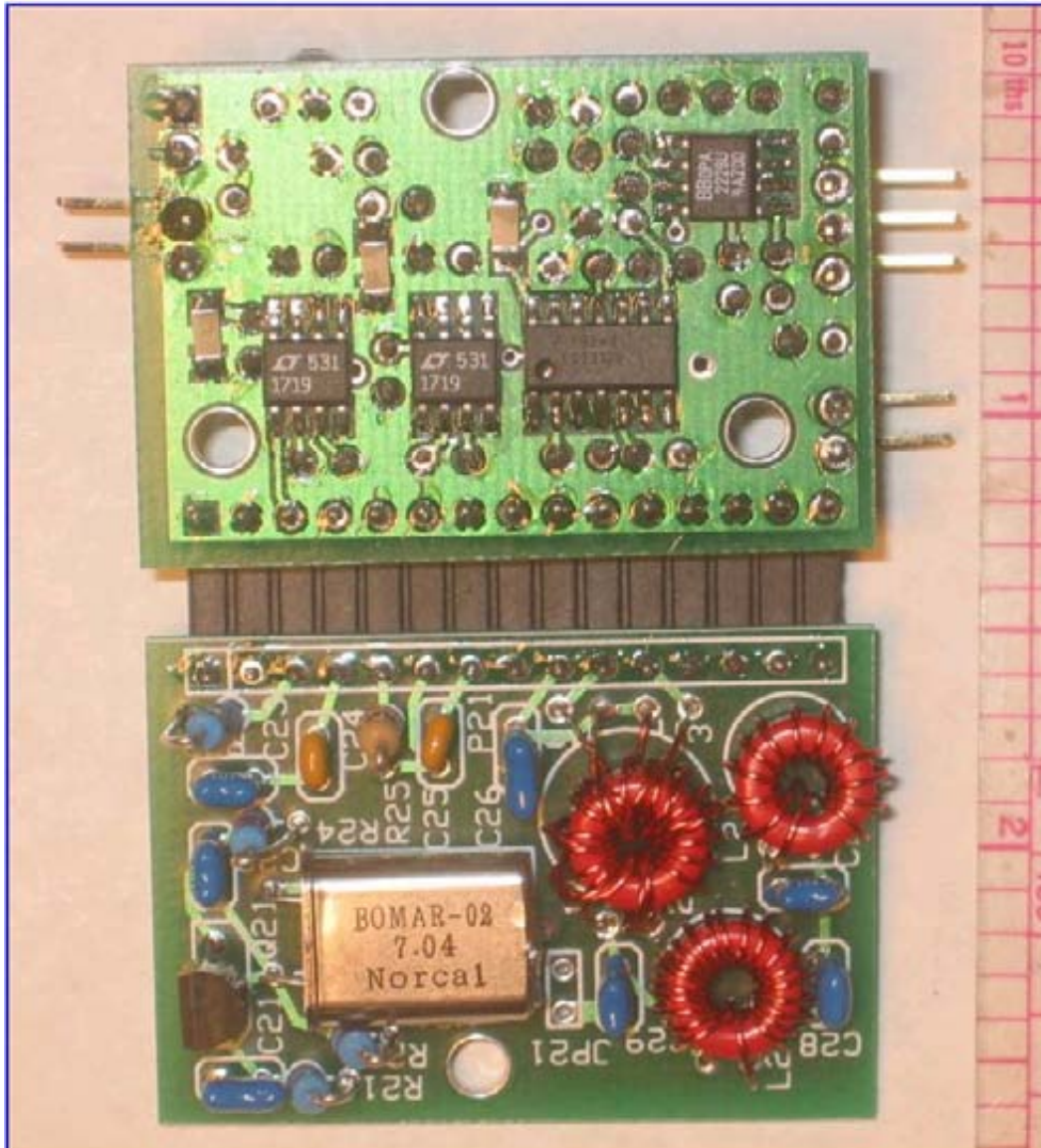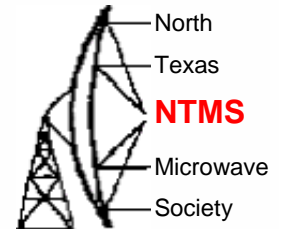W5HN

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Using the Soft Rock 5 as a Microwave IF Spectrum Analyzer

By
Al Ward
W5LUA
February 4, 2006

Soft Rock 5 Designed by Tony Parks KB9YIG

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2 Board Approach

Top board has the LNAs, Comparators and QSD

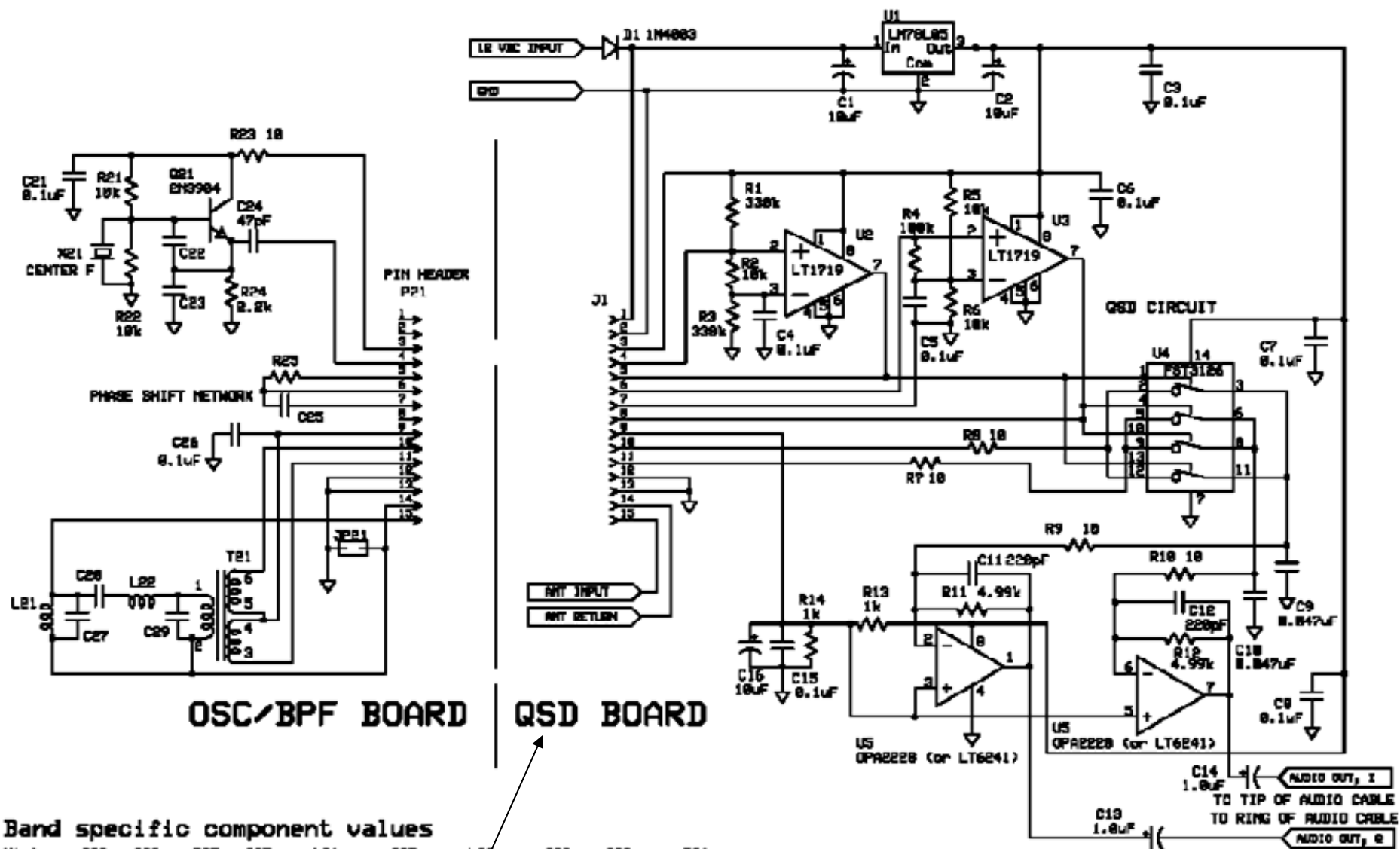**Bottom board has the frequency sensitive components – LO , band pass filter and phase shift network**

Only $26.50 !

http://ewjt.com/kd5tfd/sdr1k-notebook/sr40/v5-1stlook/index.html

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

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

Quadrature Sampling Detector

OSC/BPF BOARD | QSD BOARD

Band specific component values

Xtal	C22	C23	R25	C25	L21	C27	L22	C28	C29	T21
7.038MHz	270pF	270pF	1k	150pF	T30-2,13T	470pF	T30-2,21T	100pF	470pF	T30-2,13T/6T/6T
14.05MHz	100pF	100pF	1k	47pF	T30-6,10T	270pF	T30-6,16T	100pF	270pF	T30-6,10T/6T/6T

FLEX RADIO FRIENDS

SoftRock_v5.0

| Tony K89YIC | Rev 5.0 11/25/2005 | Page 1 of 1 |

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Block Diagram of the Soft Rock 5

QSD Board

OSC/BPF Board

LT1719

14.055 MHz Osc

0 Deg

OPA2228

I — I

90 Degree Phase Shift Network

LT1719

FST3126 (Mixer)

Q — Q

SoundBlaster Sound Card

48 kHz BW

PC

90 Deg

OPA2228 (LNAs)

0 Deg

BPF and In Phase Splitter

Antenna

14.031 to 14.079 MHz
or
28.086 to 28.134 MHz
using 2X LO
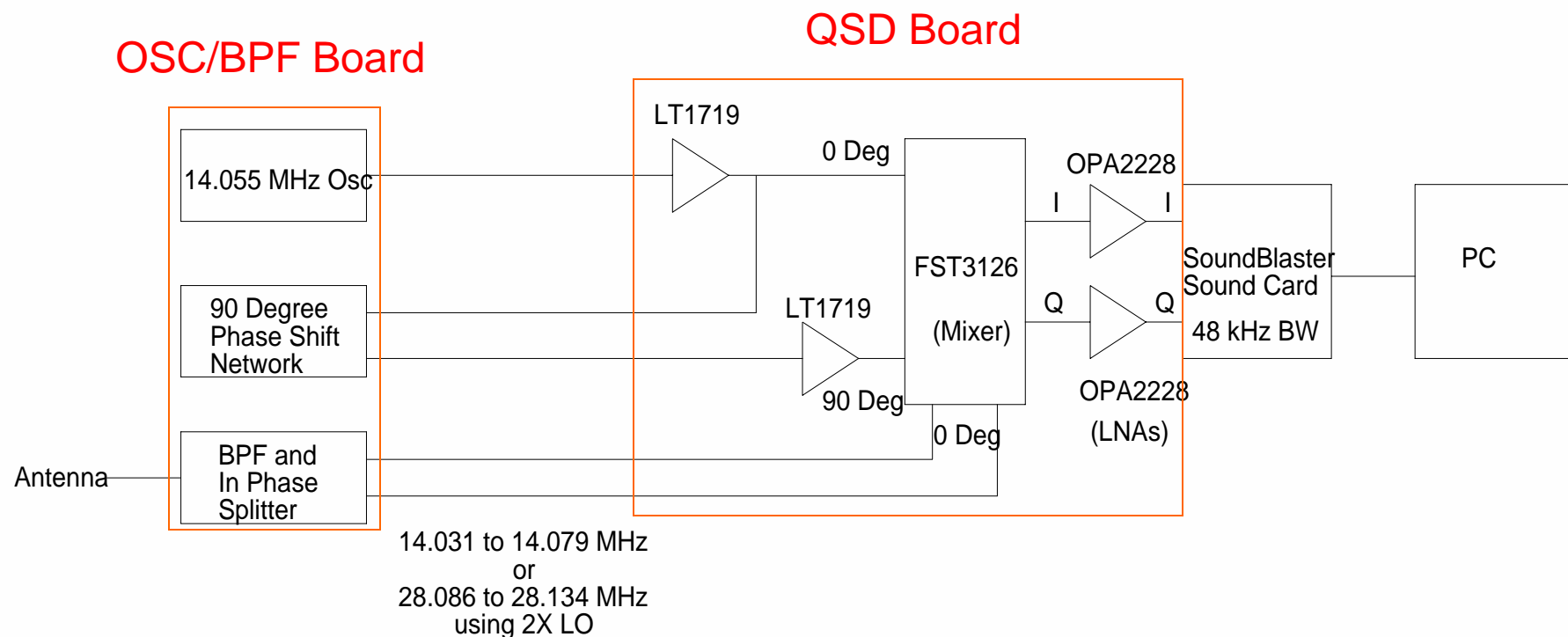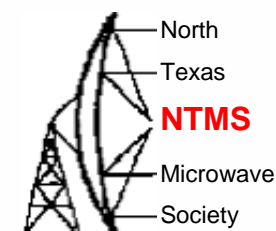
I found that the basic SoftRock 5 with a little MMIC gain in front of it will also operate as-is at 10 M once the input BPF is bypassed. The center frequency on 10M is now 28.110 MHz. On the first unit I built, I coupled in 10M RF at the junction of L22 and C29. For the second unit, I just built a 10 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.

SoftRock v5.0 Band Specific Component Values
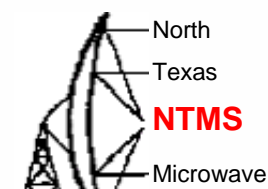
Band (MHz)	C22 (pF)	C23 (pF)	C24 (pF)	C25 (pF)	C27 (pF)	C28 (pF)	C29 (pF)	L21 (uH)	L21 wind/core	L22 (uH)	L22 wind/core	T21 core	T21 primary	T21 secondaries
1.800	470	470	220	620	6800	470	6800	1.1	16T #30 on T30-2	14	57T #30 on T30-2	T30-2	16T #30	7T/7T #30 bifilar
3.500	470	470	220	330	1000	360	1000	1.4	18T #30 on T30-2	3.9	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

From Tony Parks KB9YIG

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 5.
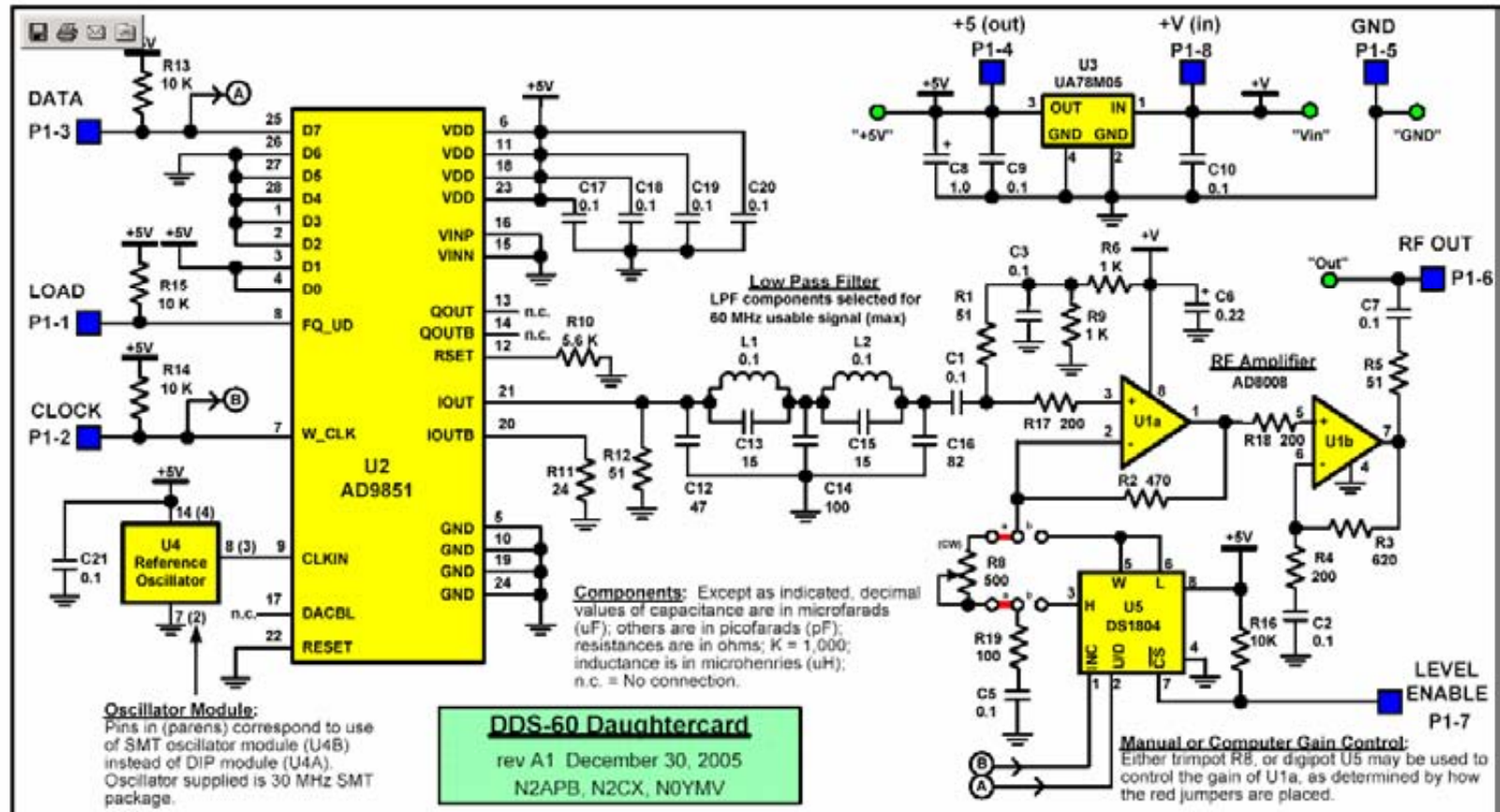
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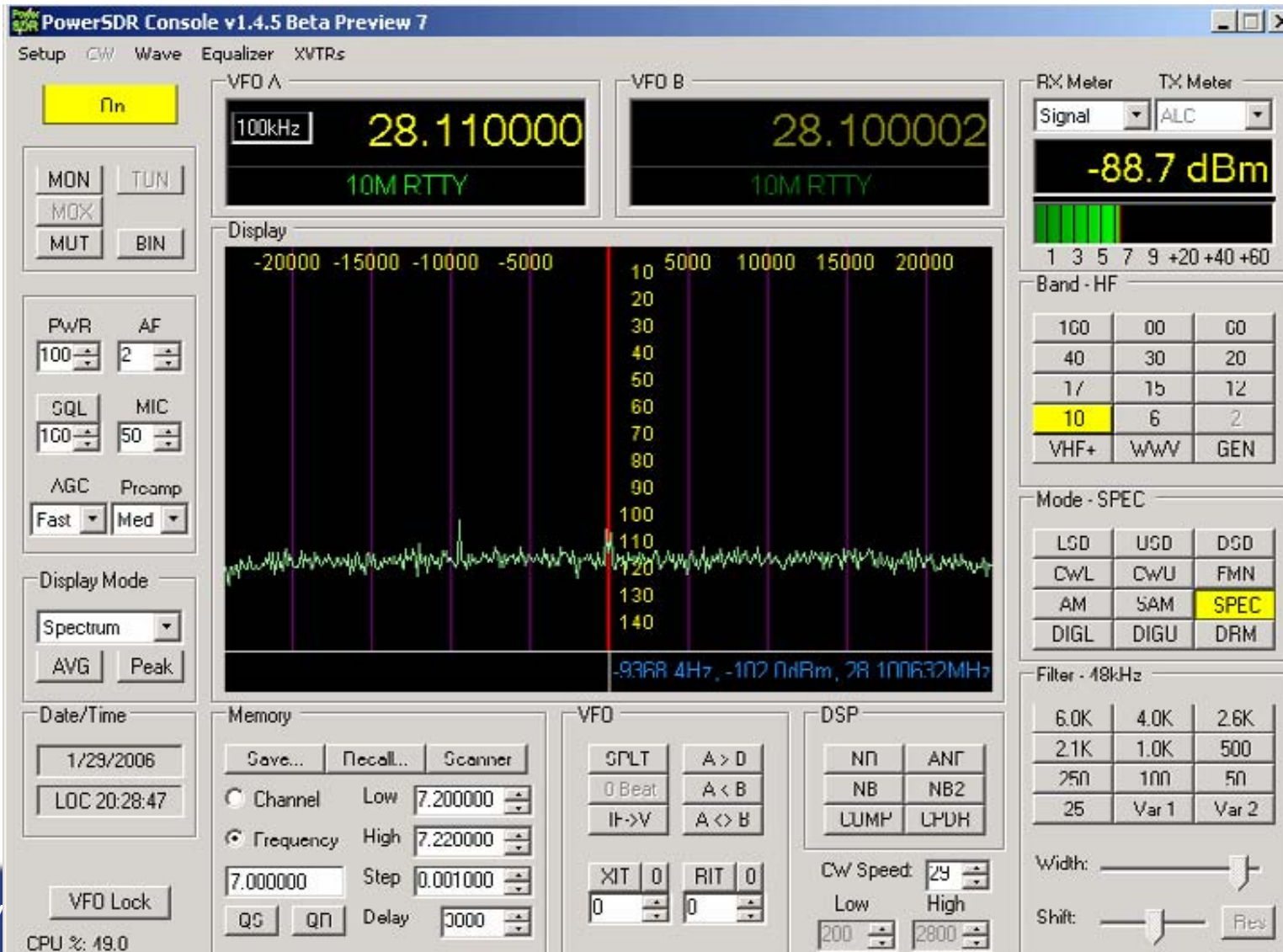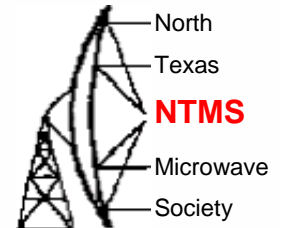# DDS-60 using the AD9851

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
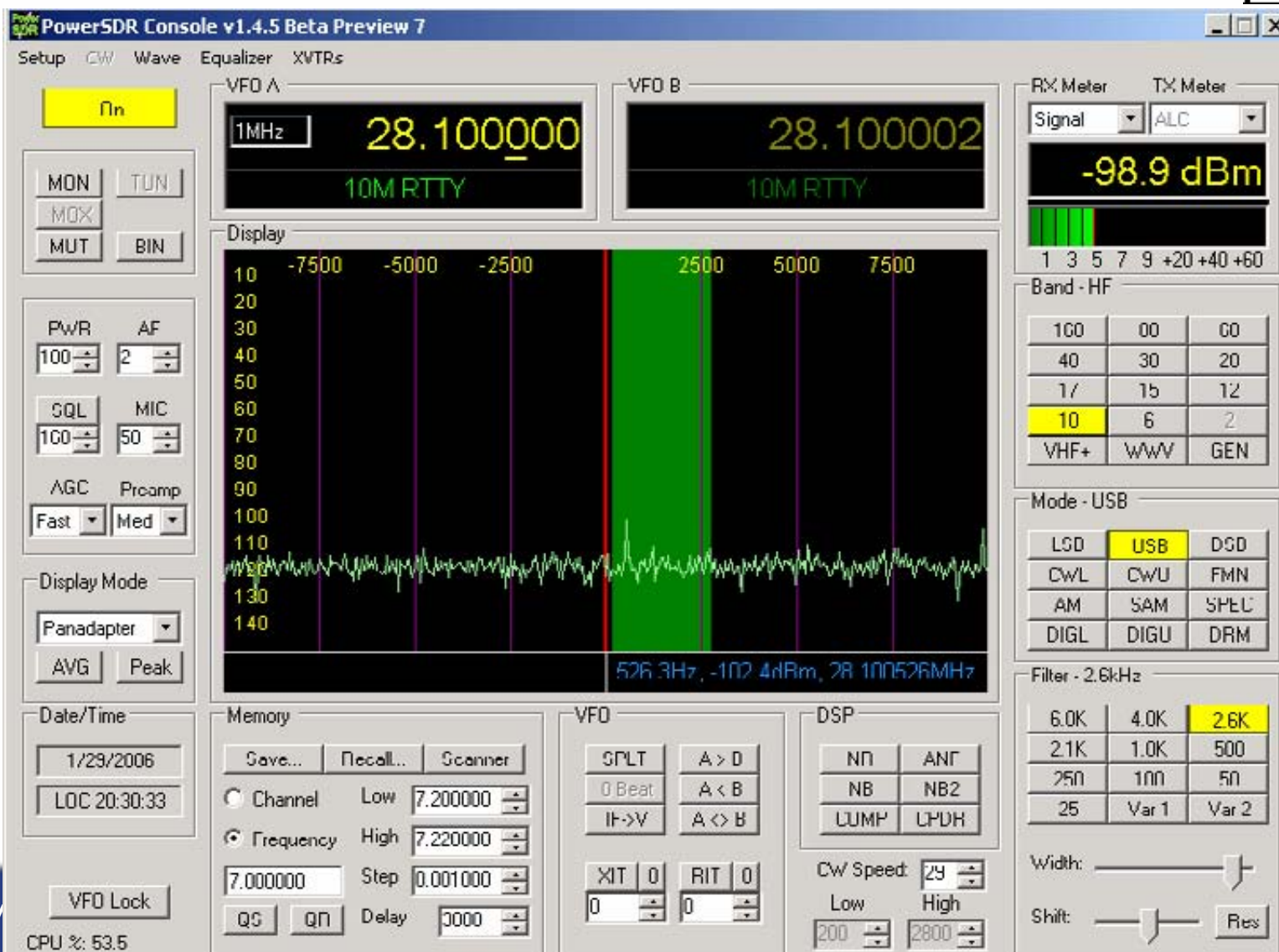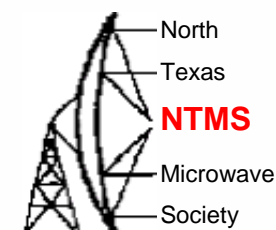- Only few changes needed in existing AD9850 software drivers

Schematic

DDS-60 Daughtercard
rev A1 December 30, 2005
N2APB, N2CX, N0YMV

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NM5M 0n 1296.100 MHz CW

Spanning 1296.086 to 1296.134 MHz

PowerSDR Console v1.4.5 Beta Preview 7

Setup CW Wave Equalizer XVTRs

On

MON TUN
MOX
MUT BIN

VFO A
100kHz **28.110000**
10M RTTY

VFO B
28.100002
10M RTTY

RX Meter TX Meter
Signal ALC
-88.7 dBm
1 3 5 7 9 +20 +40 +60

Display

-20000 -15000 -10000 -5000 10 5000 10000 15000 20000
20
30
40
50
60
70
80
90
100
110
120
130
140

-9368.4Hz , -102.0dBm, 28.100632MHz

PWR AF
100 2

SQL MIC
100 50

AGC Preamp
Fast Med

Display Mode
Spectrum
AVG Peak

Band - HF
160 80 60
40 30 20
17 15 12
10 6 2
VHF+ WWV GEN

Mode - SPEC
LSD USD DSD
CWL CWU FMN
AM SAM **SPEC**
DIGL DIGU DRM

Filter - 48kHz
6.0K 4.0K 2.6K
2.1K 1.0K 500
250 100 50
25 Var 1 Var 2

Date/Time
1/29/2006
LOC 20:28:47

Memory
Save... Recall... Scanner
○ Channel Low 7.200000
● Frequency High 7.220000
7.000000 Step 0.001000
QS QR Delay 0000

VFO
SPLT A > B
0 Beat A < B
IF->V A <> B
XIT 0 RIT 0
0 0

DSP
NR ANF
NB NB2
COMP CPDR
CW Speed: 29
Low High
200 2800

Width:
Shift: Rev

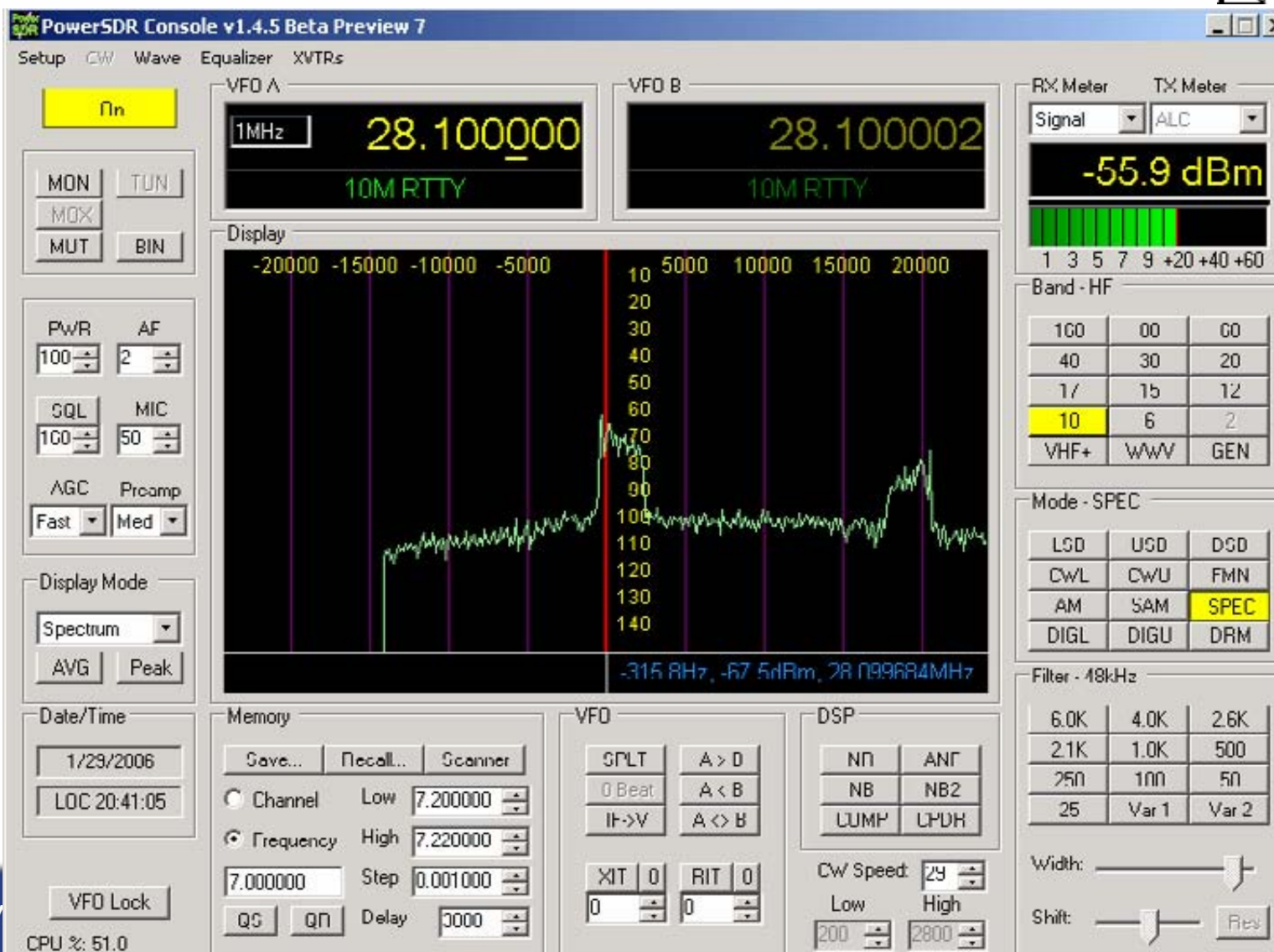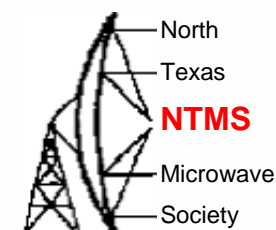VFO Lock
CPU %: 49.0

www

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NM5M 0n 1296.100 MHz CW
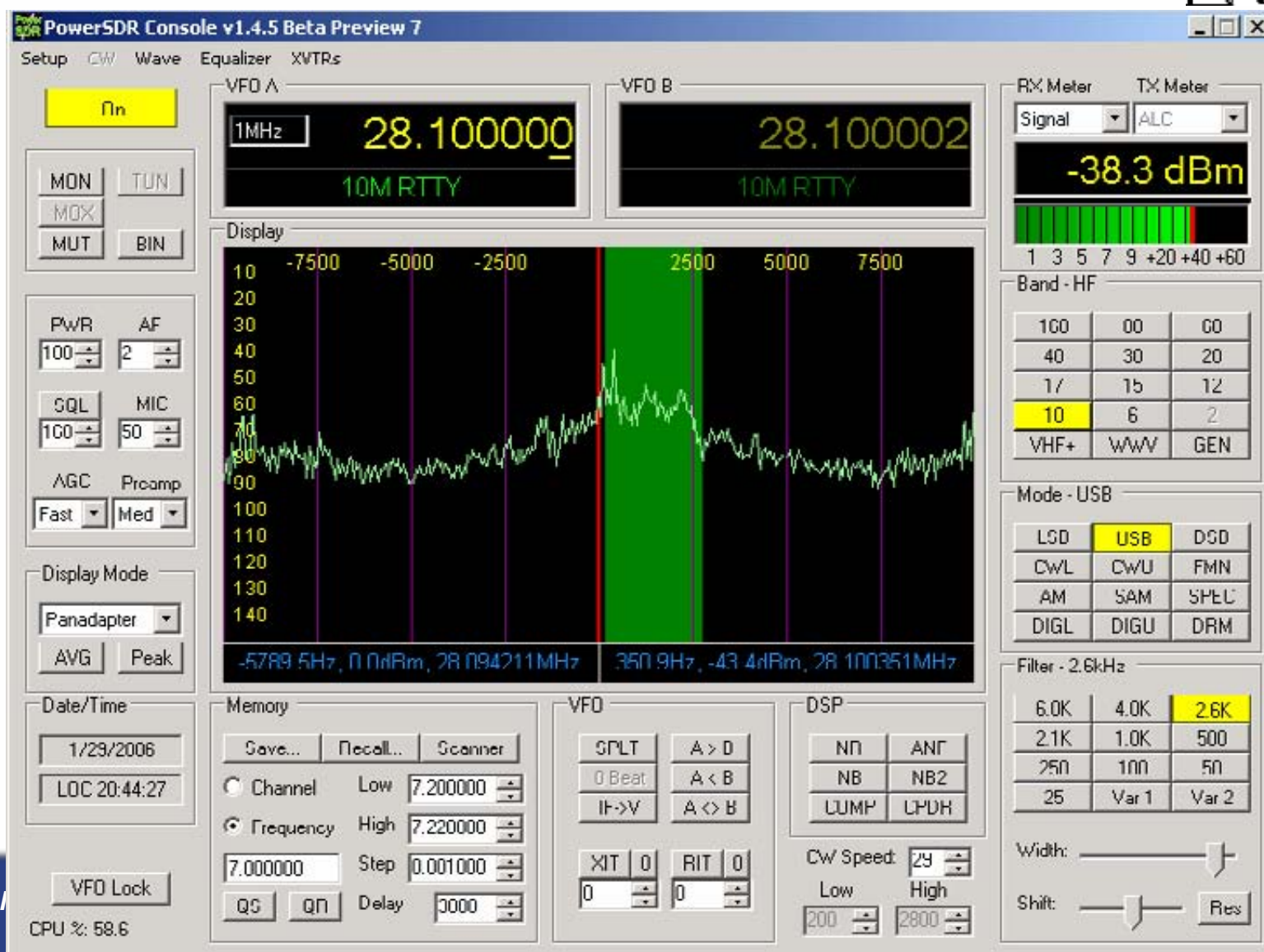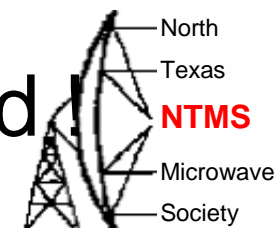
KA5BOU on 1296.100 MHz USB

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KA5BOU on 1296.100 MHz USB
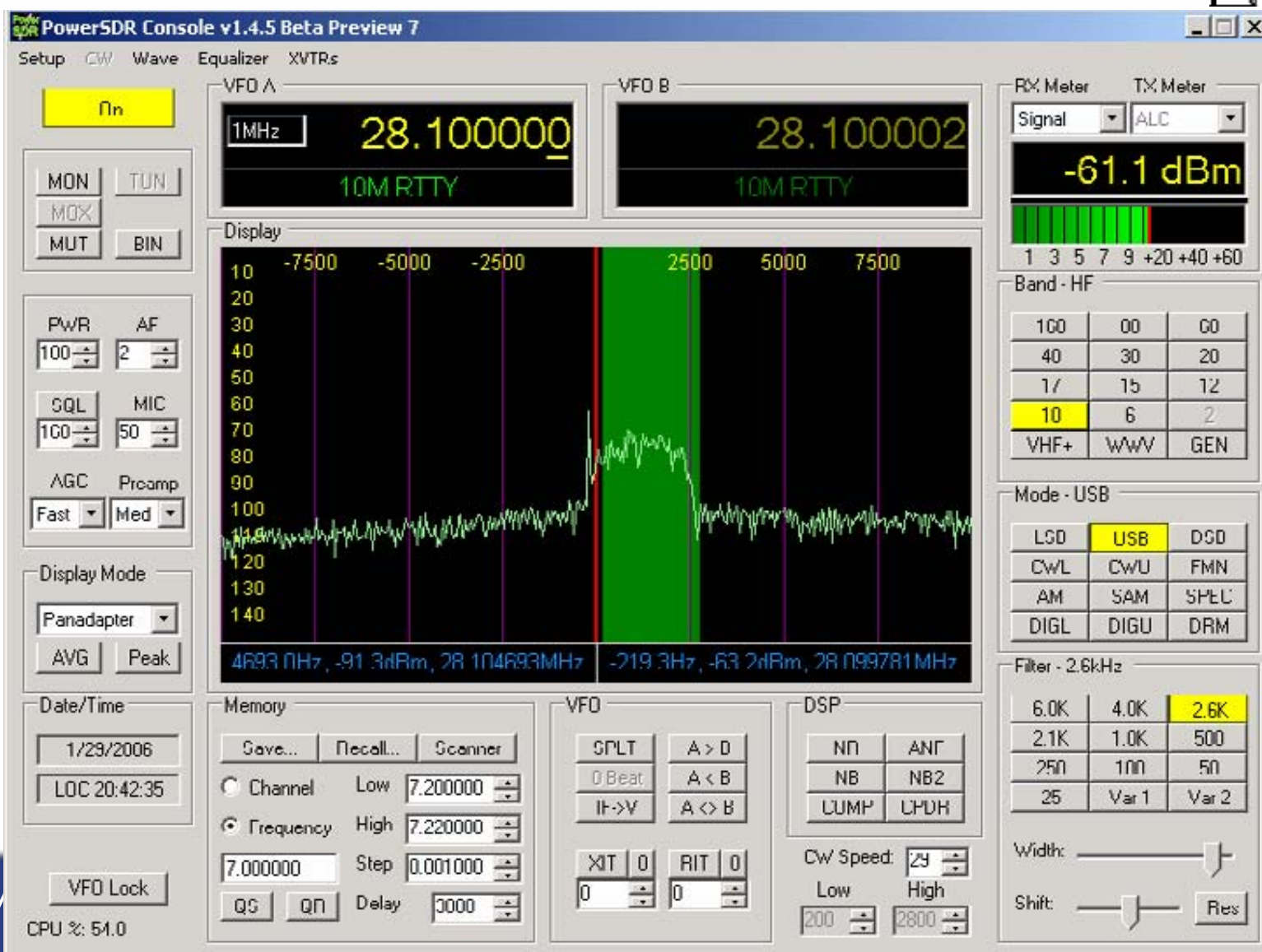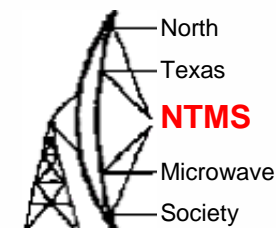
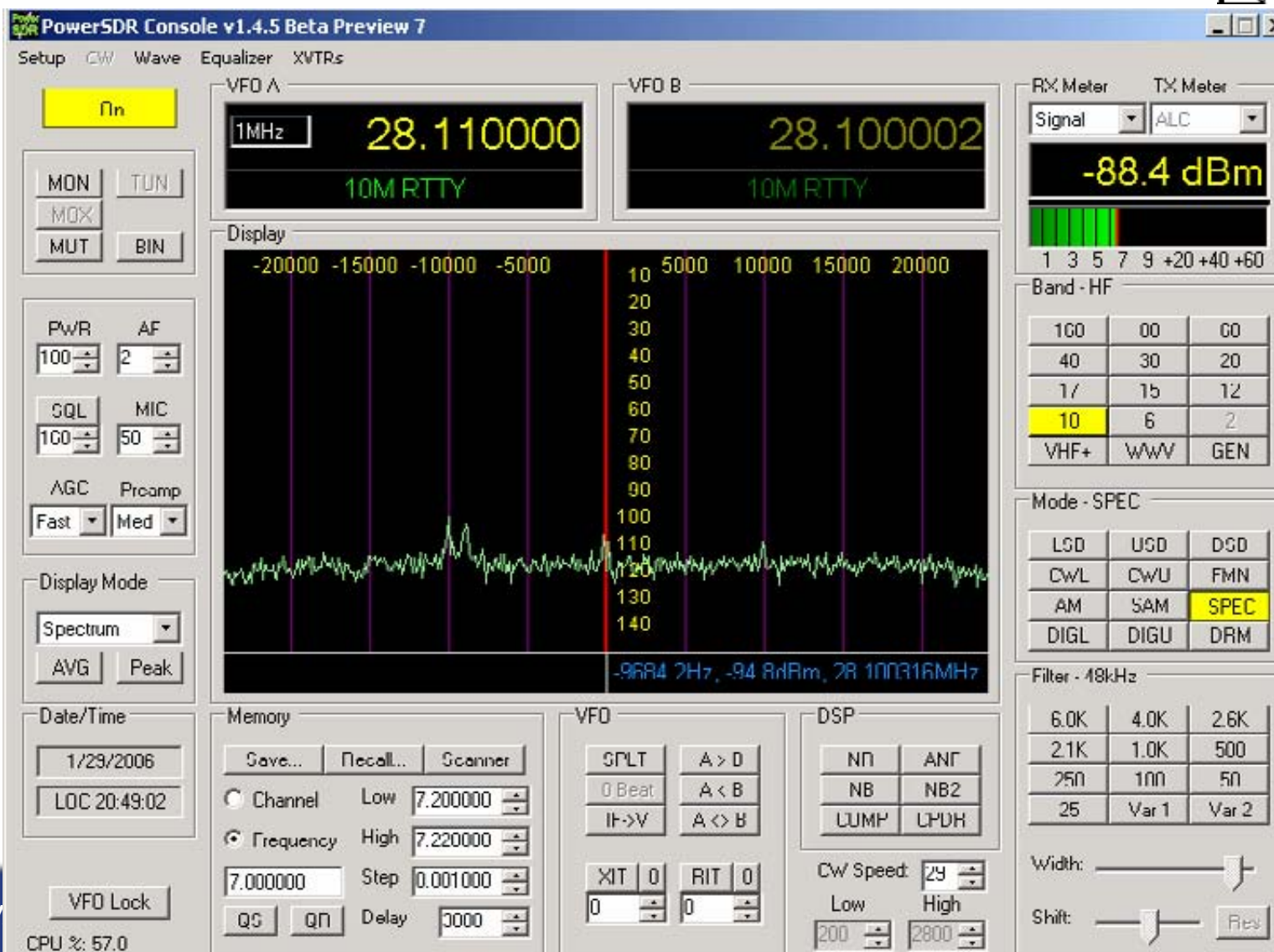# KA5BOU Overloading my Sound Card !

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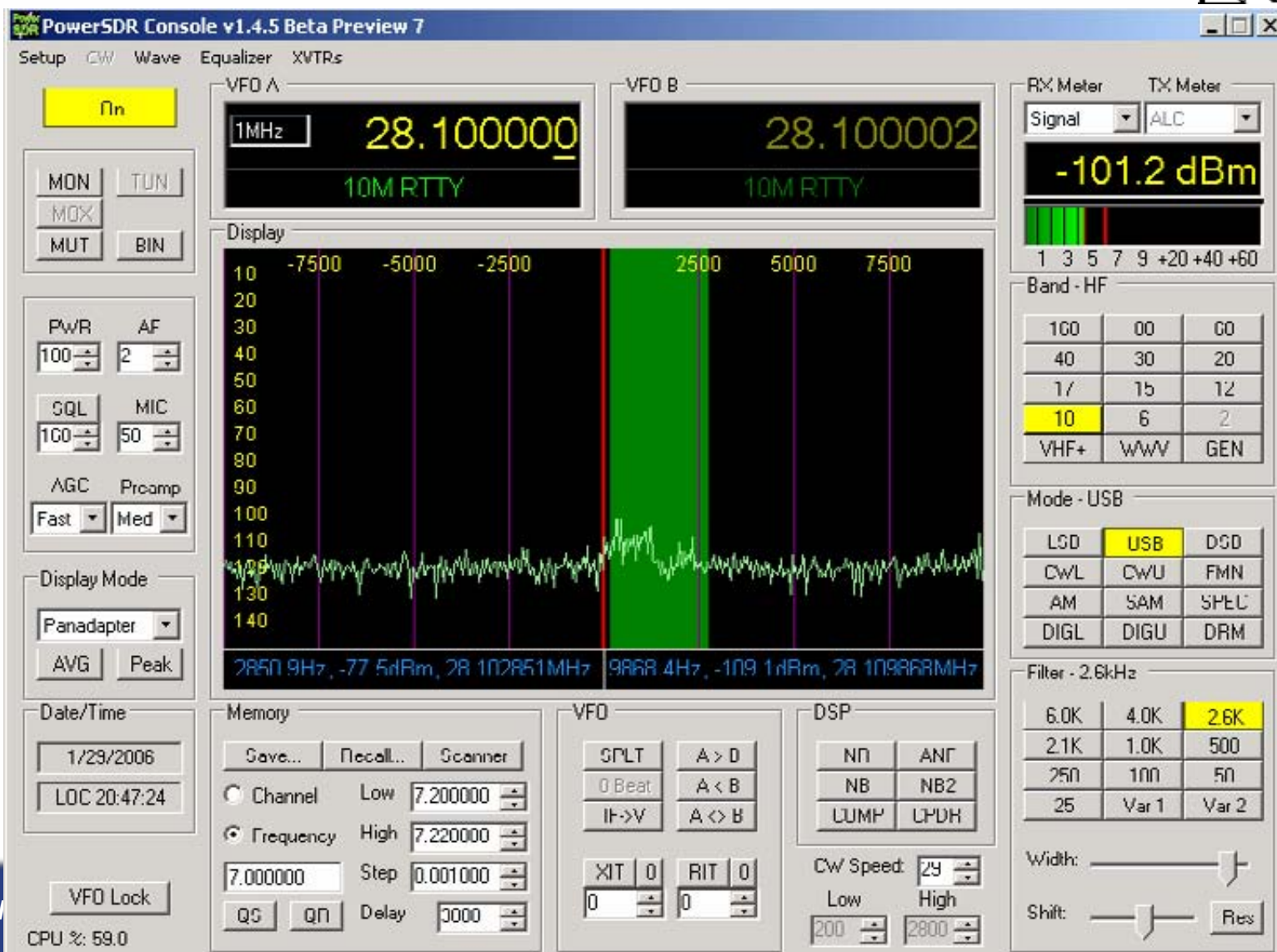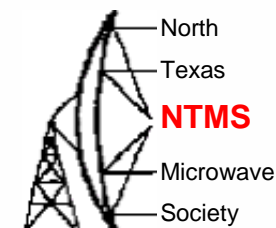Society

NM5M 0n 1296.100 MHz USB

NM5M on 1296.100 MHz SSB

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www.ntms.org   *14*

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

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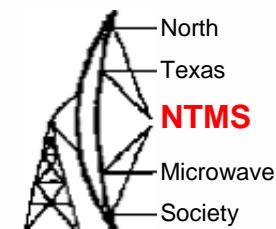
- SoftRock v5.0 OSC/BPF kits are now available for bands other than 40
  > and 20 meters. I have a limited supply of the band kits as follows:
  >
  > 160m with center frequency at 1.8432 MHz
  >
  > 80m with center frequency at 3.560 MHz
  >
  > 30m with center frequency at 10.125 MHz
  >
  > 17m with 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.
  >
  > 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 I
  > Still have a kit for the band you are interested in.
  >
  > Thanks and 73,
  > Tony KB9YIG
  >

  ## raparks@ctcisp.com

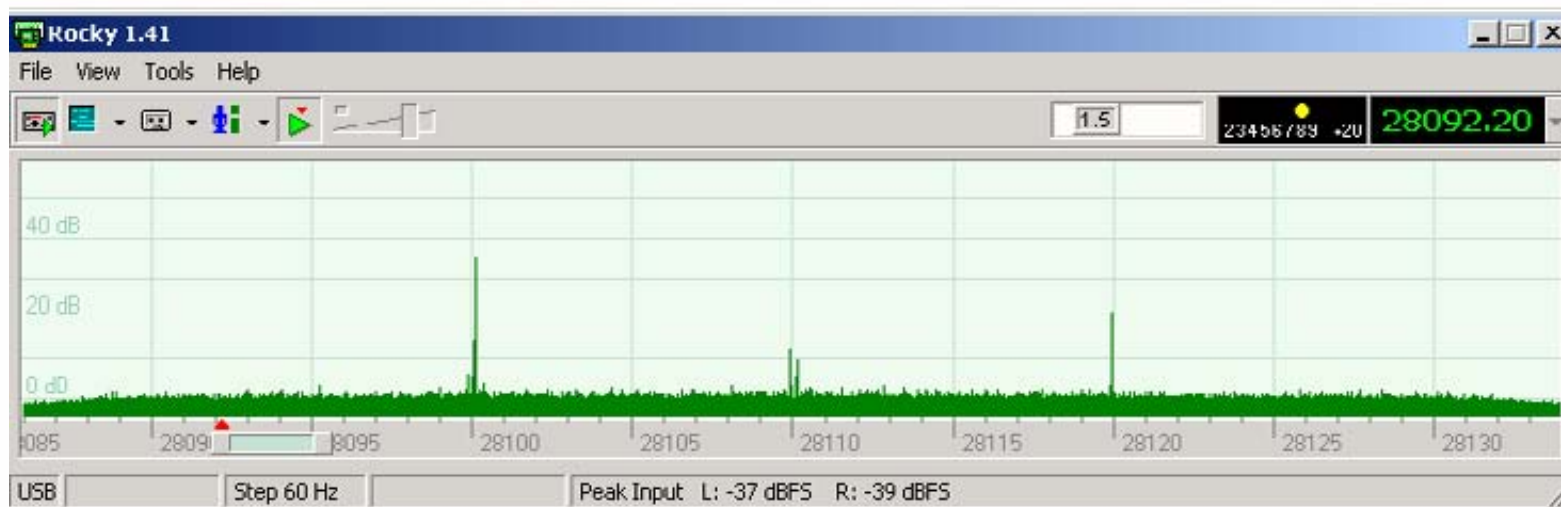# http://www.dxatlas.com/Rocky/
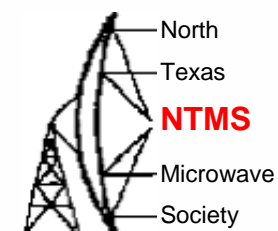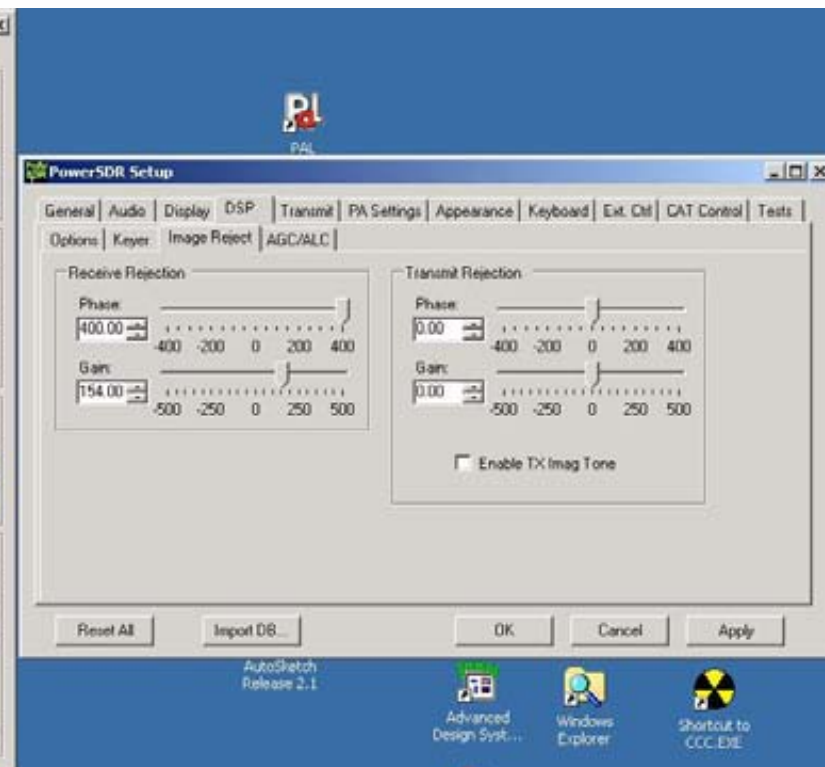
Rocky 1.41

FREEWARE

by Alex VE3NEA

ve3nea@dxatlas.com
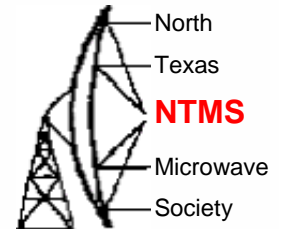
SDR software for **SoftRock40**

Optimizing I & Q Amplitude and Phase for best Image Rejection

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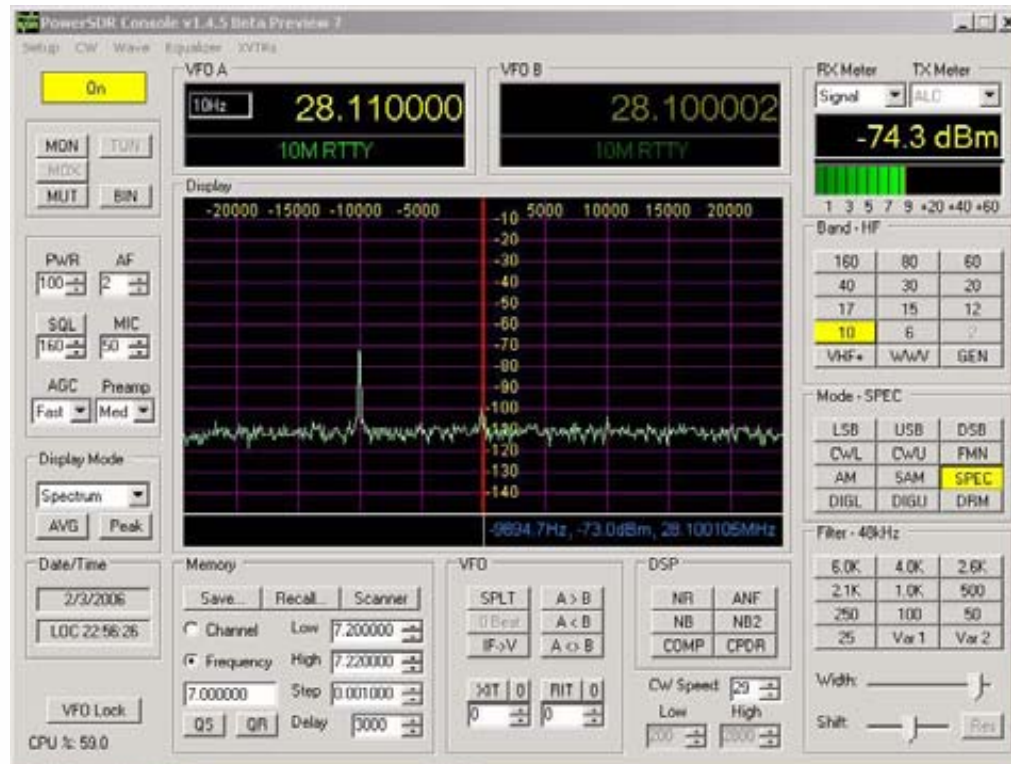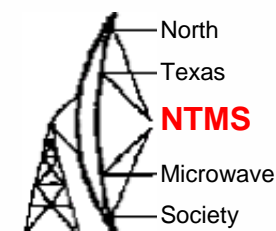
Summary

- 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?