**M Gmail**

**Clare Owens <clare.owens@gmail.com>**

# Re: [ARC5] Programmable Oscillators

17 messages

**David Stinson** <arc5@ix.netcom.com>                                   Sun, Feb 10, 2013 at 10:50 AM
Reply-To: David Stinson <arc5@ix.netcom.com>
To: David Stinson <arc5@ix.netcom.com>, arc5@mailman.qth.net

Here is a page from Digikey.  Lowest-price for through-hole
oscillator, programmed to order by them is $4.10 in quantites of 1.

http://tinyurl.com/b6kxgeo

I haven't ordered any yet but will soon.

I'd go with the 5-Volt type for the bigger rail-to-rail swing.
Some even have "Tri-state" control pins so switching is easy.

Output to a Pierce will probably need conditioning in some way,
but that should be easy.

73 Dave AB5S.


_____
ARC5 mailing list
Home: http://mailman.qth.net/mailman/listinfo/arc5
Help: http://mailman.qth.net/mmfaq.htm
Post: mailto:ARC5@mailman.qth.net

This list hosted by: http://www.qsl.net
Please help support this email list: http://www.qsl.net/donate.html

**J. Forster** <jfor@quikus.com>                                         Sun, Feb 10, 2013 at 11:26 AM

Reply-To: jfor@quikus.com
To: David Stinson <arc5@ix.netcom.com>
Cc: arc5@mailman.qth.net

Hi,

Have you checked the actual available frequencies? I'd expect them to be
quantized in some fashion..

The output is likely to be 0 & 1 logic levels, swo will have loads of odd
harmonics.

-John

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**David Stinson** <arc5@ix.netcom.com>                          Sun, Feb 10, 2013 at 12:02 PM
Reply-To: David Stinson <arc5@ix.netcom.com>
To: ARC-5 List <arc5@mailman.qth.net>

----- Original Message ----- From: "J. Forster" <jfor@quikus.com>

> Have you checked the actual available frequencies? I'd expect them to be
> quantized in some fashion..

Here is a typical oscillator's datasheet:
http://pdf1.alldatasheet.com/datasheet-pdf/view/161044/EPSON/SG-8002DB.html

It is programmable in 0.1 KC steps up to 125 MC.

> The output is likely to be 0 & 1 logic levels, swo will have loads of odd
> harmonics.

True, and that may or may not be a problem depending on the circuits following.  If it is, a low-pass filter at a 5 volt signal level
should be easy.   I'm going to get moving on this one, I think.

[Quoted text hidden]

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**Bill Fuqua** <wlfuqu00@uky.edu>      Sun, Feb 10, 2013 at 12:11 PM
To: arc5@mailman.qth.net

   I have used these when they cost much more.
They are fine at low frequencies but above 20 MHz the phase noise sidebands
are noticeable and practically unusable at VHF frequencies. At VHF frequencies
they sound more like a hiss than a carrier.
   There have been some improvements since then in the internal synthesizers and perhaps
they are much better. Perhaps I should give them a try again.
   Please let us know how they turn out for you.
Oh yes, the ones I got were programmable do the Hz.
73
Bill wa4lav
[Quoted text hidden]

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**J. Forster** <jfor@quikus.com>      Sun, Feb 10, 2013 at 12:10 PM
Reply-To: jfor@quikus.com
To: David Stinson <arc5@ix.netcom.com>
Cc: ARC-5 List <arc5@mailman.qth.net>

Looks like an interesting device. Let us know how you make out. The RT/FT
is nS so it will need filtering.

-John


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**Bill Fuqua** <wlfuqu00@uky.edu>      Sun, Feb 10, 2013 at 1:08 PM
To: David Stinson <arc5@ix.netcom.com>, arc5@mailman.qth.net

   Here is some data from a guy that has made some measurements.
That is not to say that yours may be different since the actual programming
frequency and other factors determine the actual results. It is still worth while trying
one in your application and see how it works out. Mine was to for qrp tx and rx.

Tx is less of a problem as long as the spurious responses are low enough.
Rx applications may be different. In my case up to 7 MHz seemed to be OK.
I was also looking into using one for a plasma geneator at 13.56 Mhz.


http://lowfer.us/k0lr/epson/epson.htm

73
Bill wa4lav
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**Leslie Smith** <vk2bcu@operamail.com>                          Sun, Feb 10, 2013 at 4:06 PM
To: ARC-5 List <arc5@mailman.qth.net>

My observation:  These are "digital" oscillators.
The signal out is probably square wave, so think carefully about the
harmonics etc that will accompany the fundamental.
Analog RF work is a world separate from the signals in the digital (TTL)
world.

73

  Leslie Smith
  vk2bcu@operamail.com
[Quoted text hidden]
--
http://www.fastmail.fm - mmm... Fastmail...
[Quoted text hidden]

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**Bill Fuqua** <wlfuqu00@uky.edu>                                Mon, Feb 11, 2013 at 2:08 AM
To: Leslie Smith <vk2bcu@operamail.com>, ARC-5 List <arc5@mailman.qth.net>

Most tube RF oscillators are class C and produce loads of harmonics unless you take signal straight off the tuned
circuit.
For lower frequencies use a 74HC4040 divider. When you divide a signal with phase noise you reduce the phase
noise and
jitter. Each divide by 2 reduces the phase noise by 6db.

73
Bill wa4lav

At 08:06 AM 2/11/2013 +1100, Leslie Smith wrote:
My observation: These are "digital" oscillators.
The signal out is probably square wave, so think carefully about the
harmonics etc that will accompany the fundamental.
Analog RF work is a world separate from the signals in the digital (TTL)
world.

73

Leslie Smith
vk2bcu@operamail.com

On Mon, Feb 11, 2013, at 2:50, David Stinson wrote:
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--
http://www.fastmail.fm - mmm... Fastmail...

_____
ARC5 mailing list
Home: http://mailman.qth.net/mailman/listinfo/arc5
Help: http://mailman.qth.net/mmfaq.htm
Post: mailto:ARC5@mailman.qth.net

This list hosted by: http://www.qsl.net
Please help support this email list: http://www.qsl.net/donate.html
[Quoted text hidden]

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**Francesco Ledda** <frledda@att.net>                    Mon, Feb 11, 2013 at 10:19 AM
To: Bill Fuqua <wlfuqu00@uky.edu>
Cc: ARC-5 List <arc5@mailman.qth.net>

Time jitter doesn't change, but becomes half respect to the period, by dividing by two. It is the same as you said, but
in different words....

Sent from my iPhone
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**Bill Fuqua** <wlfuqu00@uky.edu>                                   Mon, Feb 11, 2013 at 12:21 PM
To: Francesco Ledda <frledda@att.net>
Cc: ARC-5 List <arc5@mailman.qth.net>

   Time jitter does change because by dividing  the frequency thru the flip flops you
average two cycle time jitters for each flip flop. And that is why the phase noise is
also reduced as well. There is a correlation between time jitter and phase noise (phase jitter).


73
Bill wa4lav

At 09:19 AM 2/11/2013 -0600, Francesco Ledda wr


ote:
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**Dennis Monticelli** <dennis.monticelli@gmail.com>                 Wed, Feb 13, 2013 at 11:15 AM
To: David Stinson <arc5@ix.netcom.com>
Cc: ARC-5 Maillist <arc5@mailman.qth.net>

Dave,

Keep in mind that these digital oscillators often have high phase noise in
addition to rich odd harmonics.  For harmonic filtering I would suggest a
simple two section LC low pass.  The output section of these oscillators
has a low Z so you can design the low pass for low Z terminations.
Unfortunately, there is nothing you can do about the phase except try to
buy those oscillators that have this noise specified or you know were
intended for a noise critical application.  For some of our uses the phase
noise won't be a big deal.  But if the oscillator is going to multiplied up
to VHF then the phase noise is going to rear its ugly head.

BTW, these oscillators are commonly available surplus.  You many wish to
check out the webpage for Anchor Electronics and download a pdf of their

catalog.  They have all kinds of small parts for builders, including some
crystals and oscillators.  Just don't expect vintage parts.  I visit this
little store in my area regularly.  Good people.  I have no affilation;
just a long time happy customer.

http://www.anchor-electronics.com/

Dennis AE6C

On Sun, Feb 10, 2013 at 7:50 AM, David Stinson <arc5@ix.netcom.com> wrote:

> Here is a page from Digikey.  Lowest-price for through-hole
> oscillator, programmed to order by them is $4.10 in quantites of 1.
>
> http://tinyurl.com/b6kxgeo
>
> I haven't ordered any yet but will soon.
>
> I'd go with the 5-Volt type for the bigger rail-to-rail swing.
> Some even have "Tri-state" control pins so switching is easy.
>
> Output to a Pierce will probably need conditioning in some way,
> but that should be easy.
>
> 73 Dave AB5S.
>
>
> _____** _____ ** __
> ARC5 mailing list
> Home: http://mailman.qth.net/**mailman/listinfo/arc5<http://mailman.qth.net/mailman/listinfo/arc5>
> Help: http://mailman.qth.net/mmfaq.**htm<http://mailman.qth.net/mmfaq.htm>
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**mstangelo@comcast.net** <mstangelo@comcast.net>                    Wed, Feb 13, 2013 at 12:01 PM
To: Dennis Monticelli <dennis.monticelli@gmail.com>
Cc: ARC-5 Maillist <arc5@mailman.qth.net>

If your experimenting with oscillators or replacing crystals in oscillators you may want use in a DDS oscillator such as WA1FFL's Direct Digital VFO based on the Analog Devices AD9951:

<http://www.wa1ffl.com/index.html>

The phase noise is much better than those microprocessor clock oscillators and they are tuneable.

I'd invest in one of these instead of purchasing crystals or single frequency crystal oscillators.

Mike N2MS


----- Original Message -----
From: Dennis Monticelli <dennis.monticelli@gmail.com>
To: David Stinson <arc5@ix.netcom.com>
Cc: ARC-5 Maillist <arc5@mailman.qth.net>
Sent: Wed, 13 Feb 2013 16:15:03 -0000 (UTC)
Subject: Re: [ARC5] Programmable Oscillators

Dave,

Keep in mind that these digital oscillators often have high phase noise in addition to rich odd harmonics.  For harmonic filtering I would suggest a simple two section LC low pass.  The output section of these oscillators has a low Z so you can design the low pass for low Z terminations. Unfortunately, there is nothing you can do about the phase except try to buy those oscillators that have this noise specified or you know were intended for a noise critical application.  For some of our uses the phase noise won't be a big deal.  But if the oscillator is going to multiplied up to VHF then the phase noise is going to rear its ugly head.

<snip>

Dennis AE6C


On Sun, Feb 10, 2013 at 7:50 AM, David Stinson <arc5@ix.netcom.com> wrote:

> Here is a page from Digikey.  Lowest-price for through-hole
> oscillator, programmed to order by them is $4.10 in quantites of 1.
>
> <snip>
>
> 73 Dave AB5S.
[Quoted text hidden]

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**Ian Wilson** <ianmwilson73@gmail.com>                                                   Wed, Feb 13, 2013 at 12:10 PM
To: ARC-5 Maillist <arc5@mailman.qth.net>

Thought I'd put in my customary plug for the Si570 - good phase noise
performance and doesn't have those ugly DDS spurs. I believe that
one (or more) of these are used in the Elecraft K3, which has pretty
impressive specs for a glowless radio :)

73, ian K3IMW
[Quoted text hidden]

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**mstangelo@comcast.net** <mstangelo@comcast.net>                                         Wed, Feb 13, 2013 at 12:24 PM
To: Ian Wilson <ianmwilson73@gmail.com>
Cc: ARC-5 Maillist <arc5@mailman.qth.net>

Ian,

The Si570 is also a good candidate but it generates a squarewave so additional filtering would be required.

I've used K5BCQ's kit:

<http://www.qsl.net/k/k5bcq/Kits/Kits.html>

The K3 uses a DDS/PLL combination while the KX3 uses the SI-570.

The AD9951 spurs are prettly low and I don't believe they would be a factor in a surplus radio. I believe the spur
issue is overblown. ICOM uses a DDS based oscillator in their IC7000 and I haven't heard any complaints about
spurious responses. Note the K3 has spurious responses but I believe that is because of the downconversion
architecture, not the choice of oscillator.

In any case, I'd invest on one of these digital oscillators when replacing crystals.
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**David Stinson** <arc5@ix.netcom.com>                                   Wed, Feb 13, 2013 at 4:06 PM
Reply-To: David Stinson <arc5@ix.netcom.com>
To: ARC-5 List <arc5@mailman.qth.net>


----- Original Message ----- From: <mstangelo@comcast.net>

> If your experimenting with oscillators or replacing
> crystals in oscillators you may want use in a DDS oscillator
> such as WA1FFL's Direct Digital VFO based on the Analog Devices AD9951:
>
> <http://www.wa1ffl.com/index.html>

Well sir, I do thank you for the idea and I see your point.
But for me, with 4 kids to raise, here's the bottom line:

   "Complete VFO kits with displays available      for $145.00 plus $10.00 shipping"

Compare to the package I just got from Digikey:
The four frequencies I wanted, $4.10 each.
Total with shipping for the package:   $17.71

I just haywired one in.....
               .... and...... (wait for it)......

               ........................ IT WORKS!
                      (fireworks fireworks)

More about it in a later post.
73 DE Dave AB5S
[Quoted text hidden]

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**Ian Wilson** <ianmwilson73@gmail.com>                                   Wed, Feb 13, 2013 at 5:07 PM

To: David Stinson <arc5@ix.netcom.com>
Cc: ARC-5 List <arc5@mailman.qth.net>

Note that you can get a complete PCB with the AD8950 plus 125MHz
xtal oscillator, lowpass filter, LED, etc, for $4.49 with free shipping from
HK on eBay. Handy building block if DDS is OK for you.

I purchased two of these, now reduced to one when I forgot that they are
3.3v supply units (AD8950 now has a smoke-release-friendly hole in
the packaging). It may even have glowed for a moment <g>.

73, ian K3IMW

On Wed, Feb 13, 2013 at 1:06 PM, David Stinson <arc5@ix.netcom.com> wrote:

>
> ----- Original Message ----- From: <mstangelo@comcast.net>
>
>
>  If your experimenting with oscillators or replacing
>> crystals in oscillators you may want use in a DDS oscillator
>> such as WA1FFL's Direct Digital VFO based on the Analog Devices AD9951:
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>> <http://www.wa1ffl.com/index.**html <http://www.wa1ffl.com/index.html>>
>>
>
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> But for me, with 4 kids to raise, here's the bottom line:
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>     "Complete VFO kits with displays available      for $145.00 plus
> $10.00 shipping"
>
> Compare to the package I just got from Digikey:
> The four frequencies I wanted, $4.10 each.
> Total with shipping for the package:   $17.71
>
> I just haywired one in.....
>               .... and...... (wait for it)......

> 
>                           ........................ IT WORKS!
>                                  (fireworks fireworks)
> 
> More about it in a later post.
> 73 DE Dave AB5S
> 
> _____** _____* __
> ARC5 mailing list
> Home: http://mailman.qth.net/**mailman/listinfo/arc5<http://mailman.qth.net/mailman/listinfo/arc5>
> Help: http://mailman.qth.net/mmfaq.**htm<http://mailman.qth.net/mmfaq.htm>
[Quoted text hidden]

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**mstangelo@comcast.net** <mstangelo@comcast.net>                                Wed, Feb 13, 2013 at 7:20 PM
To: Ian Wilson <ianmwilson73@gmail.com>
Cc: ARC-5 List <arc5@mailman.qth.net>

Those AD9850 boars are handy but the don't have the Spurious free dynamic range of the 9951 and you have to
build your own controller. The output filter is incorrectly designed (they followed the AD9851 design notes) so they're
good to 40 Mhz hence they is why they're so inexpensive.

I use the various DDS oscilators to tune by boatanchor and military radios.

Mike N2MS


----- Original Message -----
From: Ian Wilson <ianmwilson73@gmail.com>
To: David Stinson <arc5@ix.netcom.com>
Cc: ARC-5 List <arc5@mailman.qth.net>
Sent: Wed, 13 Feb 2013 22:07:58 -0000 (UTC)
Subject: Re: [ARC5] Programmable Oscillators

Note that you can get a complete PCB with the AD8950 plus 125MHz
xtal oscillator, lowpass filter, LED, etc, for $4.49 with free shipping from
HK on eBay. Handy building block if DDS is OK for you.

I purchased two of these, now reduced to one when I forgot that they are

3.3v supply units (AD8950 now has a smoke-release-friendly hole in the packaging). It may even have glowed for a moment <g>.

73, ian K3IMW

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