

HAM RADIO WORKS

DSP Voice Processor

User Manual

Thank you for the purchase of our Digital Signal Processing module.

The heart of DSP Voice Processor is a Analog Devices BlackFin DSP ADSP-BF504F. It is 16-bit fixed point processor core features low power consumption along with complex DSP algorithms: DSP controlled voice AGC, 8 band biquad filter equalizer, digital noise reduction based on special Noise Cancellation Speech Enhancement technology and programmable 3D effect. The small board size (only 29x29mm) allows it to be installed directly into Yaesu MH-31 microphone or any other suitable mike for any HF/VHF rig produced. It requires only 5V DC output with 100mA maximum capability.

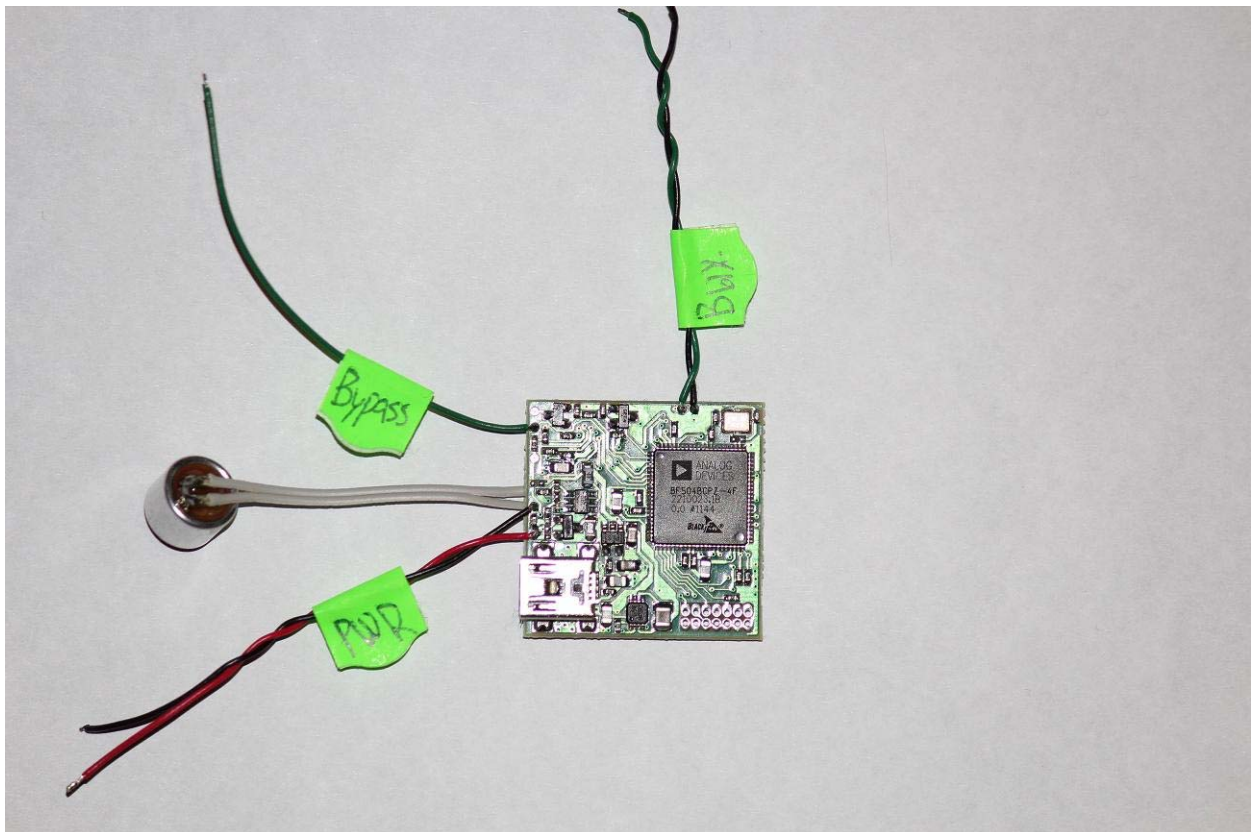


Рис.1 DSP Voice Processor.

Specially selected condenser type microphone is used and it powered from low noise on board LDO to ensure crystal clear speech on the output. Also it ensures high EMI immunity along with low impedance output and great output frequency response.

All the parameters can be set or modified using the on board mini USB port and specially designed control software. Internal firmware can be upgraded to improve module functionality.

1. DSP_VP control software.

To setup all the user settings you should run dspvp.exe control software. It requires preinstalled Microsoft .NET Frame Work 2.0 or higher.

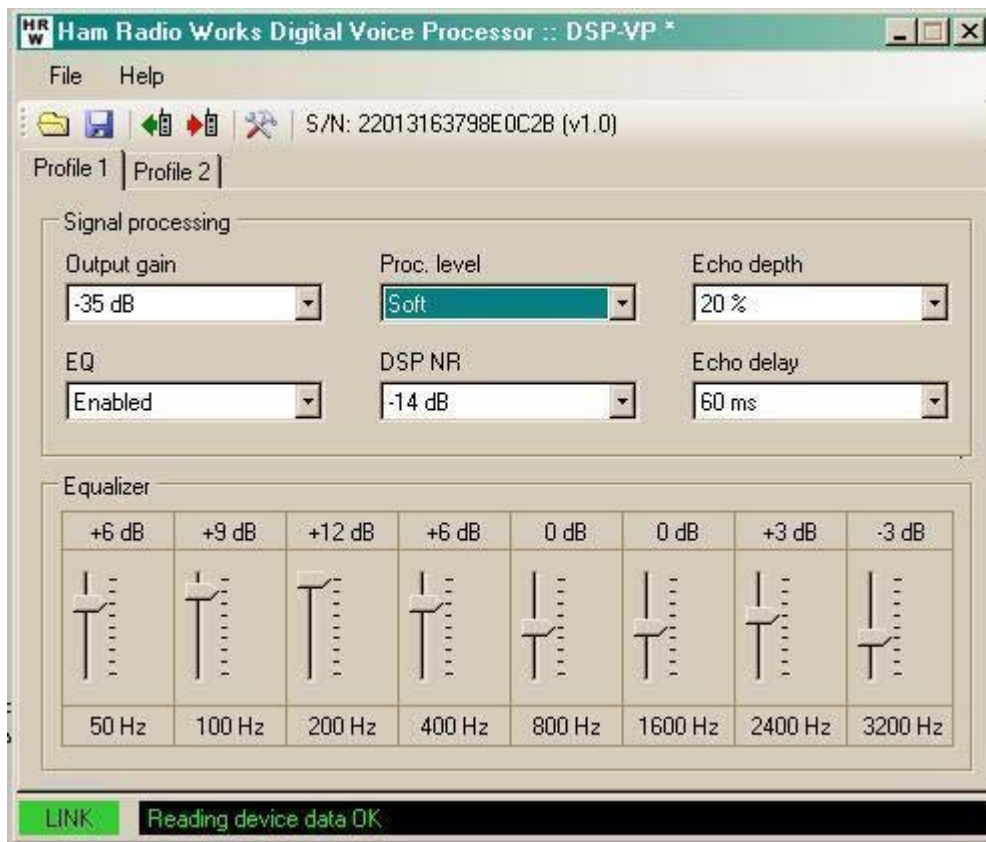


Fig. 2 DSP Voice Processor control software.

DSP_VP contains Silabs CP2103 chip for USB communication so you should download and install its driver:

<http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx>

Control software automatically establishes connection when the DSP_VP plugged in to the one of PC USB port. LINK indicator is become green. After that you can see current settings of DSP_VP as well as its serial number and firmware version.

1.1 8-band biquad filter equalizer.

To activate this feature please select in the EQ:*Enabled*. Tune each filter in ± 12 dB limits and 3dB step. After that write new EQ settings by pressing “Red Arrow” button.

1.2 Speech compressor.

To increase your talk power you can enable speech compressor. In the field Proc. level select one of these modes:

- *Disabled*, - speech compressor is turned off;
- *Soft*, - speech compressor is in normal gain mode;
- *Hard*, - speech compressor is in high gain mode.

It is recommended to use modules speech compressor and transceivers one simultaneously. This can reduce speech peak factor and rise average output power is SSB mode.

1.3 Digital Noise Reduction.

To clear your speech from unwanted noises you can activate DSP NR. In that mode special Noise Cancellation algorithm is activated and your voice is passing from adaptive complex filter with Voice Activity Detector. The result is free from non human voice noises speech and better S/N ratio. To correct your speech pitch after DSP NR please use EQ.

The level of DSP NR can be set:

- *Disabled*, - DSP NR is turned off;
- *-20dB*, - noise reduction is 20дБ;
- *-17dB*, - noise reduction is 17дБ;
- *-14dB*, - noise reduction is 14дБ;
- *-11dB*, - noise reduction is 11дБ;
- *-7dB*, - noise reduction is 7дБ.

1.4 3D effect.

To add some 3D to your voice use the fields: Echo depth:*Disable*, 10, 20..90% and Echo delay: 20, 40, 60...500мс.

1.5 Output attenuator.

To match the output level of the module and your transceiver microphone input use the programmable output attenuator. Its range is 0 to minus -72dB. The field is Output gain.

1.6 Settings Profiles.

Use settings profiles (Profile 1 and Profile 2) for instant switching between two sets of different settings. Module has Bypass signal for this purpose. If it is not connected the current settings is Profile 1 and if it is tied ground the current settings is Profile 2. You can switch between Profile 1 and Profile 2 on the go while speaking to the microphone.

1.7 Settings read and write.

To write new settings to the module press “Red Arrow” button. To read settings from the module press “Green Arrow” button. Also you can store your settings in the file or restore it from the file.

1.8 Firmware upgrade.

DSP Voice Processor module is capable with firmware upgrade feature. HRW can release new version of firmware to add some new features and improve current functionality.

Technical data:

Supply voltage from 4 to 5.5V DC;

Current consumption (DSP NR off) 25mA;

Current consumption (DSP NR on) 55mA;

Audio frequency response 0 – 7.5kHz (EQ off);

Dimensions 29x29mm.