eVerge™ Programming Workshop

EVX-530 Series

Vertex Standard

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How To Program EVX-530 Radios

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- Prerequisites
- Preface
- Call Addressing
- Channel Configuration
- Other
  - Privacy Features
  - Emergency Function
  - Text Messaging
  - VOX Function

Some content discussed hereafter is available only on radios with F/W version 3.07 or later.

How To Program EVX-530 Radios

What You Need

- **FIF-12** USB Programming Adapter
  - **FIF-10A will not work**
- CT-106 Programming Interface Cable
  (For mobiles: CT-104A Interface Cable)
- CE142 Programming Software

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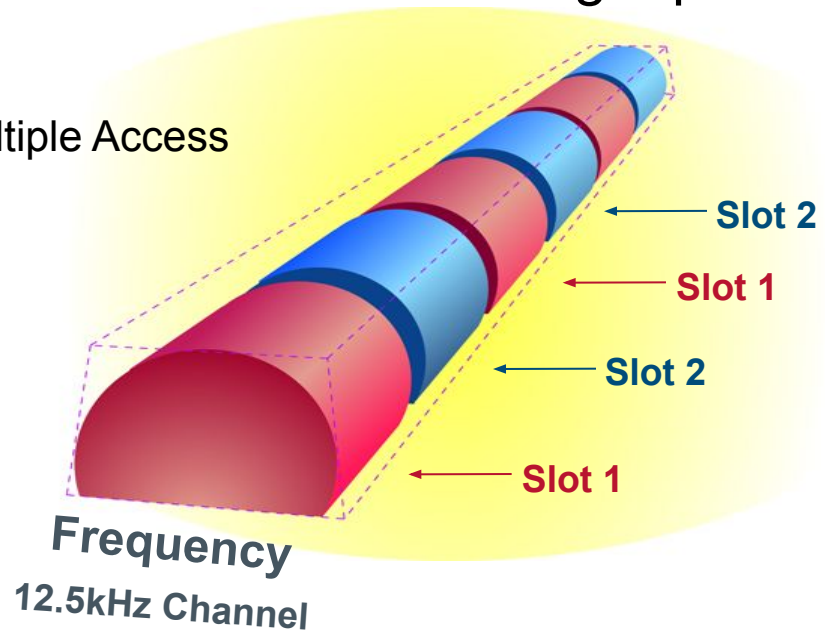
Configuration of DIGITAL Channels & Functions

- Some Theory first -

How To Program EVX-530 Radios - Preface

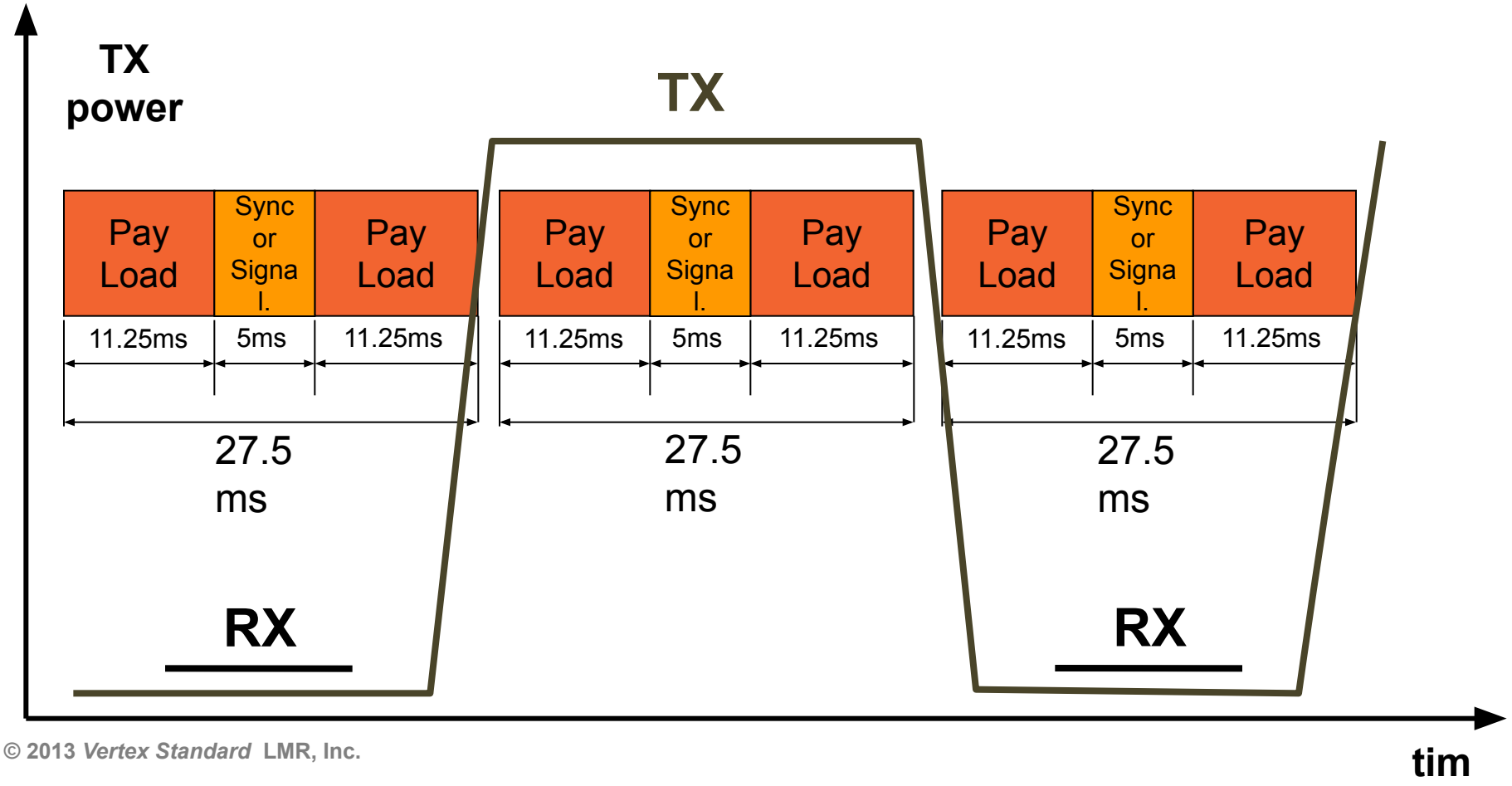
- DMR radio transactions have to adhere to a strict protocol:
  The **Common Air Interface** standard (ETSI TS 102 361-1) specifies the format and content of digital signal transmitted by DMR radios.
- For digital transmissions, a physical RF channel of 12.5 kHz BW is divided into two “Logical” Channels - **Slots** - using a procedure called T D M A *

* TDMA = Time Division Multiple Access



How To Program EVX-530 Radios - Preface

Each slot is 30 msec long and carries control bits and 60 msec compressed speech or data.



How To Program EVX-530 Radios - Preface

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- Amongst others, the DMR standard requires that every message transaction carries a **Source ID and a Destination ID**.
- **Each ID** number is 24 bits, or 3 bytes, in length
- The Destination ID can be:
  - a **Talk Group ID**
  - an **Individual ID**
  - or an **All Call**.

THEREFORE

Other than with analogue radios, just configuring channel frequencies and pressing PTT to talk to another radio will not work!
"Signaling" or **Addressing** is mandatory.

How To Program EVX-530 Radios - Preface

To establish the communication link, each radio must have:

- A list of target radios' ID numbers called **"Contacts List"**
- A unique **Radio ID #**
- The appropriate –
  - Channel **Frequencies**
  - Transmit **Slots**
  - and "**Color Code**" assigned

How To Program EVX-530 Radios - Preface

- Repeaters are more important than on analogue radio systems. The Repeater is the “Timing Master” for the range it covers - it controls the slot 1 & 2 timing and various other channel activities.

- With subscriber radios in Talk Around (TA), or Direct Mode (DMO), i.e. in the absence of that “Timing Master,” no synchronization of the 2 slots is possible.

  Therefore, **only one slot** can be used per RF channel at a time in this mode!

Step 1: Populate Contact List

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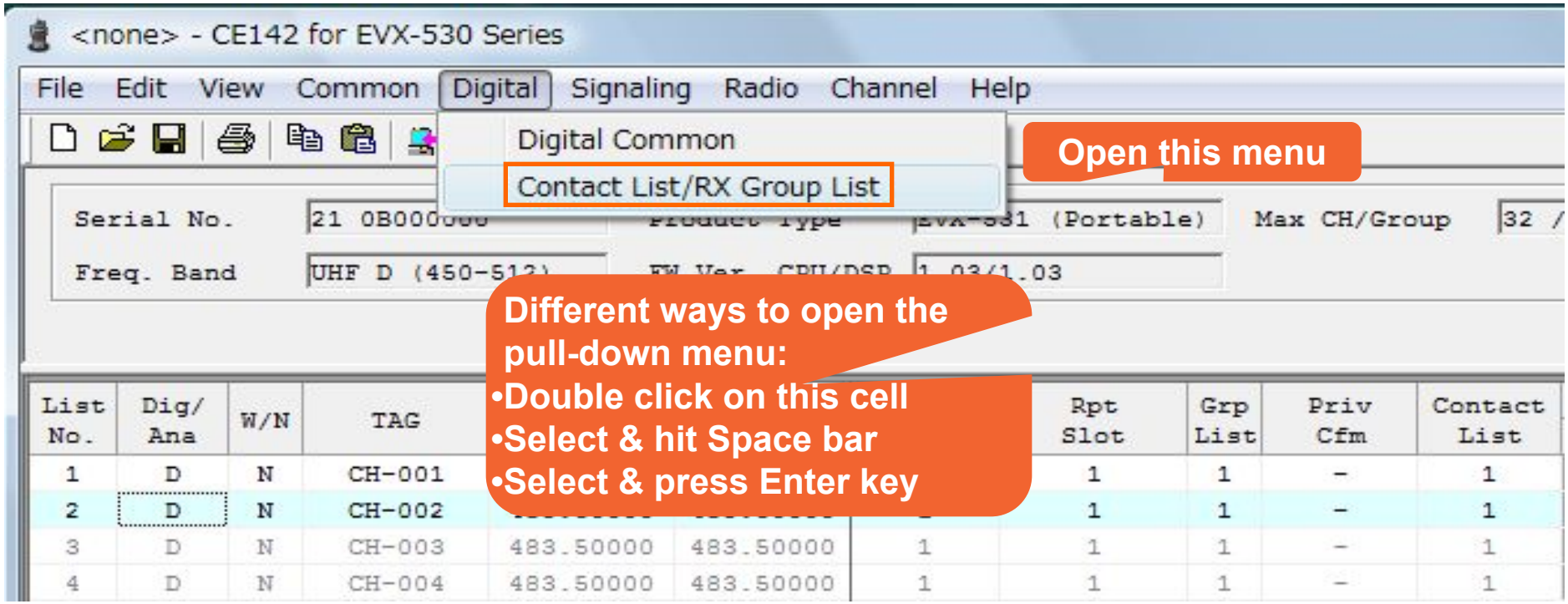
Open the Contact List setting dialogue



Step 1: Populate Contact List, Call Type

3 Different **“Call Types”** can be used:

1. **Group Call:** This is the default call type.
2. **All Call:** A call to all subscribers on the same LOGICAL channel (i.e. same frequency, color code, and slot).
   This is intended for usage by supervisors only.
   This call type is associated with a fixed ID of 16777215 and will be received per default by all radios on the logical channel.
3. **Private Call**: A call to a single user with the additional unique characteristic that it **cannot be monitored** by any other radio on the channel.
   (This is an ADDRESSING feature and has got nothing to do with “PRIVACY” which is an encryption of the message payload.)

Step 1: Populate Contact List, Call Type

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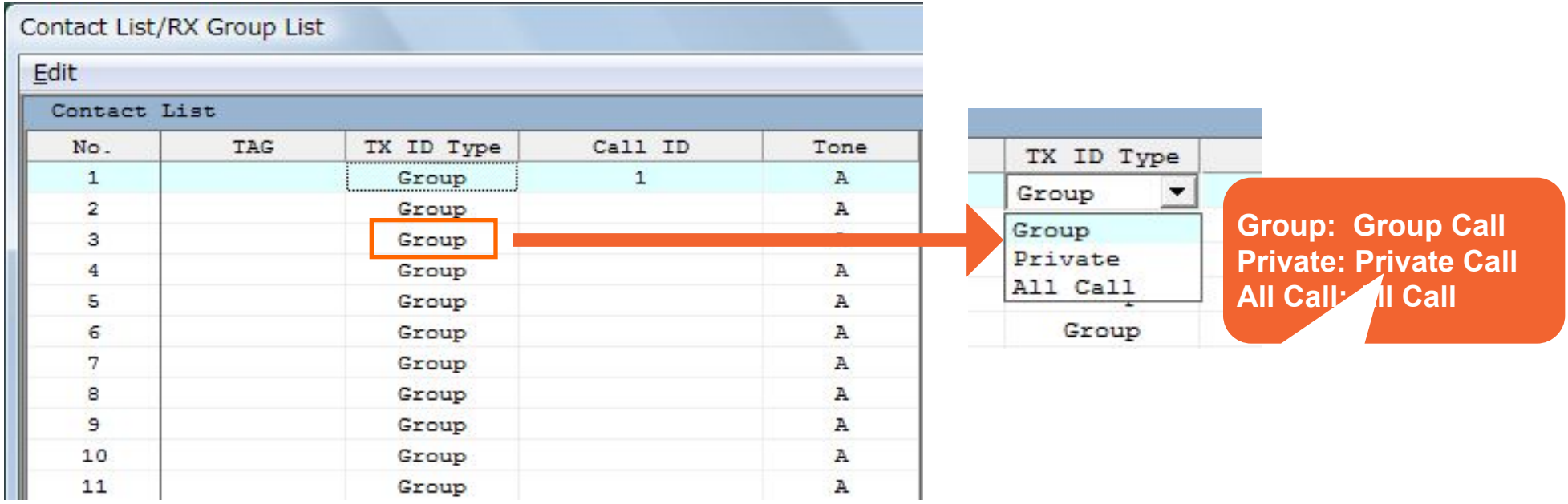
Select TX ID type



Step 1: Populate Contact List

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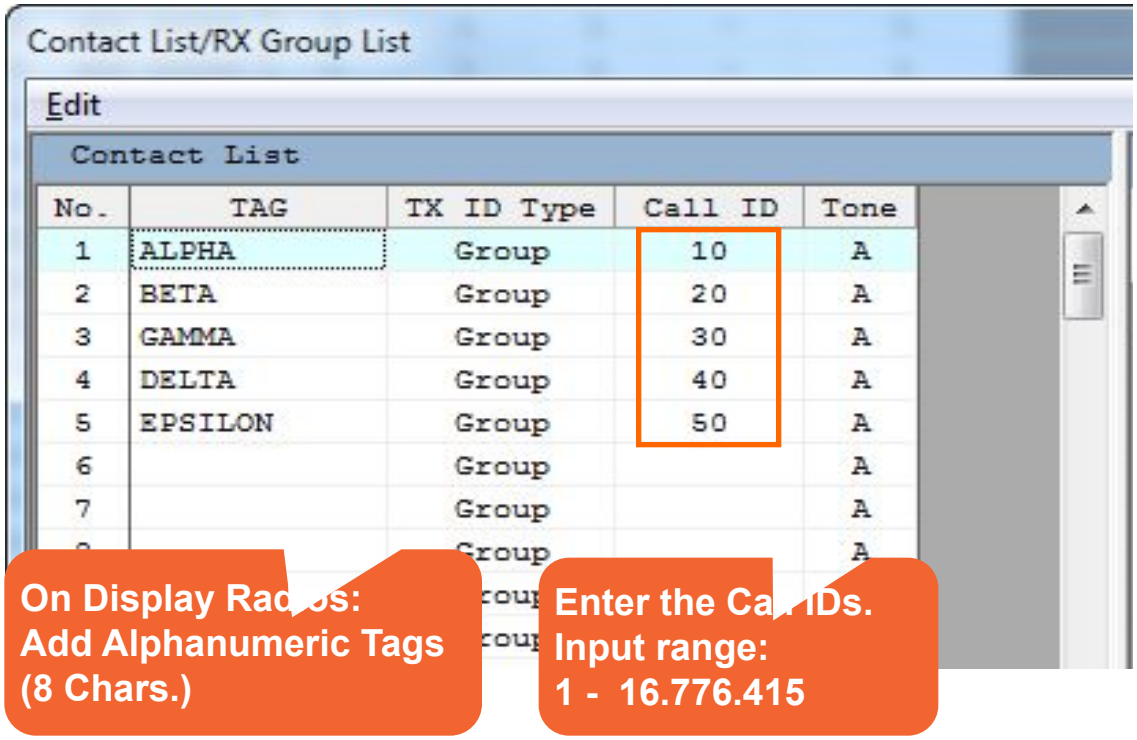
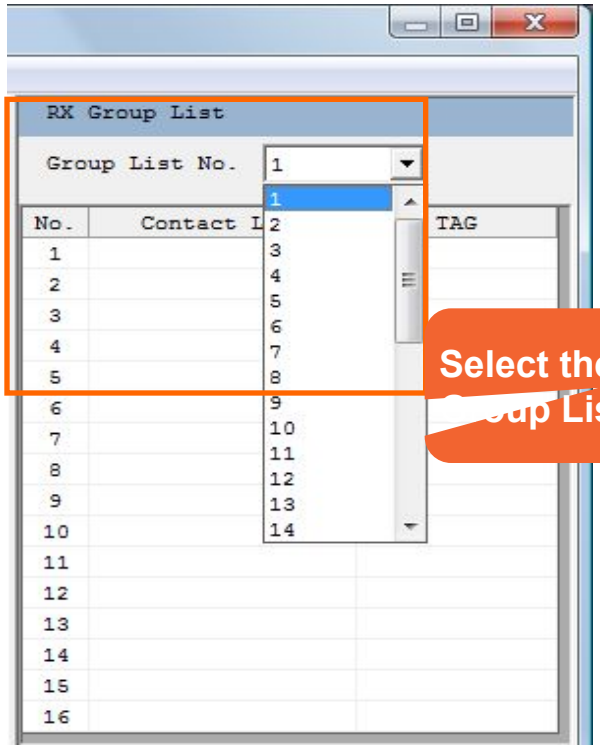
Set the Call ID



Step 1: Populate Contact List

Select a RX Group List (this is a list of GROUP IDs to be available on a given channel.)

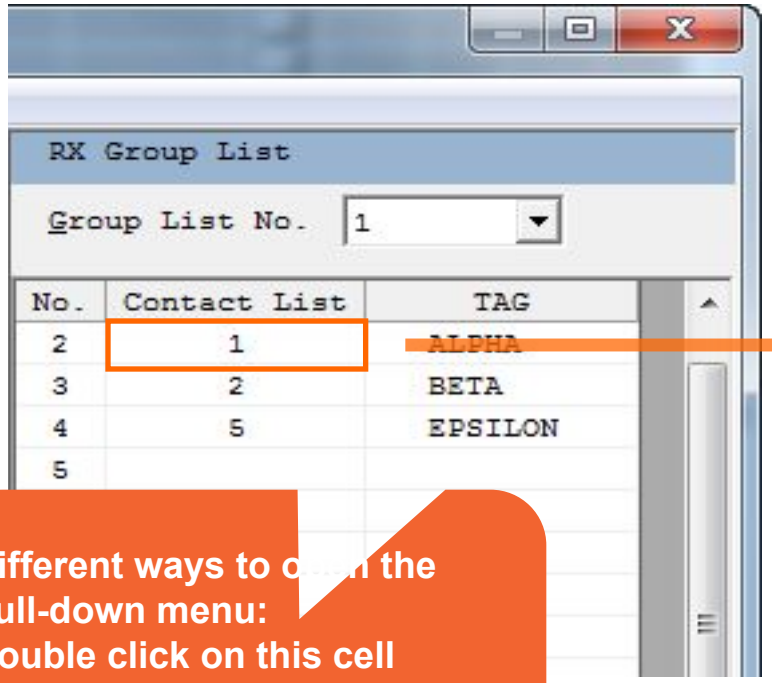


The Contact List allows for 128 Entries

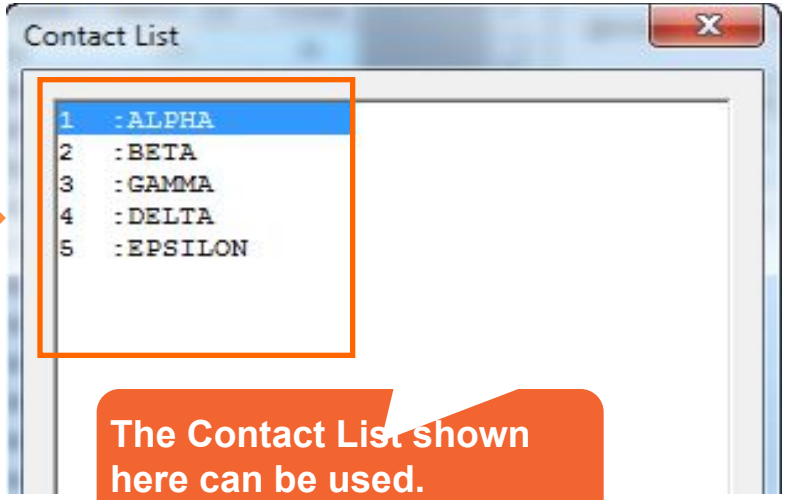
Any radio can be a member of up to 32 RX groups

Step 1: Populate Contact List

Edit the RX Group List



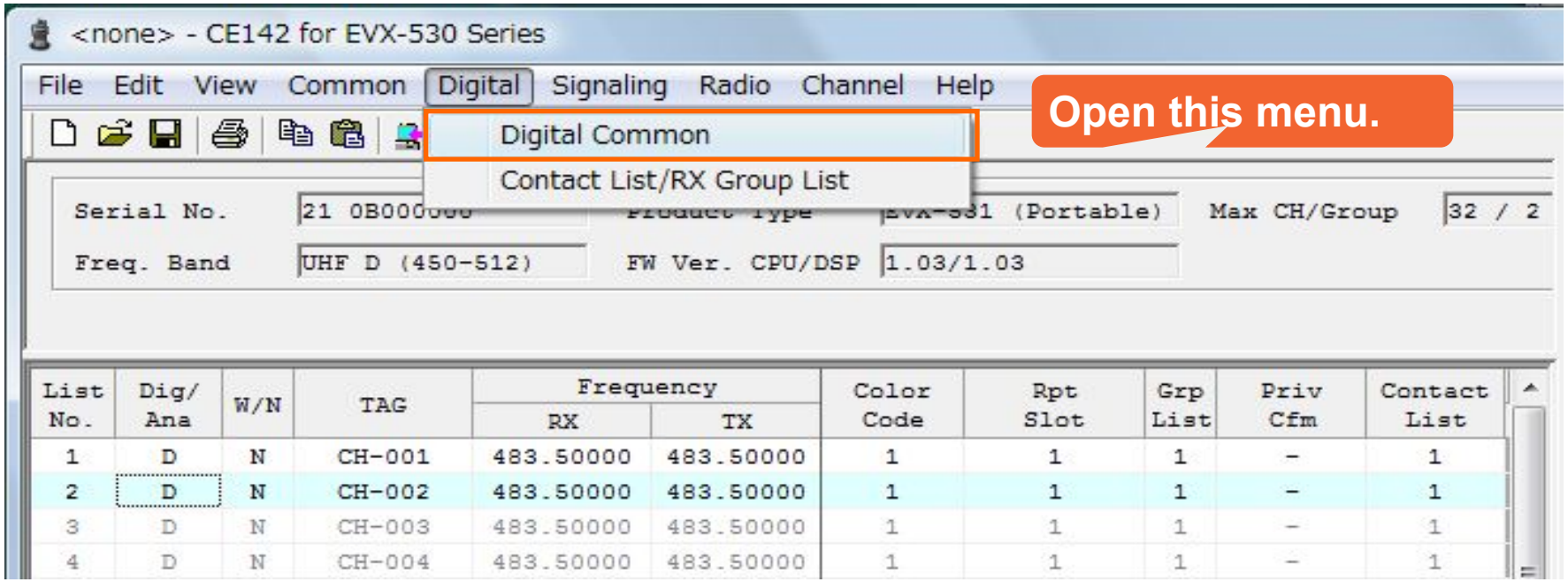
Different ways to open the pull-down menu:
- Double click on this cell
- Select & hit Space bar
- Select & press Enter key



The Contact List shown here can be used.

Step 2: Configure Common Settings

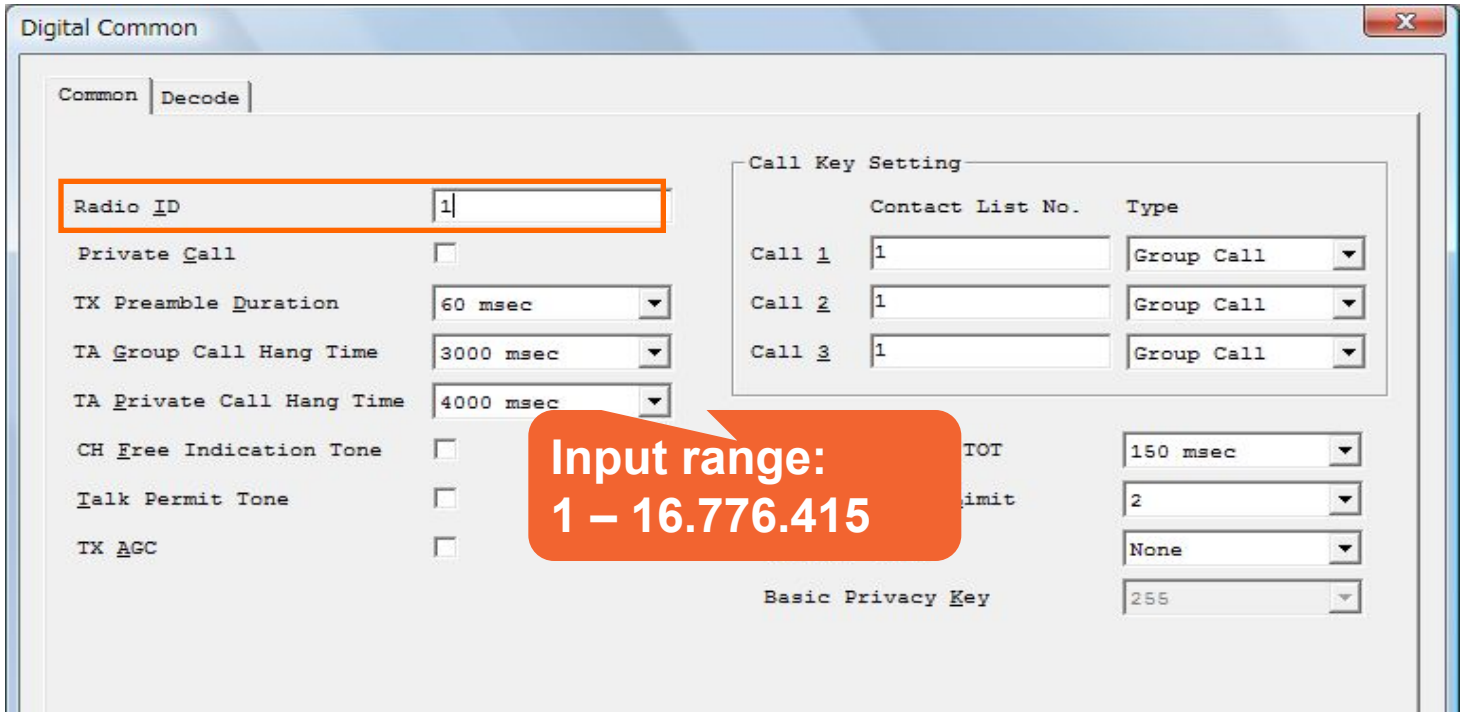
Open the **Digital Common** dialog box



Step 2: Configure Common Settings

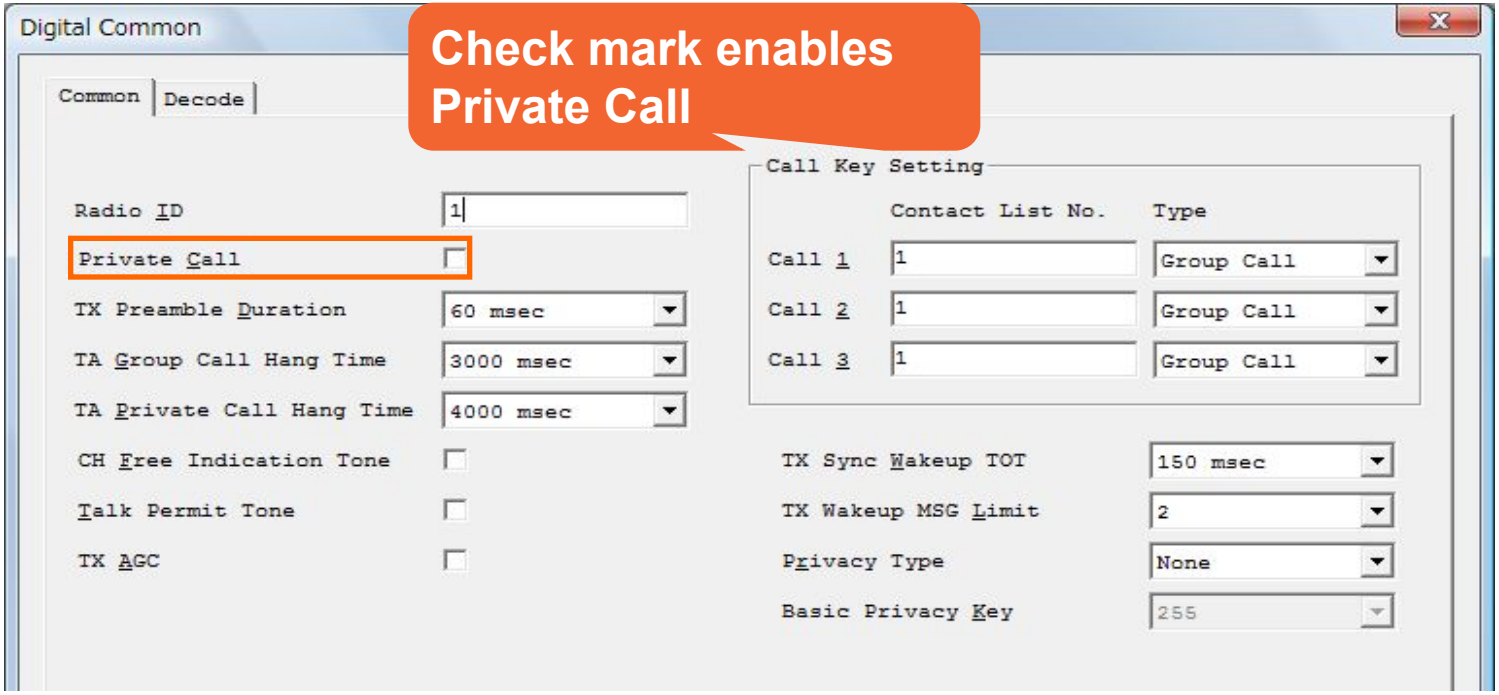
Assign the Radio ID

(Reminder: Each radio must have its own unique ID !)

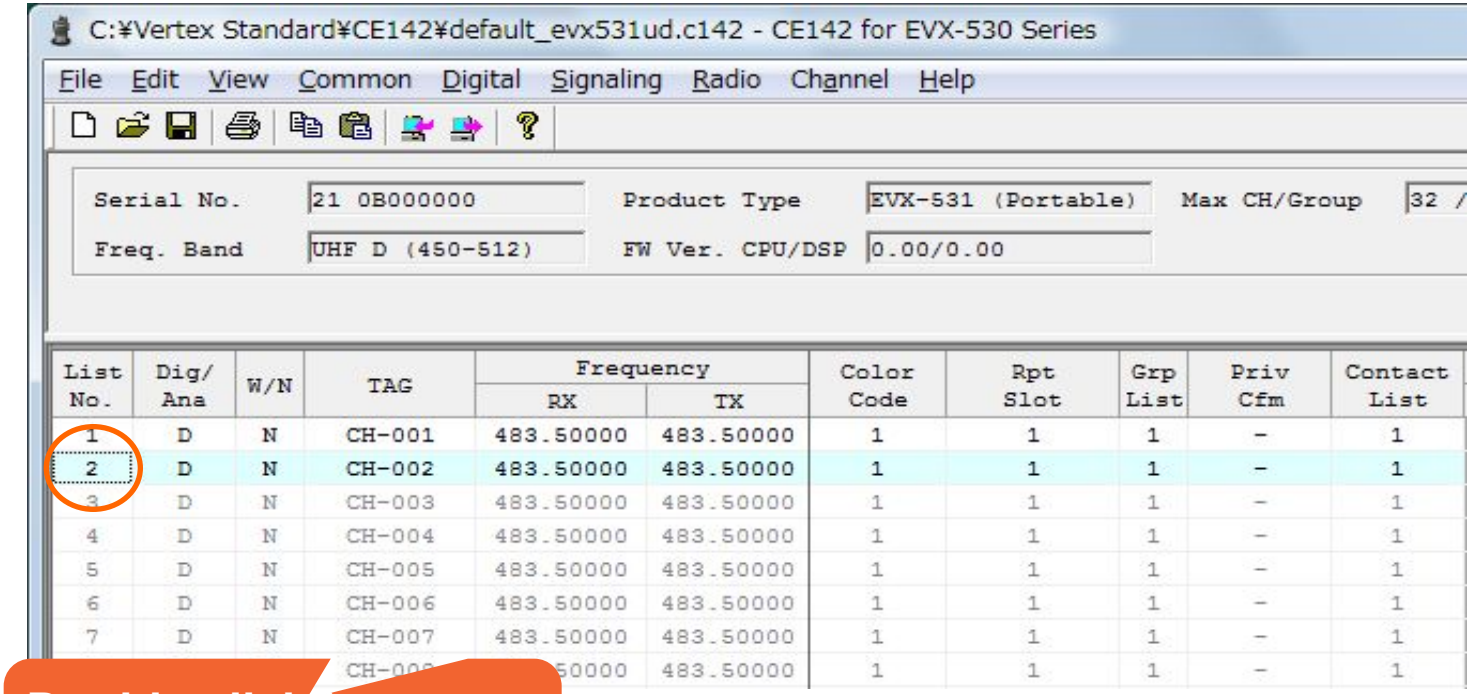


Step 2: Configure Common Settings

Enable / Disable Private Call



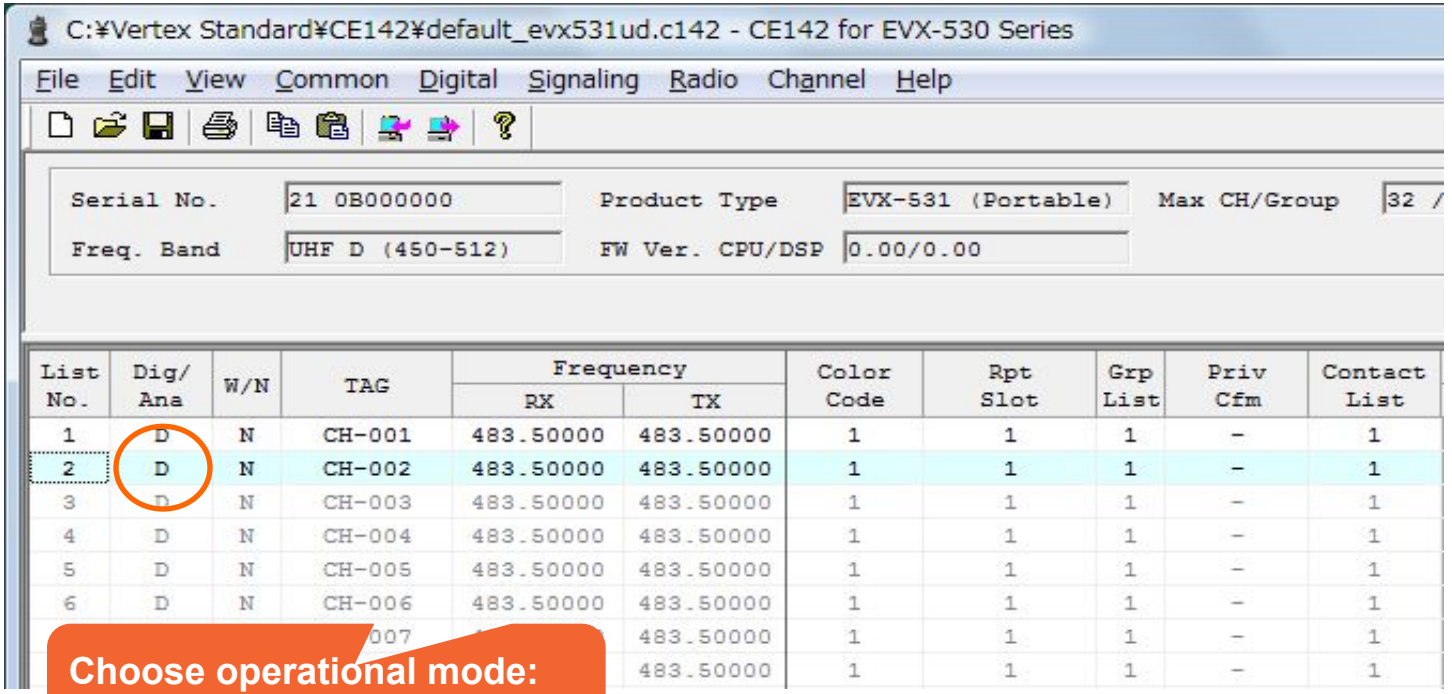
Step 3: Configure Operating Channels



List No.	Dig/ Ana	W/N	TAG	Frequency RX	Frequency TX	Color Code	Rpt Slot	Grp List	Priv Cfm	Contact List
1	D	N	CH-001	483.50000	483.50000	1	1	1	-	1
2	D	N	CH-002	483.50000	483.50000	1	1	1	-	1
3	D	N	CH-003	483.50000	483.50000	1	1	1	-	1
4	D	N	CH-004	483.50000	483.50000	1	1	1	-	1
5	D	N	CH-005	483.50000	483.50000	1	1	1	-	1
6	D	N	CH-006	483.50000	483.50000	1	1	1	-	1
7	D	N	CH-007	483.50000	483.50000	1	1	1	-	1
			CH-00	50000	483.50000	1	1	1	-	1

Double click here or press the space bar.

Step 3: Configure Operating Channels



List No.	Dig/ Ana	W/N	TAG	Frequency RX	Frequency TX	Color Code	Rpt Slot	Grp List	Priv Cfm	Contact List
1	D	N	CH-001	483.50000	483.50000	1	1	1	-	1
2	D	N	CH-002	483.50000	483.50000	1	1	1	-	1
3	D	N	CH-003	483.50000	483.50000	1	1	1	-	1
4	D	N	CH-004	483.50000	483.50000	1	1	1	-	1
5	D	N	CH-005	483.50000	483.50000	1	1	1	-	1
6	D	N	CH-006	483.50000	483.50000	1	1	1	-	1
			007		483.50000	1	1	1	-	1
					483.50000	1	1	1	-	1

Choose operational mode:
D = Digital

Step 3: Configure Operating Channels

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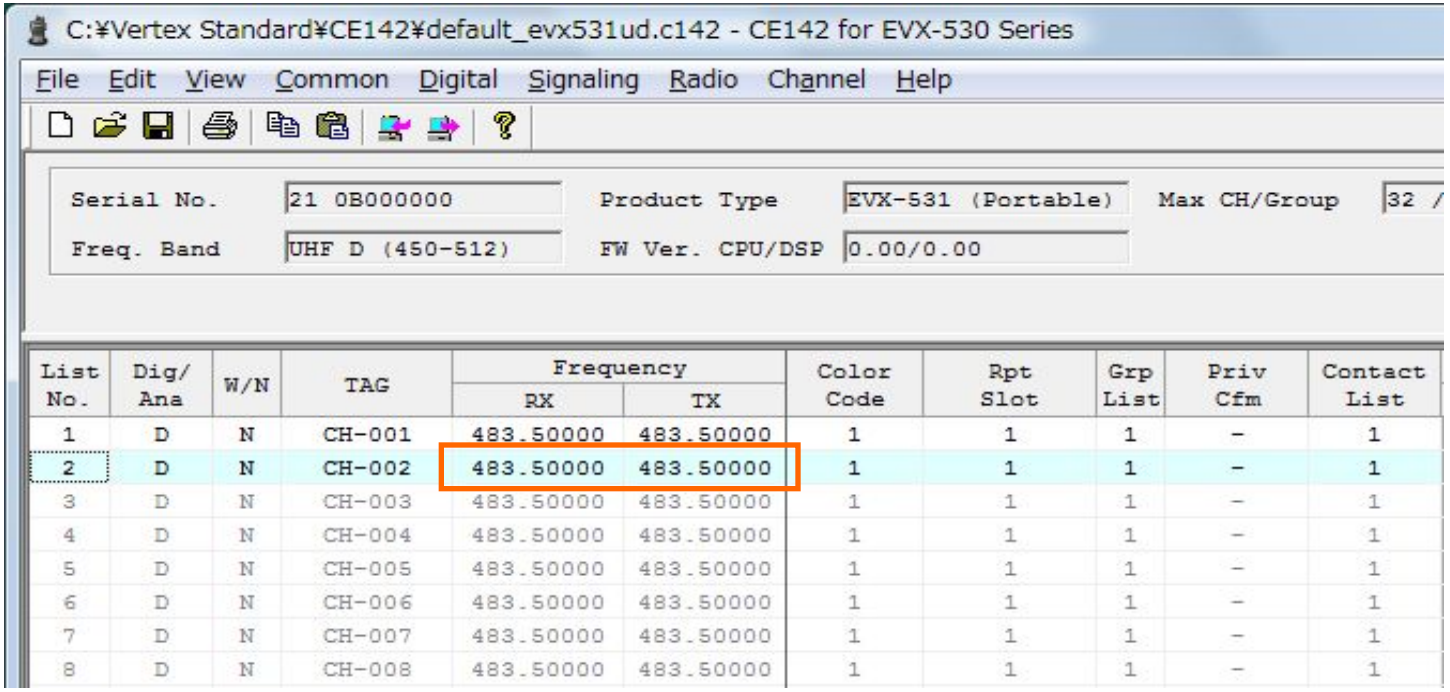
Enter Frequencies



List No.	Dig/ Ana	W/N	TAG	Frequency RX	Frequency TX	Color Code	Rpt Slot	Grp List	Priv Cfm	Contact List
1	D	N	CH-001	483.50000	483.50000	1	1	1	-	1
2	D	N	CH-002	483.50000	483.50000	1	1	1	-	1
3	D	N	CH-003	483.50000	483.50000	1	1	1	-	1
4	D	N	CH-004	483.50000	483.50000	1	1	1	-	1
5	D	N	CH-005	483.50000	483.50000	1	1	1	-	1
6	D	N	CH-006	483.50000	483.50000	1	1	1	-	1
7	D	N	CH-007	483.50000	483.50000	1	1	1	-	1
8	D	N	CH-008	483.50000	483.50000	1	1	1	-	1

Enter the desired frequencies here

Step 3: Configure Operating Channels

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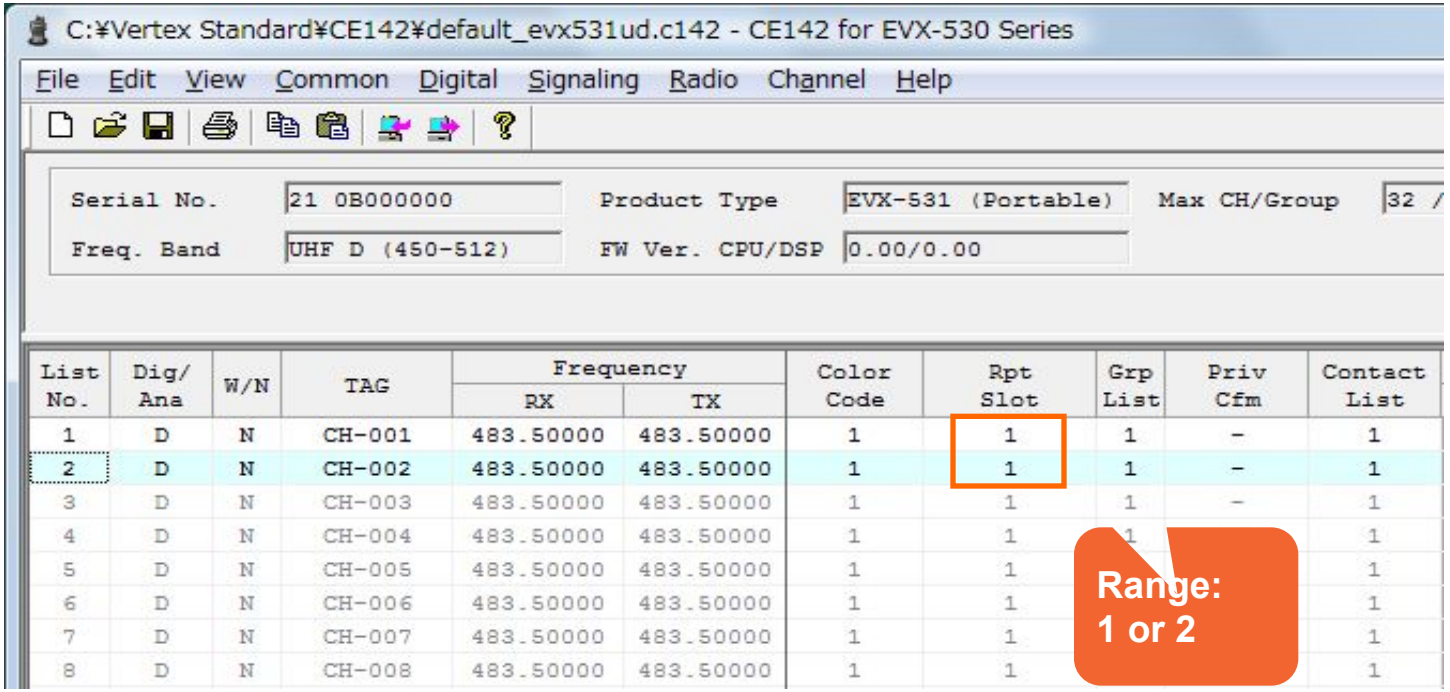
Set the Repeater Slot



List No.	Dig/ Ana	W/N	TAG	Frequency RX	Frequency TX	Color Code	Rpt Slot	Grp List	Priv Cfm	Contact List
1	D	N	CH-001	483.50000	483.50000	1	1	1	-	1
2	D	N	CH-002	483.50000	483.50000	1	1	1	-	1
3	D	N	CH-003	483.50000	483.50000	1	1	1	-	1
4	D	N	CH-004	483.50000	483.50000	1	1	1		1
5	D	N	CH-005	483.50000	483.50000	1	1			1
6	D	N	CH-006	483.50000	483.50000	1	1			1
7	D	N	CH-007	483.50000	483.50000	1	1			1
8	D	N	CH-008	483.50000	483.50000	1	1			1

Range: 1 or 2

Step 3: Configure Operating Channels

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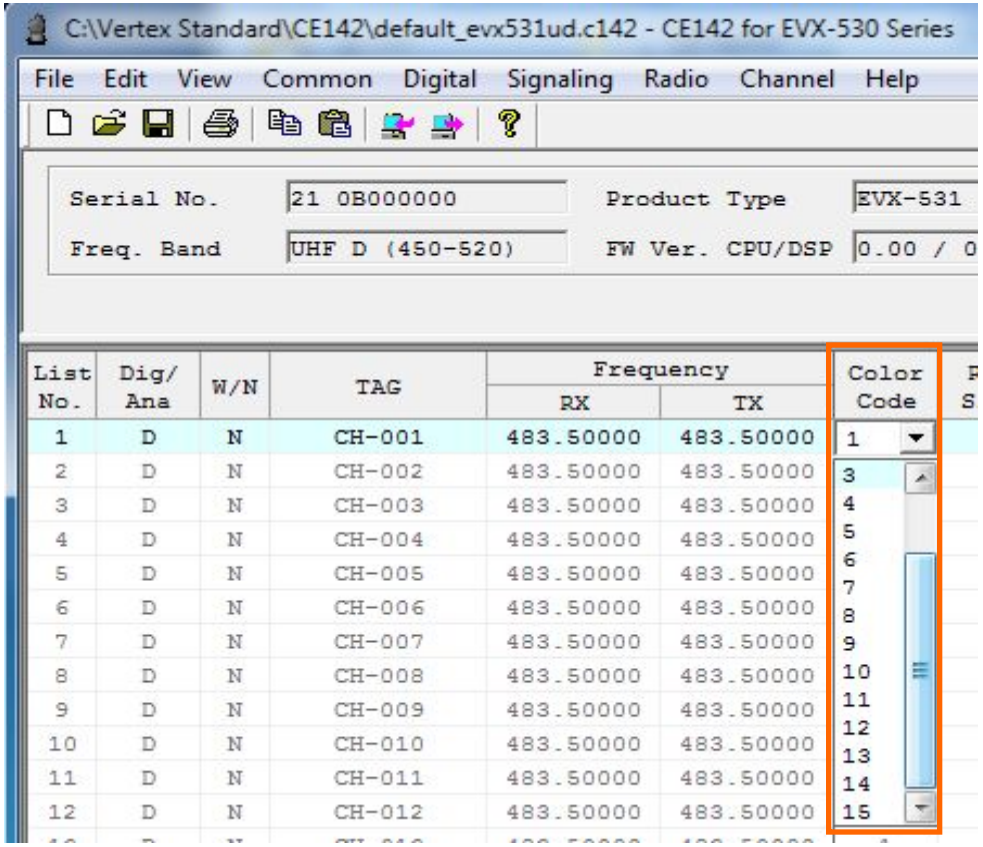
Choose the appropriate Color Code

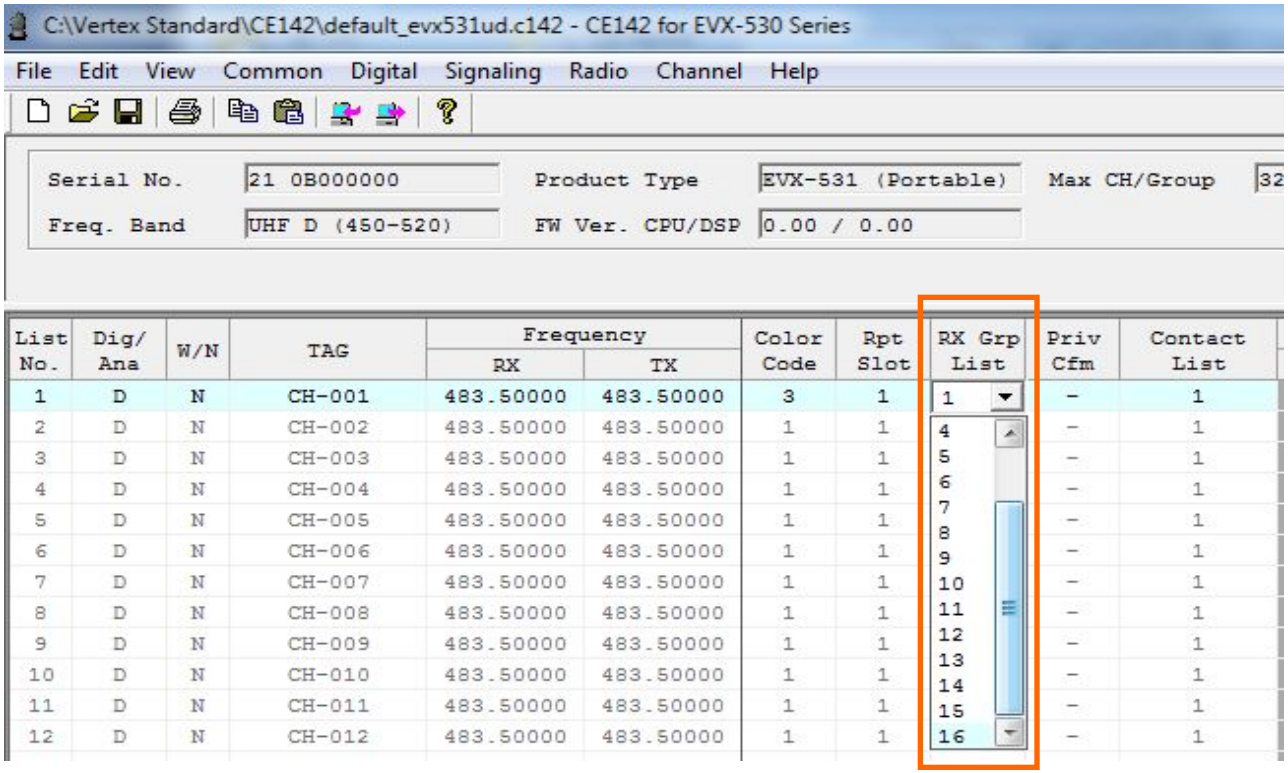


A ‘Color Code‘ is a ‘System ID’ It works like PL / CTCSS:
Only radios with the same CC can communicate.

16 CCs are available (0 – 15)

Step 3: Configure Operating Channels

Enable the correct Group List for this channel. The radio will respond to any group call ID listed in the selected list.



Step 3: Configure Operating Channels

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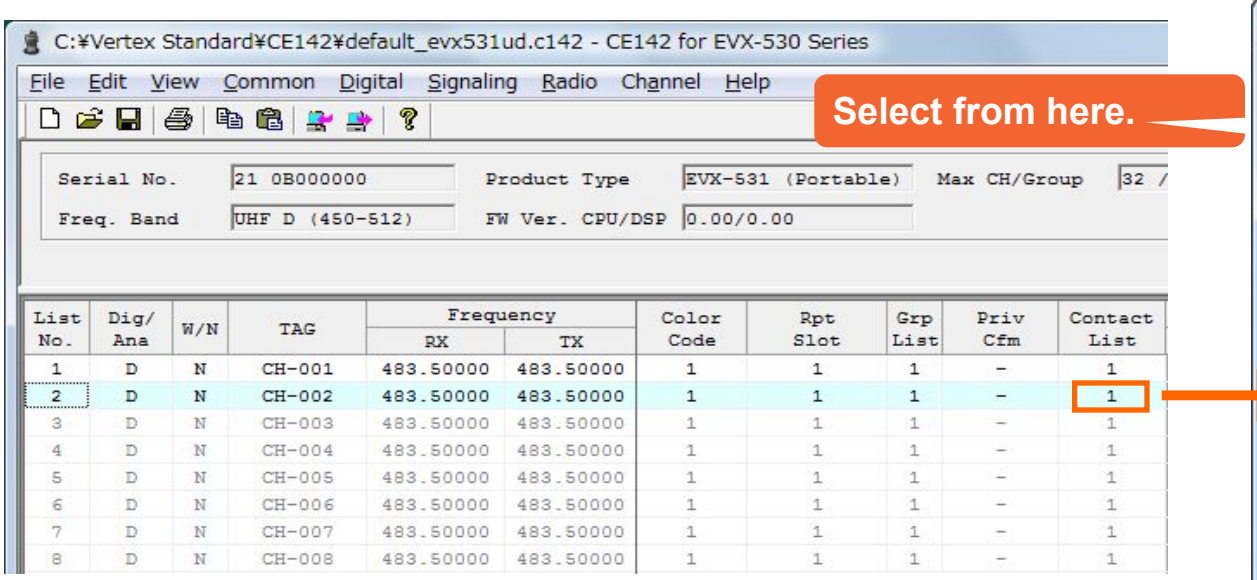
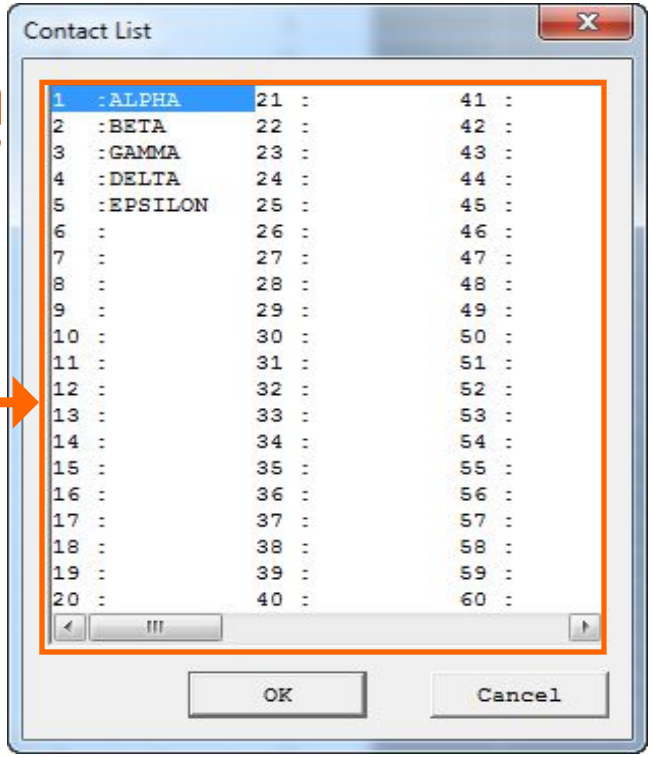
Select the DESTINATION ADDRESS (Contact) for a call on this channel.



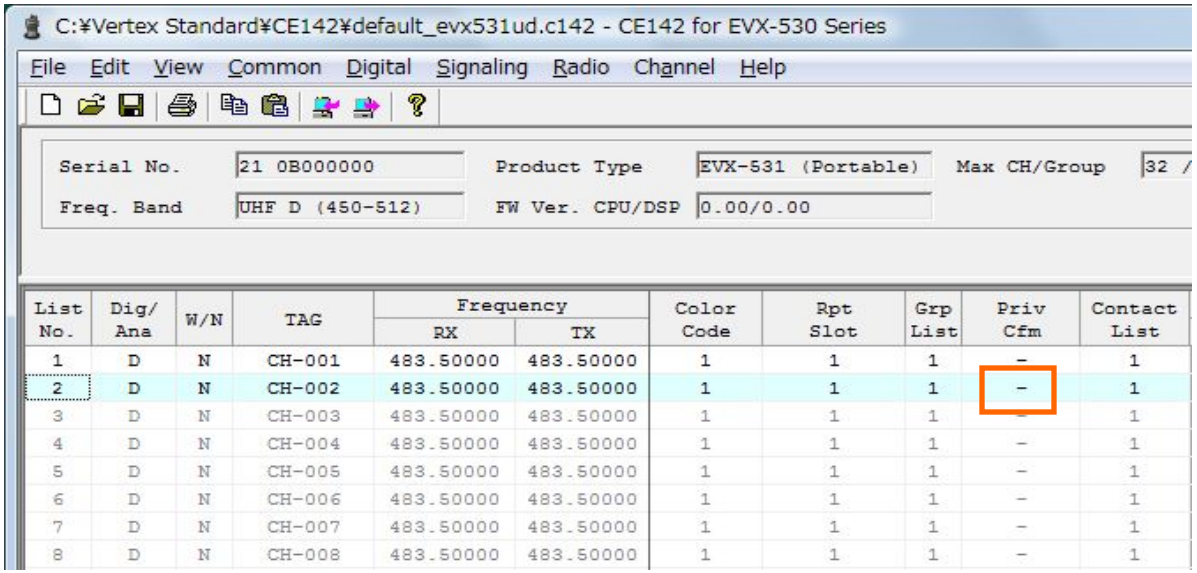
List No.	Dig/ Ana	W/N	TAG	Frequency RX	Frequency TX	Color Code	Rpt Slot	Grp List	Priv Cfm	Contact List
1	D	N	CH-001	483.50000	483.50000	1	1	1	-	1
2	D	N	CH-002	483.50000	483.50000	1	1	1	-	1
3	D	N	CH-003	483.50000	483.50000	1	1	1	-	1
4	D	N	CH-004	483.50000	483.50000	1	1	1	-	1
5	D	N	CH-005	483.50000	483.50000	1	1	1	-	1
6	D	N	CH-006	483.50000	483.50000	1	1	1	-	1
7	D	N	CH-007	483.50000	483.50000	1	1	1	-	1
8	D	N	CH-008	483.50000	483.50000	1	1	1	-	1



Step 3: Configure Operating Channels

Optional: Configure Private Calls as “Confirmed”.

If enabled, the radio will upon PTT first establish the link to the target radio, and then inform the user by a talk permit beep that the link has been established; or by an error tone that the target could not be reached.



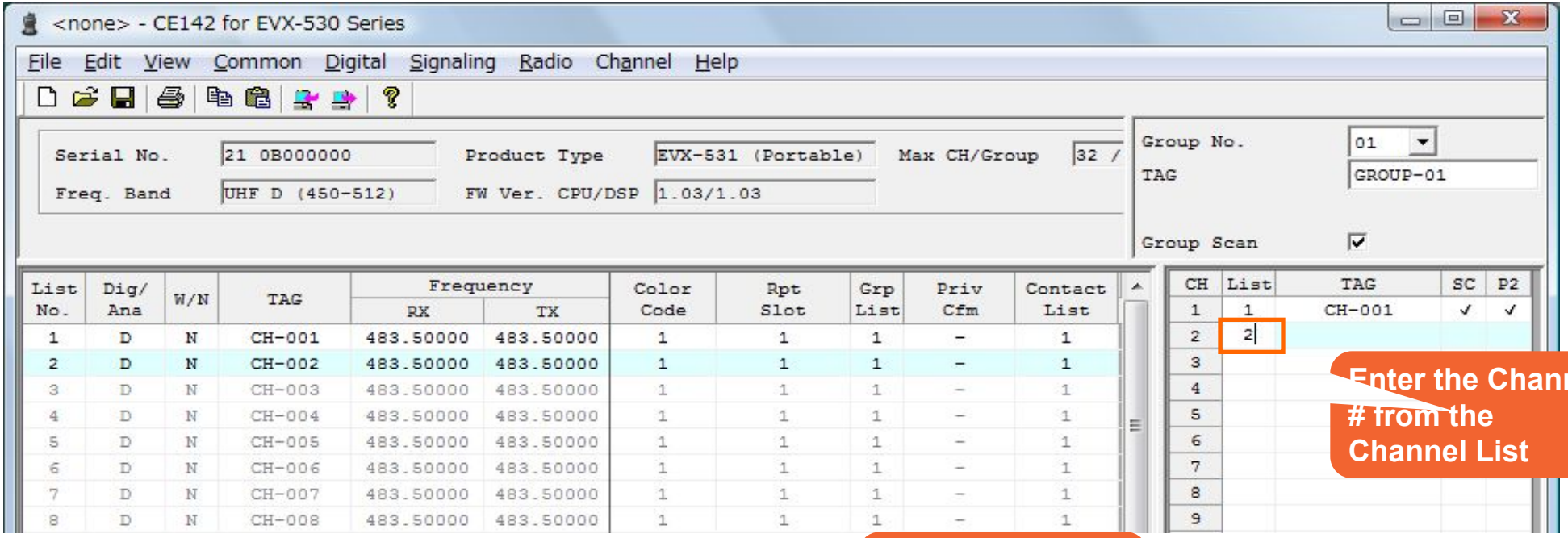
List No.	Dig/ Ana	W/N	TAG	Frequency RX	Frequency TX	Color Code	Rpt Slot	Grp List	Priv Cfm	Contact List
1	D	N	CH-001	483.50000	483.50000	1	1	1	-	1
2	D	N	CH-002	483.50000	483.50000	1	1	1	-	1
3	D	N	CH-003	483.50000	483.50000	1	1	1	-	1
4	D	N	CH-004	483.50000	483.50000	1	1	1	-	1
5	D	N	CH-005	483.50000	483.50000	1	1	1	-	1
6	D	N	CH-006	483.50000	483.50000	1	1	1	-	1
7	D	N	CH-007	483.50000	483.50000	1	1	1	-	1
8	D	N	CH-008	483.50000	483.50000	1	1	1	-	1

Double click on this cell or select & press the space bar.

With check mark: ‘Private Confirmed’ is Enabled

Step 3: Configure Operating Channels - Register Channel in Group List

Activate configured channels by adding them to the GROUP LIST



Step 4: Optional Settings

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Configuration of Optional Functions

- Privacy
- Emergency Call
- Text Messaging
- VOX Operation

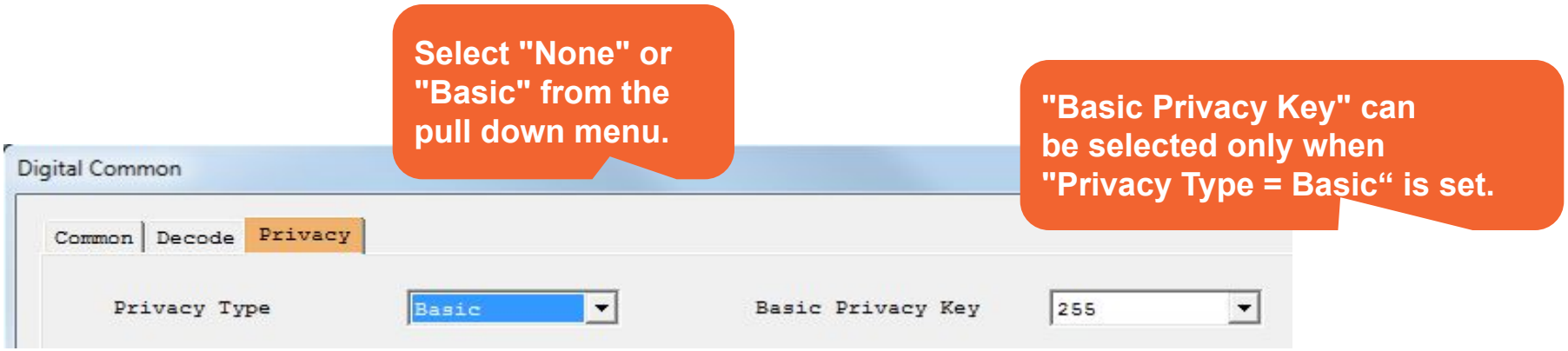
Step 4: Option Privacy

- 2 Privacy Options are available: BASIC and ENHANCED *)
- Settings located under >Digital - Digital Common<
- Common Characteristics:
  - If enabled, call content will be encrypted such that it can only be decoded by a radio that has the same key activated (and is on the same logical channel having proper ID) .
  - Voice as well as Text content will be scrambled, or encrypted.
  - Clear (unencrypted) calls will be received even if Privacy is enabled.
  - Repeaters are transparent for Privacy calls.

*) Enhanced Privacy is available as of F/W version 3.07.

Step 4: Optional Settings - BASIC Privacy Configuration

- The BASIC Privacy function uses a non-cryptographic algorithm to perform a digital ‘scrambling’ of the Message Payload (not of the control & addressing bits).
- 255 fixed keys - each 16 bits long - are available to choose from (should not be misunderstood as different levels of complexity).



Step 4: Optional Settings - ENHANCED Privacy Feature

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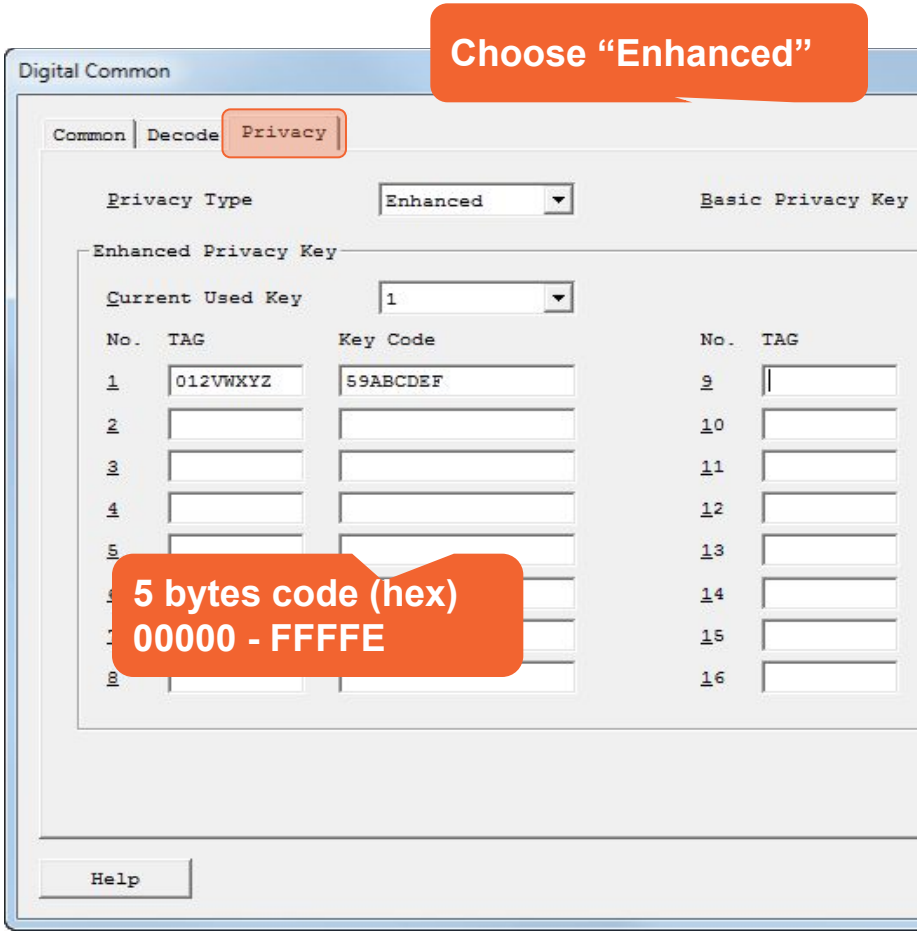
- The ENHANCED Privacy feature uses a cryptographic algorithm and performs a real encryption of the message payload (again, not of the control & addressing bits).
- 16 keys may be preconfigured
- Each key has 40 bits in length (5 bytes).
- Key range is (hex) 0000 – FFFE
- This allows for **1,099,511,627,775** Combinations.

Step 4: Optional Settings - ENHANCED Privacy Configuration

16 codes available; display radio users can change codes during operation.

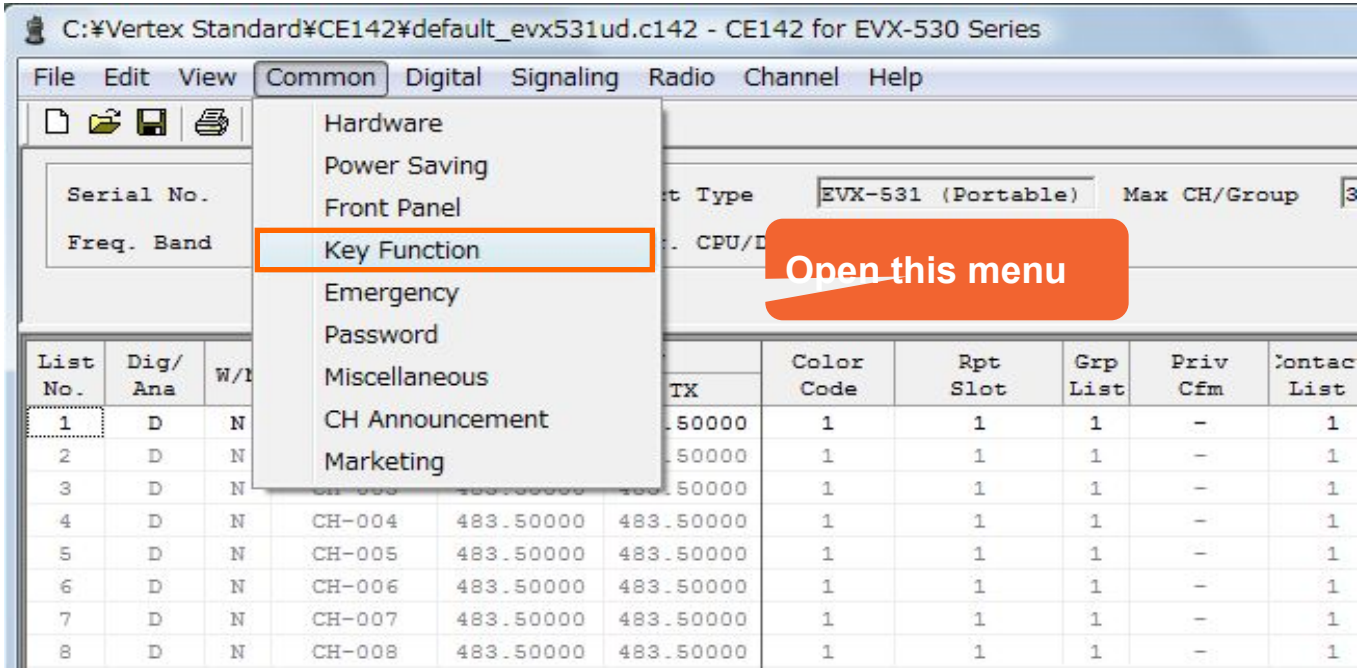
For non-display radios, select active Key here

Alphanumeric Tag max. 8 Digits



Step 4: Optional Settings – Privacy, assign to programmable Button

Open the Key Function Menu



Step 4: Optional Settings – Privacy, assign to programmable button.

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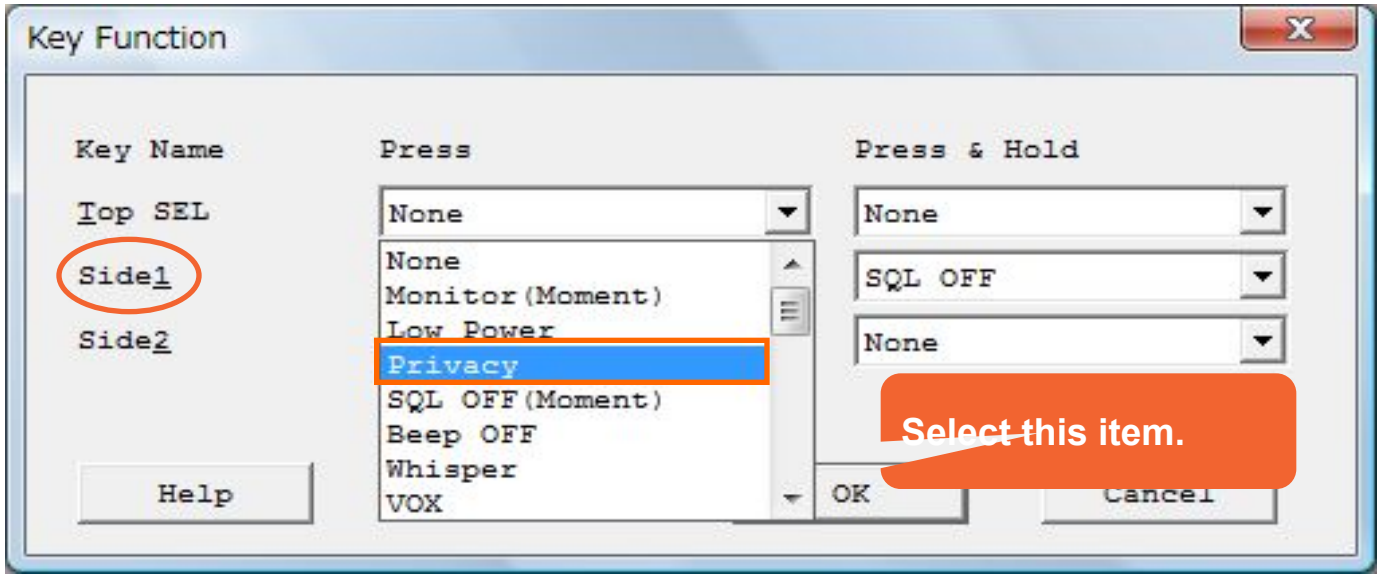
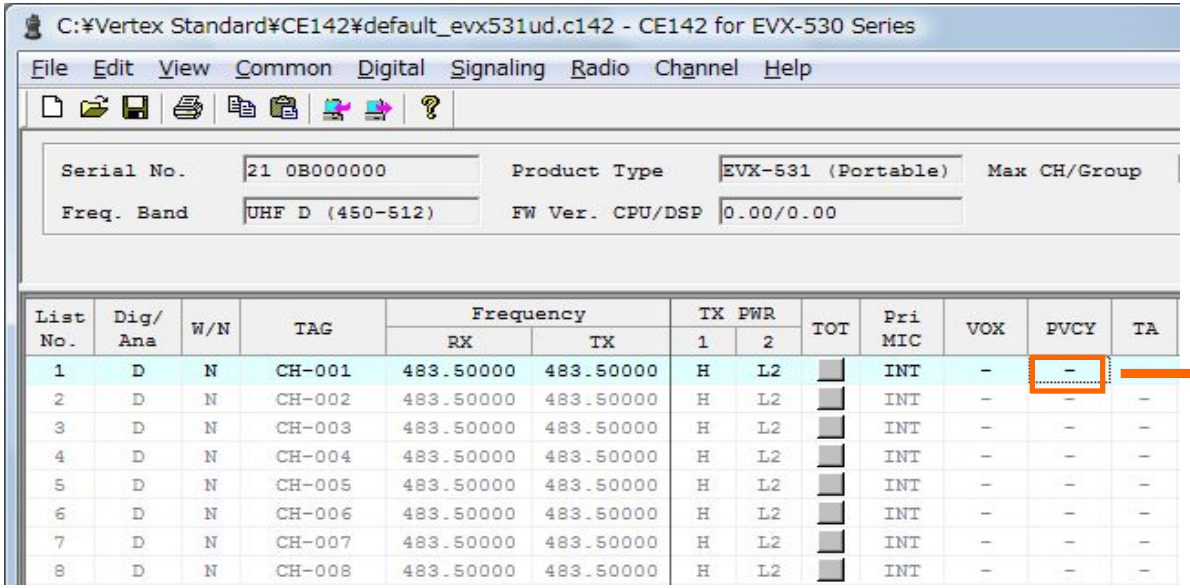
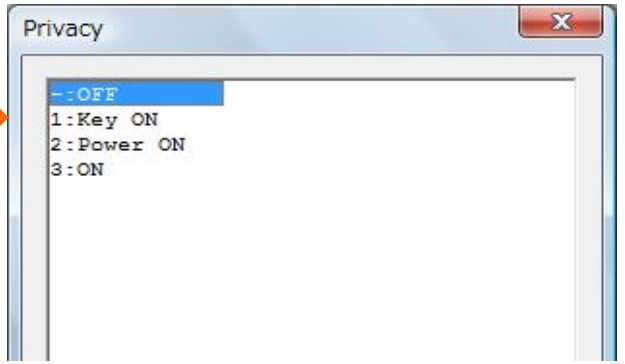
Key Settings



Step 4: Optional Settings
- Privacy, Activate on Channel

Return to the Main screen. Add Privacy to channels as required and select appropriate activation method.





Step 4: Optional Settings
- Emergency Function (Digital Mode)

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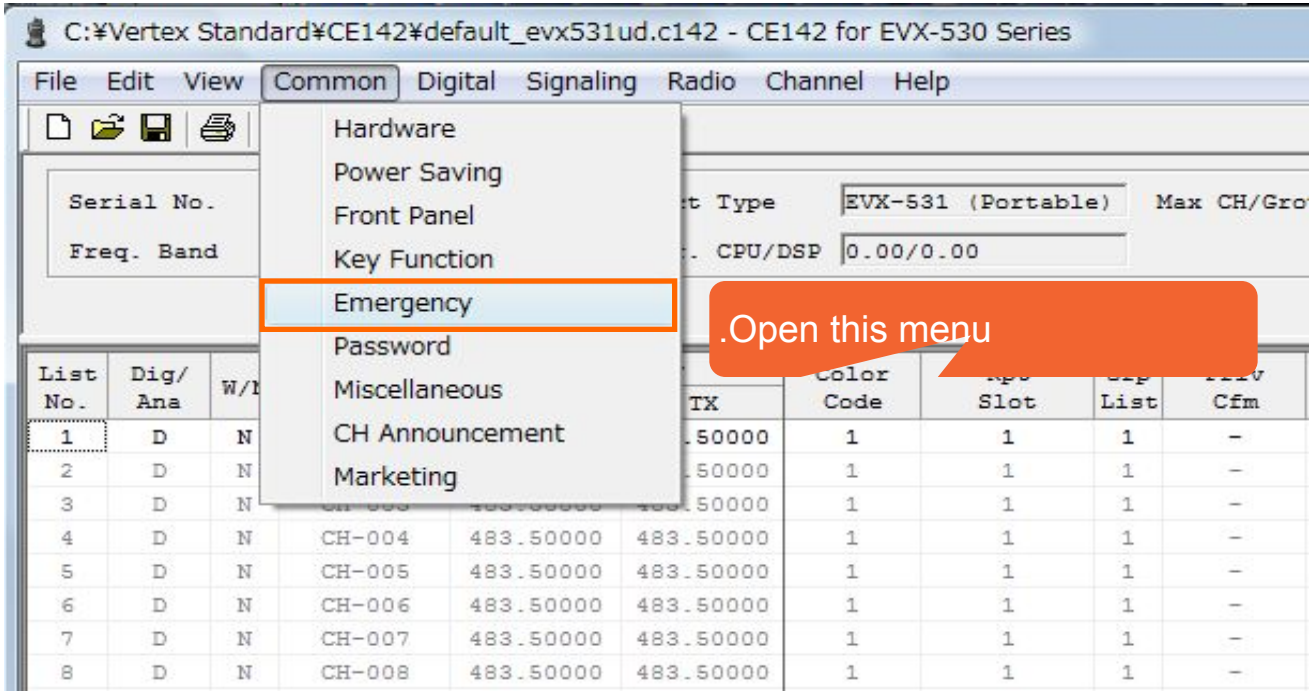
Open the Emergency Function Dialog Window



Step 4: Optional Settings - Emergency Function (Digital Mode)

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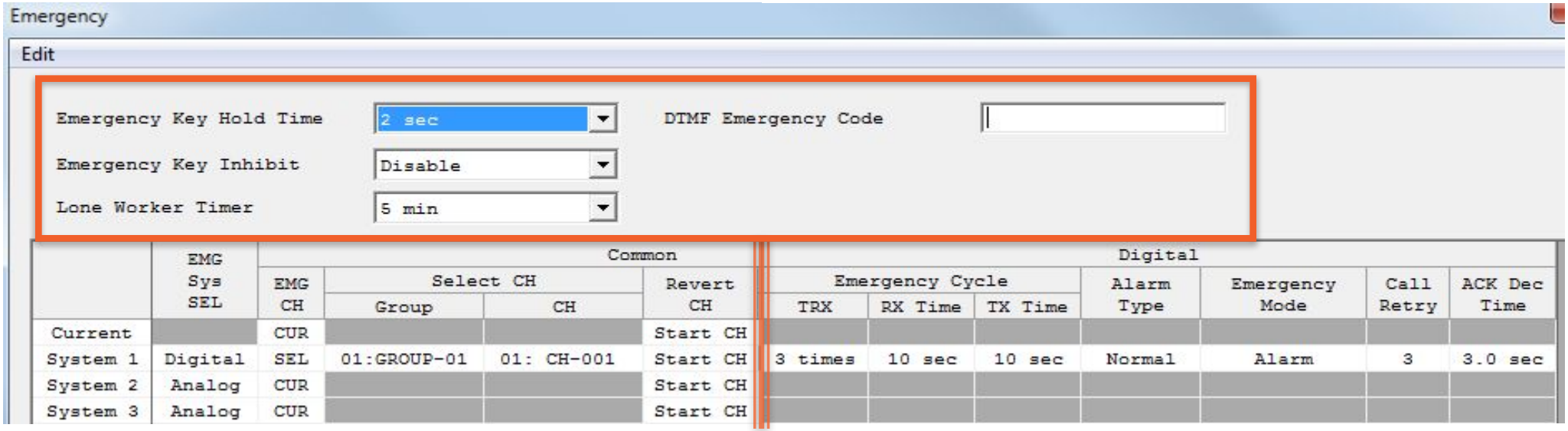
Configuration Window for Emergency settings (shown w/o analogue elements)

Upper section:

- Duration of button-press for Emergency trigger;
- Key Inhibit: Keys locked during emergency cycle (except emergency stop by assigned key)
- Time-out timer for Lone Worker function.



	EMG Sys SEL	Common				Digital						
		EMG CH	Select CH		Revert CH	Emergency Cycle			Alarm Type	Emergency Mode	Call Retry	ACK Dec Time
			Group	CH		TRX	RX Time	TX Time				
Current		CUR			Start CH							
System 1	Digital	SEL	01:GROUP-01	01: CH-001	Start CH	3 times	10 sec	10 sec	Normal	Alarm	3	3.0 sec
System 2	Analog	CUR			Start CH							
System 3	Analog	CUR			Start CH							

Step 4: Optional Settings - Emergency Function (Digital Mode)

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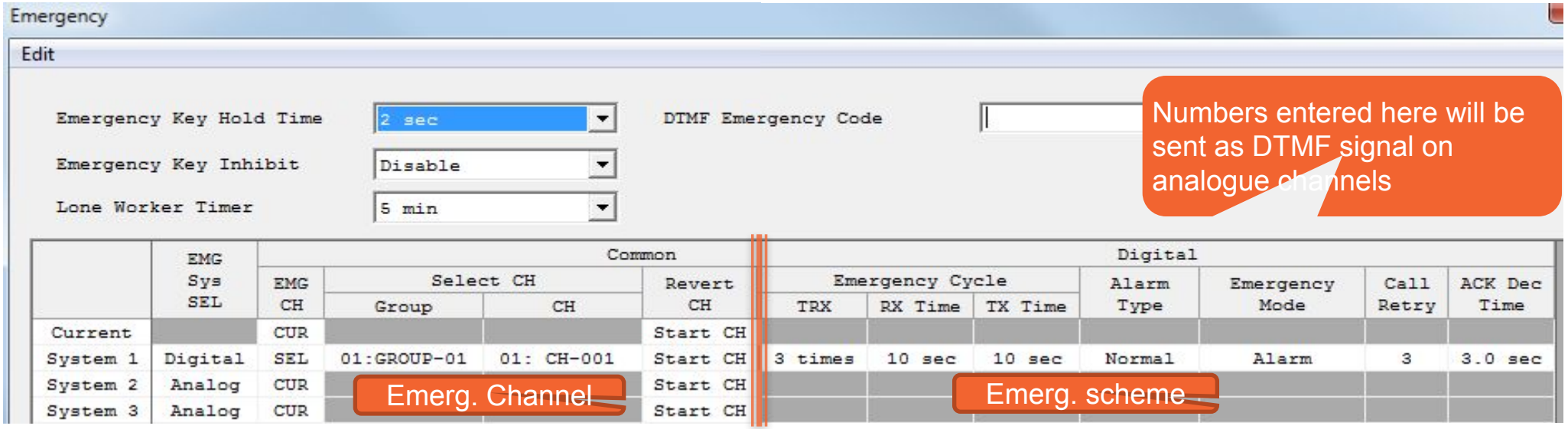
Configuration Window for Emergency settings (analogue elements cut out)

Up to 32 Emergency Schemes (“Systems”) may be defined for analogue or digital channels



Step 4: Optional Settings
- Emergency Function (Digital Mode)

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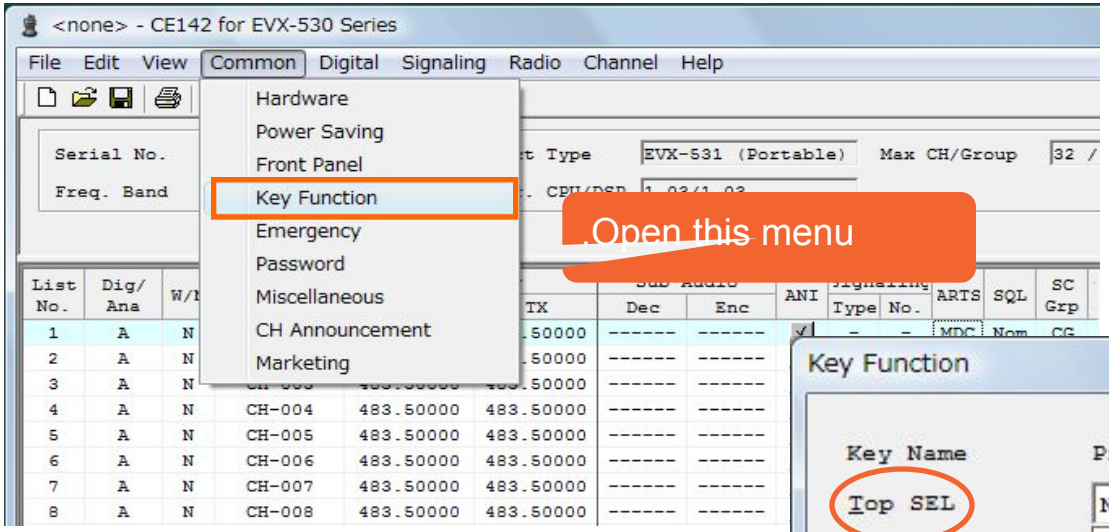
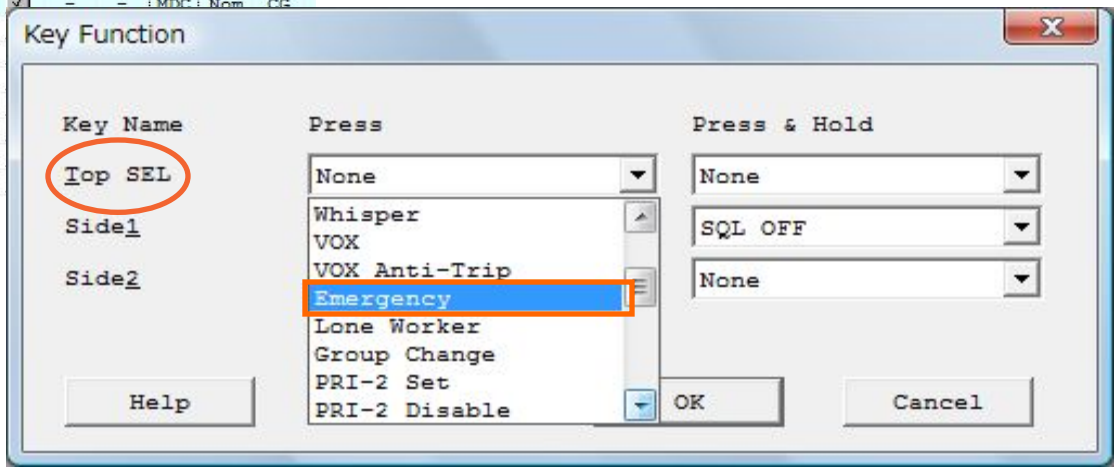
Assign Emergency to Programmable Key



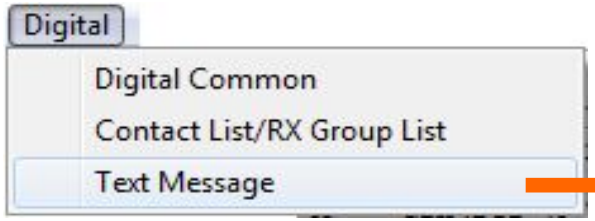


Step 4: Optional Settings - Text Messages

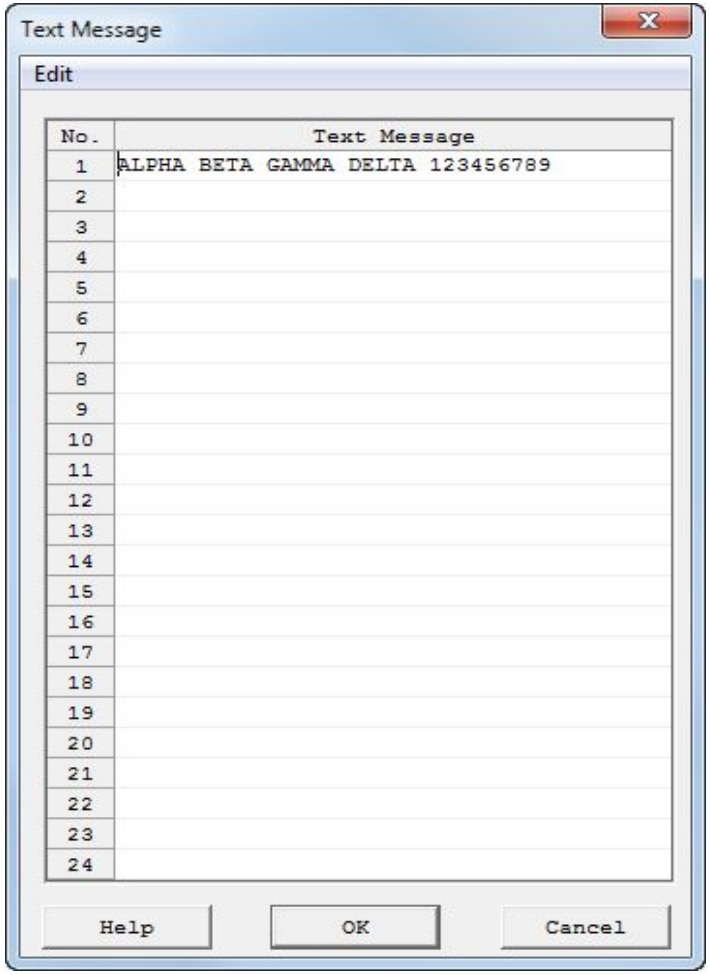
- The Text Messaging Feature is available as of F/W ver. 3.06. It is primarily intended for use with the upcoming EVX-534 / EVX-539 radios.
- 24 Quick Text Messages (QTM) with up to 32 characters each in length can be edited.
- Of limited use on EVX-531 radios; however, up to 3 quick text messages can be assigned to a direct call key.
- These calls should be addressed to display radios only ☺
- A specific alert tone may be associated with a QTM reception.

Step 4: Optional Settings - Text Messages

Open Text Editor.



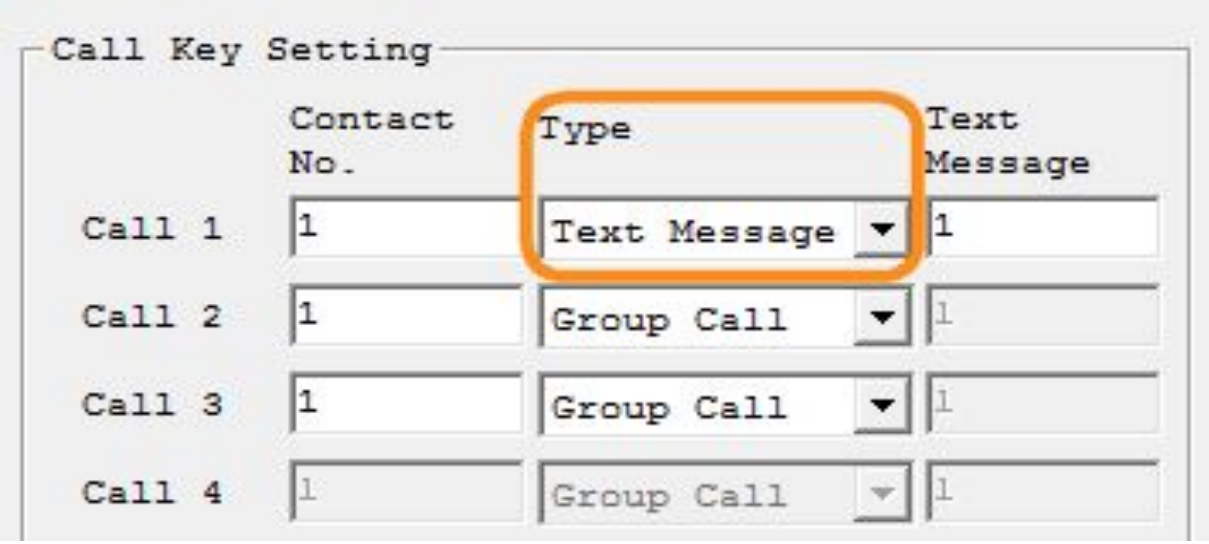
Enter texts as required



Step 4: Optional Settings - Text Messages

Under >Digital Common, Common< assign the QTM to a Direct Call:

1. Change Call Type to “Text Message”



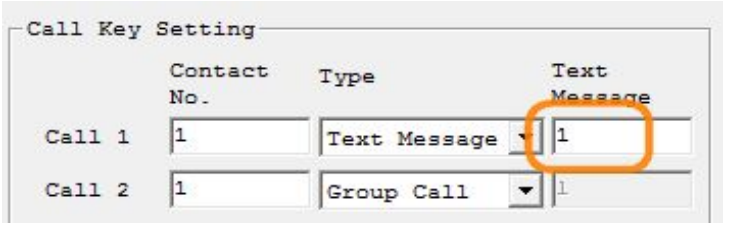
Step 4: Optional Settings - Text Messages

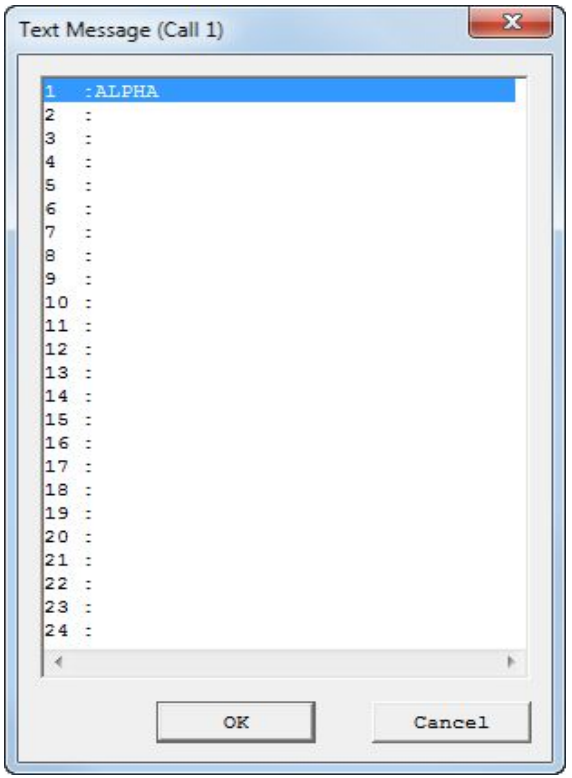
2. Select the intended QTM:

   a. Click in field “Text Message”

   b. The QTM list opens.
      Make sure to select the QTM

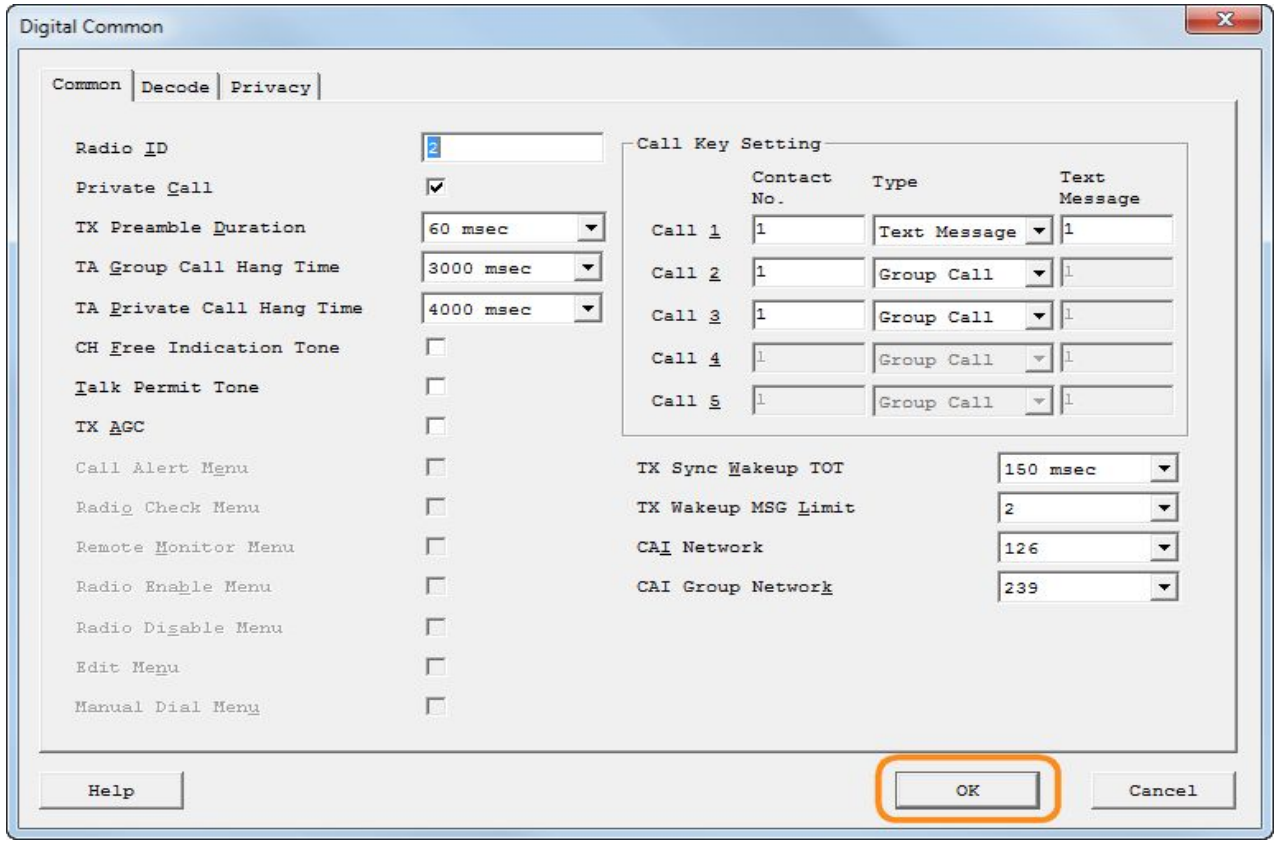
   c. Click “OK”





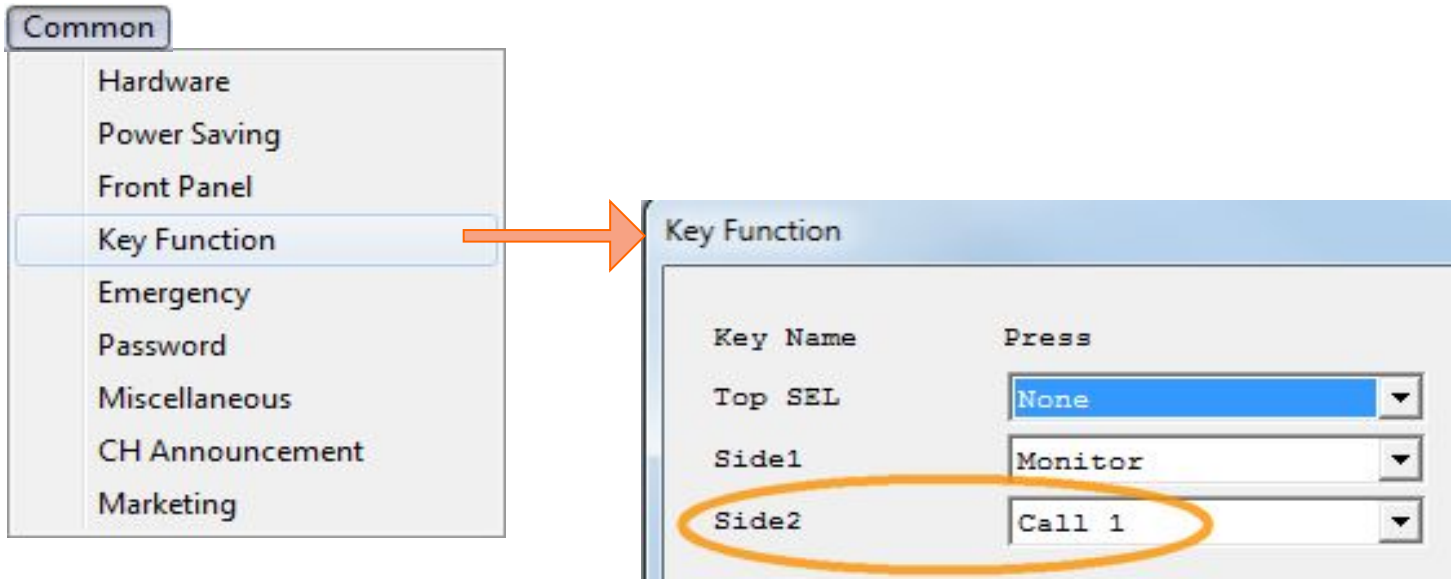
Step 4: Optional Settings - Text Messages

3. Close the >Digital Common< window by clicking “OK”



Step 4: Optional Settings - Text Messages

Under >Common, Key Function< assign a button to Call1:

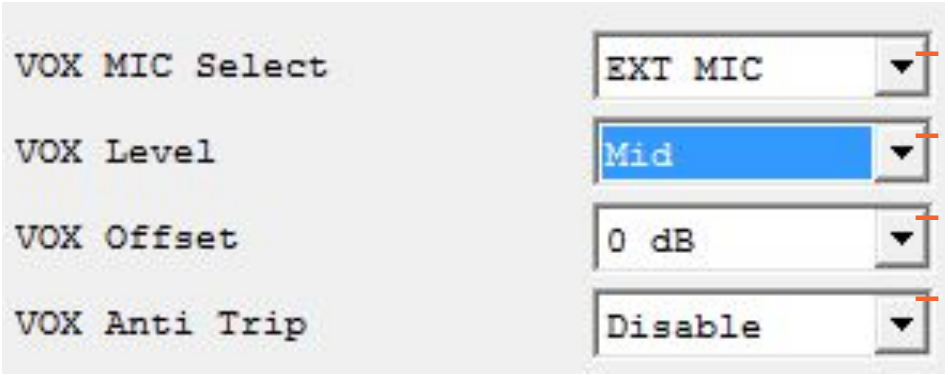


Step 4: Optional Settings - VOX Function

- VOX (Voice Operated Transmission) can be used with the internal microphone, alternatively with MH-81A4B Over-the-head VOX Compatible Headset.

VC-25 cannot be used!

- VOX is a channel-wide feature
- Basic settings located under >Front Panel, Front Panel<



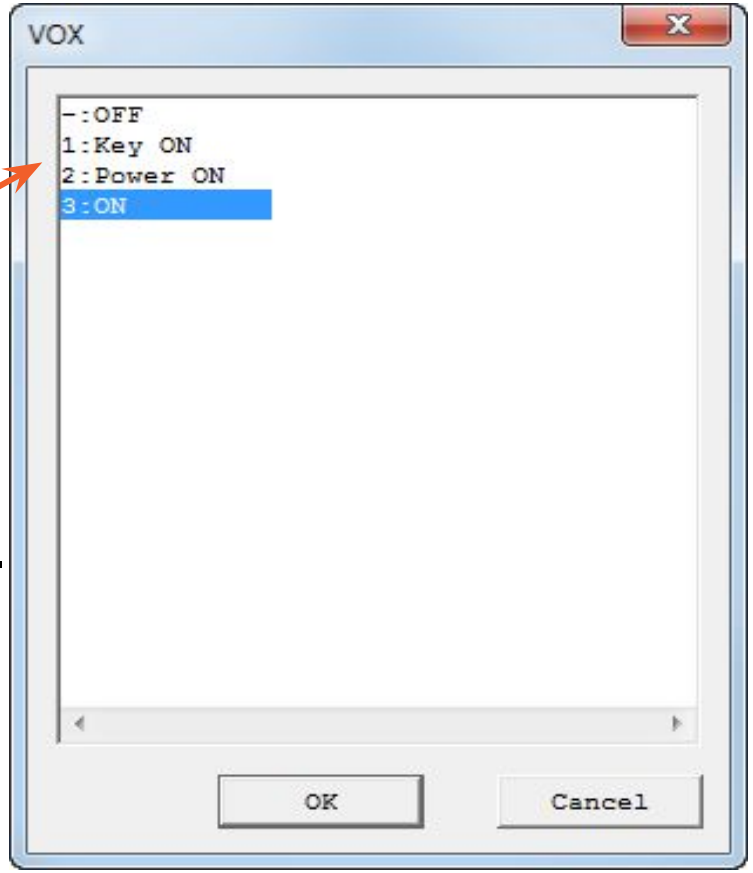
- Choose active microphone
- Set Attack / Release time
- Adjust Mic sensitivity
- Helps to prevent self-generation of xmission by e.g. CH announcement

Step 4: Optional Settings - VOX Function

- In main window, active VOX on desired channel.

EMG SYS	Pri MIC	VOX
1	INT	3
1	INT	-
1	INT	-
1	INT	-

Double click opens selection:



- Optional Settings 1 & 2 need to have a button assigned to turn VOX on / off during operation.

Vertex Standard

eVerge™

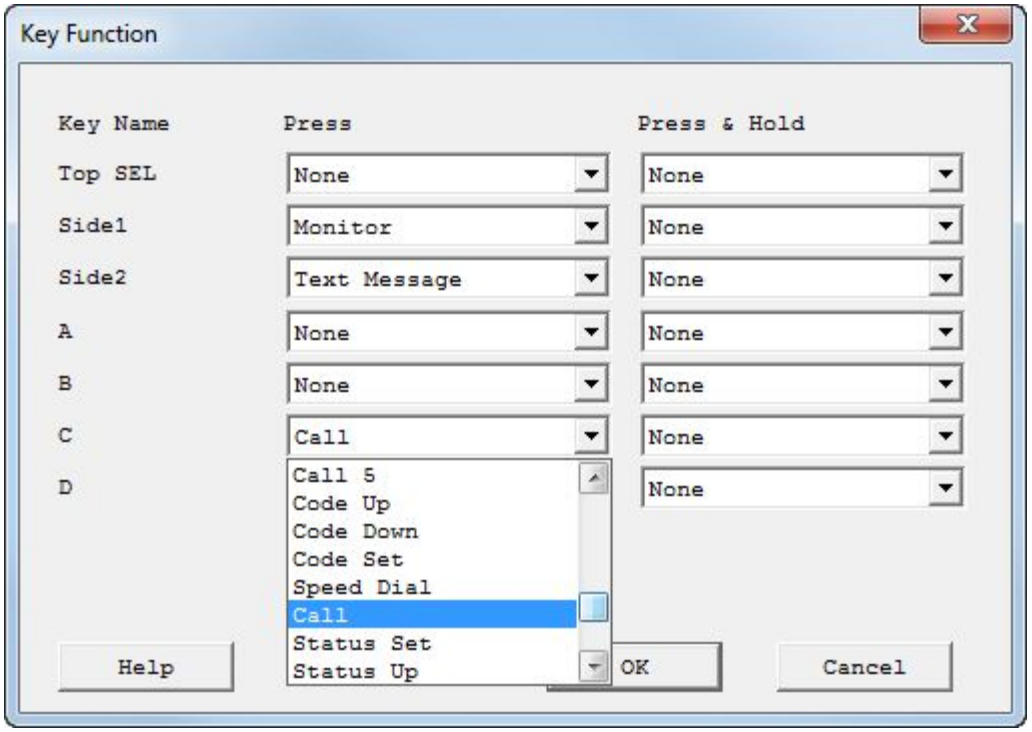
Display Radios
Menu-guided Operation

Operation – Call Management

Vertex Standard
eVerge™

Programming Prerequisite:

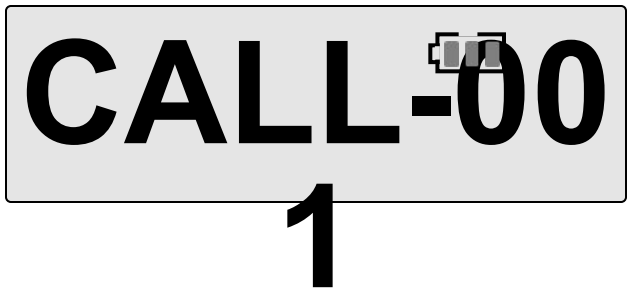
The CALL menu must have a PF button assigned:



Operation – Call Management

Invoke the CALL menu by pressing the assigned PF button.

Contact # 1 tag will be displayed [CALL-001]:

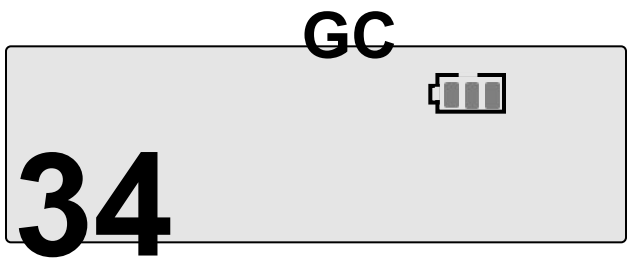


Call Type Notifier
GC = Group Call
= Private Call
AC = All Call

Scroll through the contacts list using **SIDE-1/SIDE-2** buttons or **[A]/[B]** keys.

Operation – Call Management

Once the wanted contact is displayed, press the **[D]** key to select, or **[C]** key to cancel.



Call Type Notifier
GC = Group Call
= Private Call
AC = All Call

If the CALL TYPE is Private (PC), various additional functions become available (scroll through using side buttons):

CALL ALT, VIEW ID, EDIT TAG*, EDIT ID*, ALT SEL, DEL LIST*, RADIO CK, RADIOMON, REVIVE and STUN (*:EVX-539 only).

Assistance

For more information or support requests, please send your inquiry to:

support-emea@vertexstandard.com