

Weekender Easy Upgrade

A couple of years ago I published an article where I presented a VHF/UHF FM transceiver that was based on the DRA818 module. This transceiver was named “Weekender” since it can be built from a kit typically over one weekend. There are many Weekender users around the globe and most of them were disappointed because they could not change the repeater data easily to use the Weekender with their local repeaters. Although the Weekender’s source code was available on my web page I also realized that not all Weekender users are familiar with programming AVRs.

To address this problem Marko, S56FGS has written a small piece of PC software, which enables Weekender users to easily enter any HAM Frequency, Channel Name, Repeater Name, TX CTCSS and Shift into the radio. The Weekender will require an extensive firmware upgrade so that it can now “talk” to Marko’s PC software. We have made this easy for you.

To program frequencies successfully we have to be sure that the Weekender’s AVR has the latest firmware. This new firmware now adds a special “LOAD CHANNELS” option in the program that will allow it to communicate directly with Marko’s PC software. Older versions of Weekender programming do not have this option and will not be able to communicate with Marko’s software.

For advanced Weekender users I have uploaded HEX versions of new firmware that can be programmed into the ATmega328 on board the Weekender. For Weekender users that are not equipped with an AVR programmer, I have preprogrammed AVRs available on the website which are loaded with the new firmware.

Hardware requirements & connections

We wanted to make this as easy as possible for you so we kept programming and hardware changes to a minimum. You will only have to make a minor change to the Weekender in order to upgrade the firmware and successfully program your own frequency/channel list into the Weekender.

To do the upgrade you’ll need one of the following:

- Preprogrammed Arduino Nano
- USB to UART adapter.

Most of us have a spare Arduino Nano laying around in the drawer.

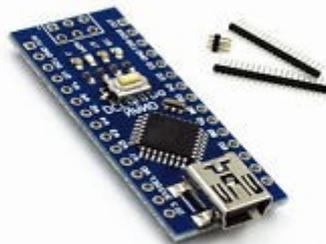


Figure 1: Arduino Nano

Using a USB cable, program a Nano with the Arduino_UART.ino that you will find on the Yahoo Weekender Group or Weekender GITHUB. This will enable your Arduino Nano to become a USB to UART adapter with a fixed communication speed of 1200 baud.

While this can be done as you see fit, in our example we will use 4 wires with male pins on both sides like shown in Figure 2:

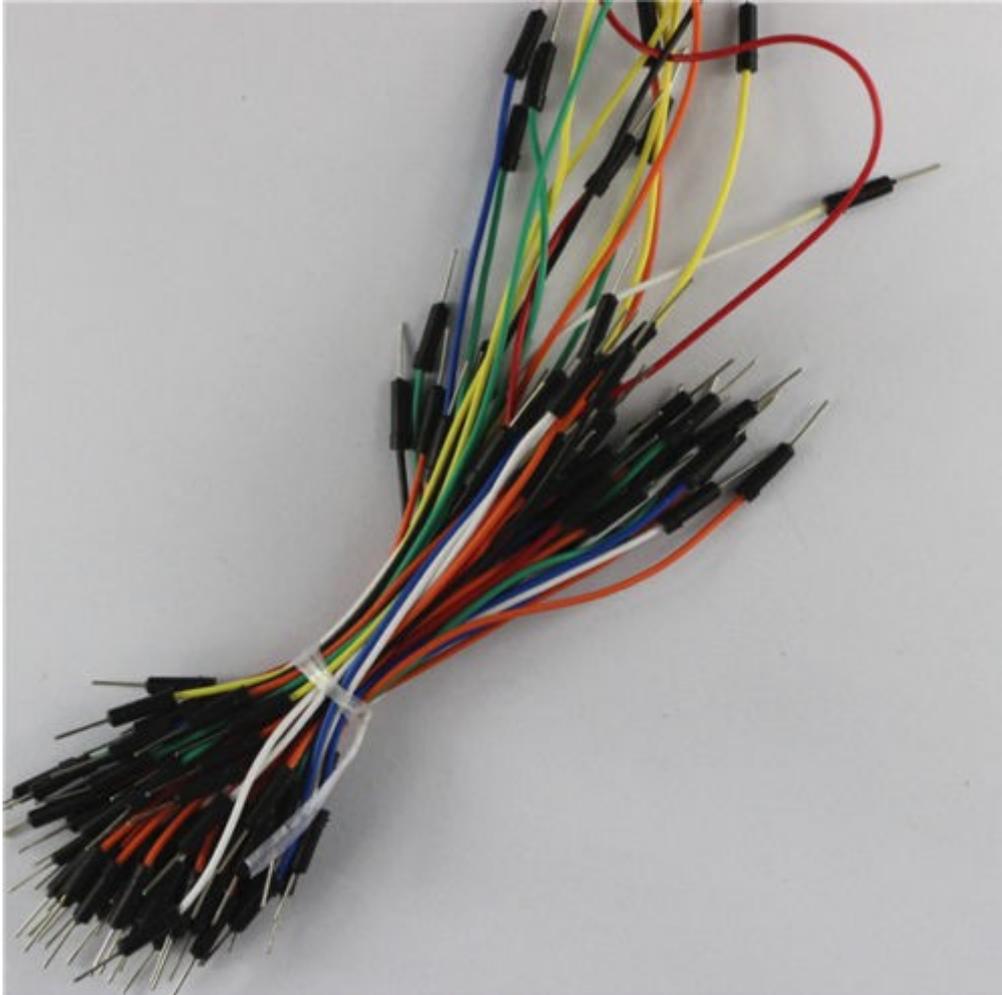


Figure 2: Male to male wires

Solder 4 wires to the Arduino Nano on pins 5V, GND, D6 and D7 as shown in Figures 3 and 4.

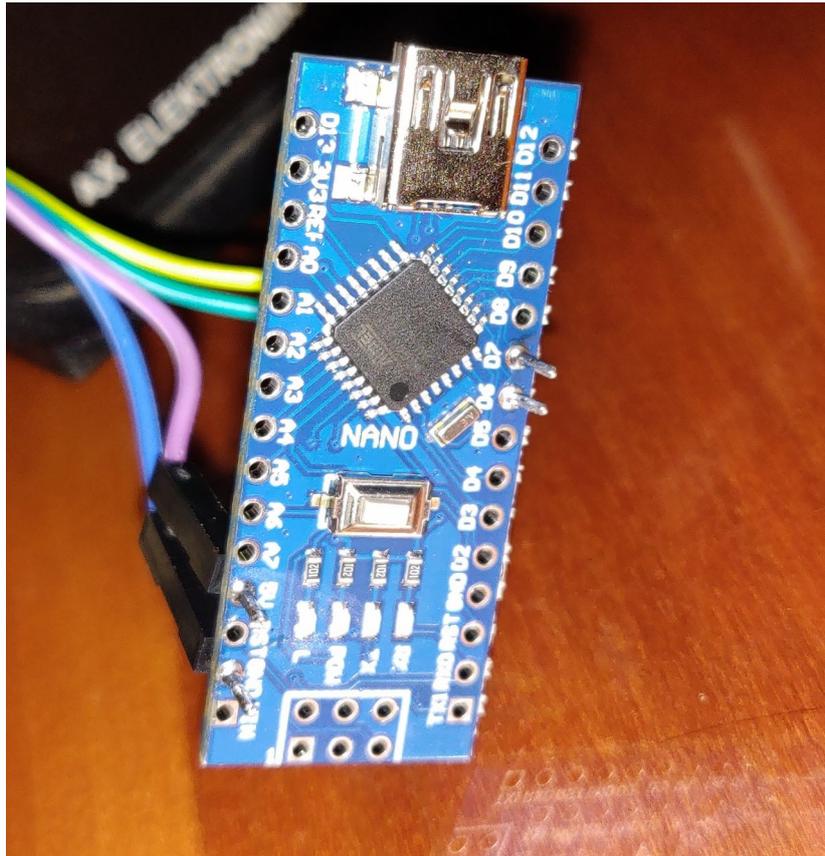


Figure 3: Arduino Nano (top view)

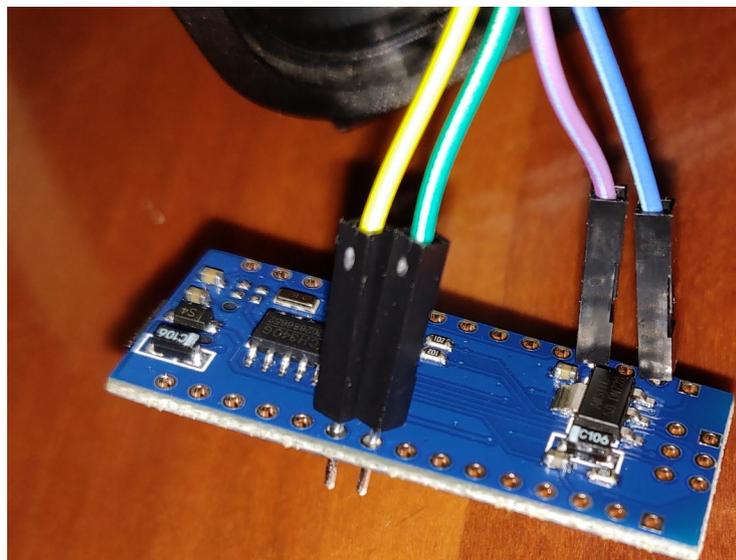


Figure 4: Arduino Nano (bottom view)

Before you make any connections to the Weekender I strongly recommend that you turn it's power off completely and disconnect all power cords – not only +12V, but also any GND connections too!

Open the Weekender's cover and place the wires into the programming sockets (CON 3) as seen on Figure 5.

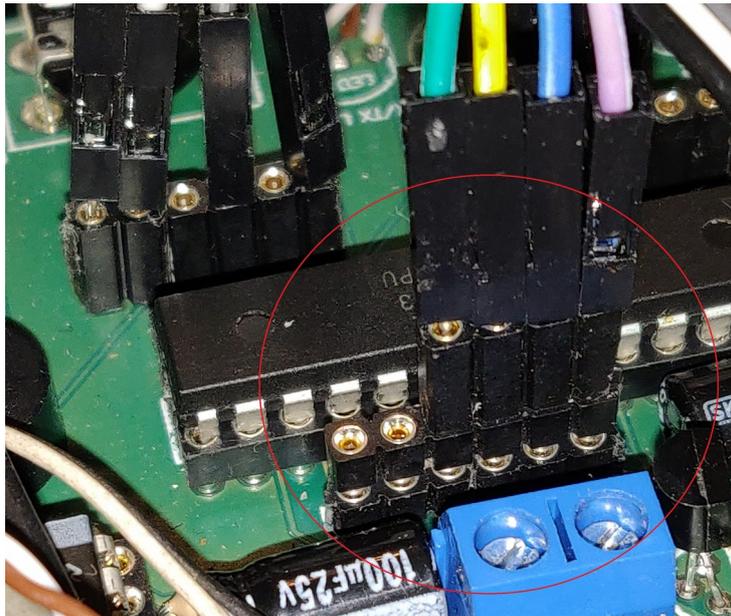


Figure 5: Inside the Weekender the VCC pin is on the far right at CON3 nearest the DRA818

I have soldered a 6-pin female header which can be used for regular programming. You may not already have that but if you plan to play with the Weekender more often I suggest to solder a 6pin header on the board at CON3. You may chose male or female headers depending on what you would like to use.

Note the red circle showing how to connect the 4 wires to the programming header. To make it easier see the schematic of the programming header below for clarification.

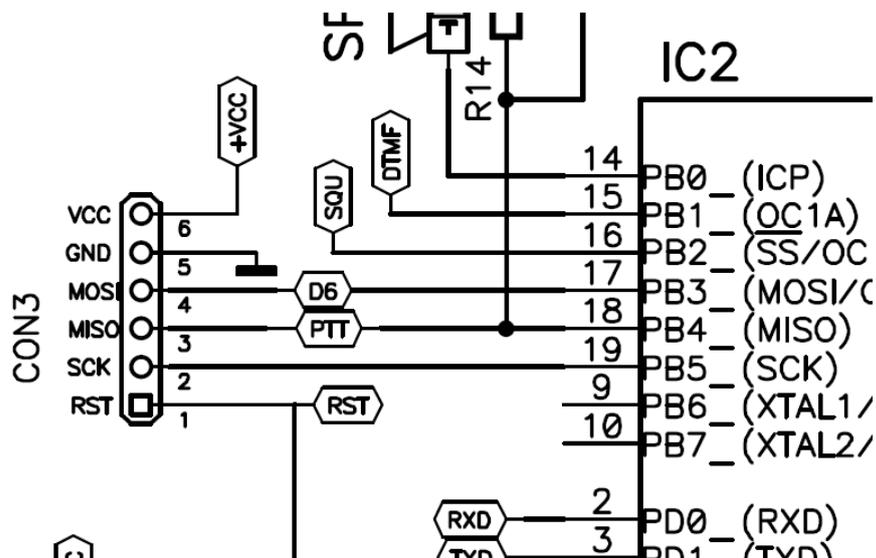


Figure 6: Schematic diagram of the programming header.

Note: When upgrading firmware via a Pocket AVR Programmer or similar device it is necessary to use all 6 connections on CON3 or else you will be unable to communicate with the ATMega328. For channel programming via Nano or USB UART adapter, only connections 3-6 are necessary.

Our Arduino was connected to Vcc, GND, MOSI and MISO pins as seen in the Table 1.

Arduino pins	5V	GND	D7	D6
USB to UART	Vcc	GND	Tx	Rx
Con3 pins	Vcc	GND	MOSI	MISO

Table 1: Connections of Arduino to programming connector CON3

If you prefer a USB to UART adapter you may use that as well. You can purchase it at our Webshop or elsewhere on the web. Make sure that you connect Vcc, GND, Tx and Rx as seen in Table 1.

PC Program and Channel Programming

Using Marko's PC software is very straight forward. You can Load file with pre-written channels, frequencies and TX CTCSSs. Files are in CSV format. Sample file can be downloaded from the Weekender Yahoo group or the Weekender Github page. Or you can simply write frequencies, channels, TX CTCSSs and Shift with a double click into to the desired field. Note that 600 kHz shift is entered as 0,600 as seen on the Fig.7. If shift is negative, you should use also minus sign, while at positive shift plus sign is not needed.

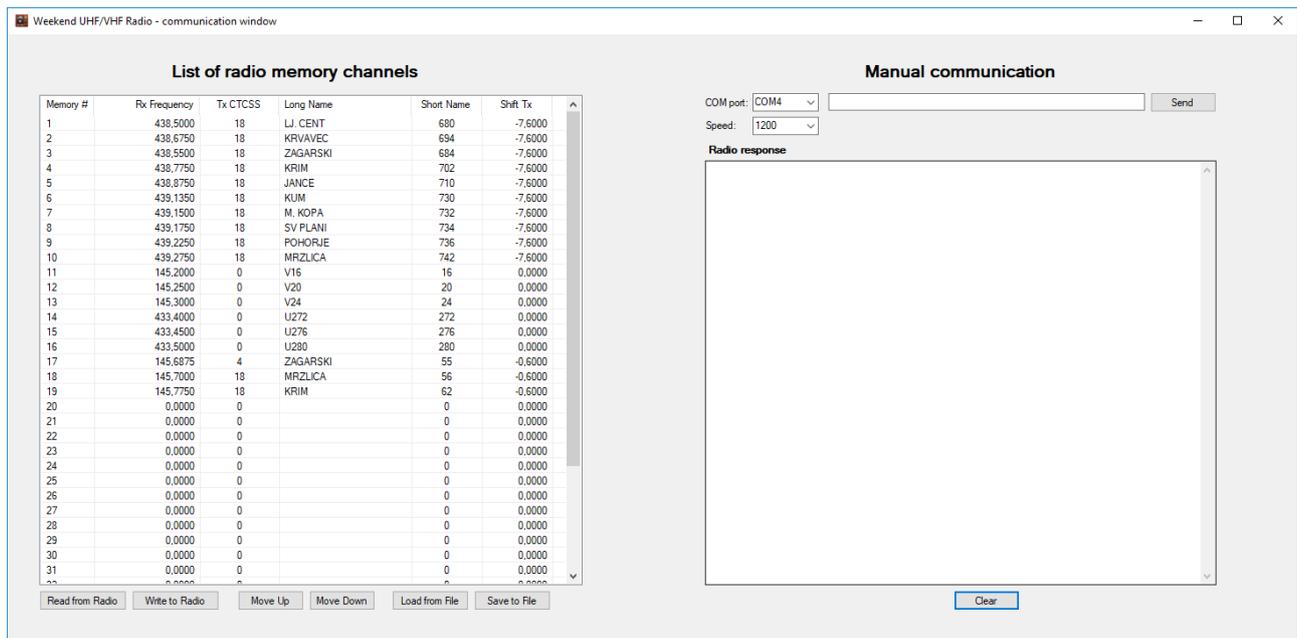


Figure 7: Marko's S56FGS PC Software for programming Weekender

With Move Up/Move Down Buttons you can easily navigate the page.

Use 1-38 in Table 2 when entering TX CTCSS into Marko's SW, **do not use the actual frequency.**

Table 2: CTCSS tone chart

N°	Fréquence en Hz	N°	Fréquence en Hz
1	67,0	20	131,8
2	71,9	21	136,5
3	74,4	22	141,3
4	77,0	23	146,2
5	79,7	24	151,4
6	82,5	25	156,7
7	85,4	26	162,2
8	88,5	27	167,9
9	91,5	28	173,8
10	94,8	29	179,9
11	97,4	30	186,2
12	100,0	31	192,8
13	103,5	32	203,5
14	107,2	33	210,7
15	110,9	34	218,1
16	114,8	35	225,7
17	118,8	36	233,6
18	123,0	37	241,8
19	127,3	38	250,3

Weekender setup

You may have been used to many menu choices in the Weekender:

1. VHF/UHF simplex
2. VHF/UHF repeaters
3. Echolink
4. Free-set frequencies
5. PMR channels
6. Setup menu.

This has now been changed. The first two menus were joined together because Marko's program now includes both simplex and repeaters channels. Also, US Echolink repeaters are different than EU ones so we have two menus, one for the US and one for the EU:

US Menu:

1. VHF/UHF simplex & repeaters
2. Free-set frequencies
3. Setup menu.

EU Menu:

1. VHF/UHF simplex & repeaters
2. Echolink
3. Free-set frequencies
4. PMR channels
5. Setup menu.

In the EU version firmware PMR channels have been increased from 8 to 16 PMR channels and the Setup menu has been changed. Within Setup menu I have added the menu option, **Load Channels**.

When you're ready to write the data to your Weekender connect the Arduino (or Serial to UART adapter) to your Weekender and then to the USB port of your PC (not vice versa!). In System/Device Manager of your PC check to see which COM port has been assigned to the Arduino (or Serial to UART adapter) and select that COM port in Marko's SW and LSO select 1200 baud. In the Weekender select Setup Menu, select LOAD CHANNELS & press encoder to enter that selection. Now in the PC software select Speed 1200 and click Write to Radio.

The PC should now be transferring data to your Weekender radio. After few moments your radio will be ready for use. Disconnect Arduino (or Serial to UART adapter) and enjoy using your Weekender.

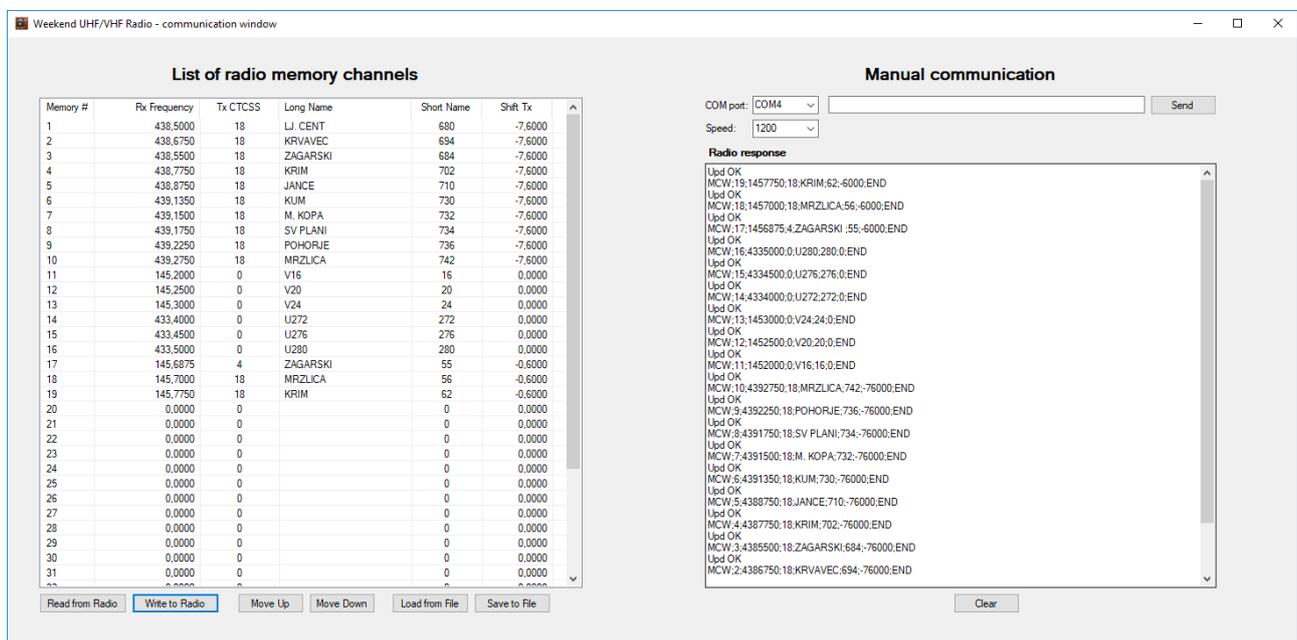


Figure 8: Newly programmed frequencies

I have opened a [Github repository](#) for the Weekender software upgrades and also for CSV channel spreadsheets that you might want to share with other Weekender users. These files can be accessed at the [Weekender Yahoo group](#). This group requires registration.

I want to credit Marko, S56FGS for writing that nice PC SW which enables simple frequency and other data to be transferred to the Weekender. Also I'd like to credit Curt, KC3HJP who provided a lot of useful information about US repeaters and did a lot of Weekender firmware testing.

73 de S52CQ, Jure