

Main Identity

From: "pa1are" <pa1are@amsat.org>
To: "Martin Rowat" <rowat@amsat.org>
Sent: 17 July 2008 20:24
Subject: Re: Antenna analyser

Hi Martin,

I have checked my voltage levels and the ones you found look normal to me. I presume that you quoted peak-peak levels.

You can't really measure the signal level at the osc input of the 602. Your probe will have a capacitance of around 10pF and will attenuate these signals because you are measuring at the outputs of the phase shift circuit. I measure about 360mVpp over the 100p capacitor at the output of the 48MHz osc.

✓ 400mV!

The variation of the output over the frequency range is normal. In my case it also drops to about half of the maximum at the edges of the frequency range. That isn't a problem since all measurements are relative.

✓ 163mV - 300mV

The calibration routine actually takes only a few milliseconds. The two second delay is just a wait to enable you to read the display message :-) By the way, the processor is running at 1 MHz.

✓

The calibration routine does only two things: It measures the DC baseline of the detector/amplifier (at 1 MHz) and it measures the stray capacitance at 10 MHz. So you normally have to calibrate once if you are using the same test fixture (connector) or every time you change the fixture (e.g if you plug in a BNC to banana adapter). But if you are still tweaking the circuit make sure to recalibrate every time you change something.

// ok.

✓✓

Have you tried measuring known impedances (resistors) yet? It is possible that you need to tweak the circuit a little for best performance. Do check that the voltages for 0° and 90° at the LPF output are exactly the same, otherwise the values will show some frequency dependence.

Yes

} need to tweak these.

Please keep me posted, I am curious how you are getting on. Currently a fellow ham in my neighbourhood is also building the analyser and he is almost as far as you are. I have only built one (mine) and I like to know how easy or difficult it is to get the offspring to perform like its parent :-)

73, Arend

Martin Rowat wrote:
 > Hi Arend,

17/07/2008

>
 > First, can I say thankyou for a very interesting project, I hope to
 > complete it soon and to retire my MFJ-259!! Then I can get more serious with
 > my antenna designs.
 >
 > Some progress. I have now added all the components to the two boards and
 > begun testing. First I should report that there was no problem programming
 > the AtMega168 using the BASCOM programmer software - it did not seem to
 > limit the size of binary written to the chip. I used the simple parallel
 > port programming cable!!
 >
 > For the digital board everything concerning the controller and display seems
 > to work OK, and values appear to be saved to EEPROM. The function switch and
 > encoder work fine.
 >
 > For the analogue board the controller sets up the synthesiser and the VCO
 > works fine across its range and is under control. The 10.24 MHz oscillator
 > is good too. However, I initially had a real problem with the 48Mhz XO. I
 > have replaced the BF494 twice and messed with the 0.47uH choke. I resoldered
 > a number of joints in the area. The oscillator now starts up fine, running
 > very close to 48Mhz according to my Racal-Dana 1991 frequency meter. The
 70
 > output to pin 6 of the SA602s is about 80mV. I used a two channel scope to
 > measure/set the phase angle to about 90 degrees. The output from the LPF
 > varies with frequency. It is easy to set the VCO to get 300mV around the
 > centre of the range 1-30MHz but at around 1-1.5 MHz and 29-30MHz it is only
 > around 160mV. Is it best to try for increased output at the extremes of the
 > range? The signal on pin24 of the controller was set for at least 1 volt
 > excursions from nominal across the frequency range (maximum was around
 > plus/minus 2 volts or so).
 >
 > How often might the calibration routine have to be run? Should it be run
 > after switching off when the analyser is set to say 15MHz (centre of range),
 > or does it in any case calibrate for the whole frequency range on switch on
 > (with function key closed)? I notice the calibration routine does not take
 > very long to execute (1-2 seconds) (I am using a 10MHz Atmega168).
 >
 > Now I hope to prepare the enclosure and set up the interface to work with
 > the software!!
 >
 > I look forward to your response.
 >
 > Best regards,
 >
 > Martin (G6CGI)
 >
 >
 > ----- Original Message -----
 > From: "pa1are" <pa1are@msa.com>
 > To: "Martin Rowat" <martin@rowat.com>
 > Sent: Thursday, July 03, 2008 10:25 PM
 > Subject: Re: Antenna analyser

17/07/2008

>

>

>> Hi Martin,

>>

>> It is a small capacitor that is supposed to prevent ringing on the clock
>> line during the programming. The simple cable programmer is not the most
>> sophisticated programmer you can think off, and a lot of people
>> experienced problems with the software recognising the chip. A 100pF
>> capacitor from Clk (pin 19) to GND would help to preventing such
>> problems. If I remember correctly I used it with the Mega8. In the later
>> V2 version I noticed that the synthesizer did not allways initiate
>> properly at switch on. After a lot of trial and error I found that
>> removing the capacitor again solved that problem. So it is probably
>> better to leave it out.

>>

>> 73, Arend

>>

>>

>> Martin Rowat wrote:

>>> Hello again,

>>>

>>> I have now made the two printed circuit boards with no problems and I
>>> am now putting on the components after carefully matching them to the
>>> schematic and to the overlays and photos in the pdf files from the
>>> download zip file. It all seems clear (and I know about the small
>>> modifications, and for example smd caps on the analogue board), but I
>>> have so far one small enquiry: the digiboard overlay shows a 100pf
>>> smd capacitor under the controller chip, (some distance from the x3
>>> 100nF caps but I cannot find this in the schematic, nor a pad on the
>>> pcb. I am using the Mega168 controller. Where should this cap be
>>> placed, please?

>>>

>>> I look forward to your reply.

>>>

>>> Kind regards, and trust all is well with you.

>>>

>>> Martin (G6CGI)

>>>

>>>

>>>

>>> ----- Original Message ----- From: "pa1are" <[redacted]> To:
>>> [redacted] <[redacted]> Sent: Saturday, June
>>> 21, 2008 4:37 PM Subject: Re: Antenna analyser

>>>

>>>

>>>> Hi Martin,

>>>>

>>>> I am using Circad 98 because the user interface looks very similar
>>>> to the professional software I used at my previous QRL. You can
>>>> simply print the layout in the PDF files onto semi transparent
>>>> paper and transfer it to photo sensitive PCB material. I always use

>>>> a laser printer. The PDF image is true to scale, so there shouldn't
>>>> be any problem.
>>>>
>>>> 73, Arend
>>>>
>>>>
>>>> Martin Rowat wrote:
>>>>> Hello again!
>>>>>
>>>>> I have now been able to get all the components for the analyser
>>>> (thankyou
>>>>> for mentioning suppliers in the Netherlands, they have quickly
>>>>> supplied
>>>> me!)
>>>>> and I am about to start making the printed circuit boards. You
>>>>> mention
>>>> that
>>>>> you prepare your boards by software methods. If you are using
>>>>> Eagle, I wonder if you have any files available?
>>>>>
>>>>> Have you any tips for the preparation of the two printed circuit
>>>>> boards?
>>>>>
>>>>> I look forward to your response.
>>>>>
>>>>> Best regards,
>>>>>
>>>>> Martin (G6CGI)
>>>>>
>>>>> ----- Original Message ----- From: "palare" <palare@xxxxxxxx>
>>>>> To: "Martin Rowat" <xxxxxxxx@xxxxxxxx> Sent:
>>>>> Sunday, June 01, 2008 12:02 PM Subject: Re: Antenna analyser
>>>>>
>>>>>
>>>>>> Hi Martin,
>>>>>>
>>>>>>> The zip file contains the Version 2 object code. It is intended
>>>>>>> for the ATmega168 whilst Version 1 was written for the Mega8.
>>>>>>>
>>>>>>>> Since the step from V1 to V2 primarily is a controller and
>>>>>>>> software update I did not bother to change the original V1
>>>>>>>> schematic diagram. So, yes if you stick a 168 in the socket and
>>>>>>>> do the modification it
>>>>> will
>>>>>>>> work with the V2 code.
>>>>>>>>
>>>>>>>>> I know I should update the schematic to avoid confusion, but it
>>>>>>>>> is a rather cumbersome procedure to get a readable drawing from
>>>>>>>>> my PCB software, and I seem to forget correct procedure time
>>>>>>>>> and again :-)
>>>>>>>>>

17/07/2008

>>>>>> Interesting to hear that you have been involved with meteo data
>>>>>> analysis. I have always been fascinated by the reception of
>>>>>> fax type pictures. I remember that in the early eighties I
>>>>>> wrote an assembler program for my Acorn (Atom, not yet BBC)
>>>>>> computer to capture news press photos from DPA. Receiving the
>>>>>> WX satellites is just as fascinating. Regrettably the noise
>>>>>> levels here have gone up so much that undisturbed reception has
>>>>>> become impossible. It is a problem on any band.... the
>>>>>> blessings of an unregulated market I guess.

>>>>>>

>>>>>> 73, Arend

>>>>>>

>>>>>>

>>>>>> Martin Rowat wrote:

>>>>>>> Hiya,

>>>>>>>

>>>>>>> I have been looking at your website: in particular your fine
>>>>>>> antenna analyser design. I think I can get the necessary
>>>>>>> components, especially from the places you have mentioned. I
>>>>>>> have one or two questions, and would be pleased for your
>>>>>>> comments.

>>>>>>>

>>>>>>>> 1. Does the zip file contain exectable code and programming
>>>>>>>> code for the version 1 or the version 2?

>>>>>>>>

>>>>>>>> 2. The schematic shows the Atmel Mega8 being used. With the
>>>>>>>> exception of the later modification of the 7805 circuit to
>>>>>>>> retain voltage data can I use the Atmel Mega128?

>>>>>>>>

>>>>>>>> I am a newly retired computer systems engineer revising my
>>>>>>>> old interests in ham radio and currently exploring indoor hf
>>>>>>>> antenna design, so I can get back on the air from my
>>>>>>>> (restricted) QTH!! You might be interested to know that from
>>>>>>>> 1991 until it closed in 1994 I worked at Bradford University
>>>>>>>> Research Limited on data capture and analysis systems from
>>>>>>>> Meteosat and NOAA satellites.

>>>>>>>>

>>>>>>>> I look forward to your comments.

>>>>>>>>

>>>>>>>> Best regards,

>>>>>>>>

>>>>>>>> Martin (G6CGI)

>>>>>>>>

>>>>>>>>

>>>>>>>>

>>>>>> -----

> -

>>>>>>>>

>>>>>>>>> No virus found in this incoming message. Checked by AVG.

>>>>>>>>> Version: 8.0.100 / Virus Database: 269.24.4/1475 - Release

>>>>>>>>> Date: 5/30/2008 2:53 PM