

ANODE

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Anode Editor's Comments

**Volume 12, Issue 10
April 2012**

There are more pictures on the following pages.

Bring and Fix and Construct!

At the last bring and fix, Tony, ZS6CCD brought to the club house his new 'project'. Thanks to Phillip, I have the pictures.



Tony ZS6CCD at the clubhouse

{—}

Possible Ham Radio Arduino Applications

Posted by Jeff K on Sunday, September 11, 2011

☞ Use Arduino to collect and process position/weather/telemetry data and then output data strings serially into an amateur radio transmitter using APRS (Automatic Packet Reporting System).

<http://www.tcmaker.org/wiki/doku.php?id=hamradio:aprs>

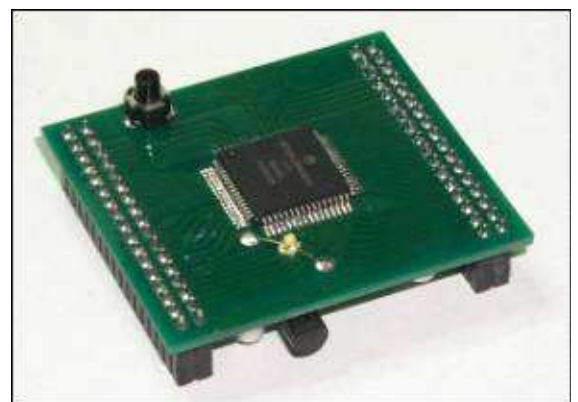
☞ Ham radio repeater controller with DTMF control.

(continued on page 2)

Ways you can use the DDS 'Daughtercard'

[Or ways you can talk to a DDS chip prototype.]B]

How many ways can you use a self-contained, high-precision signal source contained on a 1" x 2" plug-in circuit card? How about as a stand-alone VFO, a signal generator for your bench, a replacement LO for your Sierra or NC40 transceiver, or perhaps as the heart of an antenna analyzer! Control it with your favorite microcontroller, or even hang it off your PC's printer port. Any way you do it, you'll be generating quality signals for under \$20.



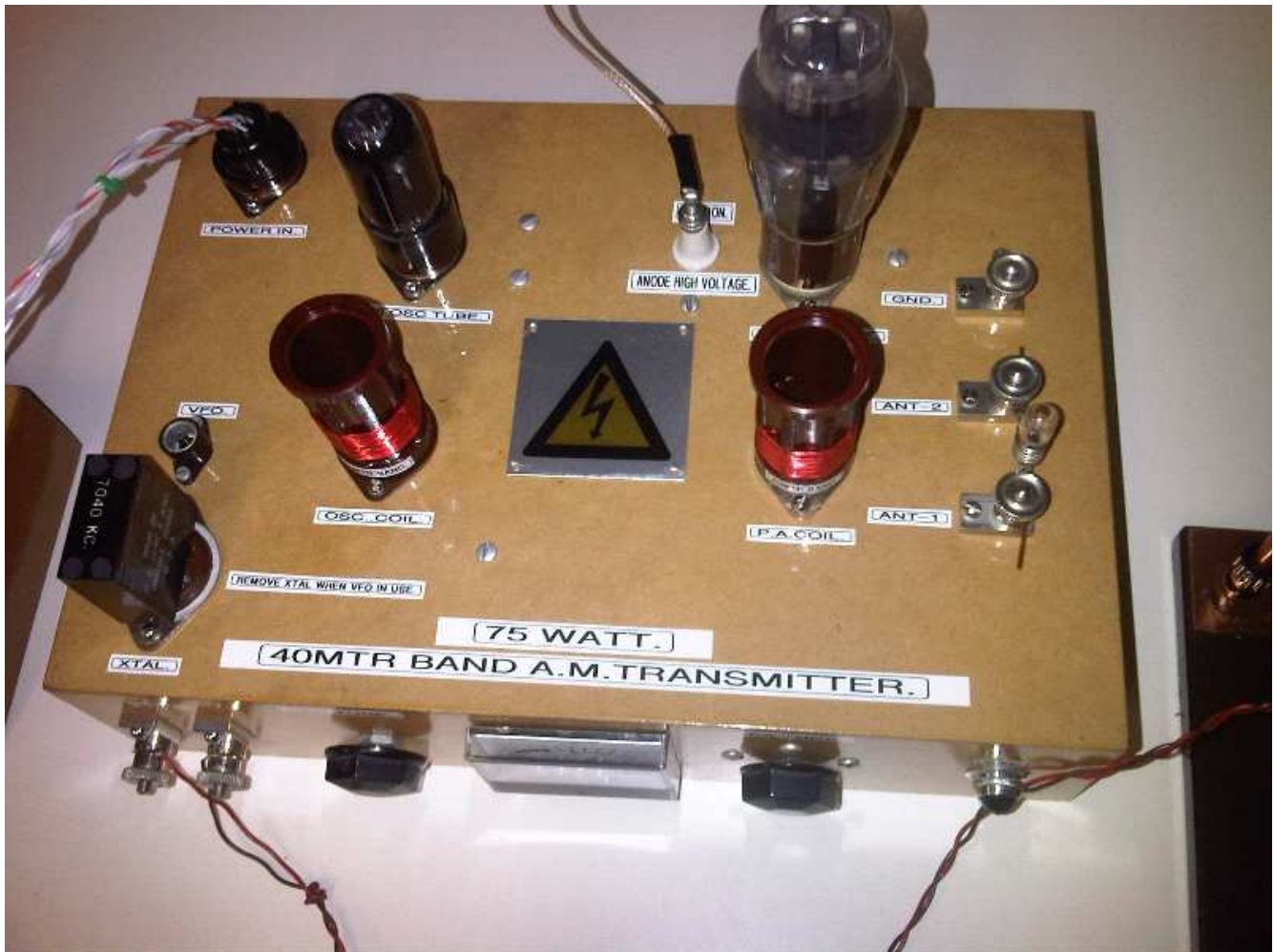
1) With a PIC
It'll work directly with the PIC16F84A and the "sigen3" PIC DDS VFO project

(Continued on page 4)

Special points of interest:

- **Contact details on back page UPDATED 2011-11-14**
- **Ham - Comp Latest on web site. Still under construction..**

Editor's comments - Club News



Tony's 40 metre band A.M. valve transmitter. On show at the club's 'bring and fix'.

(continued from page 1)

- ☐ Ham radio Morse code keyer for propagation beacon.
- ☐ Automatically tune a amateur radio's transmitting and receiving frequencies so as to allow two-way communications through a satellite. It also shows the accuracy of the doppler tuning while tracking a single satellite's tone through its pass:
http://www.youtube.com/user/VE9QRP#p/a/u/0/TP_fq_frqKw
- ☐ Antenna Rotor Controller
- ☐ Arduino-compatible GPS data logging platform designed for wireless telemetry (amateur rockets, high-altitude balloons, RC vehicles, APRS, etc.) (USA)
- ☐ Satellite tracking antenna controller
- ☐ DTMF Decoder to control an Arduino over ham radio.
<http://hackaday.com/2011/04/17/dtmf-shield-aimed-at-ham-controlled-arduino/>
- ☐ Ham radio contest keyer.
<http://radioartisan.wordpress.com/arduino-cw-keyer/>
- ☐ Controller for recorded audio messages

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duplexers: theory and tune up

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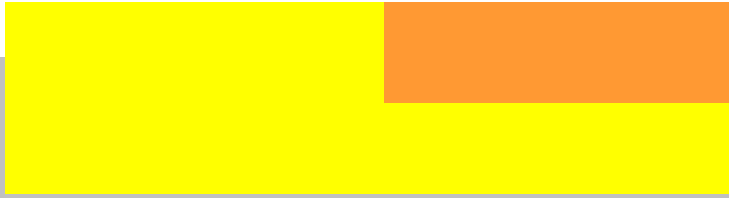


The A.M. transmitter with power supply.

(i.e.: CQ Caller)

- ☐ Use the Arduino to control the DDS-60 daughter card and create a digital VFO.
<http://midnightdesignsolutions.com/dds60/index.html>
- ☐ A USB S02R Box that is compatible with logging software.
<http://ncjweb.com/julaug10feat.pdf>
- ☐ Arduino based TNC.
<http://dangerousprototypes.com/2011/08/05/arduino-tnc/>
- ☐ Arduino APRS Tracker.
<http://hackaday.com/2011/04/20/trackuino-%E2%80%93-an-open-source-arduino-aprs-tracker/>
- ☐ Arduino PWM Laser transmitter.
<http://brainwagon.org/2011/08/14/arduino-pwm-laser-transmitter/>
- ☐ Arduino Controlled WSPR Beacon.
<http://ko7m.blogspot.com/2011/03/wspr-beacon-with-arduino-and-dds-60.html>
- ☐ Arduino True Battery Capacity Tester (Li-Ion/NiMH/NiCD/Pb)
<http://www.instructables.com/id/Arduino-True-Battery-Capacity-Tester-Li-IonNiMH/>
- ☐ Arduino controlled antenna tuner.
<http://www.n3ox.net/projects/servo>
- ☐ Arduino packet radio controller.
<http://dangerousprototypes.com/2011/01/31/>

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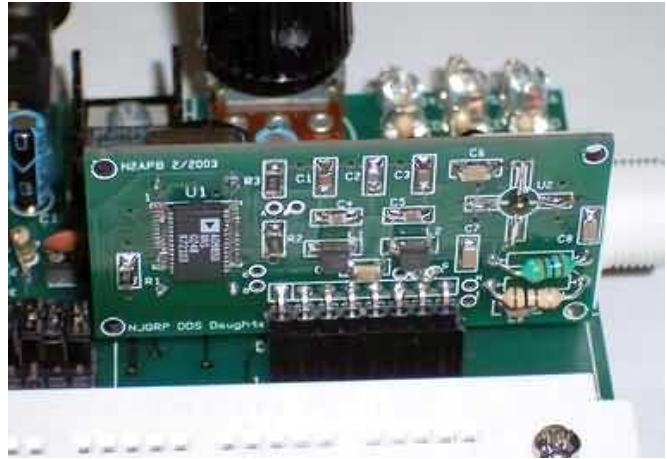
Ways you can use the DDS 'Daughtercard'

(Continued from page 1)

that started this whole craze. One can get the PIC code from the HamPIC Resource Page (<http://www.njqrp.org/ham-pic/projects.htm>) and program the PIC directly to control the DDS Daughtercard. Adding a rotary encoder yields a project that is a good VFO with bells 'n whistles designed by Craig AA0ZZ and Bruce AA0ED.

2) With the QuickieLab

It plugs directly into the NJQRP QuickieLab (<http://www.njqrp.org/quickielab/index.html>) to give that BASIC experimenter's platform RF generation capability. With the canned software available for this project, along with Joe Everhart's wonderful "Quickies" and "Test Topic & More" columns that focus on its use, this is probably the easiest and most flexible way to play with a DDS.



3) With a custom controller

Of course you can also design the DDS Daughtercard into your own custom project, using your favourite microcontroller chip as the "brains", be it a PIC, Atmel, Ubicom, or 8051-derivative processor. The possibilities are limitless!

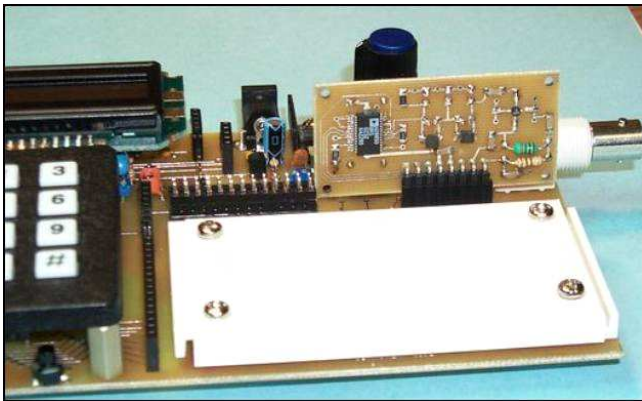


Photo of DDS Daughtercard plugged into the NJQRP QuickieLab project. Prototype DDS 'card is shown on the left, and the production version is on the right. Note the small board space actually required for this VFO function.

The back side of the DDS Daughtercard is shown in a rear view of the QuickieLab. (Prototype DDS 'card on left, production on right.)



This photo shows the DDS Daughtercard included in a circuit I call the Exerciser ... which is a test fixture that all HC908 Daughtercards get plugged into in order to get tested and qualified before being programmed with the appropriate software before shipping. (The Exerciser schematic and software program are located in the HC908 Daughtercard manual.)

4) With the Micro908

(continued on page 5)

Ways you can use the DDS 'Daughtercard'

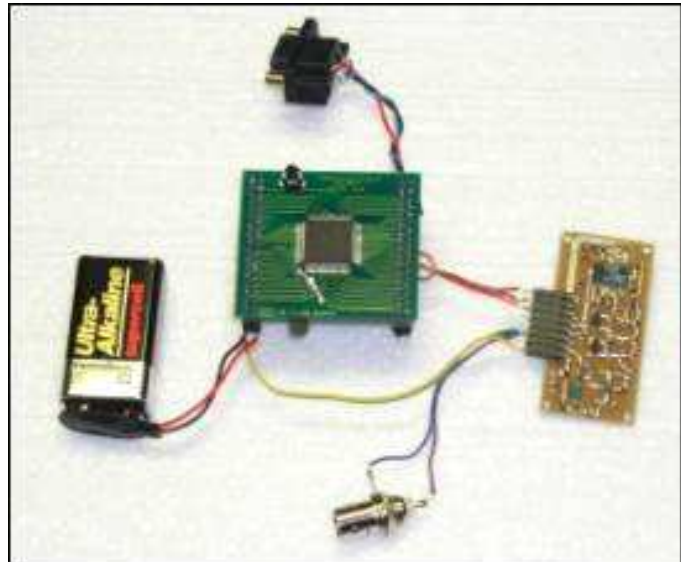
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The DDS Daughtercard is already incorporated into the Micro908 kit from the AmQRP Club and is integrally used to make the instrument function as an antenna analyzer. So if you are able to write a specific VFO program for the Micro908, or perhaps just use the VFO function provided with the AA-908 software load on the Micro908, you can use the instrument to generate signals "right out of the box".



The DDS Daughtercard (identified by the white circle in the photo above), is controlled by the HC908 Daughtercard on the Micro908 motherboard.

It plugs into an 8-pin right-angle connector that holds the DDS card up off the motherboard, above the reflectometer circuits of the Micro908.



5) With the Standalone HC908 Daughtercard microcontroller

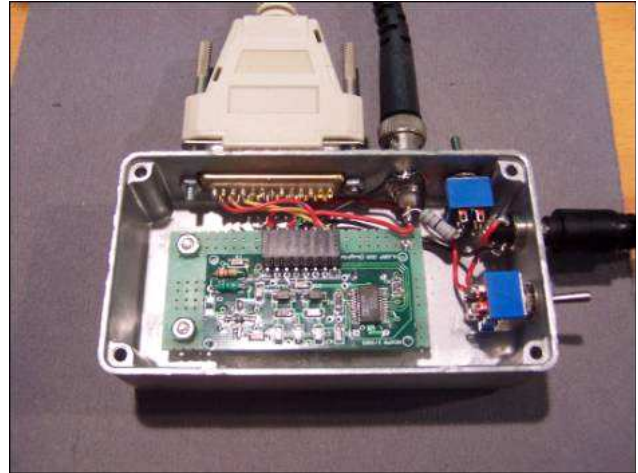
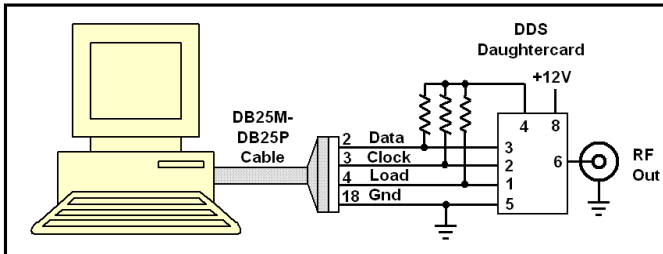
You may also plug the daughtercard into the HC908 Excerciser board described in the Digital QRP Breadboard project and use the software provided with that project to have it serve as a programmable VFO. Here is the latest versions of the "HelloDDS" control software that allows a terminal controller on a PC to serially control an HC908+DDS pair over an RS-232 port:

The HC908 Daughtercard controller is a popular and recurring component with the DDS Daughtercard. Together they make a flexible combination of modules that can be used in many different applications, using a common set of software libraries (subroutines). The configuration of the two modules shown in the right photo is the minimal hardware arrangement needed for a "dumb terminal" (like HyperTerm on a Windows PC or ProComm on a handheld computer) to command the HC908 to generate frequencies ... in effect, the HC908 and DDS daughtercards become a remotely-controlled signal generator!

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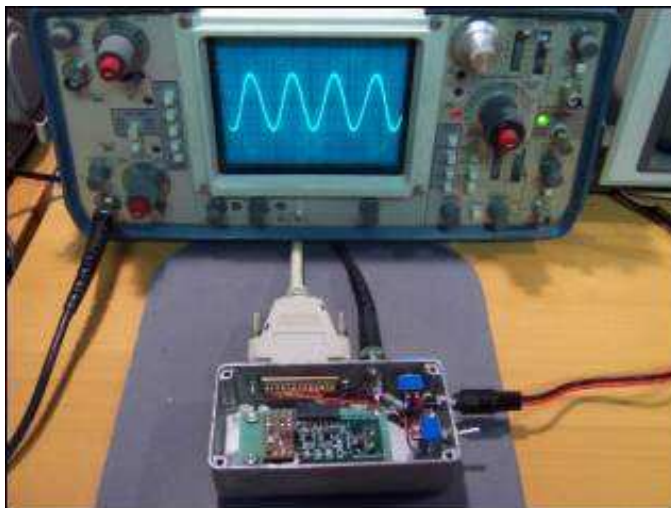
Ways you can use the DDS 'Daughtercard'

(Continued from page 5)



6) With a PC ...

Control the NJQRP DDS Daughtercards from your PC. The DDS-330/60 cards can be easily wired to the printer cable on one's PC and controlled by a program running on the PC. All you need to do is wire up the parallel port cable to the DDS card as shown below and then run either of two programs: DDSFreq (by WA6FXT) or "DDS Controller" (by WA6UFQ).



Connect the DDS Daughtercard to the parallel (printer) port of a PC, turning the PC into the 'control panel' for your VFO.

WA6UFQ "DDS Controller" PC program

The DDS Controller now has fifteen user programmable configurations, or bands. Each of the fifteen bands have twenty memory cells for sav-

ing and recalling frequencies. The screen snapshot below shows the DDS Controller programmed as a VFO for a 6M transceiver. Features of the DDS Controller include the ability to scan memory cells, and sweep the VFO's frequency spectrum at various sweep rates and frequency steps. The DDS Controller can be programmed with a frequency offset for use with a superhet receiver/transceiver, or it can output at 2X, or 4X the displayed frequency for SDR service. The output frequency of the DDS VFO can be changed by direct keypad entry or by using the UP / DOWN keys on the keypad. The DDS Controller can also be configured to use a non-standard reference oscillator frequency. And now the DDS Controller outputs band information to the parallel port interface.

Features include ...

- Saves the last frequency used at shut-down for use at the next start-up.

- Remembers the last VFO tuning step when moving from band to band.

- Saves the position of the DDS Controller on the Desktop at shut-down, and starts up at that position.

- DDS Controller outputs a four bit word to the parallel port with band information that can be decoded to control filters, etc.

- Supports fifteen bands, allowing for HF + 6M, as well as four 'Aux' bands.

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Ways you can use the DDS 'Daughtercard'

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Frequency display can be offset to allow for 'LO Above' or 'LO Below' when used in Superhet configurations.

Interfaces with parallel ports LPT1, LPT2, and LPT3.

Has option to use a non-standard reference oscillator frequency.

Works with the AD9851 chip (60 mHz), as well as the AD9850 chip (30 mHz).

Has option to enable/disable the AD9851 X6 multiplier.

Has 20 memory cells per band.

User programmable Scan and Sweep functions.

Outputs at 1X, 2X, or 4X the displayed frequency to accommodate various Software Defined Radio configurations.

See the latest information and full description of features at the WA6UFQ site: <http://home.austin.rr.com/wa6ufq//ddscontroller.html>

Download the installation package for the DDS Controller program, v2.4.1.

"DDS Controller" by WA6UFQ

WA6FXT "DDSFreq" PC program



DDSFreq, by Mike Hasenfratz, WA6FXT, serves as a VFO 'front panel'. This Windows program presents a window with settings that can be entered for frequency, phase, serial port, and start/end frequency, which instructs the program to continually update the DDS programming register with the next frequency in the series.

Download the program to run on Windows Systems

The first window to appear when running DDSFreq provides control of the control word sent to the DDS chip. Another window provide control of Sweep.

Before you are able to control your DDS Daughtercard from your PC, you should enter your computer's parallel port address and the value being used for your DDS reference clock oscillator into the Properties window. From the main window above, pull down the Edit menu and select Properties, which then shows the window below. Most often your clock will be 100 MHz, and the address of your parallel port will be '378' as shown below. If your port is different than LPT1: then you will need to change that value to what you have. (Consult your Hardware Manager in the Control Panel to see the details about your LPT ports if you have trouble.)

7) With a KG6CYN-designed ATmel Microcontroller

It can easily be controlled by the ATmel microcontroller chip used in the Trevor Jacobs KG6CYN DDS VFO board set. Although one could change the oscillator to use a 120 MHz version as Trevor used, a more straightforward and easy way for guys to use this neat VFO program would be to just change the software to use the 100 MHz oscillator used on the DDS Daughtercard. After all, it's just software constants that determine the base incremental unit

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Ways you can use the DDS 'Daughtercard'

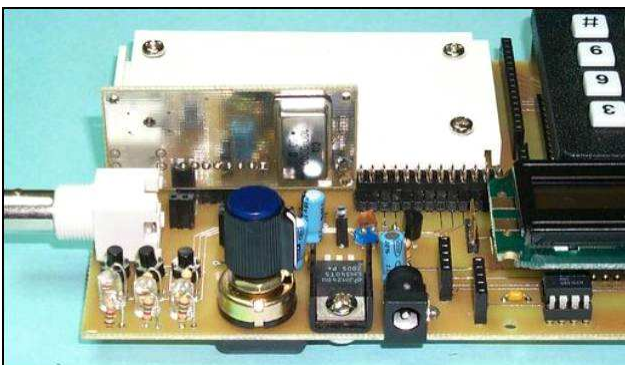
(Continued from page 7)

of the control word issued to the DDS - one can just change the software in a couple of places and be rockin' with the DDS Daughtercard. (I opted to keep the AD9850 top usable frequency at 30 MHz ... there's not as much use for the 30-40 MHz frequency range by most HF hams, and keeping the oscillator correspondingly lower offers a tad less power consumption and heat generation. Besides, with a 100 MHz oscillator its directly usable with the popular DDS code mentioned in #1 above.)

8) With a W8DIZ-designed ATmel Micrcontroller

I've been corresponding with Diz (W8DIZ) and without letting out too many of his plans, he said he's also working on some ATmel code to drive the DDS Daughtercard. I think this is just great! [I've got to get myself set up with an ATmel development station of some sort.] So pretty soon we'll have another microcontroller that one could connect up to the DDS 'card.

Here's an example of the DDS Daughtercard (the prototype version) plugged into a specialized project.



Again, note the small space needed to fit the DDS 'card.

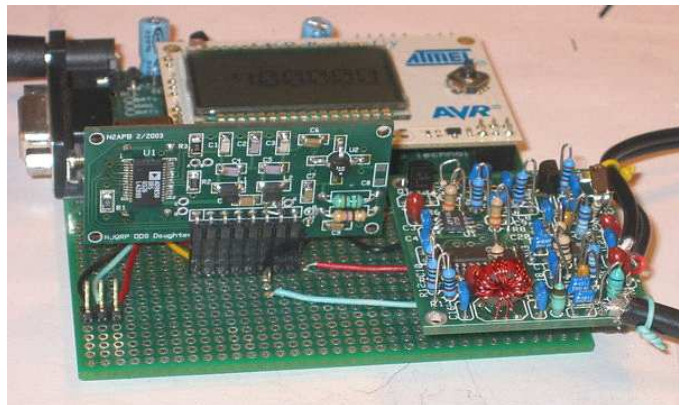
But note that all these ideas essentially gen-

erate a "VFO" as a standalone unit. That is nice and everyone sure could benefit from having a solid, precise signal generation device on their bench ... but we've only scratched the surface because there are many uses for such a stable VFO in OTHER projects. For example ...

8) In a lab-grade Signal Generator

There's been some discussion over the past couple of years concerning how one could build a very stable frequency generator suitable for lab bench work. This entails using a DDS (or a PLL and DDS combination) to generate the stable and variably-controlled frequency source, and the precise control of attenuation on the output of that signal source. We're working with an individual who thinks that the DDS Daughtercard may be the way to go at the heart of that design.

9) With the KD1JV "Butterfly" Controller



KD5TFD writes: "When I built my SoftRock-40, I wanted to perform some experiments and pair it up with a DDS Daughter Card from the AmQRP to give it more tuning range, so I replaced some of the components on the SoftRock-40 board with headers so I could tie-in the DDS signal from the daughtercard. Using an NJQRP DDS Daughtercard and an Atmel AVR Butterfly controller card, I was able to create a VFO using KD1JV software. I figured this would make a good LO to drive the SoftRock-40, so I connected them all together using a carrier board from ERCOS Technology, with the result shown

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Birthdays in April

April 02	ZS6HFW	Herculaas Wallace
April 03	Adrienne	Spouse of ZS6MJP Mark Pollock
April 10	Zoe	Child of ZR6DCP Stewart/Cindy da Costa Pereira
April 14	Anke	Child of ZR6I Jaques/Martinette Mostert
April 18	Marie	Spouse of ZS6WWJ Willem Weideman
April 18	Edwin Wallace	Child of Edgar/Cornelia Wallace
April 19	ZS6RQM	Boleslaw Halas
April 20	ZS6PET	Peter Hasert
April 21	ZR6DLD	Diane
April 22	Tommy	Child of ZS6NCK Nick/Judy Dreyer
April 22	Chad	Child of ZR6DCP Stewart/Cindy da Costa Pereira
April 24	ZR6I	Jaques Mostert
April 25	ZS6KZA	Andre' Kehlert
April 26	ZS6AU	Gus Pereira
April 29	ZS6ZOO	Paul Bester
April 30	ZS6PRO	Robert Degossely

Ways you can use the DDS 'Daughtercard'

(Continued from page 8)
below. "

SoftRock-40 (on right) being controlled by an AVR Butterfly card driving an NJQRP DDS Daughtercard, thus replacing the fixed crystal oscillator and allowing the SoftRock-40 to reach across the entire 40m ham band.


These are all "food for thought" and ideas for the workbench ... if only we all had more time to explore them! The beauty of this approach however is that there's likely at least one idea listed here that has the ability of striking the sweet spot for 'home brewers' on the list.

73, George N2APB Last Modified: April 2, 2007

Taken from:-
<http://www.njqrp.org/index.html>

Editor's Comments and Club News

(Continued from page 3)

packet-radio-and-the-arduino-radio-shield/
 Arduino controller for hidden transmitters for Foxhunt applications.

Visit JK Devices for Arduino compatible boards. The JKD MegaMini 2560 is one of the smallest interpretations of the Arduino Mega2560

The West Rand Amateur Radio Club
Established in 1938
KG33XU 26.14122 South - 27.91870 East

P.O. Box 5344
 Weltevreden Park
 1715

Phone: 083 267 3835 (Chairman)
Email: zs6wr.club@gmail.com
Web page: www.zs6wr.co.za

Bulletins (Sundays at ...)

11h15 Start of call in of stations
 11h30 Main bulletin start

Frequencies

Output: 439.000 MHz 7.6 MHz split
 Input: 431.4 MHz (West Rand Repeater)
 145,625 MHz (West Rand Repeater)
 (HF Relay when possible)

Radio Amateurs do it with more frequency!

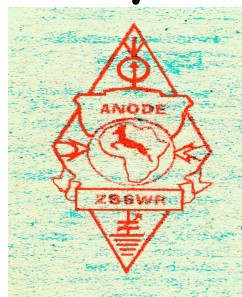
Chairman (technical)	Phillip van Tonder	ZS6PVT	083 267 3835	zs6wr.club@gmail.com OR zs6pvt@gmail.com
Vice Chairman	Geoff Levey	ZS6GRL	082 546 5546	gleyey@gmail.com
Secretary	Rory Crouch	ZS6RBJ	082 448 4445	rorycrouch@mweb.co.za
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Please send plain text with no formatting to the email address below.

See Club website at www.zs6wr.co.za for all ANODE back issues.



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