

- PMSDR -

Software Defined Radio

16/10/2009



User Guide

- *PMSDR* -

Software Defined Radio

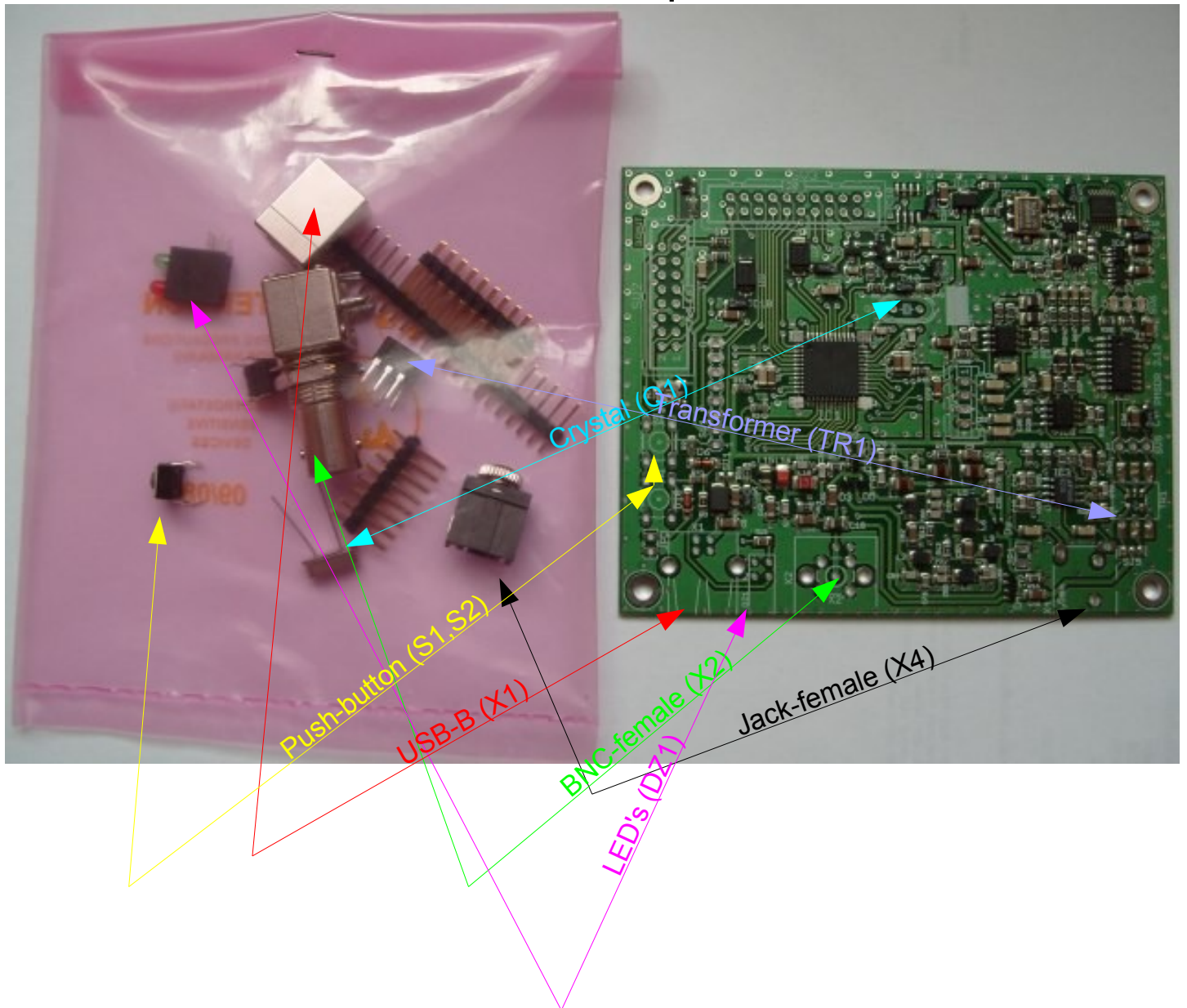
1. Introduction - Assembly Overview
2. First Step Installation
3. Setup Guide to use the PMSDR
with WinRad

- PMSDR -

Software Defined Radio

1. Assembly overview

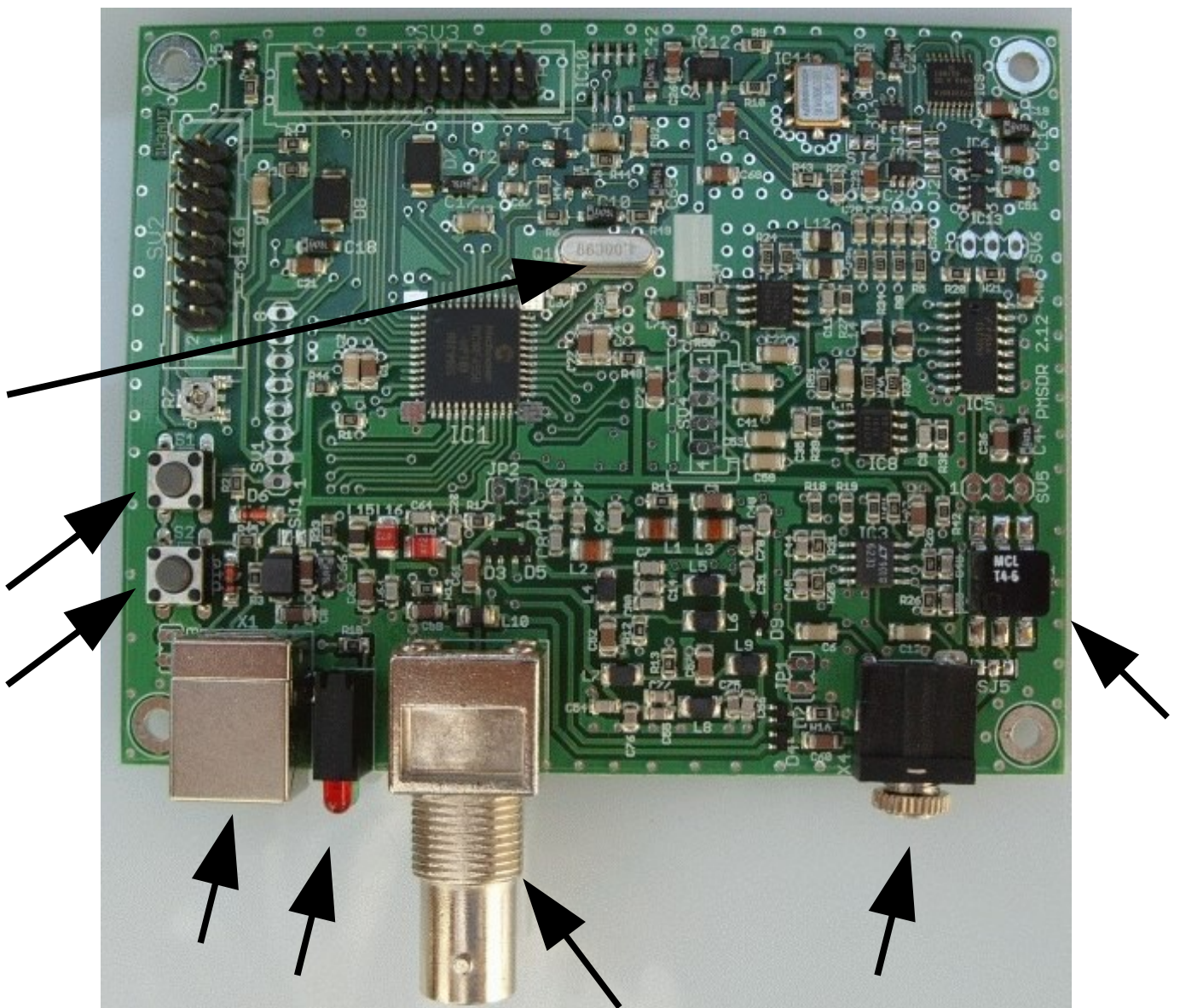
- PMSDR Kit parts -



User Guide

- PMSDR - Software Defined Radio

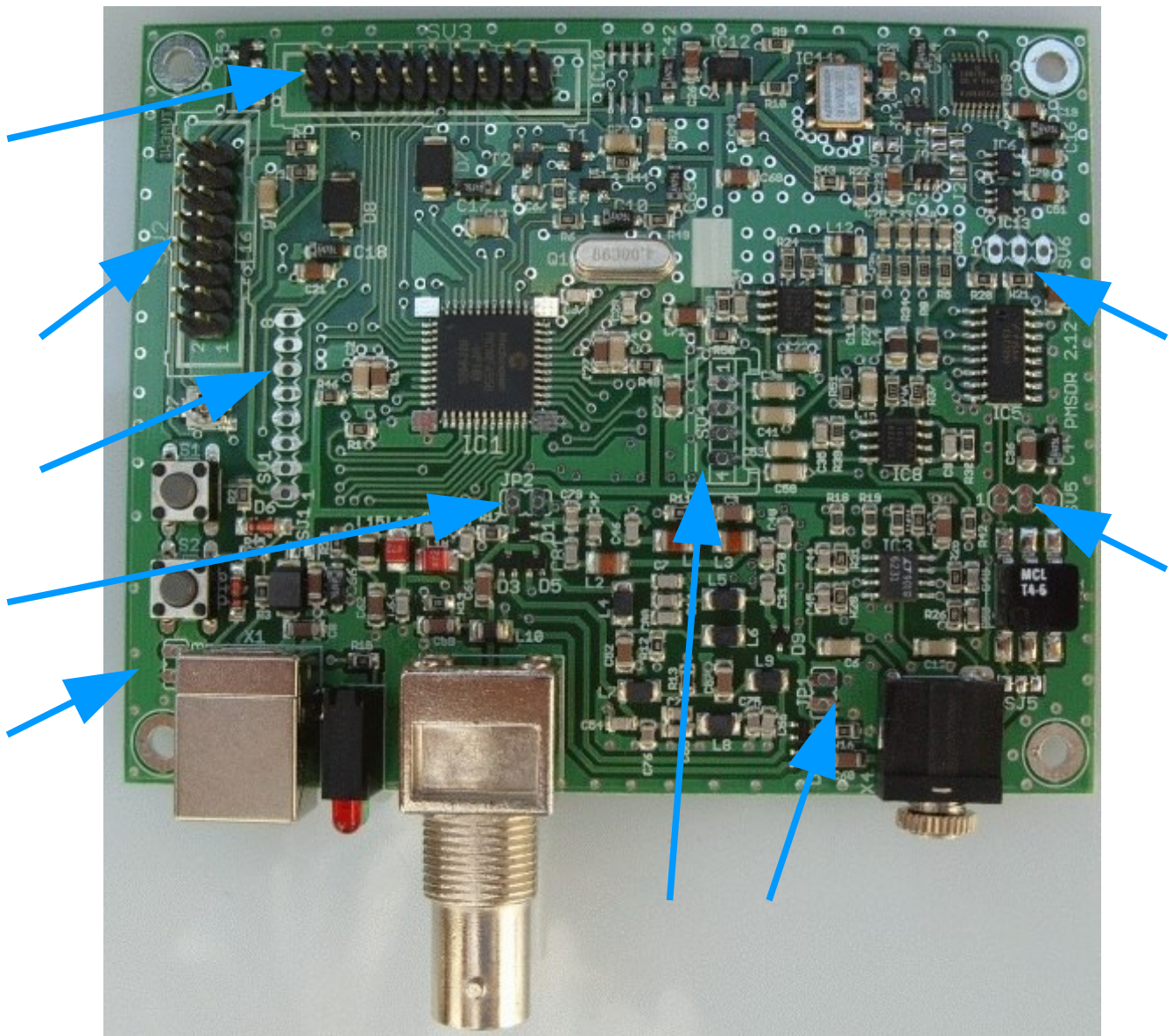
Assembled board overview 1



User Guide

- PMSDR - Software Defined Radio

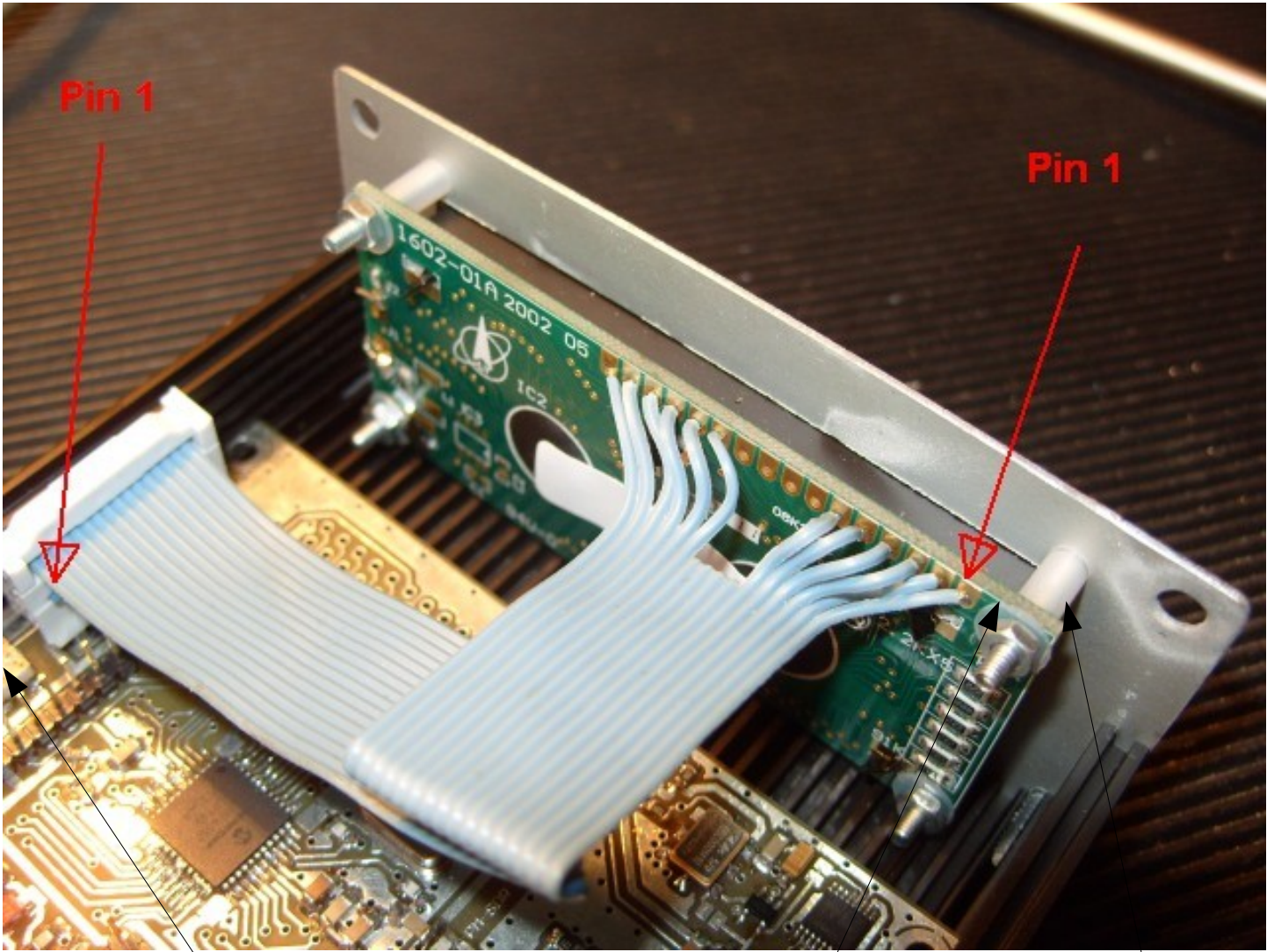
Assembled board overview, options pin header



User Guide

- PMSDR - Software Defined Radio

LCD option assembly overview



LCD contrast set
trimmer

Insulation washer

Spacer

User Guide

- PMSDR - Software Defined Radio

Minimal PC/System required features:

AMD Athlon / Pentium4 1.4 Ghz

256 Mbyte RAM

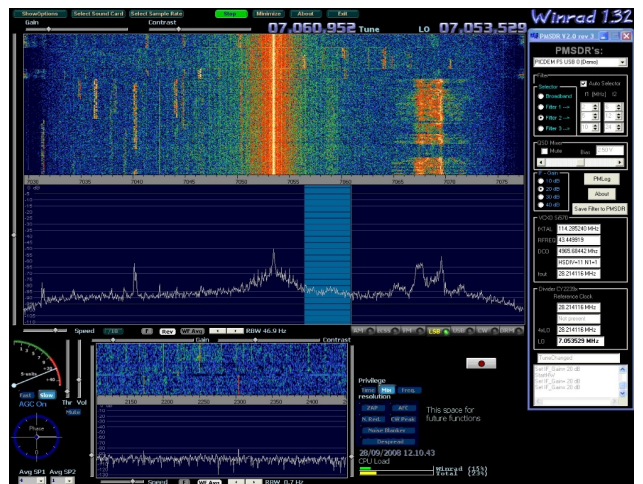
USB1.0 or USB2.0

Soundcard with Stereo Line-Input

Video resolution: 1024x768

OS: Windows XP or VISTA

Antenna



Soundcard
Line In

USB



User Guide

- **PMSDR** -

Software Defined Radio

Brief overview of installation:

Installation requires a USB (Type A to Type B) cable and a stereo audio cable with 3.5 mm plugs on both ends.

Step 1: Installation of driver software. This is initiated by connecting the PMSDR to a USB port on the computer, and should be automatic or nearly so (see Slides 7 and 8). Check for proper installation in Device Manager under „Custom USB Devices“ for „Microchip Custom USB Device,“ which should be operating properly (see Slide 11).

Step 2: Installation of viewing SDR-software (see Slide 12, which addresses specifically WinRad Ver. 1.32). Versions of WinRad are available on Google (q.v.). Normally, Windows will install WinRad to the directory

„ C:\Program Files\WinRad.“

and you may wish to install a *shortcut* to the software on the desktop. Please note that additional software must be added **to this installation directory**.

Step 3: Addition of dll and other files to the installation directory. You can find the latest version here: <http://www.iw3aut.altervista.org/downloads.htm>

Step 4: Launching of the viewing software (see Slides 12-20) and selection of the PMSDR.

Step 5: Choice of sampling rate (determines bandwidth), frequency, mode, and other details is made from the drop-down menus in the viewing software or using the menus on the dll (see Slides 13, 21 - 23).

User Guide

- **PMSDR** -

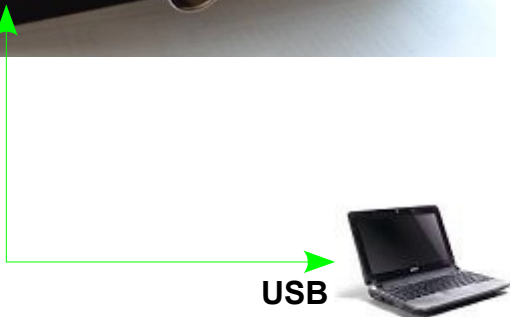
Software Defined Radio

2. First Step Installation

- Connect the PMSDR to the PC with a USB cable



After you have connected the PMSDR and your PC with a USB-Cable, the green LED will be „ON“ to show that the PMSDR is powered.



- **PMSDR** -

Software Defined Radio

2. First Step Installation

- Detect the USB Device



After you have connected the PMSDR to your PC with the USB-Cable, Windows will play the classic „ding dong“ sound (USB device detected).

USB



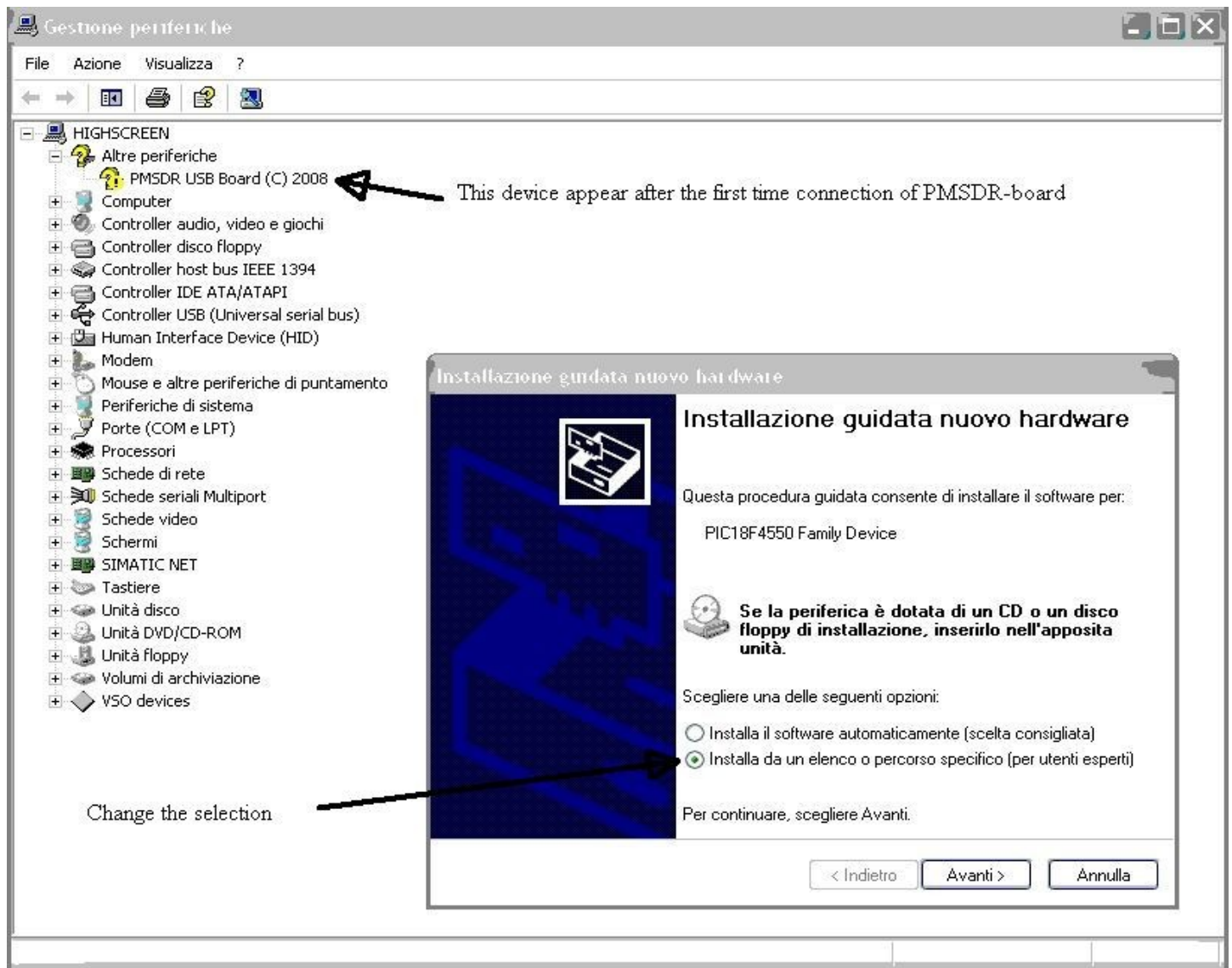
User Guide

- PMSDR -

Software Defined Radio

2. First Step Installation

- New hardware was detected; install the Microchip-USB Driver
- Get the USB-Drivers here:
http://www.iw3aut.altervista.org/files/MCHPUSB_Driver.zip
- Copy the content of this Zip-Archive to your local drive (C:)



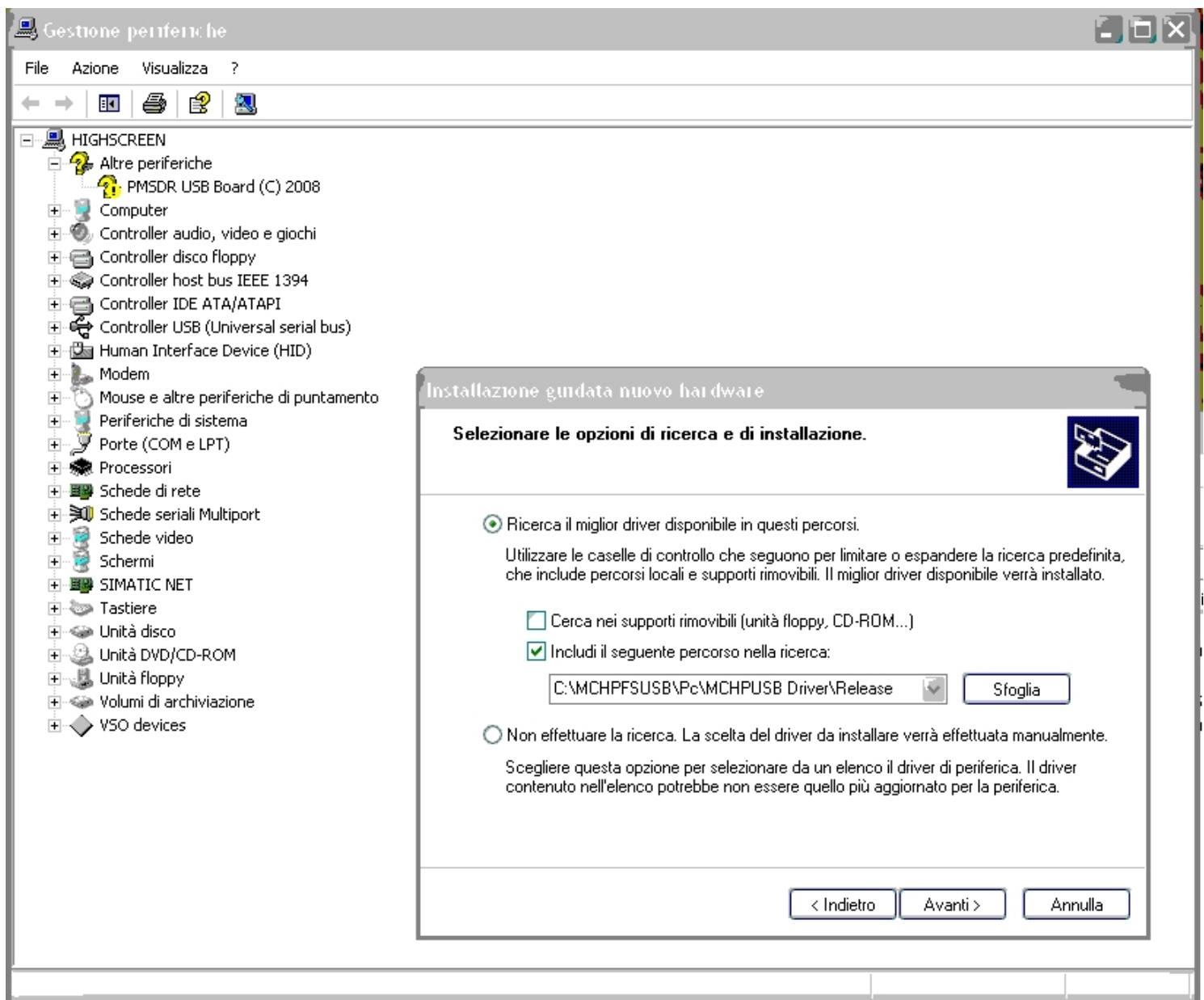
User Guide

- PMSDR -

Software Defined Radio

2. First Step Installation

- Choose the path where drivers are installed in previous step:



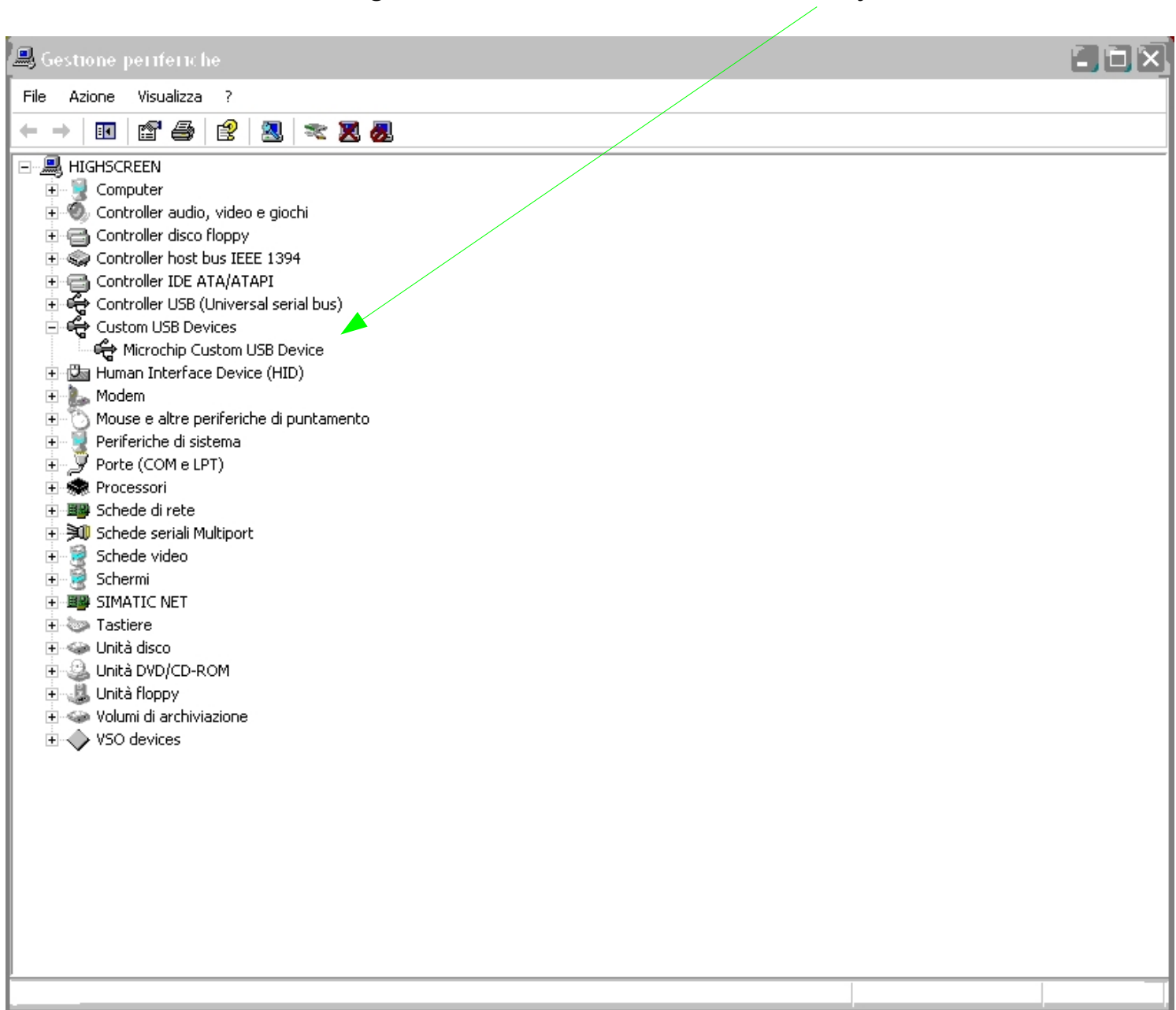
User Guide

- PMSDR -

Software Defined Radio

2. First Step Installation

- If the driver installed correctly, you will see a „Microchip Custom USB Device“ in Device Manager, and the PMSDR will be ready to use:



User Guide

Setup Guide for WinRad & PMSDR

1. Start WinRad and select the Input Device „PMSDR“:

The screenshot shows the WinRad 1.32 software interface. The 'Select Input' menu is open, and 'PMSDR' is highlighted. A blue callout box points to this menu entry with the text: "This menu entry „PMSDR“ is visible only if the PMSDR is connected to the USB port before you start WinRad." The interface includes a frequency display at the top showing 51,997,313 Tune and LO 51,984,000. The main display area shows a spectrum plot with a vertical blue bar at 52,000. The bottom panel contains various controls like Speed, Gain, Contrast, and a Privilege section with buttons for ZAP, AFC, N. Red., CW Peak, Noise Blanker, and Despread. The status bar at the bottom shows the date and time 12/03/2009 22.55.19 and CPU Load information.

Setup Guide for WinRad & PMSDR

2. The Control panel for the „PMSDR“ will now appear:

Version of DLL

The screenshot displays the WinRad 1.32 software interface. At the top, there are menu options: ShowOptions, Select Sound Card, Select Sample Rate, Start, Minimize, About, and Exit. The main display area shows a frequency spectrum plot with a central vertical bar. The frequency scale ranges from 51940 to 52030. The amplitude scale ranges from -88 to -124. The current frequency is 51,997,313 Hz, and the LO is 51,984,000 Hz. The PMSDR V2.1 rev 5 control panel is visible on the right side, featuring a Filter section with Pass through, Filter 1, Filter 2, Filter 3, and LPF options. Below this is a Quick band selection table:

LW	MW	160	120	90	80	75
60	49	41	40	31	30	25
22	20	19	17	16	15	13
12	11	10	6			

The control panel also includes a Tune Step section with a dropdown menu set to Steps, and buttons for PMLog, About, and Save Filter to PMSDR. At the bottom, there are various control elements including a Speed slider (set to 710), a Gain slider, a Contrast slider, and a Phase meter. The bottom right corner shows system information: Privilege (Time, Mix, Freq. resolution), ZAP, AFC, N. Red., CW Peak, Noise Blanker, Despread, and CPU Load (winrad {2%}, Total {2%}).

Setup Guide for WinRad & PMSDR

3. Select the appropriate Sound Card input to which the PMSDR is connected:



Example: The PMSDR audio cable is connected to the stereo line input of the „Sound Blaster X-Fi“

Setup Guide for WinRad & PMSDR

4. Select the sample rate for your Sound Card:

The screenshot displays the Winrad 1.32 software interface. A 'Select Sample Rate' dialog box is open, showing a list of sampling rates for both Input and Output. The '48000' rate is selected for both. The main interface shows a frequency display at 51,997,313 Hz, a signal strength meter, and various control panels for gain, speed, and resolution. The software is identified as 'Winrad 1.32 by IZPHD with advice from WA6KBL'.

Winrad 1.32
by IZPHD
with advice from WA6KBL

51,997,313 Tune LO 51,984,000

Sampling rates

Input	Output
8000	8000
11025	11025
16000	24000
22050	
24000	
32000	
44100	
48000	
88200	
96000	
176400	
192000	

Close

Speed 7/10 Rev WF Avg RBW 46.9 Hz

Gain Contrast

Phase

Avg SP1 Avg SP2

64 1

Speed WF Avg RBW 10.8 Hz

Privilege Time Mix Freq. resolution

ZAP AFC This space for future functions

N. Red. CW Peak

Noise Blanker

Despread

12/03/2009 22.58.21

CPU Load

Winrad {0%}

Total {0%}

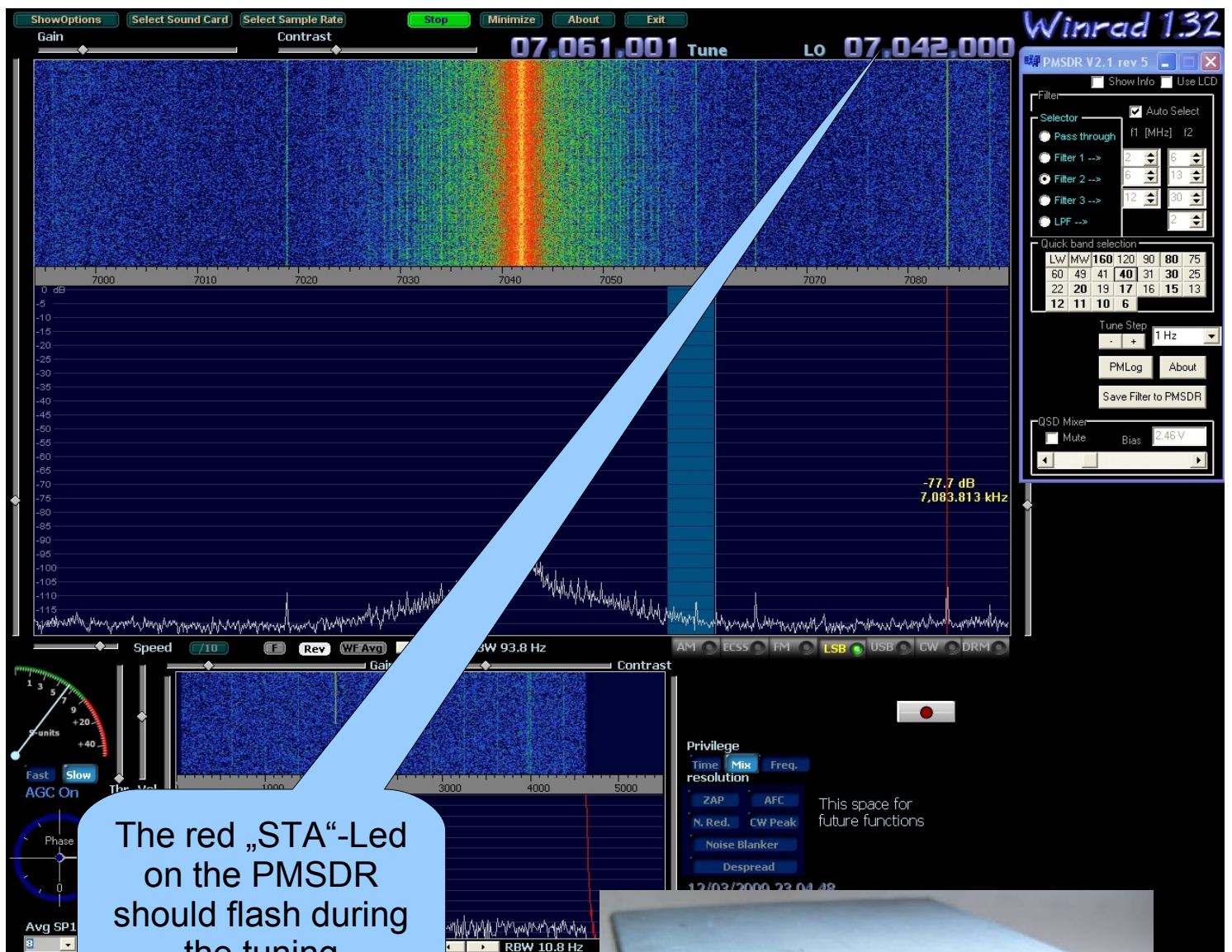
Setup Guide for WinRad & PMSDR

5. Select the input mode for your Sound Card:

The screenshot displays the WinRad 1.32 software interface. At the top, there are buttons for 'ShowOptions', 'Select Sound Card', 'Select Sample Rate', 'Start', 'Minimize', 'About', and 'Exit'. The main display area shows a frequency spectrum with a central peak at 51,997,313 Hz (Tune) and a lower limit at 51,984,000 Hz (LO). A 'Contrast' slider is visible above the spectrum. On the left, a menu is open, showing options for 'Select Input', 'Palette type', 'Window type', 'Lock Volume', 'High Process Priority', 'Normal Process Priority', 'WMME 16 bit drivers', 'ASIO 24 bit drivers', and 'Mode'. The 'Mode' submenu is expanded, showing 'Left Ch. only', 'Right Ch. only', 'Both channels added', and 'I (Left) / Q (Right)'. The 'I (Left) / Q (Right)' option is selected. Below the spectrum, there are controls for 'Speed' (set to 7/10), 'Rev', 'WF Avg', 'RBW 93.8 Hz', and 'Contrast'. At the bottom left, there are 'AGC On', 'Thr', 'Vol', and 'Mute' controls, along with a 'Phase' dial. At the bottom right, there are 'Privilege' and 'resolution' buttons, and a status area showing '12/03/2009 22:56:09' and 'CPU Load'. The bottom status bar shows 'Avg SP1', 'Avg SP2', 'Speed', 'WF Avg', and 'RBW 10.8 Hz'.

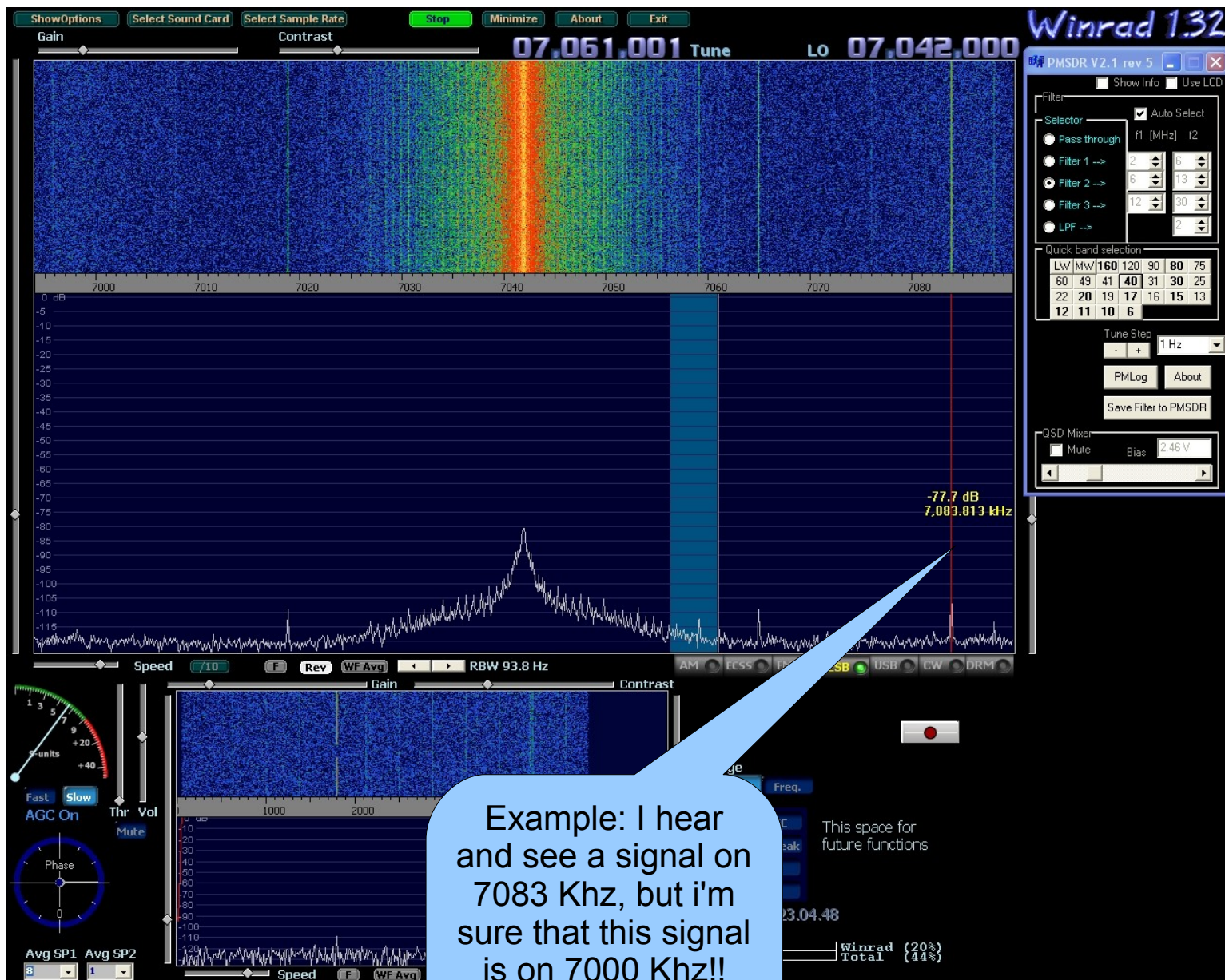
Setup Guide for WinRad & PMSDR

6. Check to see that the displayed frequency is correct:



Setup Guide for WinRad & PMSDR

6. Check to see that the displayed frequency on the spectrum is correct:



Setup Guide for WinRad & PMSDR

7. Swap the spectrum:

Winrad 1.32
by I2PHD
with advice from WA6KBL

51,997,313 Tune LO 51,984,000

Mode

- Left Ch. only
- Right Ch. only
- Both channels added
- I (Left) / Q (Right)**

Toggle „Swap I and Q“ to „swap“ the spectrum around the center.

Speed 7/10 Rev WF Avg RBW 93.8 Hz

Gain Contrast

AM ECSS FM LSB USB CW DRM

Privilege
Time Mix Freq.
resolution
ZAP AFC
N. Red. CW Peak
Noise Blanker
Despread

12/03/2009 22.56.09
CPU Load

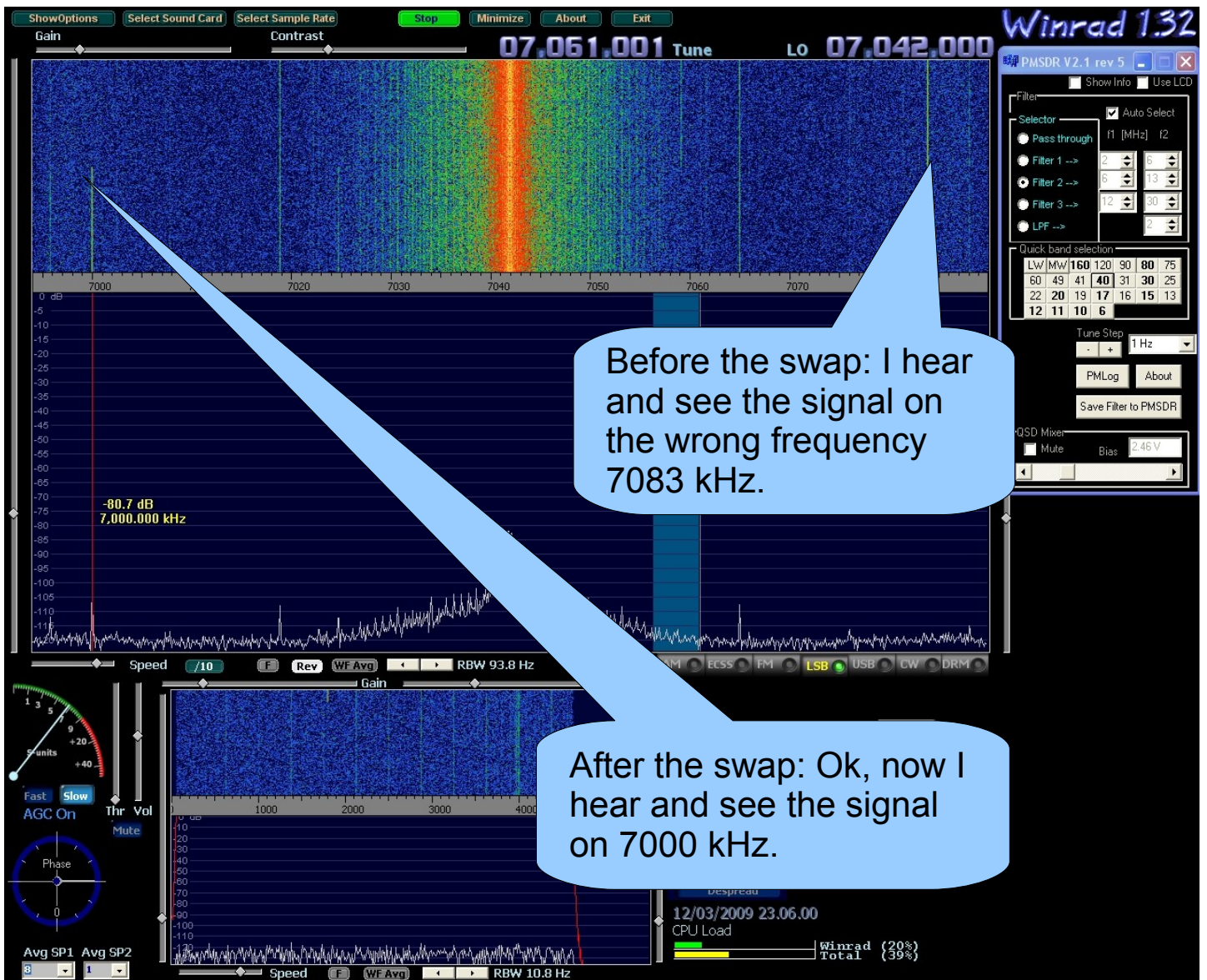
Winrad {0%}
Total {0%}

Avg SP1 Avg SP2
64 1

Speed WF Avg RBW 10.8 Hz

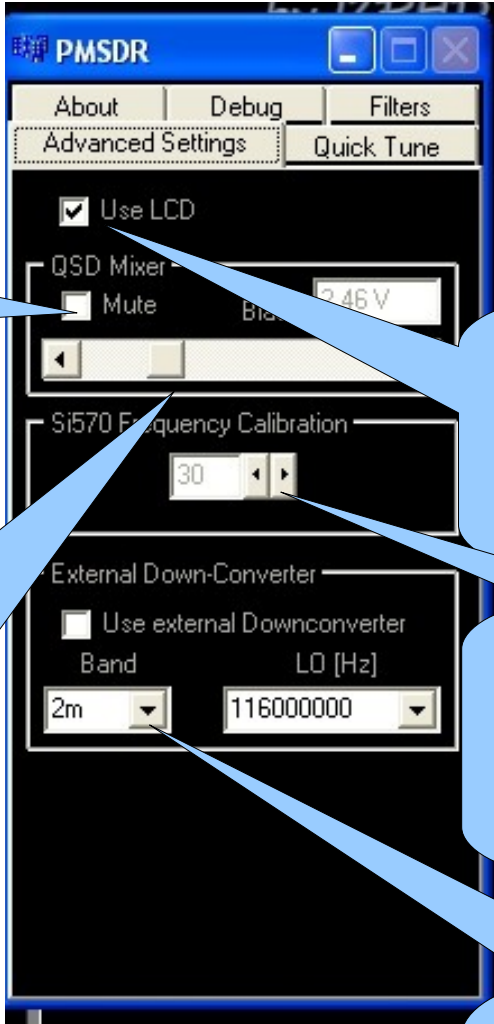
Setup Guide for WinRad & PMSDR

8. The spectrum now displays the correct frequency:



Setup Guide for WinRad & PMSDR

9. Details about the control panel for the „PMSDR“:

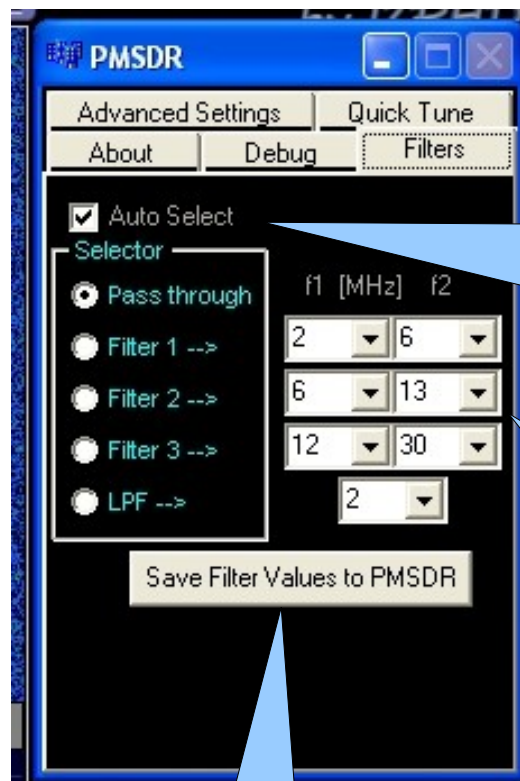


The screenshot shows the PMSDR software interface with the following sections and callouts:

- „Mute“:** Disable the QSD-Mixer. This callout points to the **Mute** checkbox in the QSD Mixer section.
- „Use LCD“:** Check to display in real-time the tuned frequency on the LCD-Display. This callout points to the **Use LCD** checkbox.
- „Bias“-Slider:** Change the the QSD-Bias voltage. This is only useful to optimize the noise figure above 30 Mhz. This control can be used also as a simple attenuator. This callout points to the **Bias** slider.
- „Frequency Calibration“:** To calibrate the Si570 reference oscillator. This callout points to the **Si570 Frequency Calibration** section.
- „External Downconverter“:** To use if you use with the PMSDR an external downconverter. This callout points to the **External Down-Converter** section.

Setup Guide for WinRad & PMSDR

10. Details about the Control panel for the „PMSDR“:



„Auto Selector“:
Check to
automatically select
the input preselection
filter

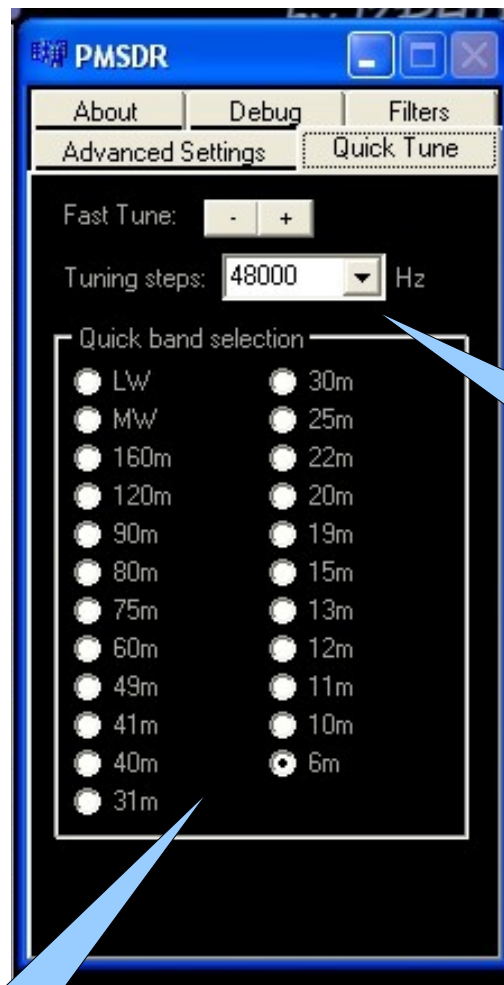
„F1 - F2“: These
boxes are to enter the
filter data (ONLY if
you modify the on-
board filters!)

„Save Filter to
PMSDR“: Save the
modified filter data to
the PMSDR. The
filter data will be
retrieved from the
PMSDR.

Manuale d'uso

Setup Guide for WinRad & PMSDR

11. Details about the Control panel for the „PMSDR“:



„Tune Step“: Tune with predefined tuning steps, selectable in the drop-down box „Tuning steps“

„Quick band selection“: You can quickly select your preferred band (entries are defined in extio_pmsdr.ini)