

--- GammaSpectrometry@yahoogroups.com wrote:

From: "yahumbug@xertech.net [GammaSpectrometry]" <GammaSpectrometry@yahoogroups.com>

To: <GammaSpectrometry@yahoogroups.com>

Subject: [GammaSpectrometry] Exploranium paranoia [1 Attachment]

Date: 28 Feb 2015 16:58:40 -0800

I bought one of the Exploranium GR-130 Portable Gamma Ray Spectrometers that were being sold on ebay last fall. Mine needed a little work (it was disclosed on the listing) but seems to work fine now. I'm posting because I suspect others on this group picked up some of the many others that were sold.

I had mine open and took a number of pics of what was inside. I saw that one of the chips was a Dallas Semi DS1646 Timekeeping RAM. Looking up the datasheet, it is a combination RTC and 128K of nonvolatile RAM. I believe this RAM is used for calibration parameters and storing the survey data. The chip has an internal battery that keeps the clock and static memory when the chip is getting no external power.

The datasheet say 10 years of operation in the absence of power. The chip in my unit has a date code of 96, so 18 or 19 years ago. My unit seems to be working fine but I wonder how much longer before memory and the clock start being lost with power off.

Dallas isn't making the chips anymore but many vendors still have some in stock. I decided to insure my recent investment by ordering a spare chip for the future, even though it has a steep ~\$40 price. I got mine from Mouser while I was ordering other parts and I think Digikey had some too. My order arrived today and I was relieved to see the chip has a date code of around Aug 2014.

I just thought I would mention, for others to consider, this potential future problem and an end-of-life situation for a replacement part.

I'll try to attach a picture of the chip on the CPU board of the Exploranium.

is this same item on US eBay?

DALLAS DS1646-120 DIP NVRAM Battery Based

Geo

**From:** "yahumbug@xertech.net  
[GammaSpectrometry]"  
<GammaSpectrometry@yahoogroups.com>  
**Reply-To:** GammaSpectrometry@yahoogroups.com  
**To:** <GammaSpectrometry@yahoogroups.com>  
**Subject:** Re: [GammaSpectrometry] Exploranium  
paranoia  
**Date:** Sat 02/28/15 08:37 PM

#### Attachments

Name	Type	Save	View
Part 1	text/plain	<a href="#">Save</a>	
Part 2	text/html	<a href="#">Save</a>	

I searched on that and got one exact hit from u-barn in Hong Kong. In the close matches there was one from a guy in Israel. That looks like the right part (see my attachment jpg in the original post), but you have to ask two questions.

1. Do you trust eBay for buying chips? I've heard of china dealers selling fake parts.
2. What's the date code on the part? The date code is the first 4 numbers in the line below Timekeeping RAM. First two is year, next two are week. So the original in my unit had 9646 or late in 1996. The new one I bought has 1432 or ~Aug 2014. The chip from u-barn has a logo on top of the date line so I can't read it. I would ask what you are getting before buying. The one from Israel has a clear picture that shows 0039 so made in 2000. Not much better than the one in my unit.

**From:** "M K ka2mce@gmail.com  
[GammaSpectrometry]"  
<GammaSpectrometry@yahoogroups.com>  
**Reply-To:** GammaSpectrometry@yahoogroups.com  
**To:** "GammaSpectrometry@yahoogroups.com"  
<GammaSpectrometry@yahoogroups.com>  
**Subject:** Re: [GammaSpectrometry] Exploranium  
paranoia  
**Date:** Sat 02/28/15 09:21 PM

#### Attachments

Name	Type	Save	View
Part 1	text/plain	<a href="#">Save</a>	
Part 2	text/html	<a href="#">Save</a>	

Actually, I hope that they do not store the calibration data there-else, the unit is going to need recalibration if the module loses it's data.

**From:** "yahumbug@xertech.net  
[GammaSpectrometry]"  
<GammaSpectrometry@yahoogroups.com>  
**Reply-To:** GammaSpectrometry@yahoogroups.com  
**To:** <GammaSpectrometry@yahoogroups.com>  
**Subject:** Re: [GammaSpectrometry] Exploranium

#### Attachments

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Part 2	text/html	<a href="#">Save</a>	

paranoia

**Date:** Sat 02/28/15 11:13 PM

There's a normal calibration that needs to be run periodically with a Cs137 source. They call it Stabilization. So that's easy to do. I don't know if there are any parameters at the factory level that would need to be preserved. I suspect not.

Mostly the memory is used for surveys and spectra which can be dumped out of the device for saving.

I doubt if the GR-130 has any writable nonvolatile memory besides what is in this Dallas chip.

I also suspect that if the chip's internal battery died you could still use the device, just that you may need to reset the clock and stabilize each time main batteries are swapped. Also you could lose surveys and spectra if the main batteries die.

If anyone knows of critical parameters that could be lost from the nonvolatile memory, please let us know.

-Rex

--- GammaSpectrometry@yahoogroups.com wrote:

From: "robert8rpi@yahoo.co.uk [GammaSpectrometry]" <GammaSpectrometry@yahoogroups.com>

To: <GammaSpectrometry@yahoogroups.com>

Subject: [GammaSpectrometry] Re: Exploranium paranoia

Date: 01 Mar 2015 02:23:46 -0800

Some people have literally hacked the dallas chips to replace the battery. See De Blauwe Schicht!  
<http://www.deblauweschicht.nl/tinkering/indybattery.html>

<http://www.deblauweschicht.nl/tinkering/indybattery.html>

De Blauwe Schicht! <http://www.deblauweschicht.nl/tinkering/indybattery.html> Main Pictures Writing  
Tinkering Matlab on O2 ETOPO1 Google Earth QL Keys (1) QL Keys (2) Atari2USB MOS  
6581 (1) MOS 6581 (2) In...

View on [www.deblauweschicht...](http://www.deblauweschicht.nl/tinkering/indybattery.html) <http://www.deblauweschicht.nl/tinkering/indybattery.html>

Preview by Yahoo

It might be an interesting exercise on th old chip.

**From:** "M K ka2mce@gmail.com  
[GammaSpectrometry]"  
<GammaSpectrometry@yahoogroups.com>

**Reply-To:** GammaSpectrometry@yahoogroups.com

**To:** "GammaSpectrometry@yahoogroups.com"  
<GammaSpectrometry@yahoogroups.com>

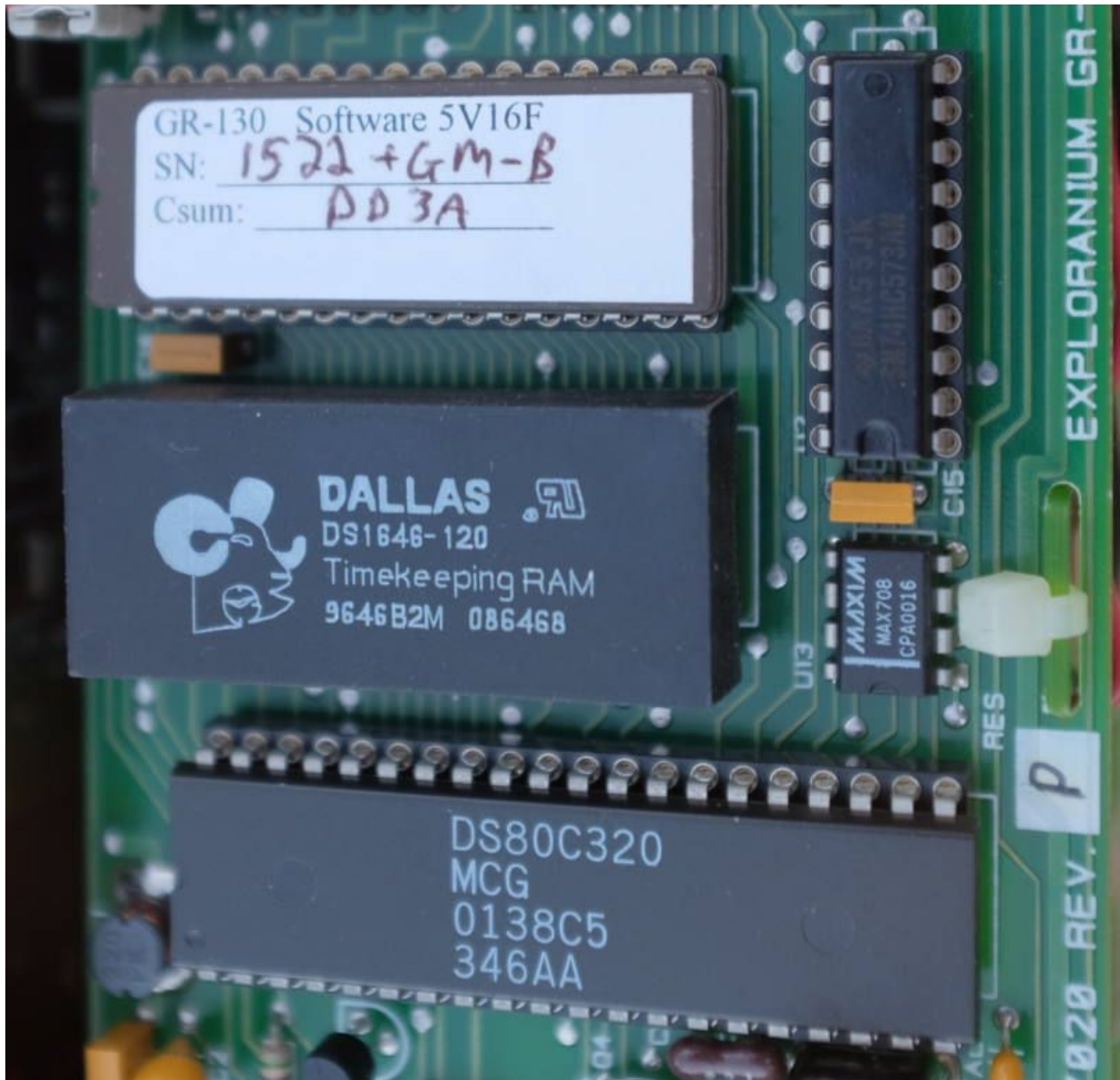
**Subject:** Re: [GammaSpectrometry] Exploranium  
paranoia

**Date:** Sat 02/28/15 11:30 PM

#### Attachments

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Part 1	text/plain	<a href="#">Save</a>
Part 2	text/html	<a href="#">Save</a>

The stabilization is not the same as a full calibration.....the full calibration would be more involved, and normally would not need to be done often...but if the settings are in that Dallas module, then a full calibration would be needed for proper operation-the defaults may work to some degree, but not particularly well.



The efficiency calibrations are stored in an eeprom which doesn't need a battery backup. These calibrations are unit specific but are fairly close to each other.

Dud KK7IF

Thanks for the heads-up on the Dallas chip in the GR-130!

I also picked up a GR-130 recently and also felt it prudent to obtain a new IC before the battery expires. One of the IC's was located at a lesser known parts distributor and I ordered the last one they had in stock for \$19.50. Wish they had more for everyone in the group who wants one.

**From:** "yahumbug@xertech.net [GammaSpectrometry]"  
<GammaSpectrometry@yahoogroups.com

Tom,

So are you saying that you bought a spare DS1646 chip from this vendor? If so, what was the date code on the one you got? Or maybe you don't have it yet? Just curious.

"yahumbug@xertech.net [GammaSpectrometry]"

---In GammaSpectrometry@yahoogroups.com, <robert&rpi@...> wrote :

Some people have literally hacked the dallas chips to replace the battery.

---

Interesting. I thought that might be possible but wouldn't try it while the chip is still working. Sure looks like a lot of work to get to the battery without doing serious damage.

Another possibility I thought of is studying the data sheet and building an equivalent with a few newer chips and maybe a micro. The memory portion could probably be done now without a battery. I guess the RTC would still need a battery. That would be a lot of effort too, though.

Too bad the designers didn't do something with a replaceable battery like a coin cell.

---

"Taray sukhjez@yahoo.com [GammaSpectrometry]"

Hi ...I have one too.Perhaps to extend ram battery life,leave dry cell batteries inside .To prevent corrosion use it at least weekly.I hope I am not wrong here.

"Tom King btking@swbell.net [GammaSpectrometry]"

I ordered the chip yesterday from Quest Components, so I won't have it until sometime this week.

Quest is a standard electronics parts distributor, so their stock should be fresh, unlike the seller on ePay, or the multitude of vendors who buy up discontinued stock and sell them dated parts as "new, old-stock" parts.

**From:** "Andy Kirby andy@kirbyand.co.uk [GammaSpectrometry]"

Dunno if this is of any use or not.

I seem to recall when I was doing embedded design work in a previous life (a few years ago now) that there were more than one version of that device. Or pin compatible devices from other manufacturers.

It was pretty much a Jedec standard static ram pin-out. It was a static ram chip with some of the ram cells replaced with the registers for the RTC. I seem to recall it was the highest numbered locations. The static ram was optimised to keep the ram contents at low voltage and the battery was connected to a dedicated pin or the Vcc pin via a couple of diodes. Such that when the main 5v power went off the diodes connected the battery to the Vcc and stopped the battery feeding back to the Vcc or 5V rail.

There were a number of others that did not have the battery mounted on top (Top hat configuration). They were intended to have a battery mounted separately on the PCB somewhere. Worth locating instead of jumping back into the same hole

Armed with the above info, if you don't fancy chopping up an existing device you may be able to bodge together a drop in replacement. At a fraction of the cost and risk, with replaceable battery.

Other variants used the same as above but used a small NiCad and simple trickle charge circuit in place of the coin cell. Some years later designs moved to the same or similar but using a super capacitor.

This was well before flash was widely available. Eeprom and or EEprom devices were savagely expensive and reserved for development work. End devices were ROM. If you bought in more than a thousand or so you could get the manufacturer to mask program the ROM's for you. Firmware updates were always device replacements.

I think the sram capacity was 2K although later versions could have been 4K. Earlier devices may have been 1K.

Interestingly enough these devices were the main worry about the year 2K issues as they did not have enough register space to carry enough of the date range. The devices were incredibly common. Clever enough firmware though could detect the wrapped date based on some educated guesswork and extend the date range.

I pointed out the impending Y2K issue to my then employer many years before we got to it. As their firmware was not that clever. Their attitude was that the devices battery would not last long enough for it to be an issue. It was default planned obsolescence and a good way to keep them in business.

Cheers

Kirbs

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Kirbs

Forgot to mention.

Sorry distracted by the reminiscing.

If you know the below you can read what is in them using an arduino mega or some such with enough IO pins and the data sheet and make yourself a backup of the contents before it goes belly up.

Similarly you can write the contents back to your replacement. Before plugging it back in.

Kirbs