

This page describes pre-release version of usb armory, so if you are receiving release version, head over to usb armory wiki <https://github.com/f-secure-foundry/usbarmory/wiki> which improved massively since this page was first written.

I had wrong expectations from this board: I was hoping to be able to use GPIO for serial or connecting sensors and that is not possible.

te=0x08d42068 [0, 0]

Contents: [Dobrica Pavlinu's random unstructured stuff]

- [Dobrica Pavlinu's random unstructured stuff \(network setup\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(boot select switch\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(image delivered on device\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(pads on board\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(sdcard vs emmc speed\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(community\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(led heartbeat off\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(network speed\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(network setup for desktop\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(bluetooth\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(armoryctl\)](#)
- [Dobrica Pavlinu's random unstructured stuff \(i2c\)](#)

SoC: NXP i.MX6ULZ ARM® Cortex® A7 900 MHz

RAM: 512 MB DDR3

Storage: internal 16 GB eMMC + external microSD

Bluetooth module: u-blox ANNA-B112 BLE

USB-C ports: DRP (Dual Role Power) receptacle + UFP (Upstream Facing Port) plug, USB 2.0 only (no video support)

LEDs: two

Slide switch: for boot mode selection between eMMC and microSD

External security elements: Microchip ATECC608A + NXP A71CH

Physical size: 66 mm x 19 mm x 8 mm (without enclosure, including USB-C connector)

https://github.com/inversepath/usbarmory-debian-base_image

```
dpavlin@klin:~/usb-armory/usbarmory-debian-base_image$ ls -al usbarmory-mark-two-debian_stretch-b  
-rw-r--r-- 1 root root 3670016000 Oct 13 13:30 usbarmory-mark-two-debian_stretch-base_image-20191
```

```
dpavlin@nuc:/mnt/klin/home/dpavlin/usb-armory/usbarmory-debian-base_image$ dd if=usbarmory-mark-t
```

```
dpavlin@nuc:~$ dmesg
```

```
[764607.538898] usb 2-1: new high-speed USB device number 34 using xhci_hcd  
[764607.689068] usb 2-1: New USB device found, idVendor=0525, idProduct=a4a2, bcdDevice= 4.19  
[764607.689078] usb 2-1: New USB device strings: Mfr=1, Product=2, SerialNumber=0  
[764607.689082] usb 2-1: Product: RNDIS/Ethernet Gadget  
[764607.689100] usb 2-1: Manufacturer: Linux 4.19.78-0 with 2184000.usb  
[764607.900916] cdc_subset: probe of 2-1:1.0 failed with error -22  
[764607.902622] cdc_subset 2-1:1.1 usb0: register 'cdc_subset' at usb-0000:00:14.0-1, Linux Device  
[764607.902666] usbcore: registered new interface driver cdc_subset  
[764607.902711] cdc_ether: probe of 2-1:1.0 failed with error -16  
[764607.902732] usbcore: registered new interface driver cdc_ether
```

```
[764607.914234] cdc_subset 2-1:1.1 enp0s20u1i1: renamed from usb0
```

network setup

```
dpavlin@nuc:~$ sudo ifconfig enp0s20u1i1 10.0.0.2 netmask 255.255.255.0
```

```
dpavlin@nuc:~$ sudo iptables -t nat -A POSTROUTING -s 10.0.0.0/24 -o eth0 -j MASQUERADE
```

```
dpavlin@nuc:~$ ssh usbarmory@10.0.0.1
```

```
# password is usbarmory
```

```
usbarmory@usbarmory:~$ uname -a
```

```
Linux usbarmory 4.19.78-0 #1 PREEMPT Sun Oct 13 11:05:18 UTC 2019 armv7l GNU/Linux
```

```
usbarmory@usbarmory:~$ cat /proc/cpuinfo
```

```
processor       : 0
model name     : ARMv7 Processor rev 5 (v7l)
BogoMIPS      : 109.09
Features      : half thumb fastmult vfp edsp neon vfpv3 tls vfpv4 idiva idivt vfpd32 lpae
CPU implementer : 0x41
CPU architecture: 7
CPU variant   : 0x0
CPU part      : 0xc07
CPU revision  : 5
```

```
Hardware      : Freescale i.MX6 Ultralite (Device Tree)
```

```
Revision     : 0000
```

```
Serial       : 0000000000000000
```

```
usbarmory@usbarmory:~$ free
```

	total	used	free	shared	buff/cache	available
Mem:	512204	25588	436744	7624	49872	467984
Swap:	0	0	0			

boot select switch

Switch near sdcard select booting from emmc or microsd (silkscreen is somewhat poor, but by default before removing sticker it will boot from sdcard)

If it's closer to sdcard, it will boot from sdcard

image delivered on device

Password for image delivered with device is not usbarmory (?)

In fact, it doesn't have usbarmory user in /etc/passwd, but has it in /etc/shadow, go figure!

```
root@usbarmory:/# cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
```

```

mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false
_apt:x:104:65534::/nonexistent:/bin/false
messagebus:x:105:108::/var/run/dbus:/bin/false
sshd:x:106:65534::/run/sshd:/usr/sbin/nologin
interlock:x:1000:1000::/home/interlock:/bin/bash
lcars:x:1001:1001::/home/lcars:/bin/bash

```

```

root@usbarmory:/# cat /etc/shadow

```

```

root:*:18068:0:99999:7:::
daemon:*:18068:0:99999:7:::
bin:*:18068:0:99999:7:::
sys:*:18068:0:99999:7:::
sync:*:18068:0:99999:7:::
games:*:18068:0:99999:7:::
man:*:18068:0:99999:7:::
lp:*:18068:0:99999:7:::
mail:*:18068:0:99999:7:::
news:*:18068:0:99999:7:::
uucp:*:18068:0:99999:7:::
proxy:*:18068:0:99999:7:::
www-data:*:18068:0:99999:7:::
backup:*:18068:0:99999:7:::
list:*:18068:0:99999:7:::
irc:*:18068:0:99999:7:::
gnats:*:18068:0:99999:7:::
nobody:*:18068:0:99999:7:::
systemd-timesync:*:18068:0:99999:7:::
systemd-network:*:18068:0:99999:7:::
systemd-resolve:*:18068:0:99999:7:::
systemd-bus-proxy:*:18068:0:99999:7:::
_apt:*:18068:0:99999:7:::
messagebus:*:18068:0:99999:7:::
sshd:*:18068:0:99999:7:::
usbarmory:$6$rcyB4m4EPv$udqWl0CZH/Av1IkJVuZHyWMhw/fYkhLGeVlo17C3x6qMemSHUmPPAQrvc0SaY.yWVIIU0ADL0
lcars:$6$iFljmotV$gnK66oZpz7BD3BqlFpPWoy/Q1tey8in75868neosxypKswjSoNDQotIMBZ9hh.vQBDyltA08z2Vji/Q
interlock!:18072:0:99999:7:::

```

After adding usbarmory account, running apt upgrade (since image has old kernel) device isn't bootable any more (at least it's not detected by host in which it's plugged in).

Let's try to rebuild image for emmc and flash it.

Well, re-build fails with patches already applied errors in linux source, so let's wipe it:

```

root@813046ba7c77:/opt/armory# rm -Rf linux-* u-boot-2019.07*

```

```

root@813046ba7c77:/opt/armory# make all V=mark-two IMX=imx6ull BOOT=eMMC -j 8

```

pads on board

there is kicad project of production one which just removed pads

<https://github.com/f-secure-foundry/usarmory/tree/master/hardware/mark-two>

```
t=0x8d4e060
```

cell=0x8d4e060 [0,4]	cell=0x8d4e060 [0,4]	cell=0x8d4e060 [0,4]	cell=0x8d4e060 [0,4]	cell=0x8d4e060 [0,4]	cell=0x8d4e060 [0,4]
			jtag_mod	jtag_tck	
cell=0x8d4e060 [0,4]	cell=0x8d4e060 [0,4]	cell=0x8d4e060 [0,4]	cell=0x8d4e060 [0,4]	cell=0x8d4e060 [0,4]	cell=0x8d4e060 [0,4]
			jtag_nrst	jtag_tms	jtag_tdi

from changelog those pads might be jtag (since it's enabled in u-boot), but schematics confirms it.

It seems that 8 gpio pins are available using additional board:

<https://github.com/inversepath/usarmory/tree/master/hardware/mark-two-debug-accessory>

sdcard vs emmc speed

```
root@usarmory:/mnt/klin/home/dpavlin/usb-armory/usarmory-debian-base_image# hdparm -Tt /dev/mmcblk0
```

```
/dev/mmcblk0: # -- sdcard
```

```
Timing cached reads: 664 MB in 2.00 seconds = 331.99 MB/sec
```

```
Timing buffered disk reads: 34 MB in 3.03 seconds = 11.21 MB/sec
```

```
/dev/mmcblk1: # -- emmc
```

```
Timing cached reads: 716 MB in 2.00 seconds = 357.40 MB/sec
```

```
Timing buffered disk reads: 128 MB in 3.04 seconds = 42.17 MB/sec
```

community

<https://groups.google.com/forum/#!forum/usarmory>

<https://hackaday.com/2019/09/29/usb-armory-mkii-a-usb-c-thumb-drive-based-linux-computer-for-pentesters/>

led heartbeat off

<https://photos.app.goo.gl/rRzfbbs4GGjt3ePA>

very bright and annoying in dark room

```
sbarmory@usarmory:/sys/class/leds/LED_WHITE$ cat trigger
```

```
none kbd-scrollllock kbd-numlock kbd-capslock kbd-kanalock kbd-shiftlock kbd-altgrlock kbd-ctrllock
```

```
root@usarmory:/sys/devices/soc0/leds/leds/LED_WHITE# echo none > trigger
```

network speed

```
root@usarmory:~# iperf3 -c 10.0.0.2
```

```
Connecting to host 10.0.0.2, port 5201
```

```

[ 4] local 10.0.0.1 port 33574 connected to 10.0.0.2 port 5201
[ ID] Interval           Transfer     Bandwidth   Retr  Cwnd
[ 4]  0.00-1.03       sec   23.0 MBytes  188 Mbits/sec    0   174 KBytes
[ 4]  1.03-2.00       sec   20.6 MBytes  178 Mbits/sec    0   272 KBytes
[ 4]  2.00-3.01       sec   21.1 MBytes  176 Mbits/sec    0   286 KBytes
[ 4]  3.01-4.01       sec   21.8 MBytes  182 Mbits/sec    0   297 KBytes
[ 4]  4.01-5.00       sec   20.1 MBytes  171 Mbits/sec    0   297 KBytes
[ 4]  5.00-6.00       sec   21.0 MBytes  176 Mbits/sec    0   329 KBytes
[ 4]  6.00-7.00       sec   20.3 MBytes  171 Mbits/sec    0   329 KBytes
[ 4]  7.00-8.00       sec   20.4 MBytes  171 Mbits/sec    0   329 KBytes
[ 4]  8.00-9.00       sec   20.3 MBytes  171 Mbits/sec    0   329 KBytes
[ 4]  9.00-10.00      sec   20.1 MBytes  169 Mbits/sec    0   329 KBytes
-----
[ ID] Interval           Transfer     Bandwidth   Retr
[ 4]  0.00-10.00      sec    209 MBytes  175 Mbits/sec    0
[ 4]  0.00-10.00      sec    208 MBytes  174 Mbits/sec

```

iperf Done.

network setup for desktop

```

dpavlin@nuc:~$ grep usbarmory -A 5 /etc/network/interfaces
# usbarmory
allow-hotplug enx1a5589a26942
iface enx1a5589a26942 inet static
    address 10.0.0.2
    netmask 255.255.255.0
    post-up iptables -t nat -A POSTROUTING -s 10.0.0.0/24 -o eth0 -j MASQUERADE

```

bluetooth

<https://github.com/inversepath/usbarmory/wiki/Bluetooth>

```

root@usbarmory:/home/usbarmory# microcom -p /dev/ttymx0

```

```

AT+GMR
"1.0.0-017"

```

armoryctl

```

usbarmory@usbarmory:~$ sudo apt install armoryctl

```

since device is on stretch it has go 1.7 which can't compile it.

```

dpavlin@klin:~/usb-armory$ git clone https://github.com/inversepath/armoryctl

```

```

dpavlin@klin:~/usb-armory/armoryctl$ make armoryctl GOARCH=arm
github.com/inversepath/armoryctl/anna_b112
# github.com/inversepath/armoryctl/anna_b112

```

```
anna_b112/openocd.go:328:9: undefined: strings.ReplaceAll
anna_b112/openocd.go:329:8: undefined: strings.ReplaceAll
note: module requires Go 1.12make: *** [Makefile:27: armoryctl] Error 2
```

After compile:

```
usbarmory@usbarmory:~$ sudo ./armoryctl tusb id
TUSB320
usbarmory@usbarmory:~$ sudo ./armoryctl ble info
manufacturer:"u-blox" model:"ANNA-B1" serial:"0" sw:"1.0.0-017" device_name:"USBARMORY-MKII-DUT-3
usbarmory@usbarmory:~$ sudo ./armoryctl sel info
serial:0x0123455d2a9039e5ee revision:0x00006002
usbarmory@usbarmory:~$ sudo ./armoryctl pmic info
id:0x4("PF1510") family:0xf("15") otp:"A6" rev:0x11
```

i2c

```
root@usbarmory:/home/usbarmory# i2cdetect -l
root@usbarmory:/home/usbarmory# modprobe i2c-dev
root@usbarmory:/home/usbarmory# i2cdetect -l
i2c-0 i2c 21a0000.i2c I2C adapter
root@usbarmory:/home/usbarmory# i2cdetect -y 0
 0 1 2 3 4 5 6 7 8 9 a b c d e f
00: -- -- -- -- -- -- -- 08 -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- 31 -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- 48 -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: 60 61 -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- -- -- -- -- --
```