 (Narrow)	Devils Local	
14												



NX-5000 Programming Steps (cont.)

Model Program Tools Setup View Operation KENWOOD

Zone/Channel Information Group ID Range

File Name Class_1.kpgd1n.dat

NX-5300 [Portable]: K/F
UHF : 380-470 MHz

Transceiver Settings

- Zone/Channel
 - 1 : RMHAMCtrlEast
 - Zone/Channel Information
 - Zone Edit
 - Channel Edit** 15
 - 2 : SX Analog
 - Zone/Channel Information
 - Zone Edit
 - Channel Edit
 - 3 : RMH Wide Roam
 - Zone/Channel Information
 - Zone Edit
 - Channel Edit
 - 4 : RMHAM Ctrl Roam
 - Zone/Channel Information
 - Zone Edit
 - Channel Edit

Channel Edit

[+] [-] General Analog DMR

Zone Number 1 Zone Name RMHAMCtrlEast

System Number 1 System Name DMR_Analog

System Type DMR Conventional Signaling Type MDC-1200

Channel Number 1 Channel Name Thorodin Rk M

Total 43 / 1024

Busy Channel Lockout (DMR) Correct CC

In-call Busy Channel Lockout Follow BCL

Slot Selection 1

Digital Profile None

Selcall on PTT

Selcall on PTT Group Call

ID List Number 3

ID 700

ID Name 700 Colo Wide

☐ Group ID Scan (DMR)

☐ Dual Slot Direct Mode **UNCHECK for Compatibility**

COM4 P25 ID Format: Decimal DMR ID Format: Decimal



NX-5000 Programming Steps (cont.)

Write Data to the Transceiver

File Name: [Class] NX-5300 [Po] UHF : 380-47

Transceiver Set

- ☒ Zeroize
- ☐ Audio/GPS Data Erase (Internal Memory)
- ☒ Time Adjustment
- ☐ Consecutive Write
- ☒ ID (Own) Overwrite

Block 15851/15851

Write

Write Data

Writing completed.

OK

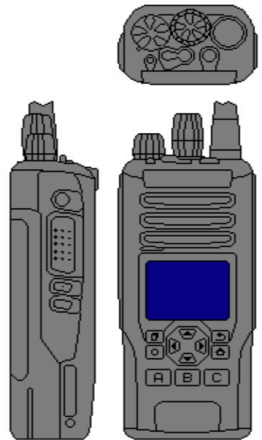
	Function	2nd Function	Hold Function	Hold Delay [s]
AUX	None	None	None	1.0
Side 1	None	None	None	1.0
Side 2	Squelch Off Momentary	None	None	1.0
Side 3	Backlight	None	None	1.0

Secondary

	Function	2nd Function	Hold Function	Hold Delay [s]
AUX	None	None	None	1.0
Side 1	None	None	None	1.0
Side 2	Squelch Off Momentary	None	None	1.0
Side 3	Backlight	None	None	1.0

Front

COM4 P25 ID Format: Decimal DMR ID Format: Decimal





Programming Lab (Your Turn!)

Programming Information	FM Analog	DMR - Repeater	DMR - Repeater	DMR Roam	DMR Roam
Your Radio ID []					
Zone Name	SX Analog	RMH Den	RMH Den	RMH Wide Roam	RMH Wide Roam
Channel Name	446.025 141.3	Thorodin Rk M	Squaw Rk Mtn	Thorodin Rk M	Squaw Rk Mtn
Receive Frequency (MHz)	446.0250	446.8000	446.9375	446.8000	446.9375
Transmit Frequency (MHz)	446.0250	441.8000	441.9375	441.8000	441.9375
Bandwidth (KHz)	25	12.5	12.5	12.5	12.5
Time Slot		1	1	1	1
CTCSS/DCS Encode	141.3				
CTCSS/DCS Decode	141.3				
Digital Color Code		7	7	7	7
TX Group		Group ID 700	Group ID 700	Group ID 700	Group ID 700
RX Group		Group ID 700	Group ID 700	Group ID 700	Group ID 700
Admit Criteria, BCL	Always/No	Color Code Free or Correct Color Code	Color Code Free or Correct Color Code	Color Code Free or Correct Color Code	Color Code Free or Correct Color Code
In-Call Criteria		Follow Admit Criteria or Follow BCL	Follow Admit Criteria or Follow BCL	Follow Admit Criteria or Follow BCL	Follow Admit Criteria or Follow BCL



Thank you!!

73 de
KIØKN & N7CTM