Subject: Re: DSP filter
Date: Tue, 15 Oct 1996 19:20:35 -0700
From: w9gr@oro.net
To: Ottar Kvindesland <clank@netup.no>

Hello Ottar,

Thank you for your e-mail. Guess what? I am in Texas again! But this time, I have a better computer with me and can handle e-mail better this time.

With the case, the total cost to Norway including insured airmail post is US$188.00. I'm sorry, but I am too small to take charge cards.

More information follows below (the same information that was on the sheets I mailed you).

73 de W9GR

Dave Hershberger | Named "Saint David of Grass Valley" by
Principal Engineer | "Dilbert" cartoonist Scott Adams.
Continental Electronics, Inc | (See "Newsletter 4.0" at this web site:
Nevada City, California | http://www.unitedmedia.com/comics/dilbert)
(916) 265-6438 voice or fax
packet radio: W9GR@WA6NWE.#NOCAL.CA.USA.NOAM
internet: w9gr@oro.net << NOTICE NEW E-MAIL ADDRESS!!

Thank you for your inquiry about the W9GR digital signal processor. Basically, it is a PC board kit which takes audio from your receiver, digitizes the audio, performs various DSP functions, then converts it back to analog again. A 1 watt audio amplifier is included to drive a loudspeaker. An attractive custom made metal cabinet is also available.

You may have heard that there was a long wait of about 3 months to get the DSP-1 kit. This was caused by the overwhelming response to the September 1992 QST article, and the fact that it was taking 16 weeks to obtain CPU chips for the DSP. Well, the long waits are now over, and I am shipping kits from stock. I am now shipping kits out about one week after receiving the orders.

The DSP-3 described below is a brand new design incorporating many new features requested by DSP users.

At this time, there is no upgrade available for the earlier DSP-1. There are some hardware limitations of the earlier kits that are incompatible with the newly developed firmware. There may be an upgrade in the future for the DSP-1 kits, but if and when it is done it will only be possible to add some of the new functions to the old kits.

Product reviews on the DSP-3 were published in August 1995 QST and in the summer 1995 issue of Communications Quarterly.

The DSP-3 also appears as a construction article in the 1996 ARRL Handbook.

73
Dave
W9GR
internet: w9gr@oro.net

==========If you cut here, you'll probably break your CRT!==========

Powerful Digital Signal Processing: the W9GR DSP-3
LOW COST DIGITAL SIGNAL PROCESSOR KIT
NOW WITH CABINET and 18 SWITCH SELECTED MODES!

* Highly effective noise (QRN) reduction
* Heterodyne removal (automatic notch filtering)
* DTMF decoder with memory
* CTCSS decoder with memory
* 7 tunable CW filters
* Filters for special modes and narrow SSB
* Operates from 12 volt DC power source (0.4 amp)
* Easy interfacing: connects between your rig and speaker
* Custom metal cabinet available
* Easy to build PC board kit

The 18 DSP-3 functions are:

1. Simultaneous Noise Filter (QRN reducer) & Automatic Notch Filter with selectable AGC
2. Optimized Noise Filter (QRN reducer) with selectable AGC
3. Optimized Automatic Notch Filter with selectable AGC
4. 2.1 kHz narrow voice FIR filter
5. 1.8 kHz narrow voice FIR filter
6. North American RTTY filter (2125/2295 Hz)
7. European RTTY filter (1275/1445 Hz)
8. HF packet filter (1600/1800 Hz)
9. SSTV Filter (1200-2300 Hz)
10. DTMF Decoder with tone playback memory (new DSP function!)
11. CTCSS Decoder & Squelch with tone playback memory (new DSP function!)
12. 400 Hz CW filter, 100 Hz BW
13. 400 Hz CW filter, 50 Hz BW
14. 600 Hz CW filter, 100 Hz BW
15. 750 Hz CW filter, 200 Hz BW
16. 750 Hz CW filter, 100 Hz BW
17. 750 Hz CW filter, 50 Hz BW
18. 1000 Hz CW filter, 100 Hz BW

NOTE: All CW filters are tunable!

Thousands of amateurs have built the W9GR digital signal processor since it first appeared as a feature article in the September 1992 issue of QST. Now an even more powerful and versatile version of the DSP has been developed, and it is still low cost. You can save money by building this kit yourself and have a DSP superior to units costing twice as much! Even the high priced DSPs do not have the ability to decode CTCSS and DTMF tones!

Brief Description:

The W9GR DSP-3 filter is a DSP audio filter which goes between your receiver's audio output and your loudspeaker or headphones. A LED display indicates audio level, or in the tone decoder modes it indicates DTMF and CTCSS tones. Modes are selected by a front panel rotary switch, and options are selected by a rear panel toggle switch. The DSP operates from your 12 volt DC power supply (not furnished).

The W9GR DSP-3 filter hardware uses a 13 bit A/D and D/A converter with switched capacitor filters for antialiasing and analog reconstruction. This results in a much wider dynamic range than earlier W9GR DSP filters, which used 8 bit converters. The primary advantage to having more bits is for CW operators: the ability to pick out weak CW signals amidst strong QRM.

The first three DSP functions are different combinations of noise reducers and automatic notch filters, using the Widrow-Hoff LMS adaptive filtering algorithm. The noise reducer modes are most effective against hiss and thermal noise but also reduces impulse noise and static crashes. These modes reduces listener fatigue and are recommended for long-term monitoring. The automatic notch mode eliminates multiple carriers very quickly, within a few milliseconds. Tuner-uppers, CW interference, carriers, and other forms of undesired audio tones are quickly eliminated. If a carrier comes on your frequency, all you will hear will be a subtle "click" as the automatic notch acquires.

These three modes include an defeatable digital AGC, which keeps the output level constant over variations of up to 30 dB.

Two "brick wall" narrow SSB voice filters (1.8 and 2.1 kHz) give you extra selectivity for overlapping adjacent channel QRM.

A selection of FSK filters improves copy of RTTY, AMTOR, HF packet, etc. in the presence of noise or QRM.

A special SSTV filter improves performance in that mode without group delay distortion.

A DTMF decoder uses the LED display to tell you what "touch tones" you are hearing. The last 16 decoded DTMF tones can be "played back" from the DSP's memory.

A CTCSS decoder uses the LED display to tell you what "PL" tones are being used. The last 16 different decoded CTCSS tones can be "played back" from the DSP's memory.

There are seven CW filters with various center frequencies and bandwidths. Any of these filters can be tuned down to as low as 70% of the nominal center frequency.

The CW, FSK, narrow voice, and SSTV filter firmware programs are all linear phase bandpass filters. Linear phase filtering, which is a significant advantage of DSP, allows filter bandwidth to be narrower than conventional filtering for a given maximum CW speed or data rate.

The parts kit includes a finished double sided printed circuit board with silk screen and solder mask, all PC board and front panel components, IC sockets, and a CPU chip preprogrammed with the DSP firmware. A cabinet and DC power supply are not included with the basic kit.

For those who prefer not to do their own metalwork, a custom made steel cabinet with silk screening is available.

We recommend that builders of this kit should be able to solder, identify components, and construct a PC board from a schematic and parts list.

This document is for informational purposes only. QUANTICS MAKES NO WARRANTEES, EXPRESS OR IMPLIED, IN THIS SUMMARY.

O R D E R F O R M

Name: _____ Ham Call: _____

Address: _____

City, State, Zip: _____

Item	Price	Quantity	Total
DSP-3 Kit	$149.00	_____	_____
Custom metal cabinet for DSP-3 (does not fit earlier kits)	$19.00	_____	_____
California residents add 7.25% tax			_____
Shipping & Handling			_____

In the USA and Canada:
$7.00 for one or two kits with or without cabinet;
$3.50 for each additional kit with or without cabinet.

Outside the USA and Canada:
$20.00 for one kit with or without cabinet;
$10.00 for each additional kit with or without cabinet.

For cabinets ordered separately in the USA & Canada:
$5.00 for the first cabinet; $2.50 for each additional cabinet.
Outside the USA and Canada:
$15.00 for the first cabinet; $7.50 for each additional cabinet.

Total enclosed _____

All prices quoted are for U. S. funds drawn on a U. S. bank and are subject to change without notice. California residents must add 7.25% sales tax. Send orders to:

QUANTICS

P. O. Box 2163
Nevada City, California 95959-2163