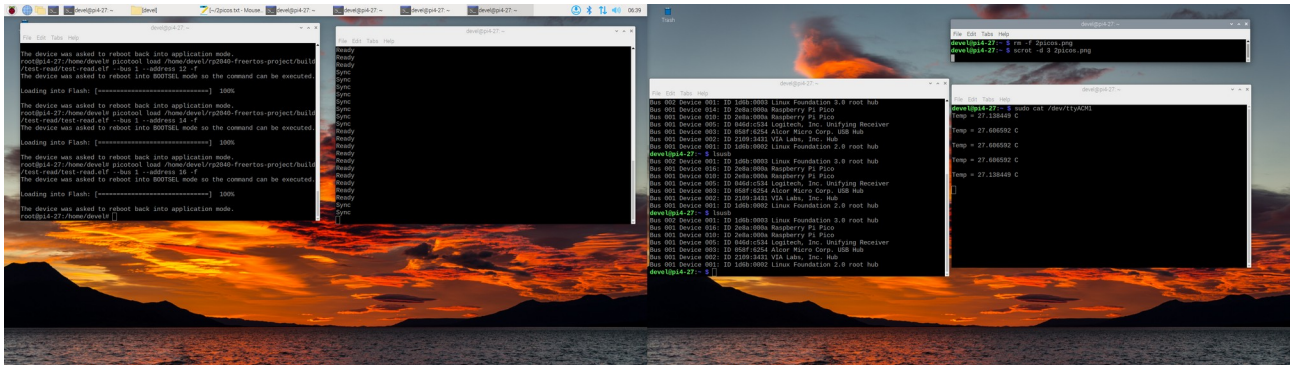


*****Default*****

RPi4B+ Raspberry Pi O/S with multiple Picos connected on USB Programming the Pico with picotool 05/18/2022

*****Default*****



The first shell is running the picotool as root

The 2nd shell is running minicom for test-read freertos (klt-feature-detect & dwt lifting) step or rp2040-logic-analyzer

The 3rd shell is being used to run lsusb to find the the address of the pico connected on USB

The 4th shell is running the cat command on /dev/ttyACM1 which is a multico pico sampling the built in temperature sensor.

Two pico are connected to RPi4B+ 8Gb

/dev/ttyACM0 /dev/ttyACM1

The first pico is programmed with freeRTOS running test-read.elf

Using minicom see the output

The 2nd pico is program showing 2 cores reading the onboard temp sensor.

The output of the 2nd pico is obtained by using the cat /dev/ttyACM1

```
devel@pi4-27:~$ lsusb
```

```
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
```

```
Bus 001 Device 008: ID 2e8a:000a Raspberry Pi Pico
```

```
Bus 001 Device 010: ID 2e8a:000a Raspberry Pi Pico
```

```
Bus 001 Device 005: ID 046d:c534 Logitech, Inc. Unifying Receiver
```

```
Bus 001 Device 003: ID 058f:6254 Alcor Micro Corp. USB Hub
```

```
Bus 001 Device 002: ID 2109:3431 VIA Labs, Inc. Hub
```

```
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

```
devel@pi4-27:~$ sudo su
```

```
root@pi4-27:/home/devel# . Ultibo_Projects/picoultibo.sh
```

```
/home/devel/ultibo/core:/home/devel/qemu-6.2.0-rpios/bin:/home/devel/local/openocd/bin:/home/devel/picotool/build:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
```

```
root@pi4-27:/home/devel# picotool info
No accessible RP2040 devices in BOOTSEL mode were found.
```

but:

Device at bus 1, address 4 appears to be a RP2040 device with a USB serial connection, so consider -f (or -F) to force reboot in order to run the command.

Device at bus 1, address 6 appears to be a RP2040 device with a USB serial connection, so consider -f (or -F) to force reboot in order to run the command.

```
root@pi4-27:/home/devel# picotool info --bus 1 --address 4
No accessible RP2040 device in BOOTSEL mode was found at bus 1, address 4.
```

but:

Device at bus 1, address 4 appears to be a RP2040 device with a USB serial connection, so consider -f (or -F) to force reboot in order to run the command.

```
root@pi4-27:/home/devel# picotool info --bus 1 --address 4 -f -a
The device was asked to reboot into BOOTSEL mode so the command can be executed.
```

Program Information

```
name:      test-read
features:   USB stdin / stdout
binary start: 0x10000000
binary end:  0x10016034
```

Fixed Pin Information

none

Build Information

```
sdk version:   1.3.0
pico_board:    pico
boot2_name:    boot2_w25q080
build date:    May 16 2022
build attributes: Release
```

Device Information

```
flash size: 2048K
ROM version: 2
```

The device was asked to reboot back into application mode.

```
root@pi4-27:/home/devel# picotool info --bus 1 --address 6 -f -a
The device was asked to reboot into BOOTSEL mode so the command can be executed.
```

Program Information

```
name:      multicore
features:   USB stdin / stdout
binary start: 0x10000000
binary end:  0x10007ea8
```

Fixed Pin Information

none

Build Information

sdk version: 1.3.0
pico_board: pico
boot2_name: boot2_w25q080
build date: May 16 2022
build attributes: Release

Device Information

flash size: 2048K
ROM version: 2

```
devel@pi4-27:~ $ sudo cat /dev/ttyACM1  
Temp = 27.138449 C
```

```
Temp = 27.606592 C
```

```
Temp = 27.138449 C
```

```
Temp = 27.138449 C
```

```
Temp = 27.138449 C
```

The pico on /dev/ttyAMC0 can also run the logic-analyzer

```
root@pi4-27:/home/devel# picotool load /home/devel/rp2040-freertos-project/build/rp2040-logic-analyzer/rp2040-logic-analyzer.elf --bus 1 --address 18 -f
```

The device was asked to reboot back into application mode.

```
lsusb -v
```

Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub

Couldn't open device, some information will be missing

Device Descriptor:

bLength 18
bDescriptorType 1
bcdUSB 3.00
bDeviceClass 9 Hub
bDeviceSubClass 0
bDeviceProtocol 3
bMaxPacketSize0 9
idVendor 0x1d6b Linux Foundation
idProduct 0x0003 3.0 root hub
bcdDevice 5.10
iManufacturer 3 Linux 5.10.92-v7l+ xhci-hcd
iProduct 2 xHCI Host Controller
iSerial 1 0000:01:00.0
bNumConfigurations 1
Configuration Descriptor:

```

bLength          9
bDescriptorType   2
wTotalLength     0x001f
bNumInterfaces    1
bConfigurationValue  1
iConfiguration    0
bmAttributes      0xe0
    Self Powered
    Remote Wakeup
MaxPower          0mA
Interface Descriptor:
bLength          9
bDescriptorType   4
bInterfaceNumber  0
bAlternateSetting  0
bNumEndpoints     1
bInterfaceClass   9 Hub
bInterfaceSubClass  0
bInterfaceProtocol 0 Full speed (or root) hub
iInterface        0
Endpoint Descriptor:
bLength          7
bDescriptorType   5
bEndpointAddress  0x81 EP 1 IN
bmAttributes      3
    Transfer Type    Interrupt
    Synch Type       None
    Usage Type       Data
wMaxPacketSize    0x0004 1x 4 bytes
bInterval         12
bMaxBurst         0

```

Bus 001 Device 030: ID 2e8a:000a Raspberry Pi Pico
 Couldn't open device, some information will be missing

```

Device Descriptor:
bLength          18
bDescriptorType   1
bcdUSB           2.00
bDeviceClass      239 Miscellaneous Device
bDeviceSubClass   2
bDeviceProtocol   1 Interface Association
bMaxPacketSize0   64
idVendor          0x2e8a
idProduct         0x000a
bcdDevice         1.00
iManufacturer     1 Raspberry Pi
iProduct          2 Pico
iSerial           3 E66034F71F1F4F36
bNumConfigurations 1
Configuration Descriptor:
bLength          9
bDescriptorType   2

```

wTotalLength 0x0054
bNumInterfaces 3
bConfigurationValue 1
iConfiguration 0
bmAttributes 0x80
(Bus Powered)
MaxPower 250mA
Interface Association:
bLength 8
bDescriptorType 11
bFirstInterface 0
bInterfaceCount 2
bFunctionClass 2 Communications
bFunctionSubClass 2 Abstract (modem)
bFunctionProtocol 0
iFunction 0
Interface Descriptor:
bLength 9
bDescriptorType 4
bInterfaceNumber 0
bAlternateSetting 0
bNumEndpoints 1
bInterfaceClass 2 Communications
bInterfaceSubClass 2 Abstract (modem)
bInterfaceProtocol 0
iInterface 4
CDC Header:
bcdCDC 1.20
CDC Call Management:
bmCapabilities 0x00
bDataInterface 1
CDC ACM:
bmCapabilities 0x02
line coding and serial state
CDC Union:
bMasterInterface 0
bSlaveInterface 1
Endpoint Descriptor:
bLength 7
bDescriptorType 5
bEndpointAddress 0x81 EP 1 IN
bmAttributes 3
Transfer Type Interrupt
Synch Type None
Usage Type Data
wMaxPacketSize 0x0008 1x 8 bytes
bInterval 16
Interface Descriptor:
bLength 9
bDescriptorType 4
bInterfaceNumber 1
bAlternateSetting 0

```

bNumEndpoints      2
bInterfaceClass    10 CDC Data
bInterfaceSubClass  0
bInterfaceProtocol  0
iInterface         0
Endpoint Descriptor:
  bLength           7
  bDescriptorType    5
  bEndpointAddress  0x02 EP 2 OUT
  bmAttributes      2
    Transfer Type    Bulk
    Synch Type       None
    Usage Type       Data
  wMaxPacketSize    0x0040 1x 64 bytes
  bInterval         0
Endpoint Descriptor:
  bLength           7
  bDescriptorType    5
  bEndpointAddress  0x82 EP 2 IN
  bmAttributes      2
    Transfer Type    Bulk
    Synch Type       None
    Usage Type       Data
  wMaxPacketSize    0x0040 1x 64 bytes
  bInterval         0
Interface Descriptor:
  bLength           9
  bDescriptorType    4
  bInterfaceNumber   2
  bAlternateSetting  0
  bNumEndpoints      0
  bInterfaceClass    255 Vendor Specific Class
  bInterfaceSubClass  0
  bInterfaceProtocol  1
  iInterface        5

```

Bus 001 Device 010: ID 2e8a:000a Raspberry Pi Pico
 Couldn't open device, some information will be missing

```

Device Descriptor:
  bLength           18
  bDescriptorType    1
  bcdUSB            2.00
  bDeviceClass       239 Miscellaneous Device
  bDeviceSubClass    2
  bDeviceProtocol    1 Interface Association
  bMaxPacketSize0    64
  idVendor          0x2e8a
  idProduct         0x000a
  bcdDevice         1.00
  iManufacturer     1 Raspberry Pi
  iProduct          2 Pico
  iSerial           3 E6605838838BA92F

```

```

bNumConfigurations    1
Configuration Descriptor:
  bLength              9
  bDescriptorType      2
  wTotalLength        0x0054
  bNumInterfaces       3
  bConfigurationValue  1
  iConfiguration      0
  bmAttributes         0x80
    (Bus Powered)
  MaxPower            250mA
Interface Association:
  bLength              8
  bDescriptorType     11
  bFirstInterface      0
  bInterfaceCount      2
  bFunctionClass       2 Communications
  bFunctionSubClass    2 Abstract (modem)
  bFunctionProtocol    0
  iFunction            0
Interface Descriptor:
  bLength              9
  bDescriptorType      4
  bInterfaceNumber     0
  bAlternateSetting    0
  bNumEndpoints        1
  bInterfaceClass      2 Communications
  bInterfaceSubClass   2 Abstract (modem)
  bInterfaceProtocol   0
  iInterface           4
CDC Header:
  bcdCDC              1.20
CDC Call Management:
  bmCapabilities      0x00
  bDataInterface      1
CDC ACM:
  bmCapabilities      0x02
    line coding and serial state
CDC Union:
  bMasterInterface     0
  bSlaveInterface      1
Endpoint Descriptor:
  bLength              7
  bDescriptorType      5
  bEndpointAddress    0x81 EP 1 IN
  bmAttributes         3
    Transfer Type      Interrupt
    Synch Type         None
    Usage Type         Data
  wMaxPacketSize      0x0008 1x 8 bytes
  bInterval           16
Interface Descriptor:

```

```

bLength          9
bDescriptorType   4
bInterfaceNumber  1
bAlternateSetting 0
bNumEndpoints    2
bInterfaceClass   10 CDC Data
bInterfaceSubClass 0
bInterfaceProtocol 0
iInterface        0
Endpoint Descriptor:
  bLength          7
  bDescriptorType   5
  bEndpointAddress 0x02 EP 2 OUT
  bmAttributes     2
    Transfer Type   Bulk
    Synch Type      None
    Usage Type      Data
  wMaxPacketSize   0x0040 1x 64 bytes
  bInterval        0
Endpoint Descriptor:
  bLength          7
  bDescriptorType   5
  bEndpointAddress 0x82 EP 2 IN
  bmAttributes     2
    Transfer Type   Bulk
    Synch Type      None
    Usage Type      Data
  wMaxPacketSize   0x0040 1x 64 bytes
  bInterval        0
Interface Descriptor:
  bLength          9
  bDescriptorType   4
  bInterfaceNumber  2
  bAlternateSetting 0
  bNumEndpoints    0
  bInterfaceClass   255 Vendor Specific Class
  bInterfaceSubClass 0
  bInterfaceProtocol 1
  iInterface        5

```

Bus 001 Device 005: ID 046d:c534 Logitech, Inc. Unifying Receiver
 Couldn't open device, some information will be missing

Device Descriptor:

```

bLength          18
bDescriptorType   1
bcdUSB           2.00
bDeviceClass      0
bDeviceSubClass   0
bDeviceProtocol   0
bMaxPacketSize0   8
idVendor          0x046d Logitech, Inc.
idProduct         0xc534 Unifying Receiver

```



```

bcdDevice      29.01
iManufacturer   1 Logitech
iProduct       2 USB Receiver
iSerial        0
bNumConfigurations  1
Configuration Descriptor:
  bLength       9
  bDescriptorType  2
  wTotalLength  0x003b
  bNumInterfaces  2
  bConfigurationValue  1
  iConfiguration  4
  bmAttributes  0xa0
    (Bus Powered)
    Remote Wakeup
  MaxPower     98mA
Interface Descriptor:
  bLength       9
  bDescriptorType  4
  bInterfaceNumber  0
  bAlternateSetting  0
  bNumEndpoints  1
  bInterfaceClass  3 Human Interface Device
  bInterfaceSubClass  1 Boot Interface Subclass
  bInterfaceProtocol  1 Keyboard
  iInterface     0
  HID Device Descriptor:
    bLength       9
    bDescriptorType  33
    bcdHID        1.11
    bCountryCode   0 Not supported
    bNumDescriptors  1
    bDescriptorType  34 Report
    wDescriptorLength  59
  Report Descriptors:
    ** UNAVAILABLE **
Endpoint Descriptor:
  bLength       7
  bDescriptorType  5
  bEndpointAddress  0x81 EP 1 IN
  bmAttributes    3
    Transfer Type  Interrupt
    Synch Type     None
    Usage Type     Data
  wMaxPacketSize  0x0008 1x 8 bytes
  bInterval      8
Interface Descriptor:
  bLength       9
  bDescriptorType  4
  bInterfaceNumber  1
  bAlternateSetting  0
  bNumEndpoints  1

```

```

bInterfaceClass      3 Human Interface Device
bInterfaceSubClass    1 Boot Interface Subclass
bInterfaceProtocol    2 Mouse
iInterface            0
HID Device Descriptor:
  bLength              9
  bDescriptorType      33
  bcdHID               1.11
  bCountryCode         0 Not supported
  bNumDescriptors      1
  bDescriptorType      34 Report
  wDescriptorLength    177
Report Descriptors:
  ** UNAVAILABLE **
Endpoint Descriptor:
  bLength              7
  bDescriptorType      5
  bEndpointAddress     0x82 EP 2 IN
  bmAttributes         3
    Transfer Type      Interrupt
    Synch Type         None
    Usage Type         Data
  wMaxPacketSize       0x0014 1x 20 bytes
  bInterval            2

```

Bus 001 Device 003: ID 058f:6254 Alcor Micro Corp. USB Hub
 Couldn't open device, some information will be missing

```

Device Descriptor:
  bLength              18
  bDescriptorType      1
  bcdUSB               2.00
  bDeviceClass         9 Hub
  bDeviceSubClass      0
  bDeviceProtocol      1 Single TT
  bMaxPacketSize0      64
  idVendor              0x058f Alcor Micro Corp.
  idProduct             0x6254 USB Hub
  bcdDevice             1.00
  iManufacturer        0
  iProduct              1 USB2.0Hub
  iSerial               0
  bNumConfigurations   1
Configuration Descriptor:
  bLength              9
  bDescriptorType      2
  wTotalLength         0x0019
  bNumInterfaces        1
  bConfigurationValue   1
  iConfiguration        0
  bmAttributes          0xe0
    Self Powered
    Remote Wakeup

```

```

MaxPower          100mA
Interface Descriptor:
  bLength          9
  bDescriptorType   4
  bInterfaceNumber  0
  bAlternateSetting 0
  bNumEndpoints    1
  bInterfaceClass   9 Hub
  bInterfaceSubClass 0
  bInterfaceProtocol 0 Full speed (or root) hub
  iInterface        0
Endpoint Descriptor:
  bLength          7
  bDescriptorType   5
  bEndpointAddress 0x81 EP 1 IN
  bmAttributes      3
    Transfer Type    Interrupt
    Synch Type       None
    Usage Type       Data
  wMaxPacketSize    0x0001 1x 1 bytes
  bInterval         12

```

Bus 001 Device 002: ID 2109:3431 VIA Labs, Inc. Hub
 Couldn't open device, some information will be missing

```

Device Descriptor:
  bLength          18
  bDescriptorType   1
  bcdUSB           2.10
  bDeviceClass      9 Hub
  bDeviceSubClass   0
  bDeviceProtocol   1 Single TT
  bMaxPacketSize0   64
  idVendor          0x2109 VIA Labs, Inc.
  idProduct         0x3431 Hub
  bcdDevice         4.21
  iManufacturer     0
  iProduct          1 USB2.0 Hub
  iSerial           0
  bNumConfigurations 1
Configuration Descriptor:
  bLength          9
  bDescriptorType   2
  wTotalLength      0x0019
  bNumInterfaces    1
  bConfigurationValue 1
  iConfiguration    0
  bmAttributes      0xe0
    Self Powered
    Remote Wakeup
  MaxPower          100mA
Interface Descriptor:
  bLength          9

```

```

bDescriptorType      4
bInterfaceNumber     0
bAlternateSetting     0
bNumEndpoints        1
bInterfaceClass      9 Hub
bInterfaceSubClass   0
bInterfaceProtocol   0 Full speed (or root) hub
iInterface           0
Endpoint Descriptor:
  bLength             7
  bDescriptorType     5
  bEndpointAddress    0x81 EP 1 IN
  bmAttributes        3
    Transfer Type     Interrupt
    Synch Type        None
    Usage Type        Data
  wMaxPacketSize      0x0001 1x 1 bytes
  bInterval           12

```

Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub

Couldn't open device, some information will be missing

Device Descriptor:

```

bLength              18
bDescriptorType      1
bcdUSB               2.00
bDeviceClass         9 Hub
bDeviceSubClass      0
bDeviceProtocol      1 Single TT
bMaxPacketSize0      64
idVendor             0x1d6b Linux Foundation
idProduct            0x0002 2.0 root hub
bcdDevice            5.10
iManufacturer        3 Linux 5.10.92-v7l+ xhci-hcd
iProduct             2 xHCI Host Controller
iSerial              1 0000:01:00.0
bNumConfigurations   1

```

Configuration Descriptor:

```

bLength              9
bDescriptorType      2
wTotalLength         0x0019
bNumInterfaces       1
bConfigurationValue  1
iConfiguration       0
bmAttributes         0xe0
  Self Powered
  Remote Wakeup

```

```

MaxPower             0mA

```

Interface Descriptor:

```

bLength              9
bDescriptorType      4
bInterfaceNumber     0
bAlternateSetting     0

```

bNumEndpoints	1
bInterfaceClass	9 Hub
bInterfaceSubClass	0
bInterfaceProtocol	0 Full speed (or root) hub
iInterface	0
Endpoint Descriptor:	
bLength	7
bDescriptorType	5
bEndpointAddress	0x81 EP 1 IN
bmAttributes	3
Transfer Type	Interrupt
Synch Type	None
Usage Type	Data
wMaxPacketSize	0x0004 1x 4 bytes
bInterval	12