

CPS Programmer Tutorial

Version	0.02
Released	2016-02-05
Autor	DL5MCC

1. Introduction

DMR (Digital Mobile Radio) is a digital voice (DV) modulation scheme, which becomes more and more popular in amateur radio (ham radio). To be able to use the radio transceivers, all frequencies (channels) used must be entered as a „memory channel“ into the so called codeplug (CP). There is a huge number of local radio repeaters, as well as analogue FM repeaters and simplex frequencies, which all have to be entered into the CP by typing it manually into a customer programming software (CPS). Only in Germany we currently have about 180 DMR repeater, which expand to about 400 channels (2 timeslots + many mixed mode FM) only for DMR.

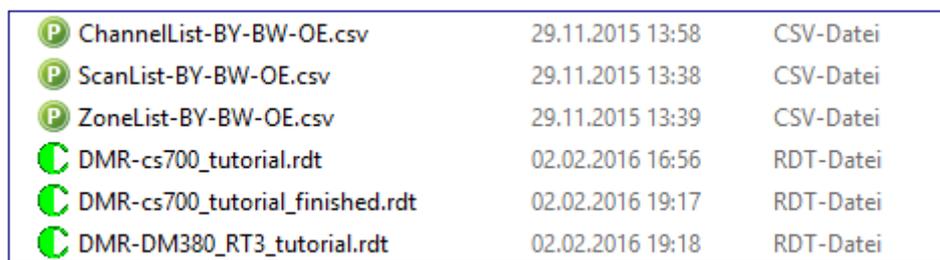
Programming this huge numbers of channels (callsigns, frequencies, timeslot & colour code, scanlist, RXGroup, TXContact, etc.) is a huge, boring and annoying pile of work, which can sum up to days.

CPSProgrammer will make that work much more simple. All DV channels can be downloaded from the DMR database and than can easily be managed and extended by analogue channels, using Excel. A CSV file, to be generated from the Excel table, then will be used by the CPSProgrammer to programme the channel information into the CPS.

CPSProgrammer directly accesses the CPS windows controls to transfer the programming information from the CSV-file into the codeplug. The automatic transfer of a few hundred channels into the Radio Programming Software takes a few minutes only.

This tutorial provides a brief introduction in using CPSProgrammer. You are going to programme the small sample codeplug, which was shown in the tutorial video as well.

A prepared codeplug and all CSV-files required, are provided with this tutorial.



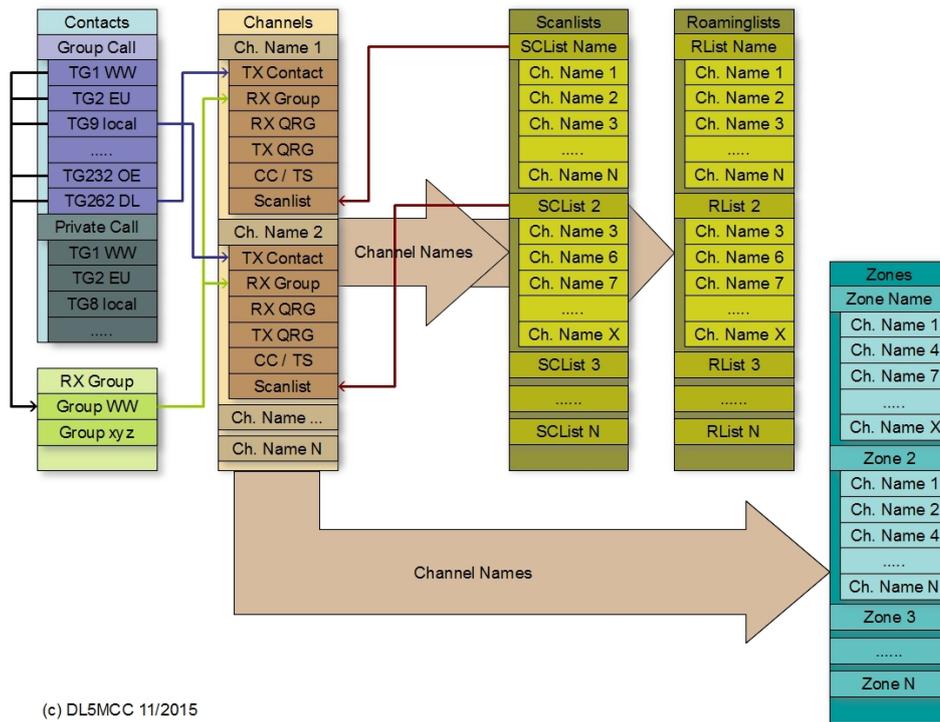
 Channellist-BY-BW-OE.csv	29.11.2015 13:58	CSV-Datei
 ScanList-BY-BW-OE.csv	29.11.2015 13:38	CSV-Datei
 ZoneList-BY-BW-OE.csv	29.11.2015 13:39	CSV-Datei
 DMR-cs700_tutorial.rdt	02.02.2016 16:56	RDT-Datei
 DMR-cs700_tutorial_finished.rdt	02.02.2016 19:17	RDT-Datei
 DMR-DM380_RT3_tutorial.rdt	02.02.2016 19:18	RDT-Datei

Figure: Sample files provided with this tutorial

2. Prepare a new codeplug

Before we can start programming channels, zones and scanlists, we have to prepare some elementary things. As you can see in the picture below, each channel stores information about the frequency, time slot, colour code or a CTCSS-frequency to be used. Beside this basic information, additional settings are used which are predefined in codeplug itself. These are the talk groups (default TX Contact), receive groups (RXGroup) and scanlists to be selected individually for each digital channel. While the channel-list will be created with the CPSProgrammer, the required groups and at least one RX Group has to be defined in advance. This has to be done manually, but can be reused for other codeplugs for the same region.

DMR Codeplug Interdependencies



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The codeplug provided with the tutorial contains numerous talk groups which are mainly used in Central Europe, and a single RX Group „WW“ which allows us to listen to all traffic on a selected DMR repeater.

CS700_V1.19 - [Digital Contact]

File Edit Program Setting View Window Help

No.	Contact Name	Call Type	Call ID	Call Receive Tone
1	-All Call-	All Call	16777215	No
2	TG1 WW	Group Call	1	No
3	TG2 EU	Group Call	2	No
4	TG3 Nordamerika	Group Call	3	No
5	TG8 Regional	Group Call	8	No
6	TG9 Lokal/Ref.	Group Call	9	No
7	TG10 DE-WW	Group Call	10	No
8	TG13 engl.-WW	Group Call	13	No
9	TG20 DACH	Group Call	20	No
10	TG9990 Echo	Group Call	9990	No
11	TG262 DL	Group Call	262	No
12	TG232 OE	Group Call	232	No
13	TG228 CH	Group Call	228	No
14	TG204 NL	Group Call	204	No
15	TG206 ON	Group Call	206	No
16	TG235 GB	Group Call	235	No
17	TG240 S	Group Call	240	No

Add Delete

Figure: Empty tutorial codeplug containing all required talk groups

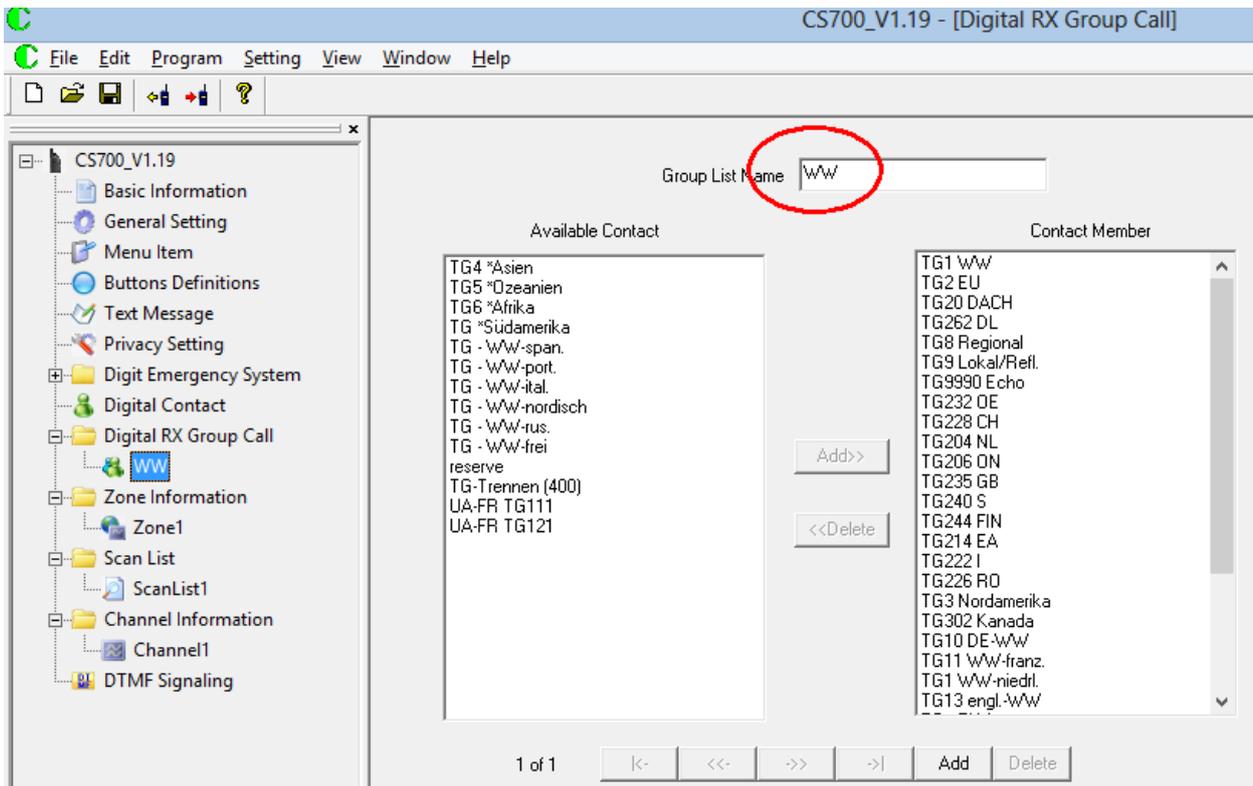


Figure: Empty tutorial codeplug containing RX Group „WW“

3. Preparing the data base

Detailed information will follow.

In the meantime, please check <http://www.spacesupport.de/repeater-liste.php> for further information.

4. Programming step by step

To learn, how CPSProgrammer interacts with a CPS, we are now going to create a small codeplug from the provided CSV-files.

This tutorial uses predefined databases for channels, scanlists and zones which are provided with the software download.

4.1. Generate Scanlists

To start the automatic programming, at first start your customer programming software (CPS) and load the related tutorial codeplug (CS700 oder MD380/RT3).

Before we can start programming any channel, we have to create empty scanlists to allow the selection of a scanlist name for each channel. To do so, please open “Scan List” in your CPS and go to „scanlist1“, as shown in the picture below.

Next start CPSProgrammer and select tab (1) Scanlist. First select the CPS/Device you use, e.g. CS700 for a CS700-CPS. Continue with selecting the required scanlist by clicking „Select Scanlist“. For this tutorial, select „ScanList-BY-BW-OE.csv“.

Now we create the empty scanlists: Just click on „Generate Scanlists“. The CPSProgrammer starts creating new scanlists. After a few seconds you should see 16 new and empty scanlists.

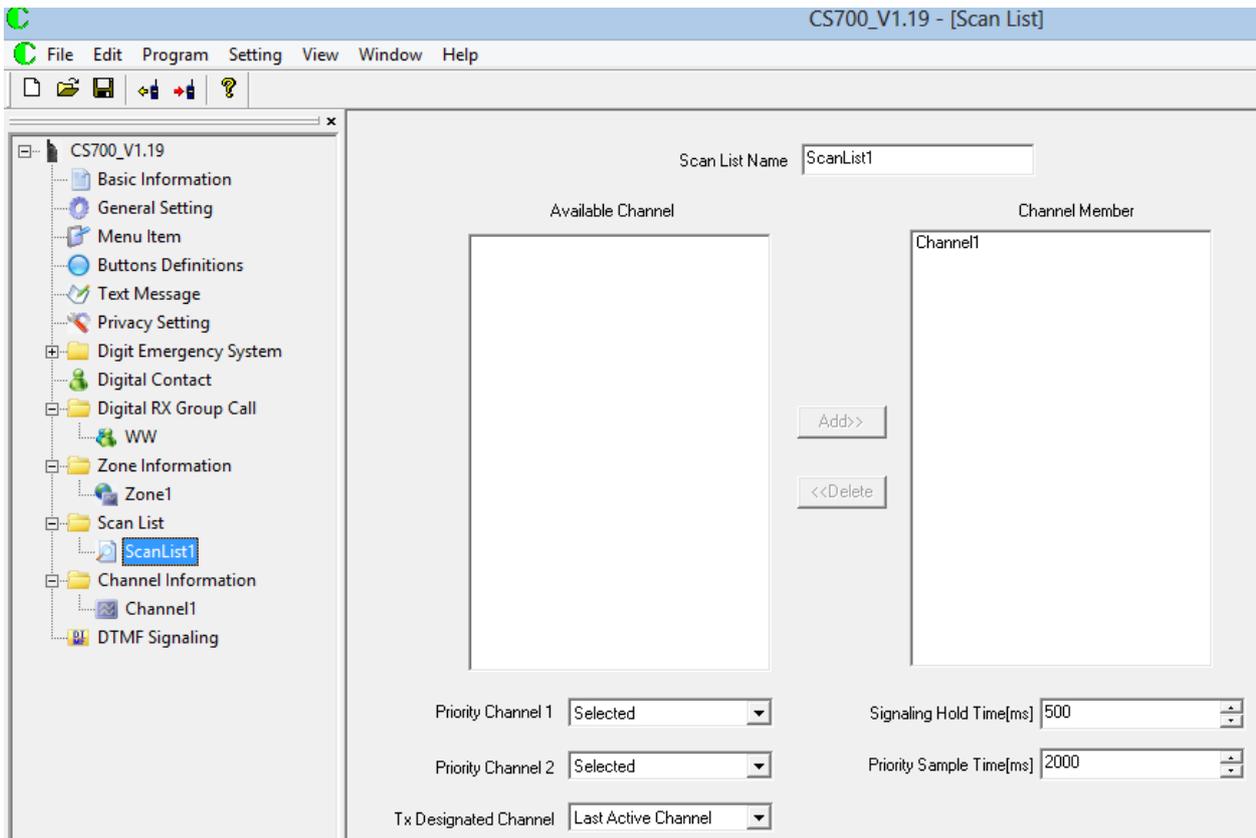


Figure: Open a ScanList

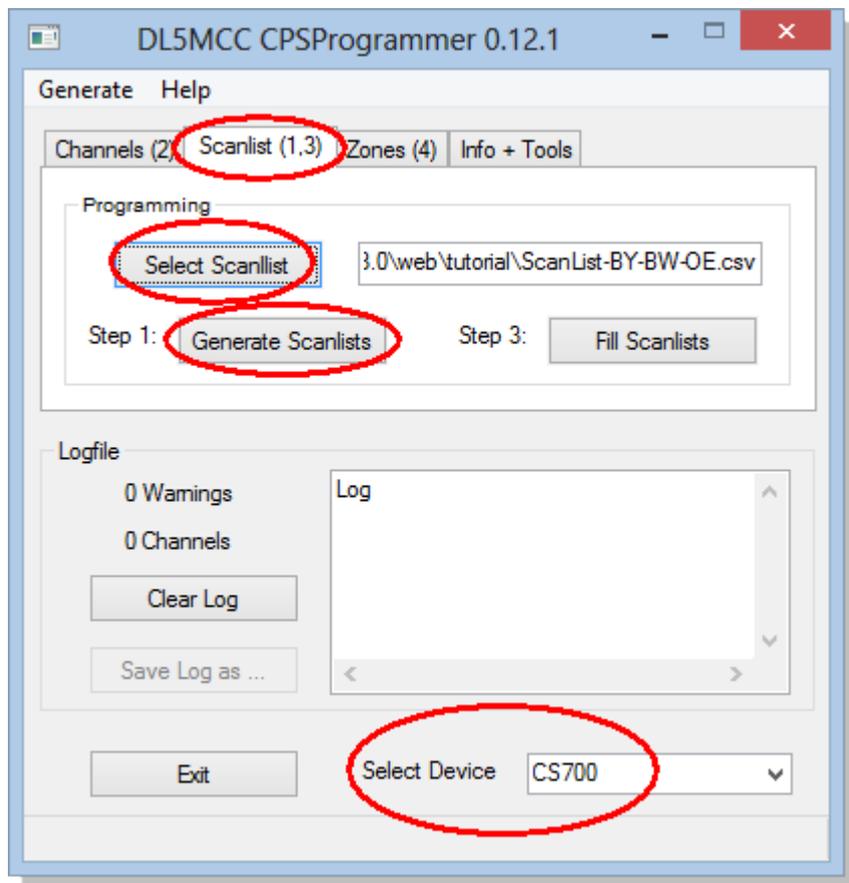


Figure: Generating empty scanlists

4.2. Writing Channels

As we have just created our scanlists, now we are well prepared to programme our channels. To do so, switch to your CPS and select Channel Information by clicking on the last channel in the list. Now, it should look like in the picture below.

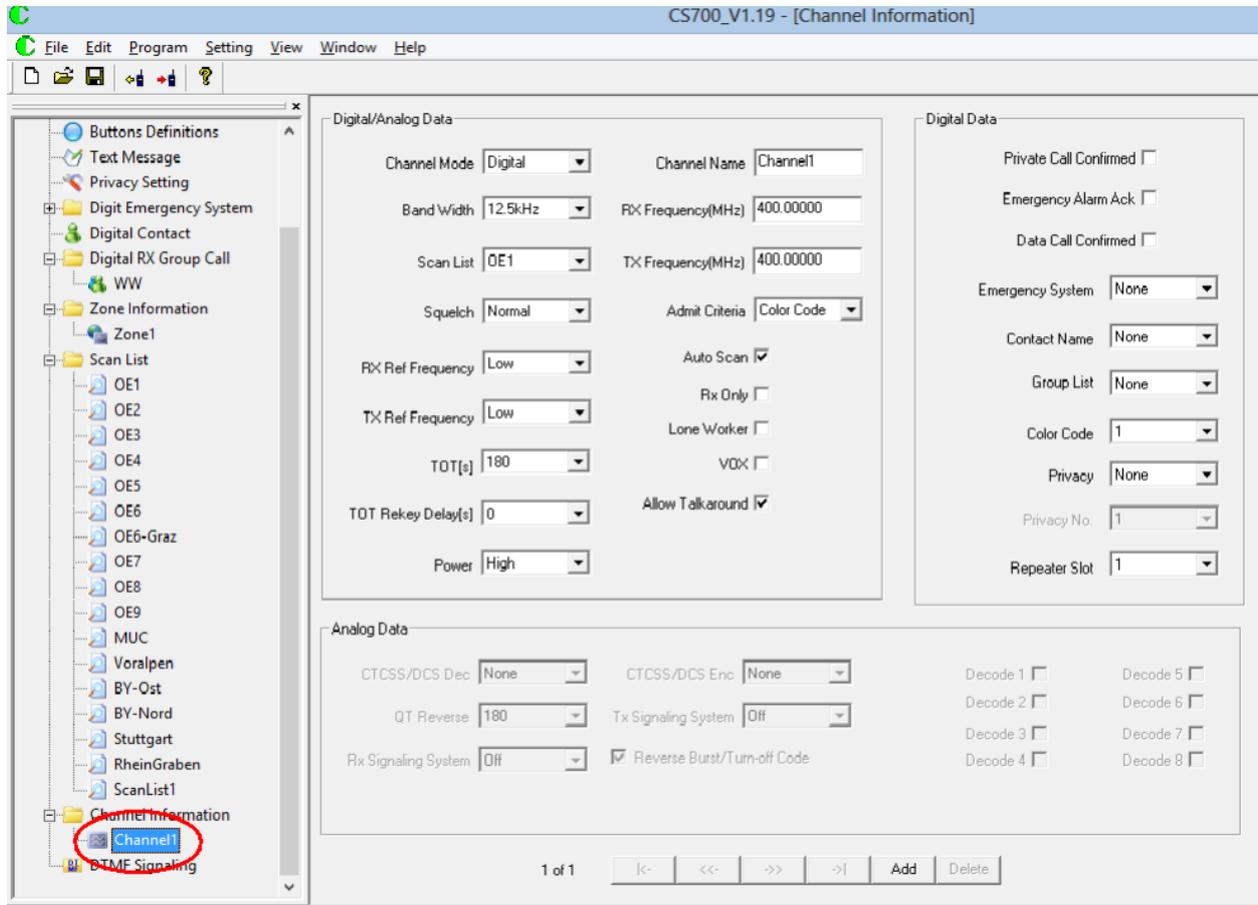


Figure: CPS with prepared Scan Lists and Channel Information opened

Switch back to CPSProgrammer now and select tab (2) Channels. Continue with selecting the required channellist by clicking „Select Channellist“. For this tutorial, select „ScanList-BY-BW-OE.csv“.

Now we are ready to write our channels. Just click on „Write Channels“. The CPSProgrammer starts writing all channels, defined in the CPS. After a while, CPSProgrammer should report the result from the programme run.

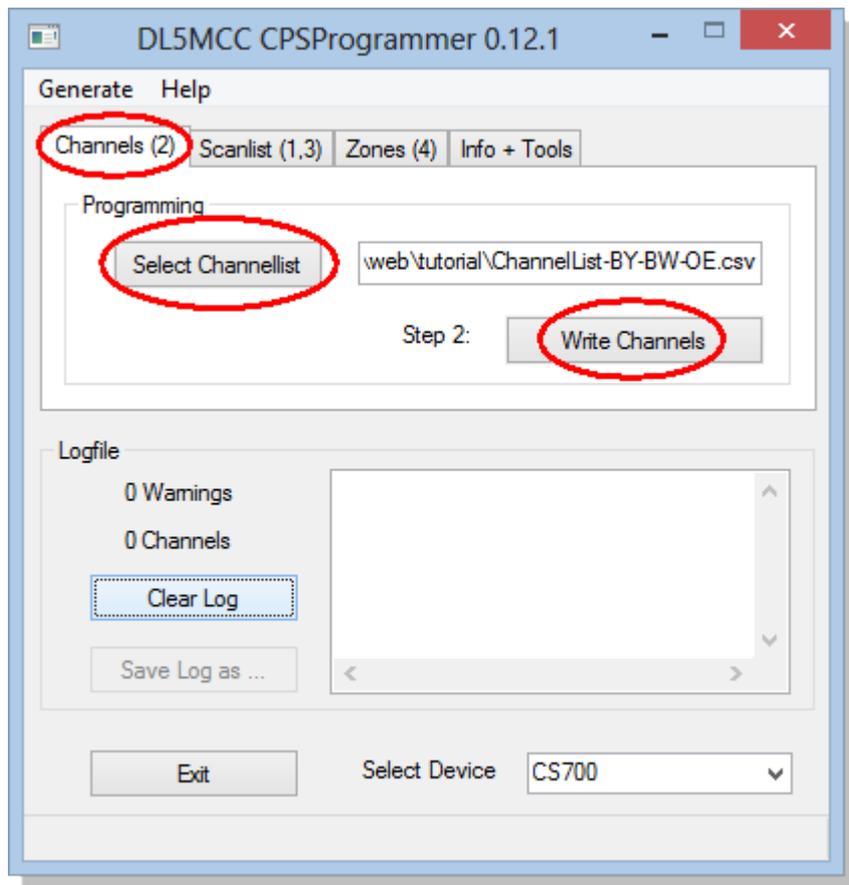


Figure: Programming Channels

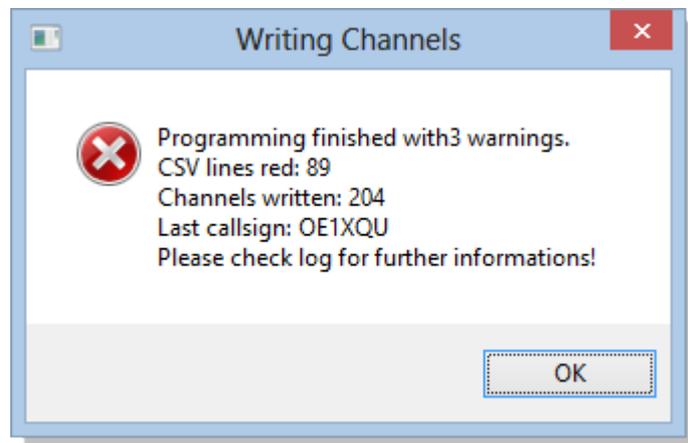


Figure: CPSPProgrammer reporting the results of the last run.

In this example, we get 3 warnings and therefore check the log to get more information. The first warning is shown in the picture below. CPSPProgrammer has found a TX frequency outside the band limits, defined in the ini-file. In this case, the shift provided in the database is going into the wrong direction.

Warnings can be caused by out-of-band TX frequencies, missing or misspelled RXGroups, Scanlists, TXContacts (talk groups) or any other settings which can not be selected.

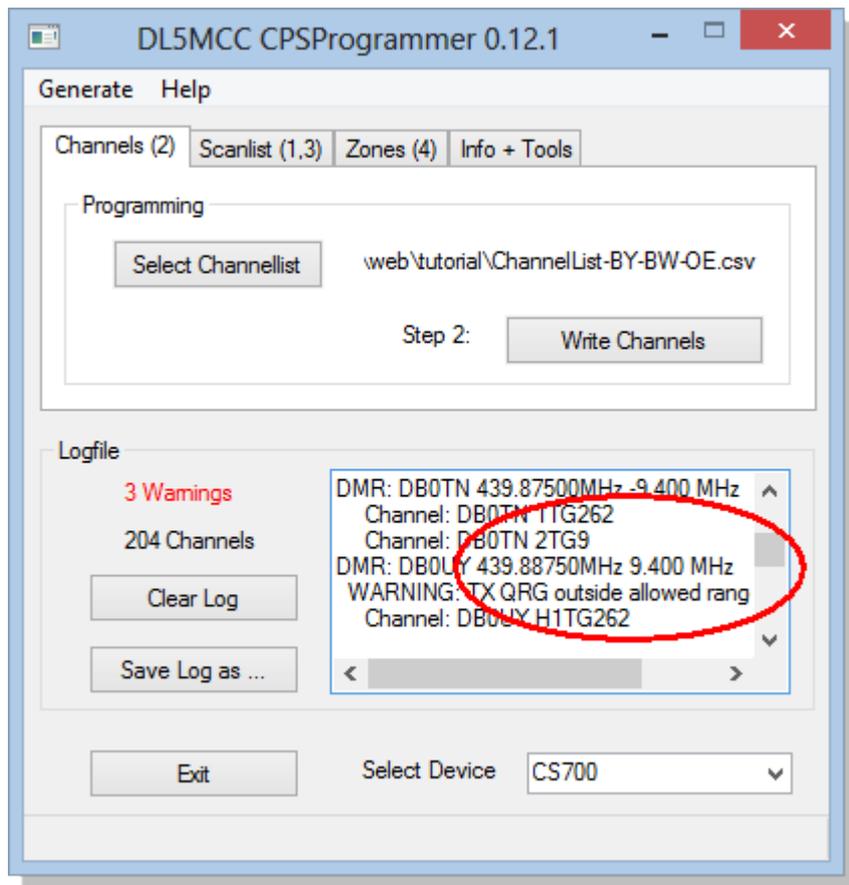


Figure: Example for a warning, generated by CPSPProgrammer

Hint: The allowed frequency range for transmitting is defined in the ini-file, which can be edited with any text editor. If any transmitt frequency is out of band, CPSPProgrammer will create a warning.

4.3. Filling Scanlists

Once we have programmed our channels, we are able to fill our scanlists, we have created before. To prepare this, switch back to your CPS and open the scanlist the CSV is starting with. Then switch back to CPSPProgrammer, select tab (3) Scanlist and click „Fill Scanlists“.

CPSPProgrammer will ask you to select the first scanlist found in the CPS, to make sure you have selected the right one. If you have selected the requested scanlist, just click ok to start filling.

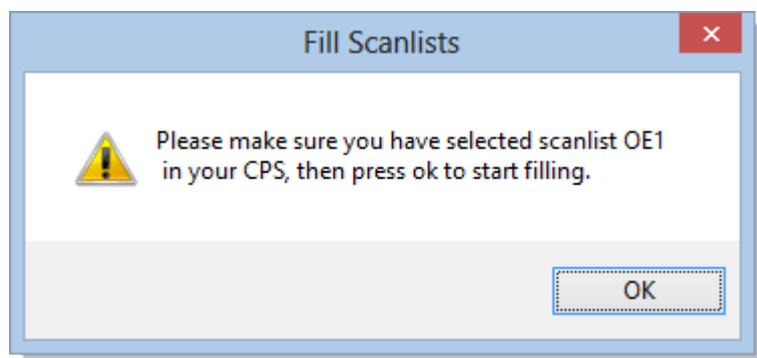


Figure: CPSPProgrammer asking for the scanlist to start from

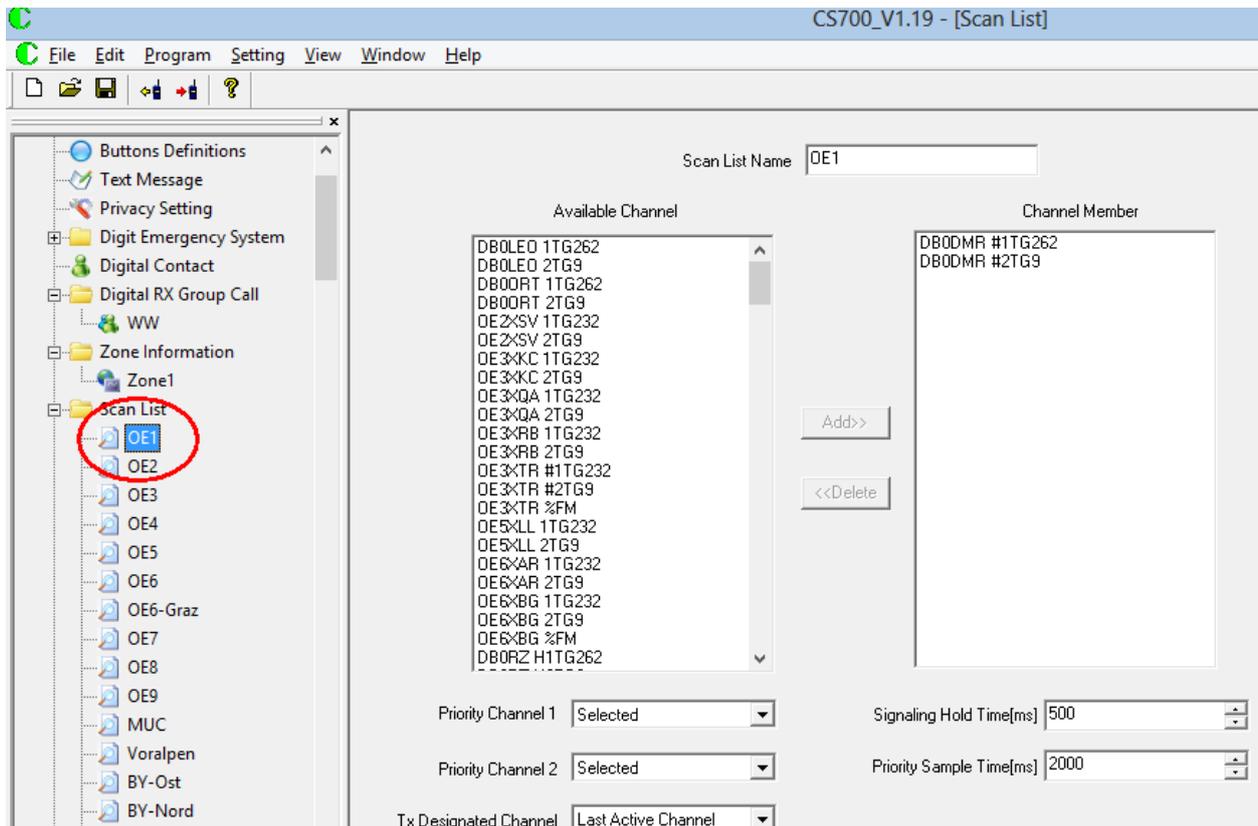


Figure: Make sure you have selected the requested scanlist

Again we get some warnings after programming. In this case, some channels were not found below the available channels, as we (intentionally!) forgot to define them in our “channels.CSV”.

4.4. Programming Zones

As a last step, we now going to programme our zones from a “zones.CSV”. To prepare this, switch to your CPS and select the last zone available.

Switch back to CPSProgrammer and open tab (4) zones, then click „Select Zonelist“ to open the required “zonlist.CSV”. For the tutorial use „ZoneList-BY-BW-OE.csv“.

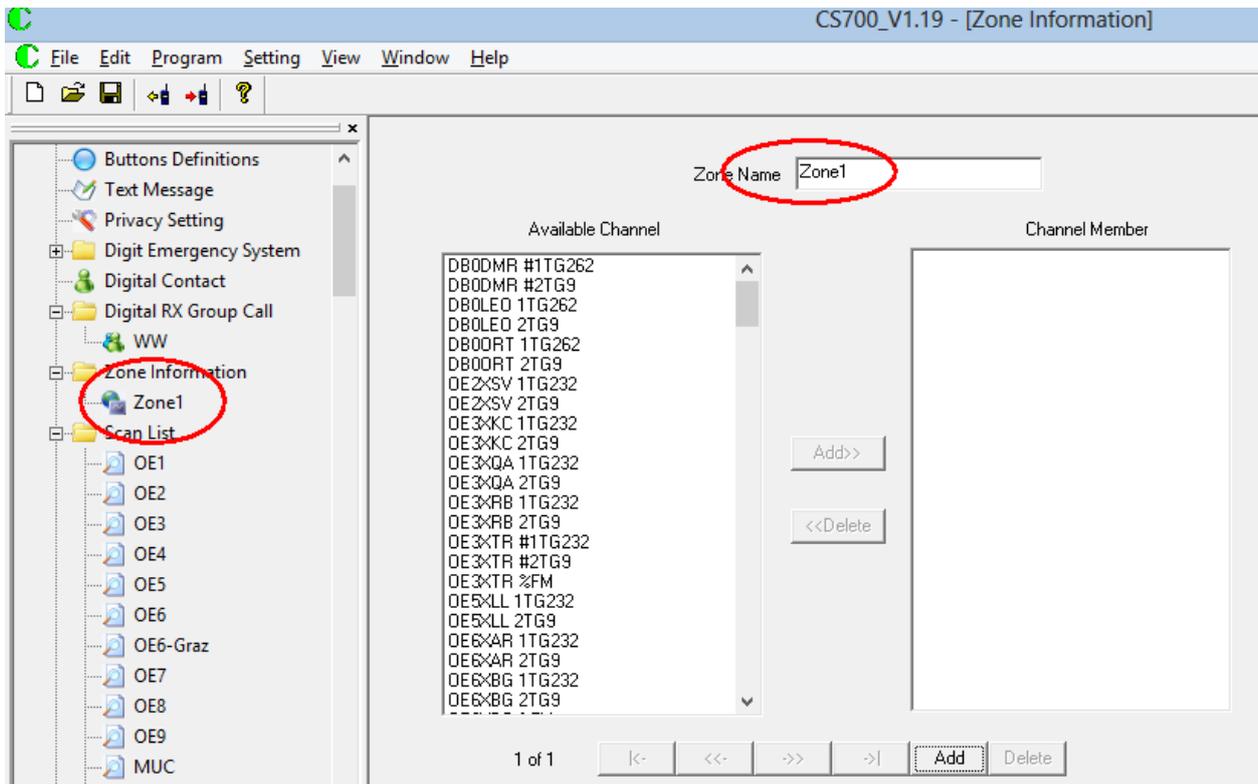


Figure: Open the last zone in Zone Information

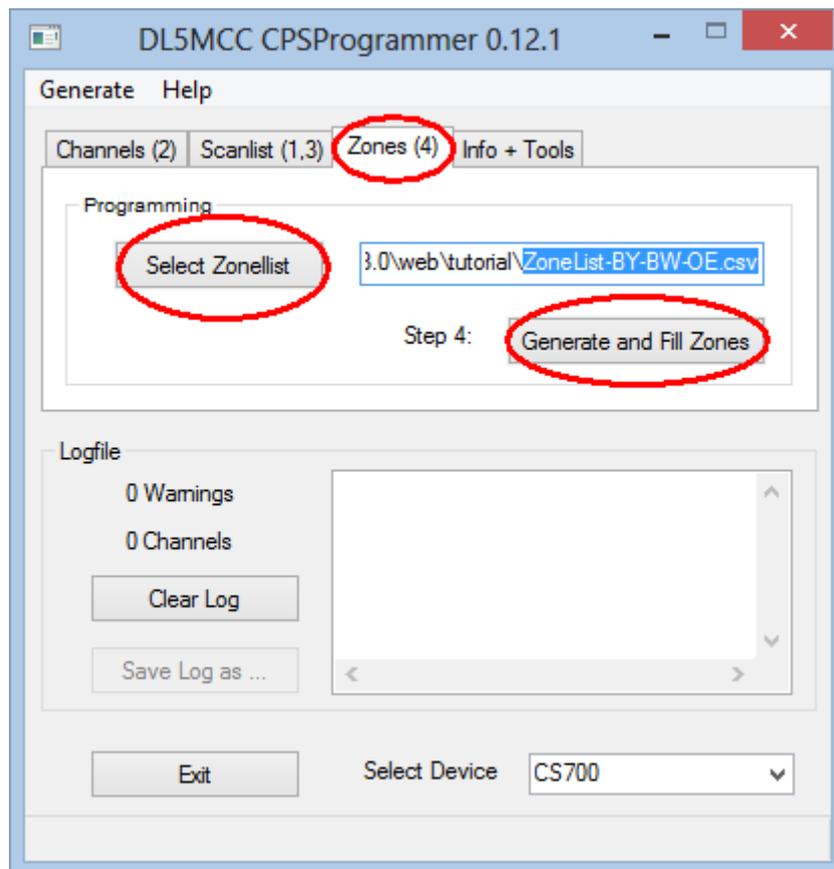


Figure: Programming zones

Finally we are ready to generate and fill our zones. Just click on „Generate and Fill Zones“. The CPSProgrammer starts generating and filling all zones, defined in the CVS. Being finished, CPSProgrammer will report the result and warnings.

With the CSVs provided with this tutorial, we again get 3 warnings due to missing channels in the codeplug. This is just to show, that CPSPProgrammer is able to detect missing or misspelled data sets.

That's it, you have just programmed your first codeplug using CPSPProgrammer