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Agilent probe interface (AutoProbe and Probe Id)

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📖 Author	Topic: Agilent probe interface (AutoProbe and Probe Id) (Read

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☐ **tnt**
Regular Contributor
🟨

Posts: 241

👤 ✉ 💬

Agilent probe interface (AutoProbe and Probe Id)
« **on:** April 20, 2011, 12:19:36 pm »

👍 **Say Thanks**   📝 **Reply**   🔲 **Quote**

Hi,

I'm trying to find informations about the way the Agilent AutoProbe interface works.

The only bit of info I found was
www.alciom.com/en/download/powerprobereadme.pdf
It has good info, but not much about the probe identification. It's more power oriented.

Quote

> The Autoprobe pinout is described in the documentation, from left to right when looking at the
> scope front panel :
> pin 1 : +3V to +6V, depending on Rs
> pin 2 : -3V to -6V, depending on Rs
> pin 3 : Offset adjustment (-1mA to +1mA, voltage limited to +/-6V)
> pin 4, 5, 6 : digital and analog probe recognition interfaces
> pin 7 : Rs, the probe connects this pin to GND through a resistor Rs
> pin 8 : -12V
> pin 9 : +12V

What I gathered about the identification is that:

pin 5 (center pin and the outer ring) is an analog probe ID. The probe connect this to the ground through a resistor.
pin 4,6 are probably an I2C bus. They're pulled up internally and the X-series fw has reference to I2C bus for probe identification. But I have no probe using it.

The pin 5 is at the center of a voltage divider inside the scope between 5V and the GND. The scope has a 28.7k and 178k resistors internally, giving an idle voltage of 4.3V. When the resistor in the probe is connected in // with the 178k, the voltage drops.

The probe I have have these resistors (measured between the 'outer' pin ring and the BNC ground).
* N2890A - 11k
* 1152A - 56.4k

Does anyone know (or can measure) values for other probes ?
Does anyone know more details ?

Report to moderator   Logged

---

tnt
Regular Contributor

Posts: 241

Re: Agilent probe interface (AutoProbe and Probe Id)
« **Reply #1 on:** April 21, 2011, 06:28:34 pm »

Say Thanks   Reply   Quote

Come on anybody ? Anyone with even passive probes shipped by default with the 2000-X / 3000-X can at least measure the resistance of their probe (or the resulting voltage on pin 5 with the scope itself).

In the meantime, I digged in the firmware and I think 46.4k is the resistor value that indicate a 'Smart Probe' with I2C interface ... I don't have that value (or any combination to make it easily enough) so I'll have to wait to confirm this.

Report to moderator   Logged

Rufus
Super Contributor

Posts: 2095

Re: Agilent probe interface (AutoProbe and Probe Id)
« **Reply #2 on:** April 22, 2011, 03:01:44 am »

Say Thanks   Reply   Quote

Not sure what you think anyone can do to help.

The ID pin to ground on tek and HP 10:1 passive probes I have is 11k. I think anything less is still considered to indicate a 10:1 passive probe.

Out of interest I stuck a 100k variable resistor between ground and the ID ring and the scope detected all kinds of 'unnamed' passive probes with 5:1 to 1000:1 attenuation and 50 ohm output or not. The only 'named' probes I saw were E2621, E2622, 1147, and N2790A.

Between 2.8 and 2.9 volts on the ring gave unsupported probe error messages, presumably because it expected and didn't find an I2C interface. I don't know what happens above 3.4v the 100k resistor didn't go that far.

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tnt

Regular Contributor

Posts: 241

Re: Agilent probe interface (AutoProbe and Probe Id)

Say Thanks   Reply   Quote

« **Reply #3 on:** April 22, 2011, 04:10:15 am »

Quote from: Rufus on April 22, 2011, 03:01:44 am

> Not sure what you think anyone can do to help.

Well, exactly what you did :p

Quote from: Rufus on April 22, 2011, 03:01:44 am

> The ID pin to ground on tek and HP 10:1 passive probes I have is 11k. I think anything less is still considered to indicate a 10:1 passive probe.
>
> Out of interest I stuck a 100k variable resistor between ground and the ID ring and the scope detected all kinds of 'unnamed' passive probes with 5:1 to 1000:1 attenuation and 50 ohm output or not. The only 'named' probes I saw were E2621, E2622, 1147, and N2790A.

This is the list I extracted last night :

Code: [Select]

```
R       ID      Name

1000M   0x00    ?
1k      0x01    ?
3.16k   0x02    ?
9.09k   0x03    ?
14.7k   0x04    ?
19.6k   0x05    ?
21.5k   0x06    ?
28.7k   0x07    ?
31.6k   0x08    ?
61.9k   0x09    ?
```

```
34.8k    0x0a    ?
38.3k    0x0b    ?
42.2k    0x0c    ?
0k       0x0d    ?
```

As you said the unnamed ones are probably 'generic' values shared between several passive probes.

> **Quote from: Rufus on April 22, 2011, 03:01:44 am**
>
> Between 2.8 and 2.9 volts on the ring gave unsupported probe error messages, presumably because it expected and didn't find an I2C interface. I don't know what happens above 3.4v the 100k resistor didn't go that far.

Interestingly it seems 1153, 1152A and E2697A are in the values and you didn't "see" them.
Even tough (at least for 1152A), there is definitely no I2C interface (I have such a probe).

Also, I tried putting a 46.4k resistor my self (I tried my best to get the value right using a bunch of resistors ... 10 of them :p) and got unsupported probe. But when I probed the pin 4 and 6 while plugging the resistor, I failed to see anything indicating the scope was trying to communicate in I2C ...

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☐ Rufus
Super Contributor
🟧🟧🟧
Posts: 2095

Re: Agilent probe interface (AutoProbe and Probe Id)
« **Reply #4 on:** April 22, 2011, 04:54:17 am »

👍 Say Thanks   📝 Reply   💬 Quote

> **Quote from: tnt on April 22, 2011, 04:10:15 am**
>
> Interestingly it seems 1153, 1152A and E2697A are in the values and you didn't "see" them.
> Even tough (at least for 1152A), there is definitely no I2C interface (I have such a probe).

This is what I scribbled measuring voltage on the ring, so I don't know what the thresholds are and I could have made mistakes:

Code: [Select]

```
1.8     100:1
2.0     100:1 50R
2.1     100:1 50R
2.2     5:1 50R
2.3     5:1 50R
2.4     20:1 50R
2.5     50:1 50R
2.6     200:1 50R
2.7     1000:1
2.8     unsupported probe
2.9     unsupported probe
```

```
3.0     20:1
3.1     E2621 5:1 50R
3.2     E2622 5:1 50R
3.3     1147 100V/A 10:1
3.4     N2790A 50:1
```

Maybe I missed some in-between ones because you have to remove and re-apply the resistance for the scope to examine the probe again.

56k // 270k is 46k4, maybe it is recognising a 1152A and just saying it isn't supported without naming it.

That powerprobereadme.pdf you linked seems to have gone or the link is bad.

Report to moderator   Logged

---

tnt

Regular Contributor

Posts: 241

Re: Agilent probe interface (AutoProbe and Probe Id)

👍 **Say Thanks**   ✏️ **Reply**   ▪▪ **Quote**

« **Reply #5 on:** April 22, 2011, 06:28:16 am »

* Great thanks for the measurements. I'll try to correlate those to the other values in the probe info structure

* Argh ... yes the document is gone ... and I didn't save a copy ! Well, what's mostly missing is the values for Rs (to select a voltage between 3 and 6V ...) I think it was between open and 40k but I'm not really sure anymore 😕

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---

tnt

Regular Contributor

Posts: 241

Re: Agilent probe interface (AutoProbe and Probe Id)

👍 **Say Thanks**   ✏️ **Reply**   ▪▪ **Quote**

« **Reply #6 on:** May 01, 2011, 03:10:02 pm »
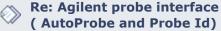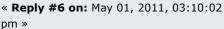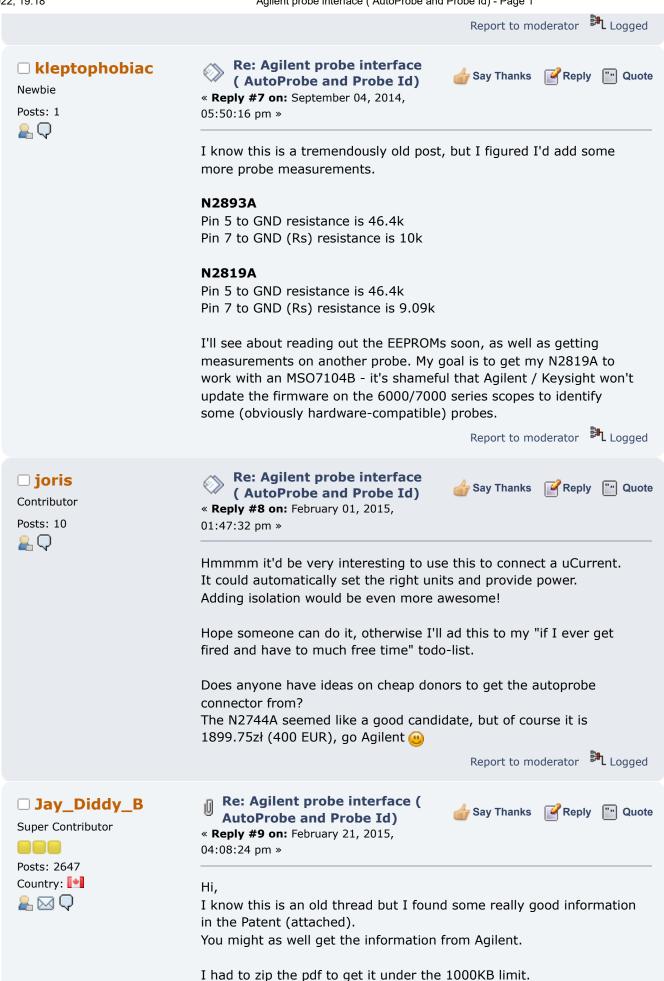
Well some more work on this, I found out several things.
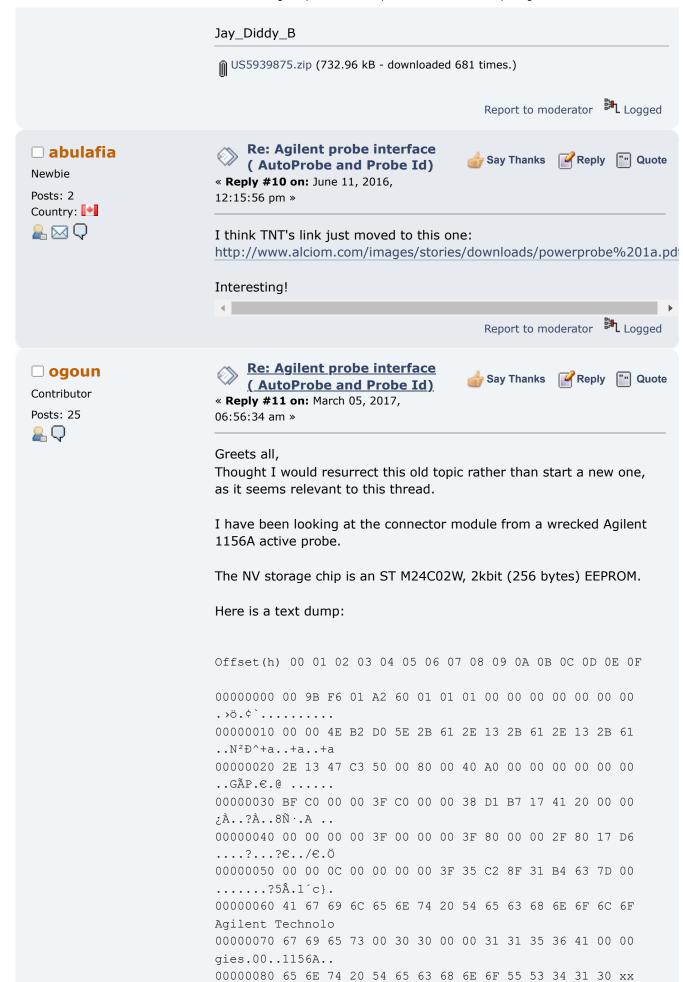
The Agilent 3000-X autoprobe interface is a cost optimized version that doesn't have all the feature of autoprobe. What's missing mostly is the variable supply dual rail. Instead of providing 3 to 6V, it's providing a fixed +/- 5V which is not good for some probes among which the 1152A I have which wants +4V (it doesn't use the -4V rail).

Also it's indeed an I2C interface (pin 4 = SDA and pin 6 = SCL) to which a 24C02 is wired at base address 0xA2. The scope just reads the full 256 bytes when the probe is plugged.

I will next attempt to mod my 1152A probe by :
* Adding a 5V -> 4V LDO
* Replace the 56.4k ID resistor with a 46.4k one (indicating smart probe)
* Replace the 40k Rs resistor with a 10k one (indicating 5V supply)
* Add a 24C02 I2C eeprom filled with the dump of a 1158A probe

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kleptophobiac
Newbie

Posts: 1

Re: Agilent probe interface (AutoProbe and Probe Id)
« **Reply #7 on:** September 04, 2014, 05:50:16 pm »

Say Thanks   Reply   Quote

I know this is a tremendously old post, but I figured I'd add some more probe measurements.

N2893A
Pin 5 to GND resistance is 46.4k
Pin 7 to GND (Rs) resistance is 10k

N2819A
Pin 5 to GND resistance is 46.4k
Pin 7 to GND (Rs) resistance is 9.09k

I'll see about reading out the EEPROMs soon, as well as getting measurements on another probe. My goal is to get my N2819A to work with an MSO7104B - it's shameful that Agilent / Keysight won't update the firmware on the 6000/7000 series scopes to identify some (obviously hardware-compatible) probes.

Report to moderator   Logged

joris
Contributor

Posts: 10

Re: Agilent probe interface (AutoProbe and Probe Id)
« **Reply #8 on:** February 01, 2015, 01:47:32 pm »

Say Thanks   Reply   Quote

Hmmmm it'd be very interesting to use this to connect a uCurrent. It could automatically set the right units and provide power. Adding isolation would be even more awesome!

Hope someone can do it, otherwise I'll ad this to my "if I ever get fired and have to much free time" todo-list.

Does anyone have ideas on cheap donors to get the autoprobe connector from?
The N2744A seemed like a good candidate, but of course it is 1899.75zł (400 EUR), go Agilent :)

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Jay_Diddy_B
Super Contributor

Posts: 2647
Country: 🇨🇦

Re: Agilent probe interface (AutoProbe and Probe Id)
« **Reply #9 on:** February 21, 2015, 04:08:24 pm »

Say Thanks   Reply   Quote

Hi,
I know this is an old thread but I found some really good information in the Patent (attached).
You might as well get the information from Agilent.

I had to zip the pdf to get it under the 1000KB limit.

Jay_Diddy_B
_____

📎 US5939875.zip (732.96 kB - downloaded 681 times.)

Report to moderator   🏁 Logged

☐ **abulafia**

Newbie

Posts: 2
Country: 🇨🇦

👤 ✉️ 💬

🔖 **Re: Agilent probe interface (AutoProbe and Probe Id)**   👍 **Say Thanks** ✏️ **Reply** 💬 **Quote**
« **Reply #10 on:** June 11, 2016, 12:15:56 pm »
_____

I think TNT's link just moved to this one:
http://www.alciom.com/images/stories/downloads/powerprobe%201a.pdf

Interesting!

◄ ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬ ►

Report to moderator   🏁 Logged

☐ **ogoun**

Contributor

Posts: 25

👤 💬

🔖 **Re: Agilent probe interface (AutoProbe and Probe Id)**   👍 **Say Thanks** ✏️ **Reply** 💬 **Quote**
« **Reply #11 on:** March 05, 2017, 06:56:34 am »
_____

Greets all,
Thought I would resurrect this old topic rather than start a new one, as it seems relevant to this thread.

I have been looking at the connector module from a wrecked Agilent 1156A active probe.

The NV storage chip is an ST M24C02W, 2kbit (256 bytes) EEPROM.

Here is a text dump:

```
Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

00000000 00 9B F6 01 A2 60 01 01 01 00 00 00 00 00 00 00
.›ö.¢`..........
00000010 00 00 4E B2 D0 5E 2B 61 2E 13 2B 61 2E 13 2B 61
..N²Ð^+a..+a..+a
00000020 2E 13 47 C3 50 00 80 00 40 A0 00 00 00 00 00 00
..GÃP.€.@ ......
00000030 BF C0 00 00 3F C0 00 00 38 D1 B7 17 41 20 00 00
¿À..?À..8Ñ·.A ..
00000040 00 00 00 00 3F 00 00 00 3F 80 00 00 2F 80 17 D6
....?...?€../€.Ö
00000050 00 00 0C 00 00 00 00 3F 35 C2 8F 31 B4 63 7D 00
.......?5Â.1´c}.
00000060 41 67 69 6C 65 6E 74 20 54 65 63 68 6E 6F 6C 6F
Agilent Technolo
00000070 67 69 65 73 00 30 30 00 00 31 31 35 36 41 00 00
gies.00..1156A..
00000080 65 6E 74 20 54 65 63 68 6E 6F 55 53 34 31 30 xx
```

```
ent TechnoUS410x
00000090 xx xx xx xx 00 00 00 00 00 00 00 00 00 00 00 00
xxxx............
000000A0 00 00 00 00 00 00 50 72 6F 62 65 20 53 79 73 74
......Probe Syst
000000B0 65 6D 00 00 00 00 00 00 00 00 00 00 00 00 00 00
em..............
000000C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
................
000000D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
................
000000E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
................
000000F0 00 00 00 53 6D 61 72 74 20 50 72 6F 62 65 00 00
...Smart Probe..
```

There appears to have been some overwrite happening at address 0x80, but I assure you, the read is good (verified on 2 different device readers).

Maybe someone can analyse the less obvious parts of the data, to determine what is stored here, and what parts are read only, versus parts that are updated by the DSO...

From my own inspection..
The string at 0xF3 "Smart Probe" appears to be necessary for the probe to be recognised as valid.
The string at 0x8A is the probe serial number.
The string at 0x79 is the model number...
There is probably a CRC somewhere, but since the serial number has been munged, this will not likely work

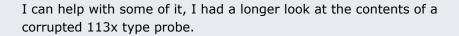Hope this is of use.

O

Report to moderator   Logged

Neganur

Supporter

Posts: 1136
Country:

Re: Agilent probe interface (AutoProbe and Probe Id)
« **Reply #12 on:** March 05, 2017, 01:25:35 pm »

Say Thanks   Reply   Quote

I can help with some of it, I had a longer look at the contents of a corrupted 113x type probe.

Will post more once back in the lab on Monday.

Report to moderator   Logged

ogoun

Contributor

Posts: 25

Re: Agilent probe interface (AutoProbe and Probe Id)
« **Reply #13 on:** March 05, 2017, 10:22:03 pm »

Say Thanks   Reply   Quote

Hi Neganur,

Cool, it would be good to work out how the DSOX and MSOX cros treat the probe interface.. I am looking into making an adaptor for my hi res surface contact current probe, and it would be nice to have the CRO recognise that it was a current probe, and display current on the screen.
I also would like to connect my Tek ADA400A differential probe amp up to it as well, again taking advantage of the autoprobe interface to supply power and to configure the cro.

Also, maybe this thread should be in test equipment... Mods?

c ya,
o

Report to moderator   Logged

larry42
Regular Contributor

Posts: 173
Country: 00

Re: Agilent probe interface (AutoProbe and Probe Id)   👍 **Say Thanks**   ✏ **Reply**   "" **Quote**
« **Reply #14 on:** February 26, 2018, 07:10:59 am »

Does anyone know the approx. current required on the +12V and -12V lines for the Agilent diff. probes?

Report to moderator   Logged

If you have an animated GIF in your avatar or signature then I reserve the right to think you're a dolt.

Wolfgang
Super Contributor

Posts: 1672
Country: 🇩🇪

Its great if it finally works !

Re: Agilent probe interface (AutoProbe and Probe Id)   👍 **Say Thanks**   ✏ **Reply**   "" **Quote**
« **Reply #15 on:** November 07, 2018, 04:54:51 pm »

The maximum current cannot be more than 200mA, for the 12V and the downregulated voltage in total.

Report to moderator   Logged

Wolfgang
Super Contributor

Posts: 1672
Country: 🇩🇪

Its great if it finally works !

Re: Agilent probe interface (AutoProbe and Probe Id)   👍 **Say Thanks**   ✏ **Reply**   "" **Quote**
« **Reply #16 on:** November 20, 2018, 01:42:52 pm »

Hi,

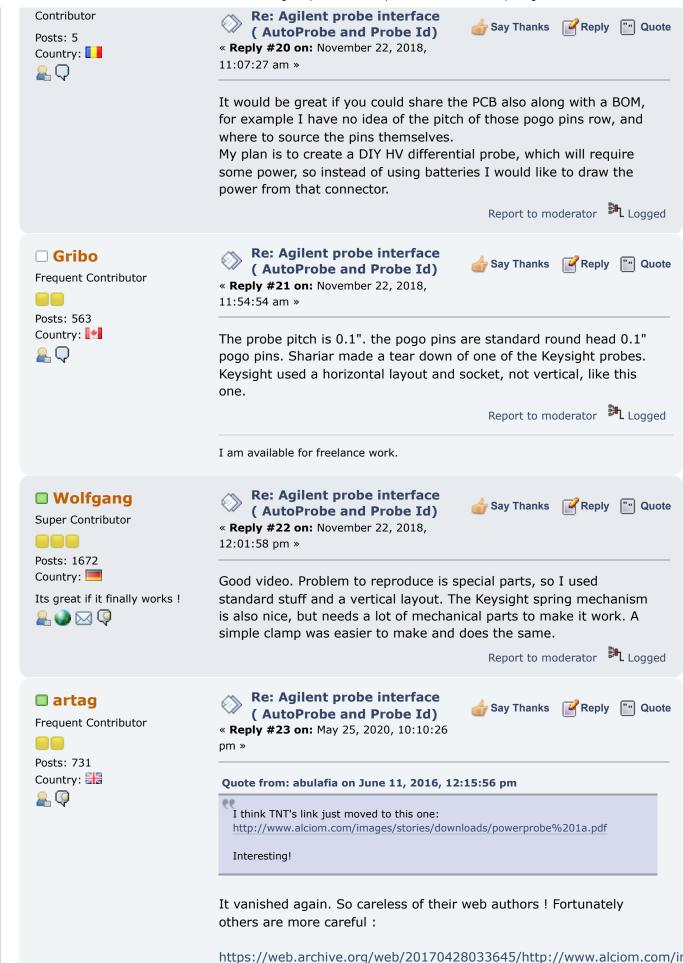I just completed a homebrew interface for AutoProbe I probes.

Details can be seen here:

https://electronicprojectsforfun.wordpress.com/using-the-keysight-autoprobe-interface-in-your-own-projects/

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The following users thanked this post: TiN

wkt

Contributor

Posts: 5
Country: 🇷🇴

Re: Agilent probe interface (AutoProbe and Probe Id)

👍 Say Thanks　📝 Reply　💬 Quote

« **Reply #17 on:** November 21, 2018, 10:42:41 am »

Quote from: Wolfgang on November 20, 2018, 01:42:52 pm

> Hi,
>
> I just completed a homebrew interface for AutoProbe I probes.
>
> Details can be seen here:
>
> https://electronicprojectsforfun.wordpress.com/using-the-keysight-autoprobe-interface-in-your-own-projects/

This is really great reverse engineering. Also the 3D-printed complete connector is something that I was planning to do, can you share the files for recreating this? Thanks

Report to moderator　🏁 Logged

Wolfgang

Super Contributor

Posts: 1672
Country: 🇩🇪

Its great if it finally works !

Re: Agilent probe interface (AutoProbe and Probe Id)

👍 Say Thanks　📝 Reply　💬 Quote

« **Reply #18 on:** November 21, 2018, 01:01:15 pm »

Yeah, why not. I'm working on some improvements, then I'll put the STL in a downloadable file.

« Last Edit: November 22, 2018, 01:40:46 am by Wolfgang » Report to moderator

🏁 Logged

The following users thanked this post: wkt

bson

Supporter

Posts: 2136
Country: 🇺🇸

Re: Agilent probe interface (AutoProbe and Probe Id)

👍 Say Thanks　📝 Reply　💬 Quote

« **Reply #19 on:** November 22, 2018, 03:30:01 am »

Quote from: Wolfgang on November 20, 2018, 01:42:52 pm

> Hi,
>
> I just completed a homebrew interface for AutoProbe I probes.
>
> Details can be seen here:
>
> https://electronicprojectsforfun.wordpress.com/using-the-keysight-autoprobe-interface-in-your-own-projects/

Nice! 🙂

Report to moderator　🏁 Logged

wkt

Contributor

Posts: 5

Country: 🇷🇴

Re: Agilent probe interface (AutoProbe and Probe Id)

👍 **Say Thanks**   ✏️ **Reply**   💬 **Quote**

« **Reply #20 on:** November 22, 2018, 11:07:27 am »

It would be great if you could share the PCB also along with a BOM, for example I have no idea of the pitch of those pogo pins row, and where to source the pins themselves.
My plan is to create a DIY HV differential probe, which will require some power, so instead of using batteries I would like to draw the power from that connector.

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☐ **Gribo**

Frequent Contributor

🟨🟨

Posts: 563

Country: 🇨🇦

Re: Agilent probe interface (AutoProbe and Probe Id)

👍 **Say Thanks**   ✏️ **Reply**   💬 **Quote**

« **Reply #21 on:** November 22, 2018, 11:54:54 am »

The probe pitch is 0.1". the pogo pins are standard round head 0.1" pogo pins. Shariar made a tear down of one of the Keysight probes. Keysight used a horizontal layout and socket, not vertical, like this one.

Report to moderator   📑 Logged

I am available for freelance work.

🟢 **Wolfgang**

Super Contributor

🟨🟨🟨

Posts: 1672

Country: 🇩🇪

Its great if it finally works !

Re: Agilent probe interface (AutoProbe and Probe Id)

👍 **Say Thanks**   ✏️ **Reply**   💬 **Quote**

« **Reply #22 on:** November 22, 2018, 12:01:58 pm »

Good video. Problem to reproduce is special parts, so I used standard stuff and a vertical layout. The Keysight spring mechanism is also nice, but needs a lot of mechanical parts to make it work. A simple clamp was easier to make and does the same.

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🟢 **artag**

Frequent Contributor

🟨🟨

Posts: 731

Country: 🇬🇧

Re: Agilent probe interface (AutoProbe and Probe Id)

👍 **Say Thanks**   ✏️ **Reply**   💬 **Quote**

« **Reply #23 on:** May 25, 2020, 10:10:26 pm »

> **Quote from: abulafia on June 11, 2016, 12:15:56 pm**
>
> > I think TNT's link just moved to this one:
> > http://www.alciom.com/images/stories/downloads/powerprobe%201a.pdf
> >
> > Interesting!

It vanished again. So careless of their web authors ! Fortunately others are more careful :

https://web.archive.org/web/20170428033645/http://www.alciom.com/ir

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The following users thanked this post: Kean

Wolfgang

Super Contributor

Posts: 1672

Country:

Its great if it finally works !

Re: Agilent probe interface (AutoProbe and Probe Id)

Say Thanks   Reply   Quote

« **Reply #24 on:** March 13, 2021, 06:30:18 pm »

I found some more info and was able to make a working Autoprobe with EEPROM:

https://electronicprojectsforfun.wordpress.com/using-the-keysight-autoprobe-interface-in-your-own-projects/hacking-keysight-autoprobe-eeproms/

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The following users thanked this post: KE5FX, 2N3055

KE5FX

Super Contributor

Posts: 1556

Country:

Re: Agilent probe interface (AutoProbe and Probe Id)

Say Thanks   Reply   Quote

« **Reply #25 on:** March 13, 2021, 07:31:51 pm »

Quote from: Wolfgang on March 13, 2021, 06:30:18 pm

> I found some more info and was able to make a working Autoprobe with EEPROM:
>
> https://electronicprojectsforfun.wordpress.com/using-the-keysight-autoprobe-interface-in-your-own-projects/hacking-keysight-autoprobe-eeproms/

Some very nice work there, Wolfgang, especially on the 3D printing job.

Also intrigued by your PythonScreenShot app, but it doesn't get very far, at least under Windows:

```
C:\dev\pythonscreenshot>PythonScreenShot.py
Traceback (most recent call last):
  File "C:\dev\pythonscreenshot\PythonScreenShot.py", line 62, in <module>
    import  pyvisa
ImportError: No module named pyvisa
```

Is there an easy way to install all the (seemingly countless) dependencies at once? Anaconda, maybe? If this can be made accessible to people who aren't Python gurus, I'd like to add a link to it in my GPIB Toolkit readme file. (PM me if you like, so we don't hijack this unrelated thread.)

Report to moderator   Logged

2N3055

Super Contributor

Re: Agilent probe interface (AutoProbe and Probe Id)

Say Thanks   Reply   Quote

« **Reply #26 on:** March 13, 2021, 07:54:15 pm »

Posts: 4618
Country:

That is some nice work!!

I simply love the little red handle on the BNC !! 👍🙂

Report to moderator   Logged

Miek

Contributor

Posts: 46
Country:

Re: Agilent probe interface (AutoProbe and Probe Id)
« **Reply #27 on:** March 13, 2021, 08:05:34 pm »

👍 **Say Thanks**   **Reply**   **Quote**

I've done quite a bit of work reverse engineering the firmware on my MSO6034A scope, so I might be able to fill in some blanks.

It definitely does check the model number against a list in the firmware (see attached image).
For older probes, it seems to have an ID number instead of the model string.

I went through the code that does the probe calibration and it seems to get the default offset & gain values from floats at 0x53 and 0x57 in the EEPROM for the newer named probes. Older probes may have them at 0x40 & 0x44 instead. I haven't tested changing them, but I think you're better setup to try it out 🙂

probe_models.png (181.87 kB, 828x1316 - viewed 128 times.)

« *Last Edit: March 13, 2021, 08:08:40 pm by Miek* »   Report to moderator
                                                                            Logged

---

Wolfgang

Super Contributor

Posts: 1672
Country:

Its great if it finally works !

Re: Agilent probe interface (AutoProbe and Probe Id)
« **Reply #28 on:** March 13, 2021, 08:10:56 pm »

👍 **Say Thanks**   **Reply**   **Quote**

... seems you need to install the pyvisa library.
Then it should work.
Should you miss other libraries, have a glance at the beginning of my code where the libs are included.
I use PIP. It resolves dependencies automatically.

Much success !

Regards
Wolfgang DL1DWG

« *Last Edit: March 13, 2021, 08:31:06 pm by Wolfgang* » Report to moderator
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Wolfgang

Super Contributor

Posts: 1672
Country: 🇩🇪

Its great if it finally works !

Re: Agilent probe interface (AutoProbe and Probe Id)

👍 **Say Thanks**   ✏️ **Reply**   💬 **Quote**

« **Reply #29 on:** March 13, 2021, 08:30:04 pm »

Quote from: Miek on March 13, 2021, 08:05:34 pm

> I've done quite a bit of work reverse engineering the firmware on my MSO6034A scope, so I might be able to fill in some blanks.
>
> It definitely does check the model number against a list in the firmware (see attached image).
> For older probes, it seems to have an ID number instead of the model string.
>
> I went through the code that does the probe calibration and it seems to get the default offset & gain values from floats at 0x53 and 0x57 in the EEPROM for the newer named probes. Older probes may have them at 0x40 & 0x44 instead. I haven't tested changing them, but I think you're better setup to try it out 🙂

Hi Miek,

agrees with my observation that a "database" (you just proved its dumb hardcompiled code) of probe types is kept in the scope.

I also agree that there ARE probes that write back calibration information. An example is my (very complex) N7026 high-sensivity current probe. When you insert this one, I sniffed that not just probe ID and serial number are retrieved, but also a lot of other information at several locations. An I2C scan also reveals several EEPROM locations, not just 0x51. When you calibrate, quite some info is written back to the probe EEPROM.

Older (and simpler) probes like the N2795A or N2796A dont read anything else than serial number and probe type. This was verified by sniffing the bus during a calibration operation.

The expected outcome of my modest probe attempts is to supply a calibratable and detectable interface to probes that Keysight does not supply. At the moment, I have three types:
1) wide voltage range 1:10 FET probes with minimal capacitance (10-200Mz). This works now with AutoProbe, I'll write a webpage in a few
weeks about this
2) 1.-1.5GHz AC Fet probes. Works, but for the moment without Autoprobe. Could also be run under N2795A.
3) current transformer probes to measure small AC currents in the frequency range from 2MHz to 200MHz (I needed those for my PhD work).
Candidate for current probe missing.

Something I would also like to have is a differential probe with wide input range. That should not be too difficult, but I lack a similar Keysight model to
start from.

For type 3 I am currently searching for a close enough Keysight

probe that can be used to make the hack possible.

As said, Keysight does not want to disclose the interface (I guess to avoid competition for their probes), so some creativity will be needed.
Everybody having similar issues and/or other Keysight probes of interest (I just have N2795A and N7026A). is invited to join efforts by suppling EEPROM images.

Regards
Wolfgang DL1DWG

« Last Edit: March 13, 2021, 11:22:01 pm by Wolfgang »   Report to moderator

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Wolfgang
Super Contributor

Posts: 1672
Country: 🇩🇪

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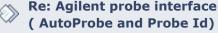
Re: Agilent probe interface (AutoProbe and Probe Id)   👍 **Say Thanks**   📝 **Reply**   🔲 **Quote**
« **Reply #30 on:** March 24, 2021, 11:46:59 pm »

Hi,

I just added the N2818A 200MHz 1:10 differential probe to my list. Still looking for a decent robust diffamp that can be made with uncritical components.

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KE5FX
Super Contributor

Posts: 1556
Country: 🇺🇸
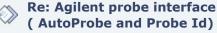
Re: Agilent probe interface (AutoProbe and Probe Id)   👍 **Say Thanks**   📝 **Reply**   🔲 **Quote**
« **Reply #31 on:** March 25, 2021, 01:40:59 am »

> Quote from: Wolfgang on March 24, 2021, 11:46:59 pm
>
> Hi,
>
> I just added the N2818A 200MHz 1:10 differential probe to my list.
> Still looking for a decent robust diffamp that can be made with uncritical components.

Depending on what you mean by 'wide input range,' the LMH5401-based probe that nctnico sells might be of interest. It works very well with the 6000 series.

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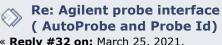
The following users thanked this post: Wolfgang

Cerebus
Super Contributor

Re: Agilent probe interface (AutoProbe and Probe Id)   👍 **Say Thanks**   📝 **Reply**   🔲 **Quote**
« **Reply #32 on:** March 25, 2021, 03:45:01 am »

> Quote from: Wolfgang on March 13, 2021, 08:30:04 pm

Posts: 10524
Country: 🇬🇧

> As said, Keysight does not want to disclose the interface (I guess to avoid competition for their probes), so some creativity will be needed.
> Everybody having similar issues and/or other Keysight probes of interest (I just have N2795A and N7026A). is invited to join efforts by suppling EEPROM images.

Interesting choice of verb, 'disclose' as it's exactly what a patent does. Like this one: US Patent US5939875A - Universal probe interface - Assignee: Agilent, expired

The patent unfortunately doesn't go into the EEPROM format, but the 'example' table in it of resistor encoded probes is in fact 'actual' rather than 'exemplary' as far as I've been able to determine by comparing it with a few real examples. It's not the "golden goose" of all the possible EEPROM encodings, but it's better than a kick in the teeth.

« Last Edit: March 25, 2021, 03:48:47 am by Cerebus »   Report to moderator

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Anybody got a syringe I can use to squeeze the magic smoke back into this?

🟢 **Wolfgang**

Super Contributor

🟨🟨🟨

Posts: 1672
Country: 🇩🇪

Its great if it finally works !

Re: Agilent probe interface (AutoProbe and Probe Id)   👍 **Say Thanks**   📝 **Reply**   🗔 **Quote**
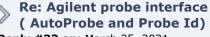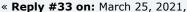
« **Reply #33 on:** March 25, 2021, 11:20:31 am »

Quote from: Cerebus on March 25, 2021, 03:45:01 am

> **Quote from: Wolfgang on March 13, 2021, 08:30:04 pm**
>
> > As said, Keysight does not want to disclose the interface (I guess to avoid competition for their probes), so some creativity will be needed.
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Hi,

by "disclose" I meant that they do not allow you to define your own probe. Now we now why: They hardcoded the probe IDs into their software, and if they find a smart probe (RId = 46.6K) and its not in their code they reject it. Somebody on EEVBLOG found the code by reverse-engineering a scope and extracted the probe types they support. There is another expired patent explaining the EEPROM content.

Working with the resistor Id is fine (I tried all values published and verified a table of working values and probe types), but leaves you without advanced support. For what I need a few FET probes with modest frequency ranges, but extra low capacitances are OK by now, and the calibration feature of EEPROM enabled probes is practical so I use it.

Another probe of interest would be a very small current transformer probe (like Tek), but I am still looking for a Keysight equivalent.

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