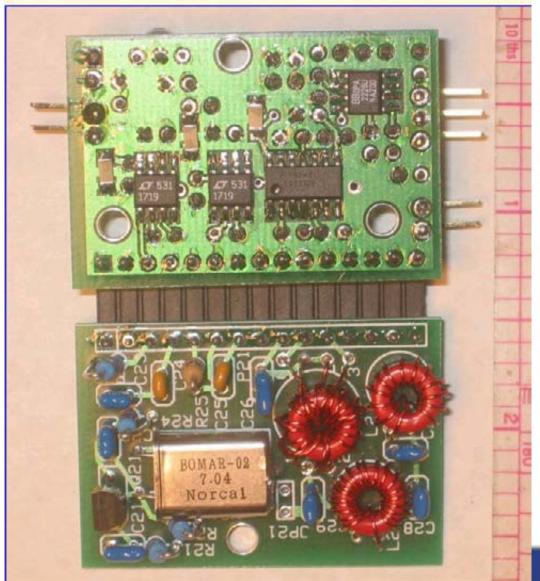


Using the Soft Rock 5 as a Microwave IF Spectrum Analyzer

By AI Ward W5LUA February 4, 2006

WWW.NTMS.ORG

Soft Rock 5 Designed by Tony Parks KB9YIG



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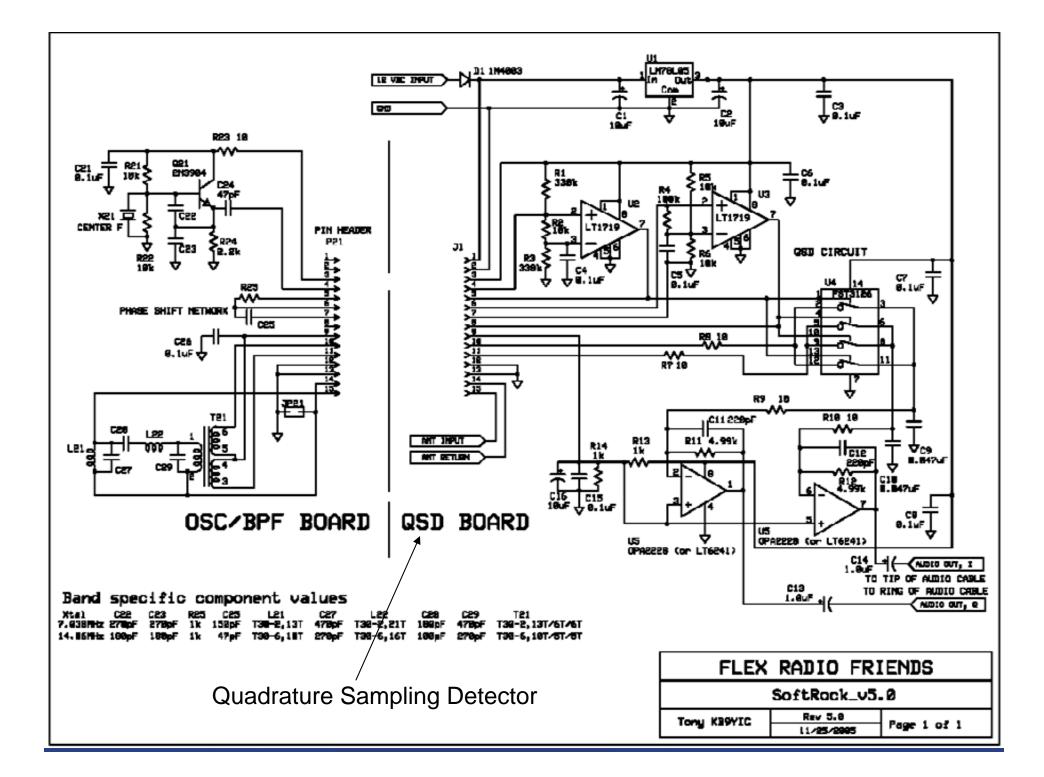
2 Board Approach Top board has the LNAs, Comparators and QSD Bottom board has the frequency sensitive components – LO , band pass filter and phase shift network North Texas NTMS Microwave Society

> Only \$26.50 !

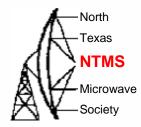
http://ewjt.com/kd5tfd/sdr1knotebook/sr40/v5-1stlook/index.html

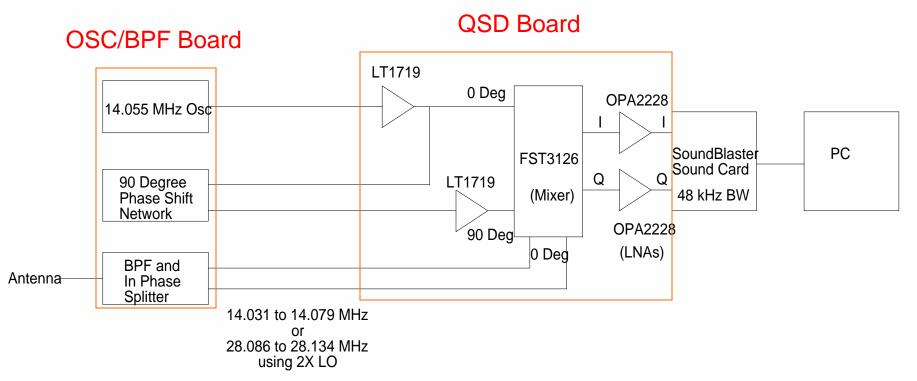
http://amqrp.org/kits/softrock40 /version5.html

http://www.hamsdr.com/Home.aspx



Block Diagram of the Soft Rock 5





I found that the basic SoftRock 5 with a little MMIC gain in front of it will also operate as-is at 10 M once the input BPF is bypassed. The center frequency on 10M is now 28.110 MHz. On the first unit I built, I coupled in 10M RF at the junction of L22 and C29. For the second unit, I just built a 10 M BPF per the following table. Both worked well but still needed some more MMIC gain between my xvtrs and Soft Rock 5 to help set SoftRock 5 noise level.

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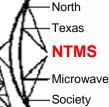
Band (MHz)	C22 (pF)	C23 (pF)	C24 (pF)	C25 (pF)	C27 (pF)	C28 (pF)	C29 (pF)	L21 (uH)	L21 wind/core	L22 (uH)	L22 wind/core	T21 core	T21 primary	T21 secondaries
1.800	470	470	220	620	6800	470	6800	1.1	16T #30 on T30-2	14	57T #30 on T30-2	T30-2	16T #30	7T/7T #30 bifilar
3.500	470	470	220	330	1000	360	1000	1.4	18T #30 on T30-2	3.0	30T #30 on T30-2	T30-2	18T #30	8T/8T #30 bifilar
7.000	270	270	47	150	470	180	470	0.73	13T #26 on T30-2	1.9	21T #26 on T30-2	T30-2	13T #26	6T/6T #26 bifilar
10.100	270	270	47	100	330	120	330	0.52	11T #26 on T30-2	1.2	17T #26 on T30-2	T30-2	11T #26	5T/5T #26 bifilar
14.000	180	180	47	47	270	100	270	0.36	10T #26 on T30-6	0.92	16T #26 on T30-6	T30-6	10T #26	5T/5T #26 bifilar
18.068	150	150	47	47	180	69	180	0.36	10T #26 on T30-6	0.71	14T #26 on T30-6	T30-6	10T #26	5T/5T #26 bifilar
21.000	150	150	47	47	150	62	150	0.29	9T #26 on T30-6	0.61	13T #26 on T30-6	T30-6	9T #26	4T/4T #26 bifilar
24.890	120	120	47	47	120	47	120	0.24	8T #26 on T30-6	0.52	12T #26 on T30-6	T30-6	8T #26	4T/4T #26 bifilar
28.000	100	100	47	33	120	47	120	0.18	7T #26 on T30-6	0.44	11T #26 on T30-6	T30-6	7T #26	3T/3T #26 bifilar

From SoftRock 5Yahoo User's Group

Band (MHz)	R24 (k)	C22 (pF)	C23 (pF)	C24 (pF)	C25 (pF)	C27 (pF)	C28 (pF)	C29 (pF)	L21 (uH)	L21 wind/core	L22 (uH)	L22 wind/core	T21 core	T21 primary	T21 secondaries	
1.800	3.3	470	470	220	680	6800	470	6800	1.1	16T #30 on T30-2	14	57T #30 on T30-2	T30-2	16T #30	7T/7T #30 bifilar	
3.500	2.2	470	470	220	330	1000	390	1000	1.4	18T #30 on T30-2	3.9	30T #30 on T30-2	T30-2	18T #30	8T/8T #30 bifilar	
7.000	2.2	270	270	47	150	470	180	470	0.73	13T #26 on T30-2	1.9	21T #26 on T30-2	T30-2	13T #26	6T/6T #26 bifilar	
10.100	2.2	270	270	47	100	330	150	330	0.52	11T #26 on T30-2	1.2	17T #26 on T30-2	T30-2	11T #26	5T/5T #26 bifilar	
14.000	2.2	180	180	47	47	270	100	270	0.36	10T #26 on T30-6	0.92	16T #26 on T30-6	T30-6	10T #26	5T/5T #26 bifilar	
18.068-21.000	2.2	150	150	47	47	180	100	180	0.36	10T #26 on T30-6	0.71	14T #26 on T30-6	T30-6	10T #26	5T/5T #26 bifilar	
24.890-28.000	2.2	100	100	47	47	120	56	120	0.24	8T #26 on T30-6	0.52	12T #26 on T30-6	T30-6	8T #26	4T/4T #26 bifilar	
		orome]	From	Tony	Parks	KB9	YIG						

http://www.amqrp.org/kits/dds60/index.html

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This should be a good way to broaden the receive capability of the Soft Rock B_{∞}^{∞} $V - s_{\infty}$



module generates a good-quality RF signal from 1-60 MHz by using a small pc board to contain just the bare DDS essentials – an Analog Devices AD9651 DDS chip, a clock oscillator, a 5th-order eliptic filter and an adjustable-level RF amplifier. Additionally, an onboard 5V regulator is provided so you only need provide a battery or power supply ranging anywhere from B-16V DC. The three digital control lines, the power supply, and the output signal are all available on a pin header at the board edge, and the DDS-60 is pin-compatible with the original DDS Daughtercard. The <u>schematic</u> is shown below on this page.

The 8-position pin header at the board edge serves to allow DDS-60 to be plugged into and used in any project you might have on your bench, regardless of which microcontroller is employed. Just provide a single strip socket (e.g., a 16-pin IC socket split lengthwise) on the project board and plug in the DDS baughtercard. Heck, you don't even need a dedicated microcontroller – use a cable connected to the parallel printer port of your PC and use public domain PC software to control the DDS board. See the Ways to Use section for a number of custom solutions for you to easily control your DDS-60 daughtercard.

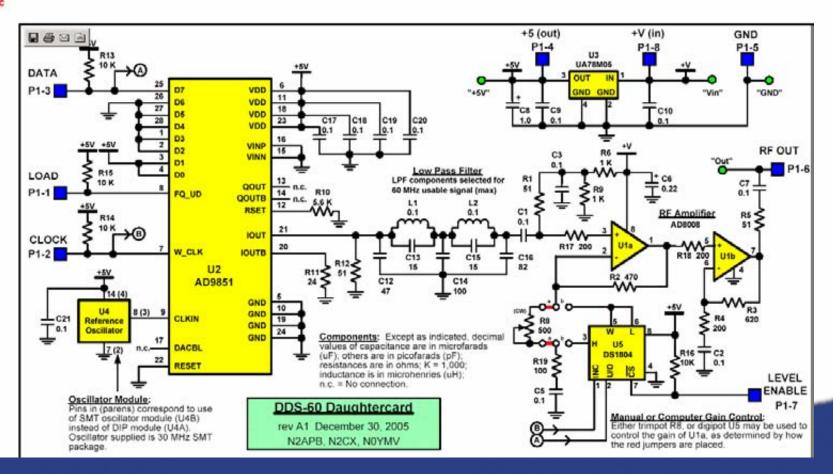
Once your controller-of-choice serially loads the 40-bit control word into the DDS, the raw waveform is presented to an elliptic filter that removes unwanted high-end frequency components, resulting in a signal of sufficient quality to serve as a local oscillator for a transceiver. We regularly see great signal quality, with harmonic content of -40 dB.

DDS-60 using the AD9851

Specifications

- Power requirements: 8-16V DC at 130 ma (typical).
- RF Output fully adjustable to +16 dBm, or about 4V p-p.
- Output signal not affected by varying +V supply voltage great for battery operation.]
- Near-constant output level from 1-60 MHz.
- > Good signal purity harmonics down approximately 40 dB from the fundamental
- > Pin-compatible with the original DDS Daughtercard module
- > Only few changes needed in existing AD9050 software drivers

Schematic



North Texas NTMS Microwave ^ ciety

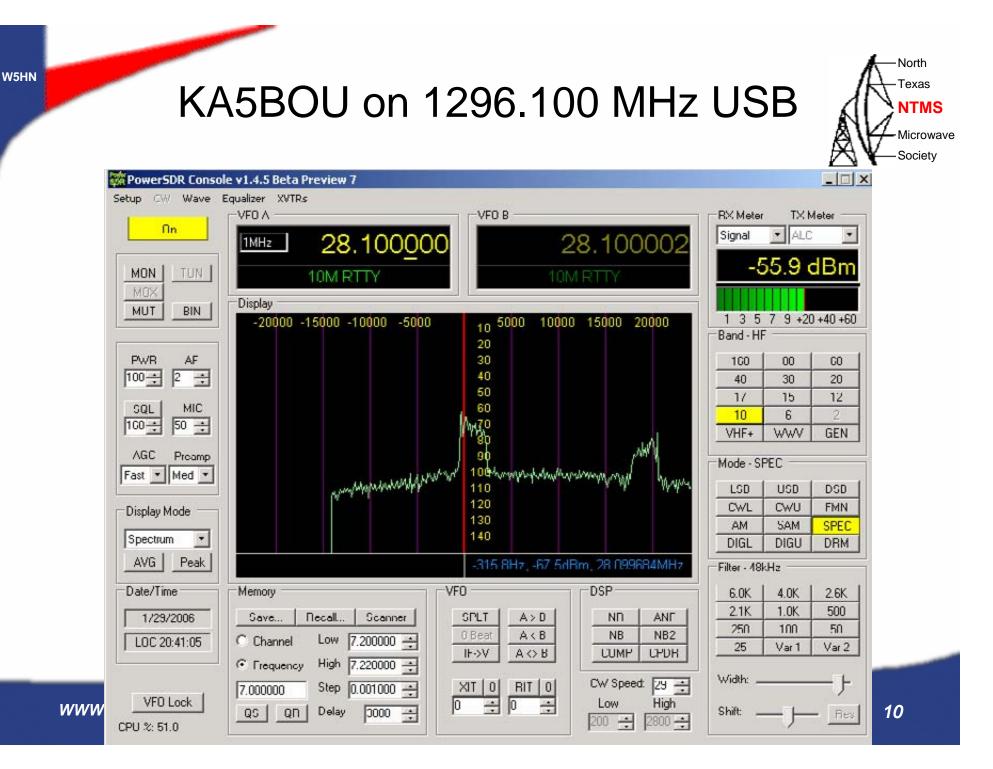
North Texas NM5M 0n 1296.100 MHz CW NTMS Microwave Spanning 1296.086 to 1296.134 MHz Society PowerSDR Console v1.4.5 Beta Preview 7 - 🗆 X Setup CW Wave Equalizer XVTRs -VFO A VFO B RX Meter TX Meter **Nn** Signal ALC • 28.110000 28.100002 100kHz -88.7 dBm TUN MON 10M RTTY MOX Display MUT BIN 1 3 5 7 9 +20 +40 +60 -20000 -15000 -10000 -5000 5000 10000 15000 20000 10 Band - HF 20 AF 30 PWR. 160 00 60 100-+ 2 + 40 40 30 20 50 12 1/ 15 60 SQL MIC 6 10 100-50 ÷ 70 VHF+ WW GEN 80 AGC Preamp 90 Mode - SPEC 100 Fast • Med • mapping and a superior and the second of the second s LOD USD. DOD. CWL CWU **FMN** Display Mode 130 SAM. AM SPEC 140 Spectrum • DIGL DIGU DRM AVG | Peak -9368 4Hz, -102 0dBm, 28 100632MH Filter - 48kHz DSP Date/Time Memory VFO 6.0K 4.0K 2.6K 2.1K 1.0K 500 1/29/2006 Save... Recall... Scanner SPLT A > DNΠ ANE 250 100 50 NB NB2 0 Beat A<B 7.200000 -LOC 20:28:47 C Channel Low 25 Var 1 Var 2 IF->V A <> B LUMP UPDH High 7.220000 -Frequency Width: CW Speed: 29 -RIT 0 Step 0.001000 -XIT 0 7.000000 VFO Lock High Low WWW 8 QS QN Delay 0000 Shift: Res 2800 ÷ 200 🕂 CPU %: 49.0

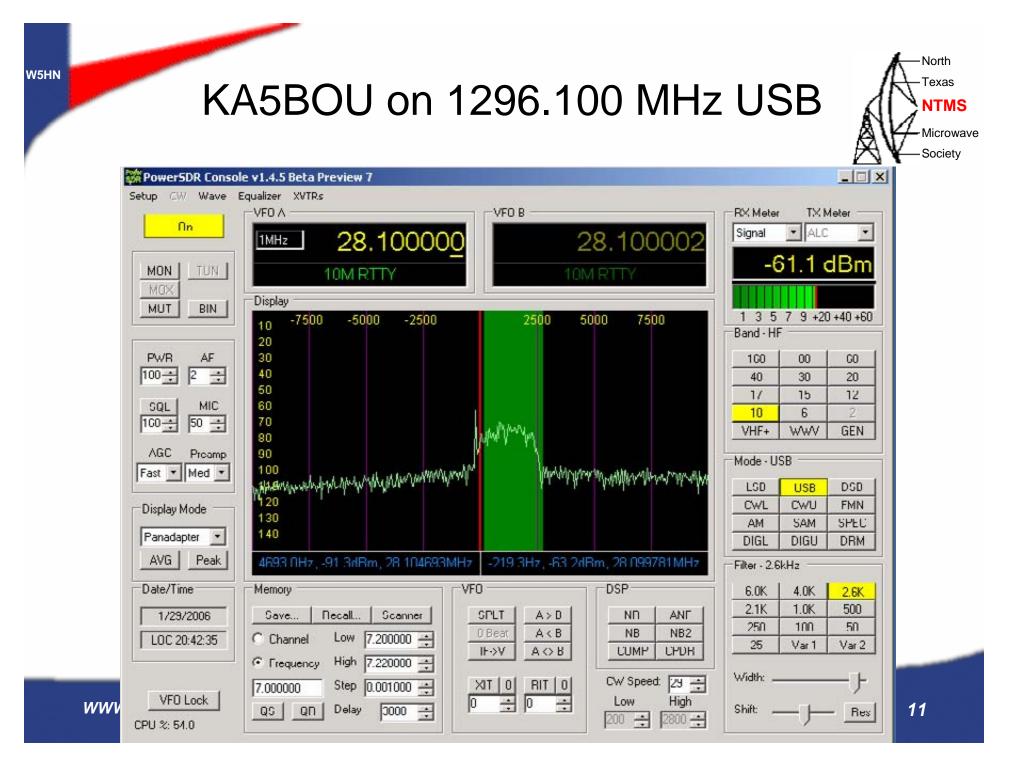
NM5M 0n 1296.100 MHz CW

and the second second	ole v1.4.5 Beta Prev	view 7					- 0
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Date/Time	Save Rec	ow 7.200000 🛨	VF0		6.0K 2.1K	4.0K 1.0K	<mark>2.6K</mark> 500 50
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Date/Time	Save Rec C Channel L C Frequency H 7.000000 S	ow 7.200000 🛨	VFO SPLT A>D O Beat A < B	DSP NN ANF NB NB2	6.0K 2.1K 250 25	4.0K 1.0K 100	2.6K 500 50 Var 2

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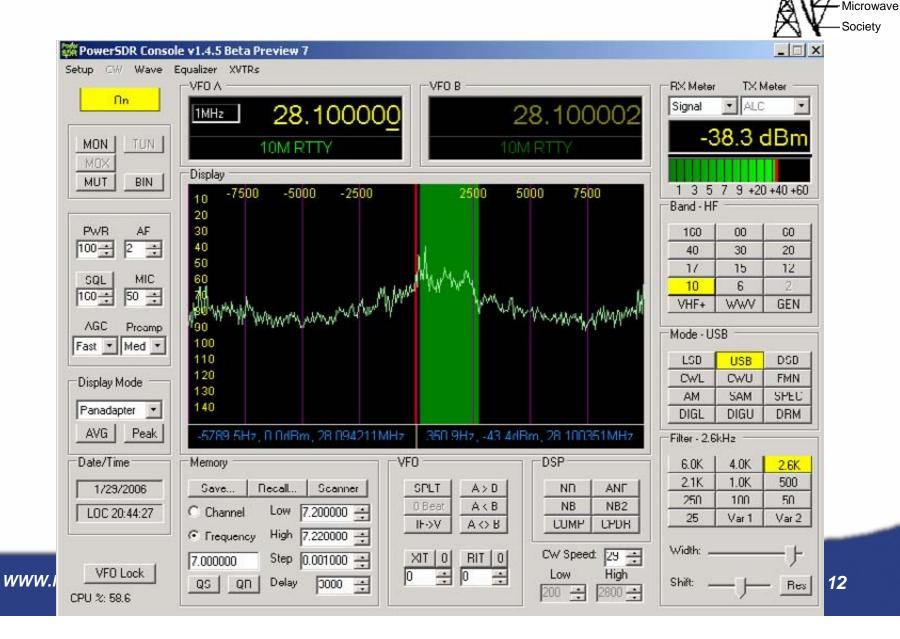
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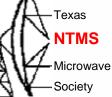


KA5BOU Overloading my Sound Card

North



NM5M 0n 1296.100 MHz USB



North

- 🗆 × PowerSDR Console v1.4.5 Beta Preview 7 Setup CW Wave Equalizer XVTRs VFO A VFO B RX Meter TX Meter Πn Signal ALC • 28.110000 28.100002 1MHz -88.4 dBm TUN MON 10M RTTY MOX Display MUT BIN 1 3 5 7 9 +20 +40 +60 -20000 -15000 -10000 -5000 5000 10000 15000 20000 10 Band - HF 20 AF 30 PWR 160 00 60 100-+ 2 + 40 40 30 20 50 12 1/ 15 60 SQL MIC 6 10 100-50 ÷ 70 VHF+ WW GEN 80 AGC Preamp 90 Mode - SPEC 100 Fast • Med • 110 Mat muhan wal your Make war way you LOD USD. DOD. many with many with Mader Matshalu CWL CWU **FMN** Display Mode 130 SAM. AM SPEC 140 • Spectrum DIGL DIGU DRM AVG | Peak -9684 2Hz, -94 8dBm, 28 100316MHz Filter - 48kHz DSP Date/Time Memory VFO 6.0K 4.0K 2.6K 2.1K 1.0K 500 1/29/2006 Save... Recall... Scanner SPLT A > DNΠ ANE 250 100 50 NB NB2 0 Beat A<B 7.200000 -LOC 20:49:02 C Channel Low 25 Var 1 Var 2 IF->V A <> B LUMP UPDH High 7.220000 -Frequency Width: CW Speed: 29 🚔 RIT 0 XIT 0 Step 0.001000 -7.000000 VFO Lock High Low WWW qs | qn | Delay 0000 ÷ Shift: , Res 200 ÷ 2800 ÷ CPU %: 57.0

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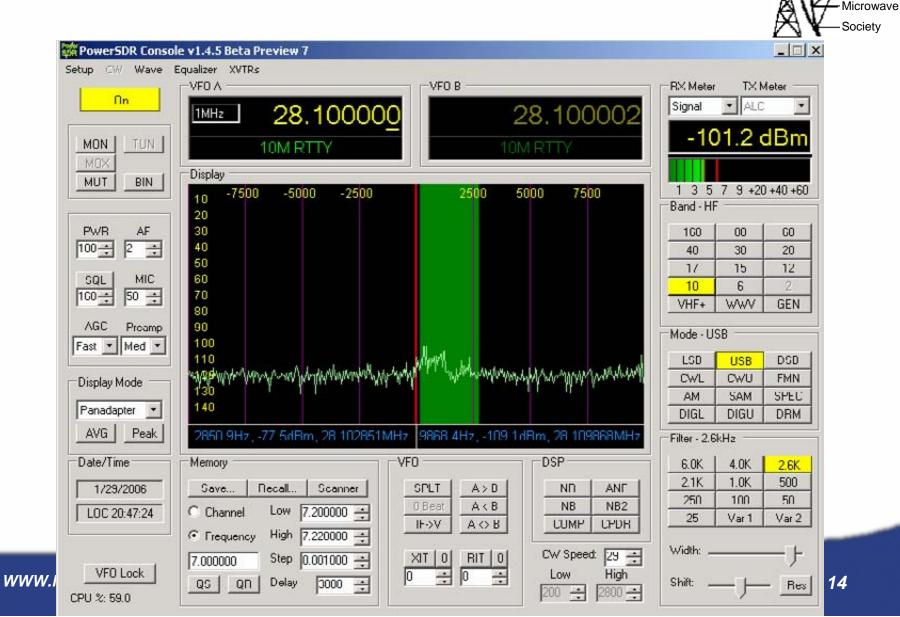
13

NM5M on 1296.100 MHz SSB

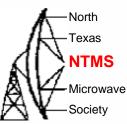
North

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NTMS



A Recent Post from the Soft Rock 40 Yahoo User's Group



SoftRock v5.0 OSC/BPF kits are now available for bands other than 40

> and 20 meters. I have a limited supply of the band kits as follows: >

> 160m with center frequency at 1.8432 MHz

> 80m with center frequency at 3.560 MHz

> 30m with center frequency at 10.125 MHz

> 17m with center frequency at 18.096 MHz

> > 15m with center frequency at 21.06 MHz

> > 12m with center frequency at 24.906 MHz

> > 10m with center frequency at 28.06 MHz

> Each kit is complete with circuit board, crystal and all other

> components including BPF caps for the specific band.

>

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> Bands at frequencies greater than 14.06 MHz are still considered

> experimental as we evaluate the performance the SoftRock will

> provide on these bands. Test data will be posted as soon as

> possible for the higher frequency bands. >

> Due to the limited number of kits, (small quantity parts purchased

> more expense), I need to ask a little more for these kits at \$9.50

> (US/Canada) and \$10.50 (DX). If you would just like the crystal for

> a band and the associated BPF components including the cores and

- > wire, that sub-kit can be purchased for \$4 (\$4.50 for DX). All
- > prices include the mailing costs.

>

> Please check with me before you enter a PayPal order to make sure

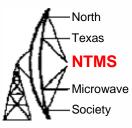
> Still have a kit for the band you are interested in.

> Thanks and 73, > Tony KB9YIG

>

raparks@ctcisp.com

http://www.dxatlas.com/Rocky/



Rocky 1.41

FREEWARE

by Alex VE3NEA

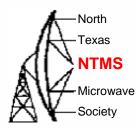
ve3nea@dxatlas.com

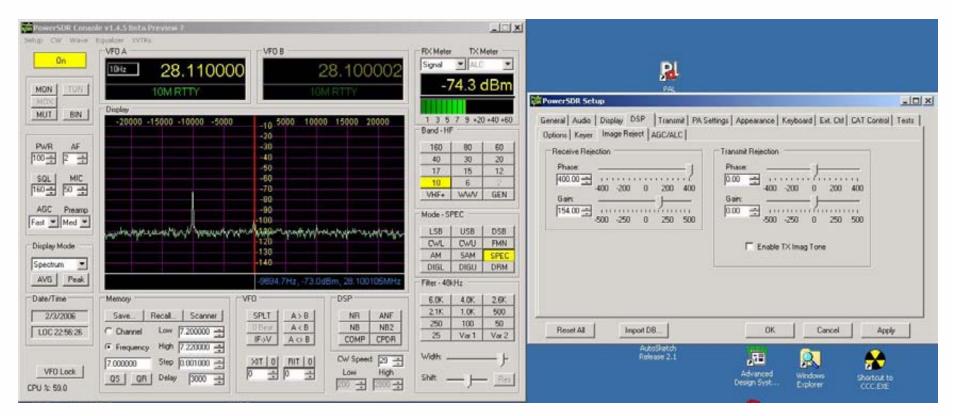
SDR software for SoftRock40

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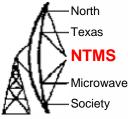
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Optimizing I & Q Amplitude and Phase for best Image Rejection





Summary



- Great for a microwave IF spectrum analyzer Frequency coverage is crystal frequency plus and minus 24 kHz
- Software is free!
- Receiver can become a well calibrated small signal power meter for the lab
- With the DDS-60, the combination can provide receive coverage from 1 to 60 MHz – only need to provide front-end BPF if connected to antenna
- Can also be set up as a spectrum analyzer at the first IF frequency of your favorite "rice-box" radio at a fraction of the cost of an IC-756pro, IC7800 and IC-9000
- Transmitter mate to the SR5 in the works by the QRP guys
- Hard to imagine all the neat stuff they can do in software today and to think our soundcards are 48 kHz wide receivers!
- Any questions?