

*****Default*****

Steps to add a UART to iCE40UP5K

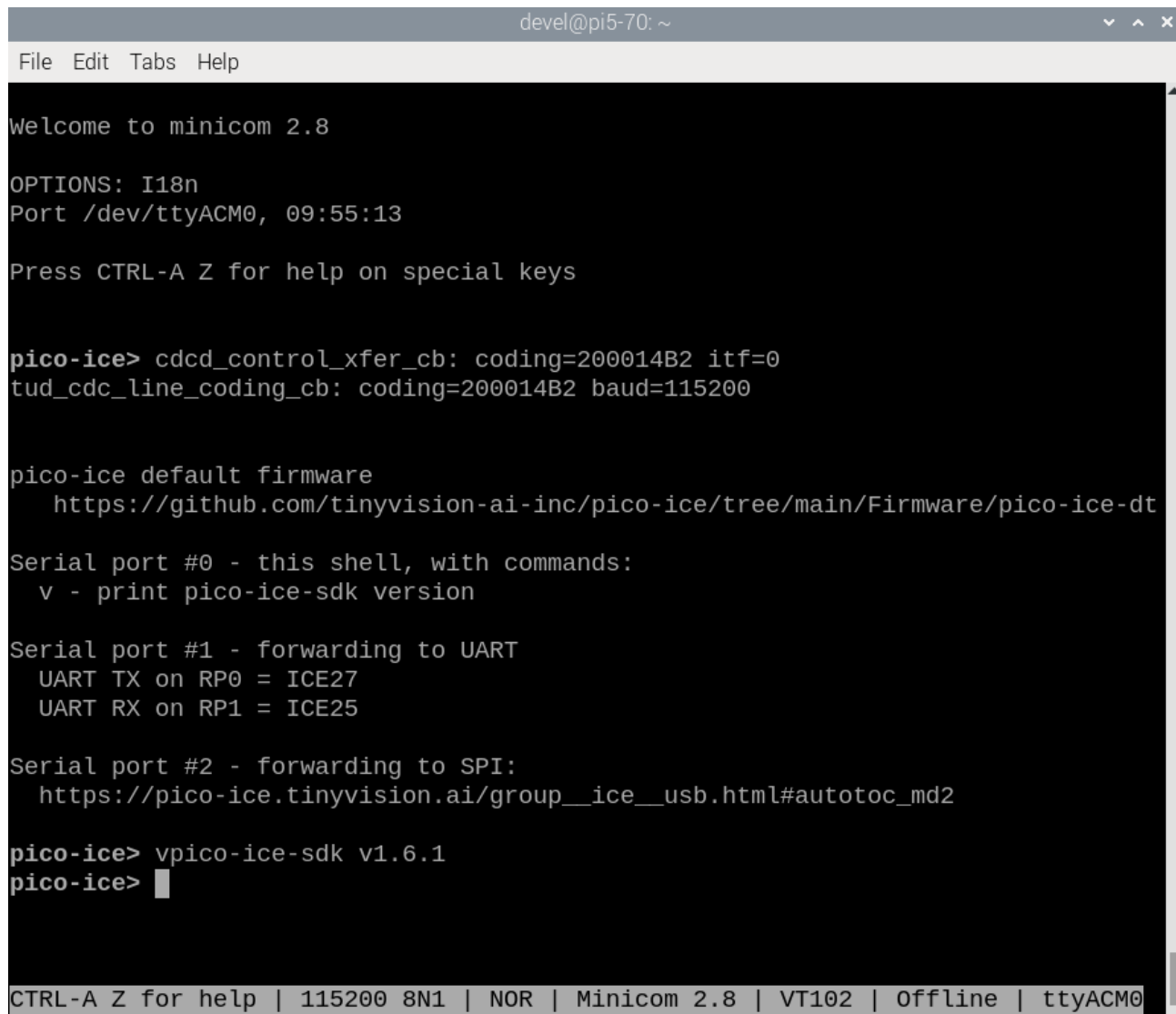
Nandland UART_RX.v

Nandland UART_TX.v

09/11/24

*****Default*****

pico_ice_default_firmware_v1.6.1.uf2 RP2040



```
devel@pi5-70: ~
File Edit Tabs Help

Welcome to minicom 2.8

OPTIONS: I18n
Port /dev/ttyACM0, 09:55:13

Press CTRL-A Z for help on special keys

pico-ice> cdcd_control_xfer_cb: coding=200014B2 itf=0
tud_cdc_line_coding_cb: coding=200014B2 baud=115200

pico-ice default firmware
  https://github.com/tinyvision-ai-inc/pico-ice/tree/main/Firmware/pico-ice-dt

Serial port #0 - this shell, with commands:
  v - print pico-ice-sdk version

Serial port #1 - forwarding to UART
  UART TX on RP0 = ICE27
  UART RX on RP1 = ICE25

Serial port #2 - forwarding to SPI:
  https://pico-ice.tinyvision.ai/group__ice__usb.html#autotoc_md2

pico-ice> vpico-ice-sdk v1.6.1
pico-ice>

CTRL-A Z for help | 115200 8N1 | NOR | Minicom 2.8 | VT102 | Offline | ttyACM0
```

minicom myusb0

blu tx

red rx

/dev/ttyUSB0

sudo minicom -s

ice25

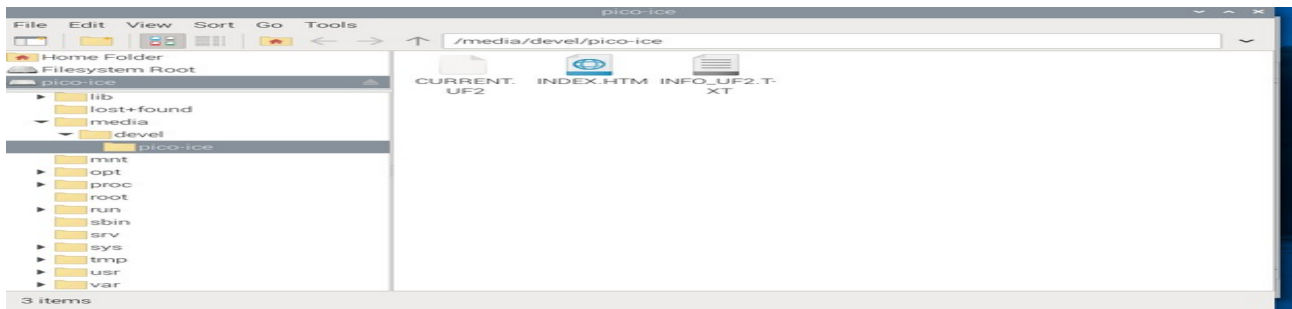
ice27

/dev/ttyACM1

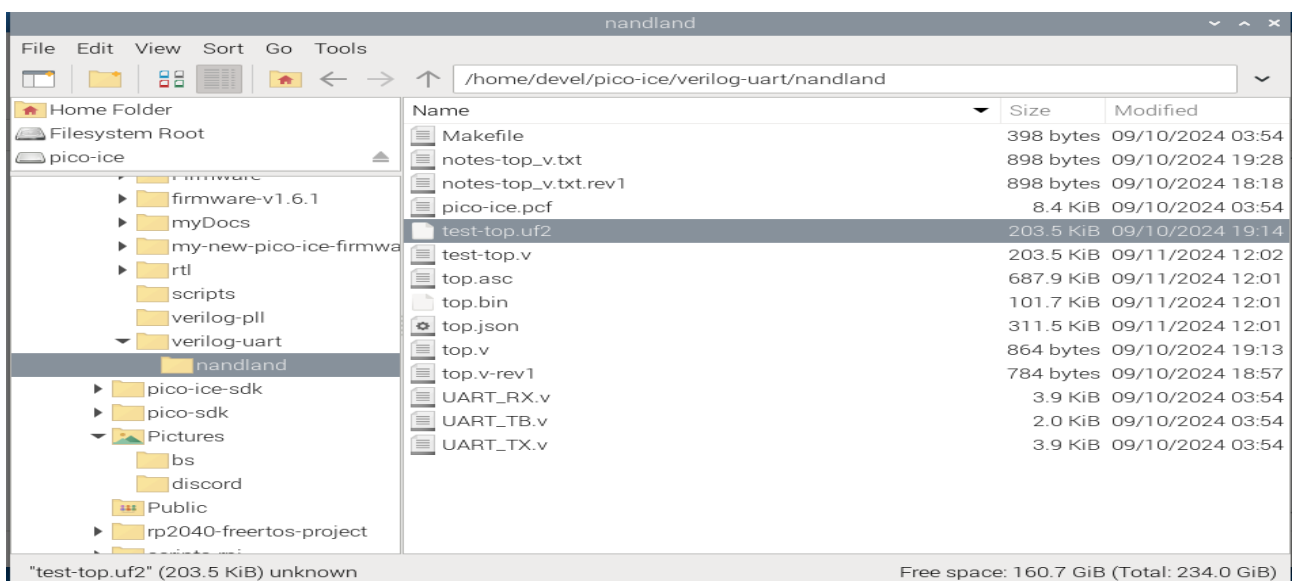
devel@pi5-80:~/pico-ice/verilog-uart/nandland \$ make

devel@pi5-80:~/pico-ice/verilog-uart/nandland \$ bin2uf2 -o test-top.v top.bin

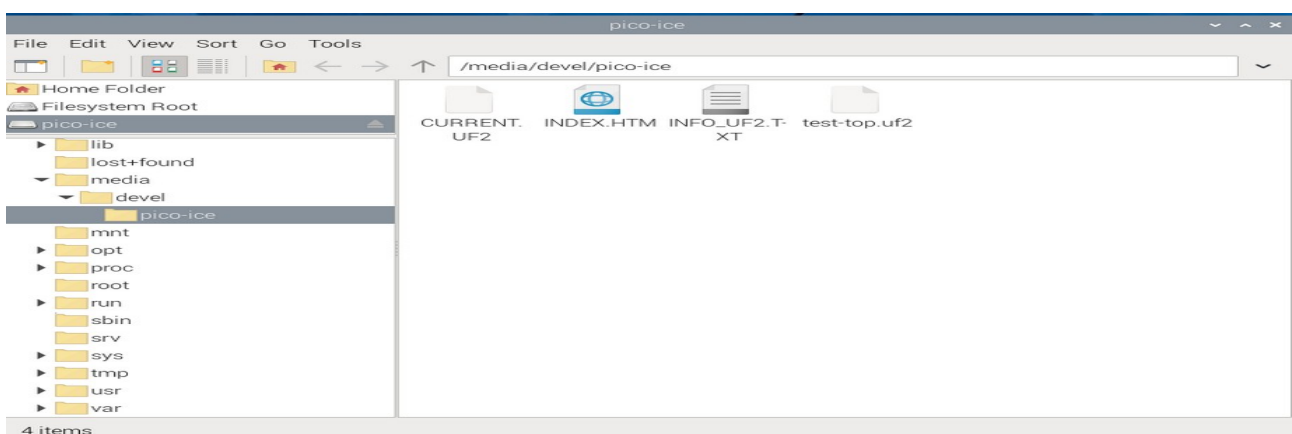
Open pico-ice



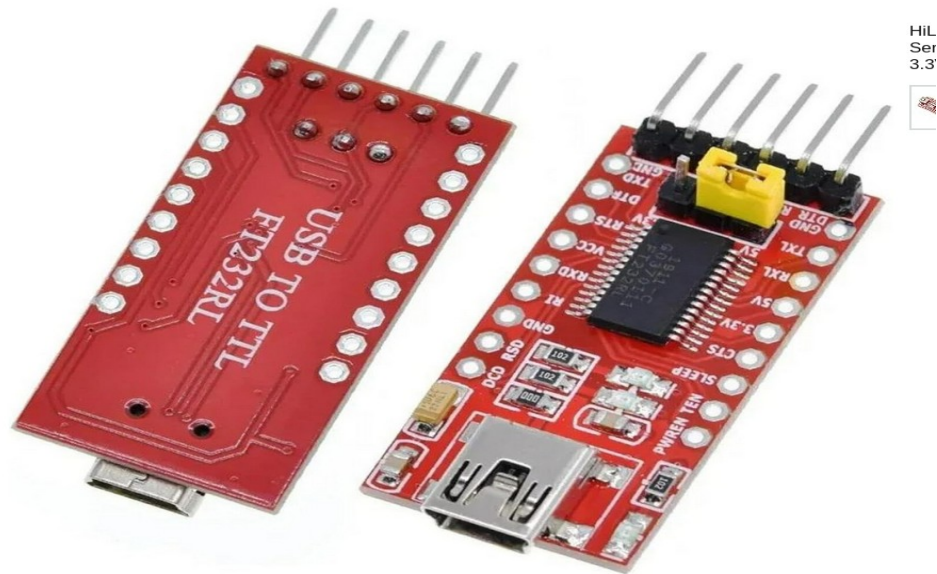
Select test-top.uf2



Paste test-top.uf2 in pico-ice.



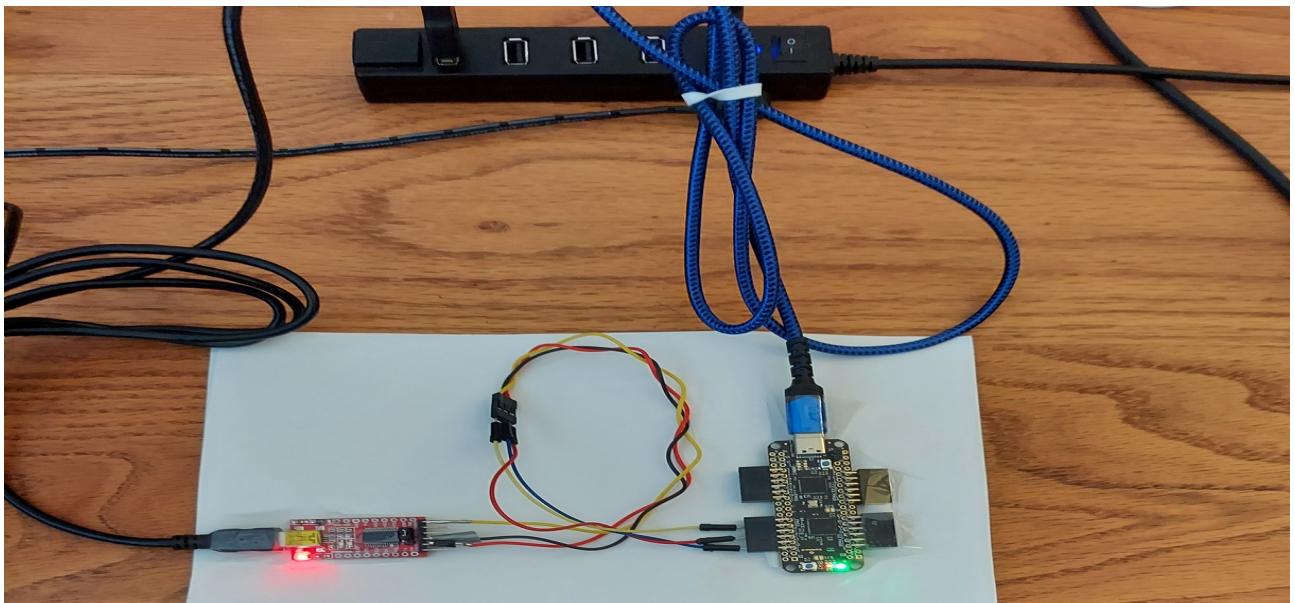
HiLetgo FT232RL Mini USB to TTL Serial Converter Adapter Module 3.3V/5.5V



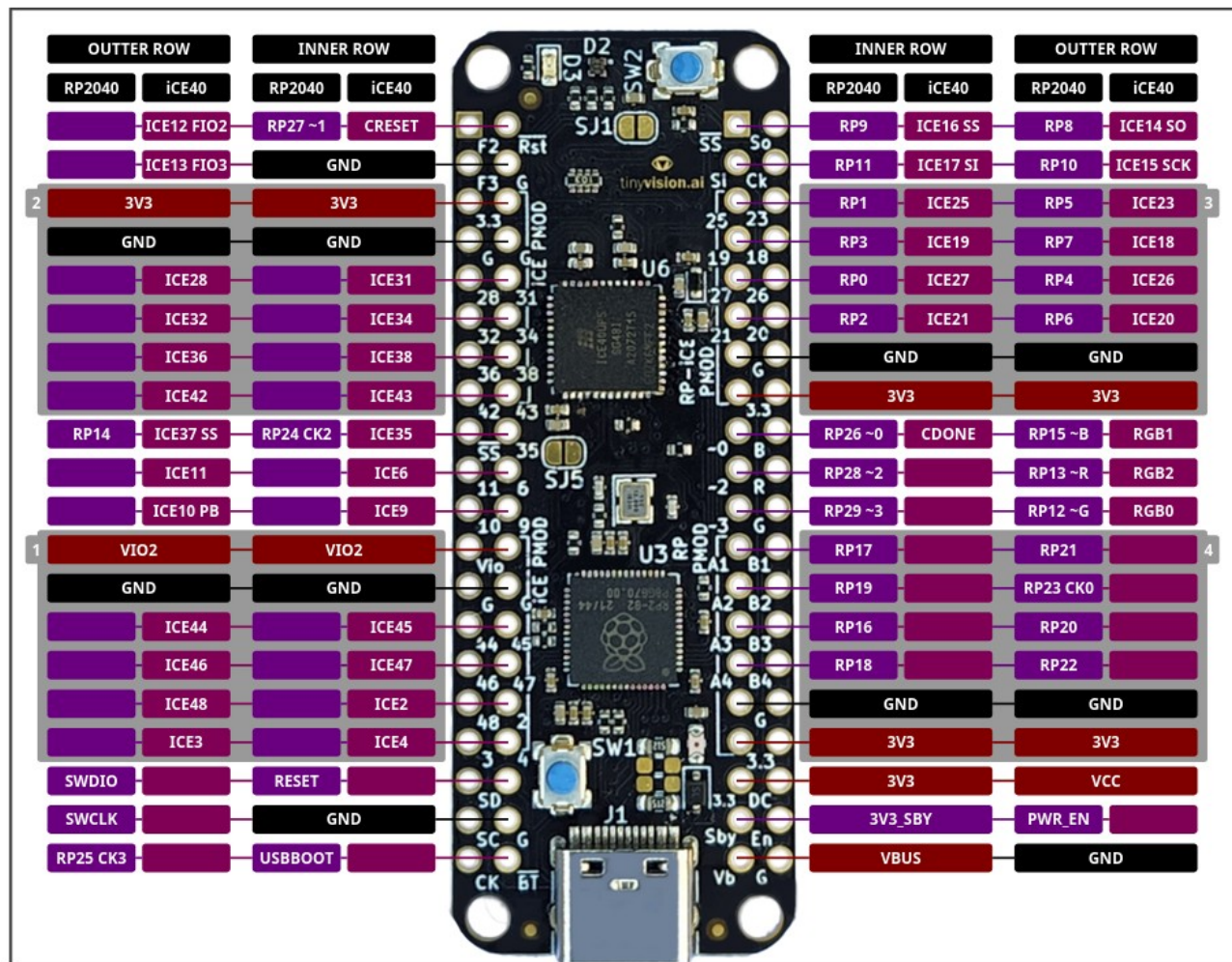
Below are the connections between the USB to FTDI

```
minicom myusb0
blu tx
red rx
/dev/ttyUSB0
```

```
sudo minicom -s
ice25
ice27
/dev/ttyACM1
```



Pinout Diagram



left
minicom myusb0
/dev/ttyUSB0

right
sudo minicom -s
/dev/ttyACM1

Change default /dev/ttyACM0 to dev/ttyACM1

```

+-----[configuration]-----+
|  Filenames and paths        |
|  File transfer protocols    |
|  Serial port setup         |
|  Modem and dialing         |
|  Screen and keyboard       |
|  Save setup as dfl         |
|  Save setup as..          |
|  Exit                      |
|  Exit from Minicom        |
+-----+

```

Depress enter

```

+-----+
|  A -   Serial Device       : /dev/ttyACM0 |
|  B - Lockfile Location    : /var/lock     |
|  C -   Callin Program     :               |
|  D -   Callout Program    :               |
|  E -   Bps/Par/Bits       : 115200 8N1    |
|  F - Hardware Flow Control : No           |
|  G - Software Flow Control : No           |
|  H -   RS485 Enable       : No           |
|  I -   RS485 Rts On Send  : No           |
|  J -   RS485 Rts After Send : No          |
|  K -   RS485 Rx During Tx : No           |
|  L -   RS485 Terminate Bus : No           |
|  M - RS485 Delay Rts Before: 0            |
|  N - RS485 Delay Rts After : 0            |
|                               |
|  Change which setting? █ |
+-----+

```

Type A enter

```
+-----+
| A -   Serial Device       : /dev/ttyACM1 |
| B - Lockfile Location    : /var/lock    |
| C -   Callin Program     :              |
| D -   Callout Program    :              |
| E -   Bps/Par/Bits       : 115200 8N1   |
| F - Hardware Flow Control : No          |
| G - Software Flow Control : No          |
| H -   RS485 Enable       : No          |
| I -   RS485 Rts On Send  : No          |
| J -   RS485 Rts After Send : No         |
| K -   RS485 Rx During Tx : No          |
| L -   RS485 Terminate Bus : No          |
| M - RS485 Delay Rts Before: 0           |
| N - RS485 Delay Rts After : 0           |
|                                     |
|   Change which setting?           |
+-----+
```

Change 0 to 1

```
+-----[configuration]-----+
| Filenames and paths          |
| File transfer protocols      |
| Serial port setup            |
| Modem and dialing            |
| Screen and keyboard          |
| Save setup as dfl             |
| Save setup as..              |
| Exit                         |
| Exit from Minicom            |
+-----+
```

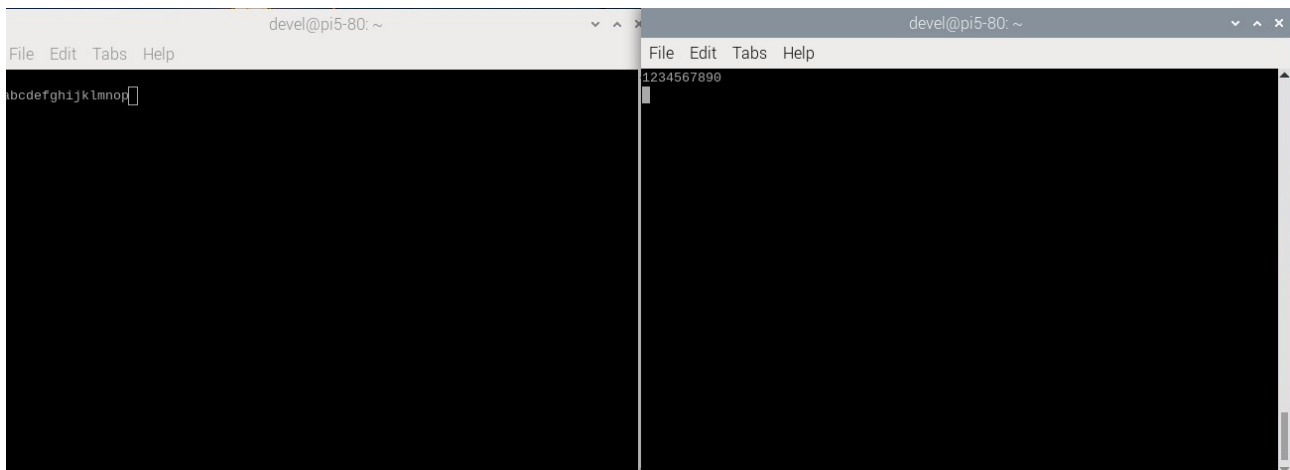
scroll to Exit enter

Typing in left terminal is displayed in right terminal.

Testing 09/11/24 after adding the pll with test-top.uf2

When characters **1234567890** are typed in the window *on the left* which is connected to “/dev/ttyUSB0”. They appear in the window *on the right* connected to “/dev/ttyACM1”.

When characters **abcdefghijklmnop** are typed in the window *on the right* which is connected to “/dev/ttyACM1”. They appear in the window *on the left* connected to “/dev/ttyUSB0”.



“/dev/ttyUSB0”

“/dev/ttyACM1”

The tx from left is connect pico-ice PMOD ICE_25 and rx is MOD ICE_27 see the pico-ice Pinout Diagram above.

With minor changes to the top.sv to detect the toggle of ICE_25 the blinking green led of the pico-ice show a spec of red.

```
diff --git a/pico-ice/my-new-pico-ice-firmware/ice_makefile_blinky/top.sv
b/pico-ice-sdk/examples/ice_makefile_blinky/top.sv
index 8c90cb5..88f0a17 100644
--- a/pico-ice/my-new-pico-ice-firmware/ice_makefile_blinky/top.sv
+++ b/pico-ice-sdk/examples/ice_makefile_blinky/top.sv
@@ -4,28 +4,17 @@ module top (
    output LED_R,
    output LED_G,
    output LED_B,
-   input ICE_25,
-   );

    localparam N = 22;

    reg [N:0] counter;
-   reg in1;
-   always @(posedge CLK) begin
-       counter <= counter + 1;
-   end

-
    always @(posedge CLK) begin
-       if (ICE_25 == 0)
-       begin
```

```

-   in1 <= 1'b0;
-   end
-   else
-   in1 <= 1'b1;
+   counter <= counter + 1;
end

```

xx

steps to program the pico-ice ice40UP5K

```

devel@pi5-70:~/pico-ice/my-new-pico-ice-firmware/ice_makefile_blinky $ .
~/OSS_CAD_SUITE.sh
/usr/local/
devel@pi5-70:~/pico-ice/my-new-pico-ice-firmware/ice_makefile_blinky $ make clean
rm -f *.json *.asc *.bin *.uf2
devel@pi5-70:~/pico-ice/my-new-pico-ice-firmware/ice_makefile_blinky $ make
/usr/local/bin/yosys -q -p "read_verilog -sv top.sv; synth_ice40 -top top -json gateway.json"
/usr/local/bin/nextpnr-ice40 -q --randomize-seed --up5k --package sg48 --pcf ice40.pcf --json
gateway.json --asc gateway.asc
/usr/local/bin/icepack gateway.asc gateway.bin

```

```

devel@pi5-70:~/pico-ice/my-new-pico-ice-firmware/ice_makefile_blinky $ bin2uf2 -o grn-red.uf2
gateway.bin

```

Drag-Drop the grn-red.uf2 file on the pico-ice.

