

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=0x0ca00008 [0, 0]

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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:$6$iF1jmotV$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

```



```

[ 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:  -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
```