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

[MMRCG] Replacing Crystals with Programmable Oscillators

8 messages

David Stinson <arc5@ix.netcom.com> Sat, Sep 26, 2020 at 7:47 AM
Reply-To: MMRCG@groups.io
To: MMRCG <MMRCG@groups.io>

On 9/25/2020 9:36 PM, Charles Agosti wrote:
> Can you tell us about the crystal replacement?
>
> Wd8axa

Back in late 2012/early 2013, I was working on a rare SCR-274N VHF set and lacked crystals. Having the remaining (at that time) crystal outfits make them for four channels would have cost about $360- insane. So I started thinking about alternatives.

Digikey offers Signetics and Epson programmable oscillators in an 8 or 14 pin DIP package for about $5 each. I got some and began experimenting with them. Some people said "it won't work" for all kinds of reasons. It does work well in many applications, especially when feeding a Pentode oscillator. Needs a little added "umph" to drive a triode like a Pierce.

In Feb of 2013, I published reports and notes on many of the Boatanchor and Mil-Radio reflectors and on Novice Rig Round-up. It was a great conversation with the folks and developed many good ideas. These oscillators got my set working FB and it still works today. Have had one chip in the set fail in seven years, probably because I "push" the Vcc to 6 Volts. Have since used them in many applications.

Now-a-days, you can get a DDS outboard sig gen for under $100 and I've used that on some projects, but I don't want that hanging-off every mil rig or Marine/Foresty radio I fool with. Have used them in a Western Electric Marine set, a BC-669, the Forestry set and a Canadian SSB transceiver, among others.

In 2018, W9RAN picked-up the idea and developed it further, publishing a great article in Jan. 2018 Electric Radio. He has produced an awesome and inexpensive four-channel oscillator board which is available from Hayseed Hamfest:

https://hayseedhamfest.com/products/ran-technology-four-channel-oscillator-board

I recommend it for anyone who would like to play with the idea. More details, such as how to order them (gotta do it "just so ;-) if anyone is interested.

GL OM ES 73 DE Dave AB5S

Paul Sokoloff WA3GFZ <dogfaces@comcast.net> Sat, Sep 26, 2020 at 9:00 AM
Reply-To: MMRCG@groups.io
To: MMRCG@groups.io

Hi Dave,
Do you have a part number for the programmable oscillators? There are many different ones and need to order the ones that match the 4 channel boards available from hayseedhamfest. I used a DDS board with an arduino for my ARC-4 which has the added advantage of frequency agility but that is not necessary.

Paul WA3GFZ

Thanks, Paul WA3GFZ
[Quoted text hidden]
View/Reply Online (#1738): https://groups.io/g/MMRCG/message/1738
[Quoted text hidden]

Bob W9RAN <w9ran@oneradio.net> Sat, Sep 26, 2020 at 11:49 AM
Reply-To: MMRCG@groups.io
To: MMRCG@groups.io

On 9/26/2020 8:00 AM, Paul Sokoloff WA3GFZ wrote:
> Do you have a part number for the programmable oscillators? There are many different ones and need to order the ones that match the 4 channel boards available from hayseedhamfest.

Hi Paul,

Since I'm the one who gets blamed if you order the wrong part, let me clarify that for you: The correct DigiKey part for the Hayseed board is:

SGR-8002DC-PHB-ND

These are “value added” parts which are programmed by DigiKey staff to your specific frequencies. Enter the frequencies desired as “Order Notes” in the online order form. Please note that

frequencies must be in the range of 1 to 125 MHz and must be specified in MHz (not kHz)

My involvement with them started after my "Cheap and Easy SDR" article was published in QST in 2013. The editor pushed me in to including the "RANVerter" HF upconverter for the RTL dongles even though I wasn't happy with it because the only packaged oscillators I could find in current production were in SMT. So I picked the largest case size I could and hoped for the best, and most builders managed to get them soldered down (some in ingenous ways!). But I didn't like having to use one SMT part and asked a DigiKey sales engineer if they would stock at least one part with thru-hole leads. In reply he suggested the Epson programmable oscillators which were available in DIP and mini-DIP packages. I was a little skeptical because they were PLL based but in fact they worked great and gave me the flexibility to move the LO down to 55 MHz where there were virtually no potential interfering signals, thanks to the FCC clearing out the low VHF TV band.

Stability is spec'd at 50ppm from -20 to 70 C which is pretty impressive, and I've found them to be spot-on for use even in SSB rigs. You just can't "pull" 'em like you can a crystal, so trimmer caps or inductors use to tweak the crystal right on frequency won't have any effect. But the good news you won't need to!

73, Bob W9RAN

David Stinson <arc5@ix.netcom.com> Sat, Sep 26, 2020 at 12:07 PM
Reply-To: MMRCG@groups.io
To: MMRCG@groups.io

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> Paul WA3GFZ

W9RAN recommends the Epson SG-8002 series for his board,
specifically the SG-8002DC-PHC-ND.

https://www.digikey.com/products/en?keywords=SG-8002DC-PHC-ND

There are many other types and models available
for your experimenting pleasure. Like most CMOS,
don't hook them up backwards or pop the output
with voltage. Each one draws about 45 mils current
when operating. You can get them with EN/DIS,
HIZ, control busses etc.
When you order, be sure to specify the frequency
* in MHZ * in the "order notes" on the web order form.
They don't understand KC, KHZ or MC.
Usually arrive at my house in just a day or two.

GL OM DE Dave AB5S

David Stinson <arc5@ix.netcom.com> Sat, Sep 26, 2020 at 12:11 PM
Reply-To: MMRCG@groups.io
To: MMRCG@groups.io

Hi, Bob. I thought the "R" in the part number was an ER Typo.
If I search Digikey with the "R," I don't get a result.
But if I drop the "R" it comes right up.

Maybe they changed it since 2018?

On 9/26/2020 10:49 AM, Bob W9RAN wrote:
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David Stinson <arc5@ix.netcom.com> Sat, Sep 26, 2020 at 12:24 PM
Reply-To: MMRCG@groups.io
To: MMRCG@groups.io

NOPE> My bad. This time I tried it with the "R" and it worked.
What is the difference between the two?

On 9/26/2020 11:11 AM, David Stinson wrote:
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Bob W9RAN <w9ran@oneradio.net> Sat, Sep 26, 2020 at 2:15 PM
Reply-To: MMRCG@groups.io
To: MMRCG@groups.io

> On 9/26/2020 11:24 AM, David Stinson wrote:
> > What is the difference between the two?

My guess is they stuck the R in there to denote that it's got to be programmed aka "value added". Just a guess because the Epson series is in fact SG-8002. DigiKey slaps their "-ND" on the end of the part number, and I don't know what that means either ;-)

I just cut and paste the p/n so I don't mess it up like I did the time I inadvertently ordered 3.3 volt parts which no doubt work fine - but on on 5 volts!

I might add that the DigiKey engineer warned me 7 years ago to not get too attached to DIP packages as they were rapidly being discontinued by many manufacturers. I hope we've given them enough business for crystal replacement that the DIP package version will be around for a long time yet.

73, Bob W9RAN

Nick K4NYW <navy.radio@gmail.com> Sat, Sep 26, 2020 at 2:24 PM
Reply-To: MMRCG@groups.io
To: MMRCG@groups.io

R is for ROHS, i.e. Lead-free Amoco.

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Nick England K4NYW
www.navy-radio.com
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