

\*\*\*\*\*Default\*\*\*\*\*

Steps to add a UART to iCE40UP5K

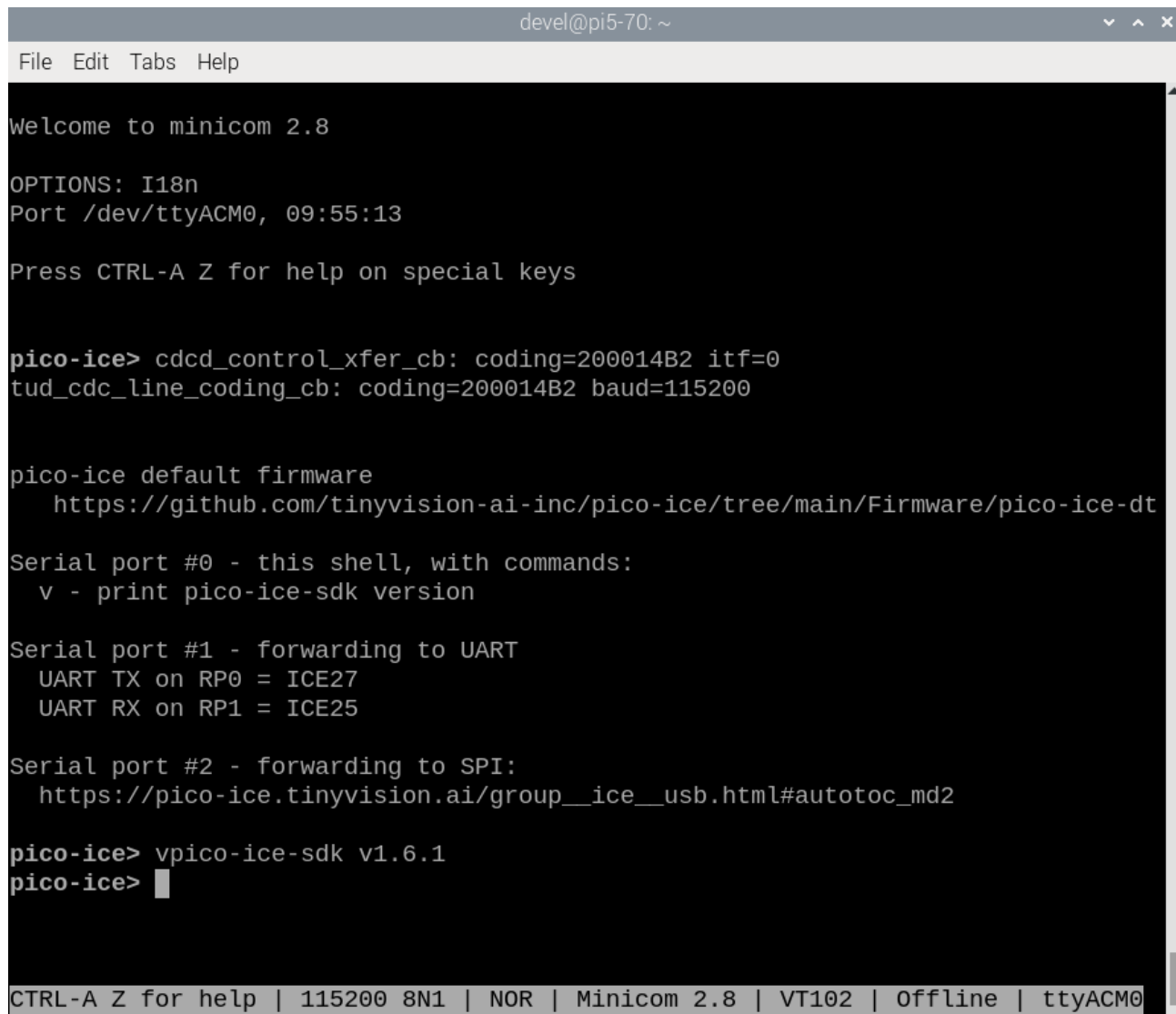
Nandland UART\_RX.v

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

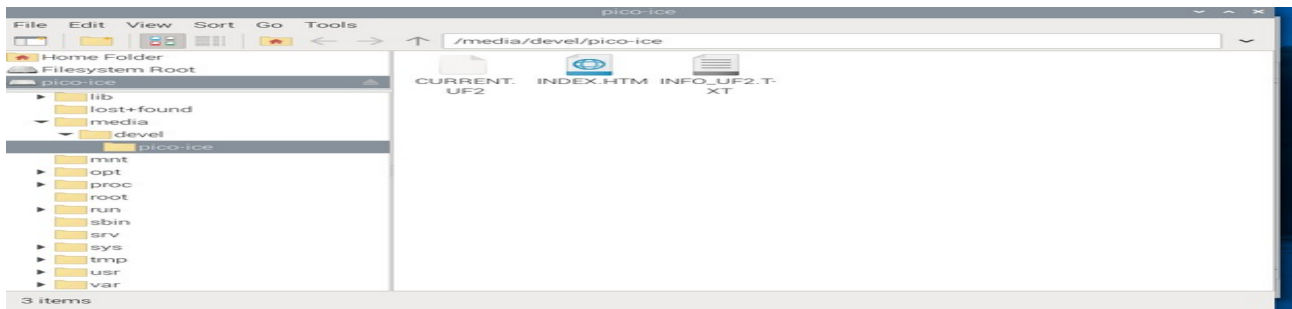
ice27

/dev/ttyACM1

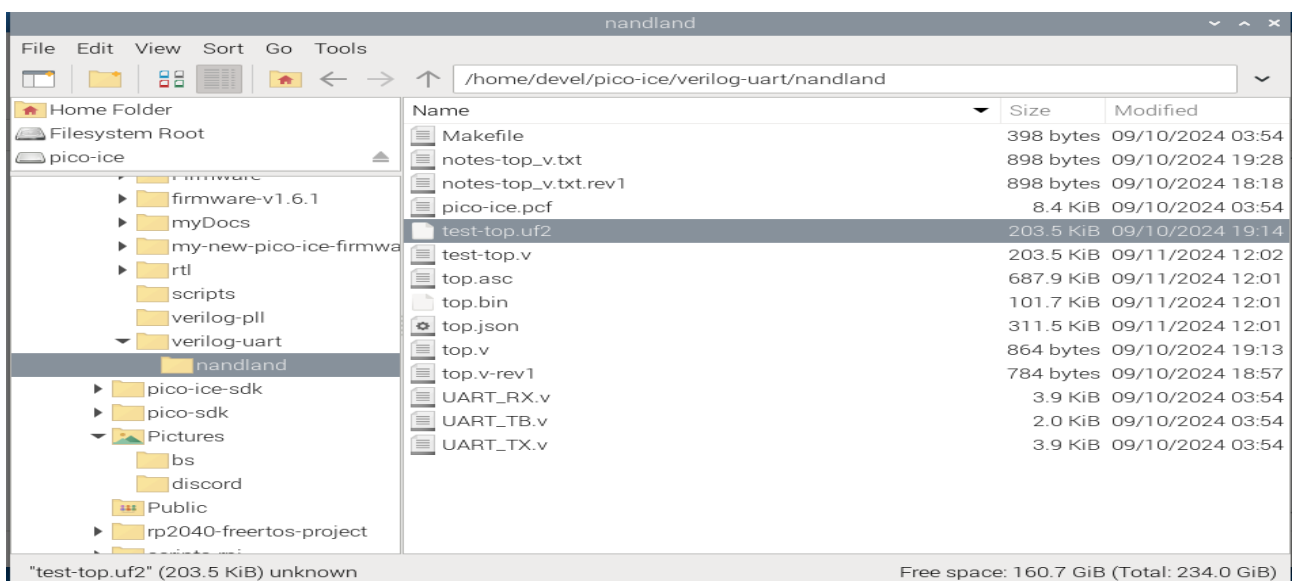
devel@pi5-80:~/pico-ice/verilog-uart/nandland \$ make

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

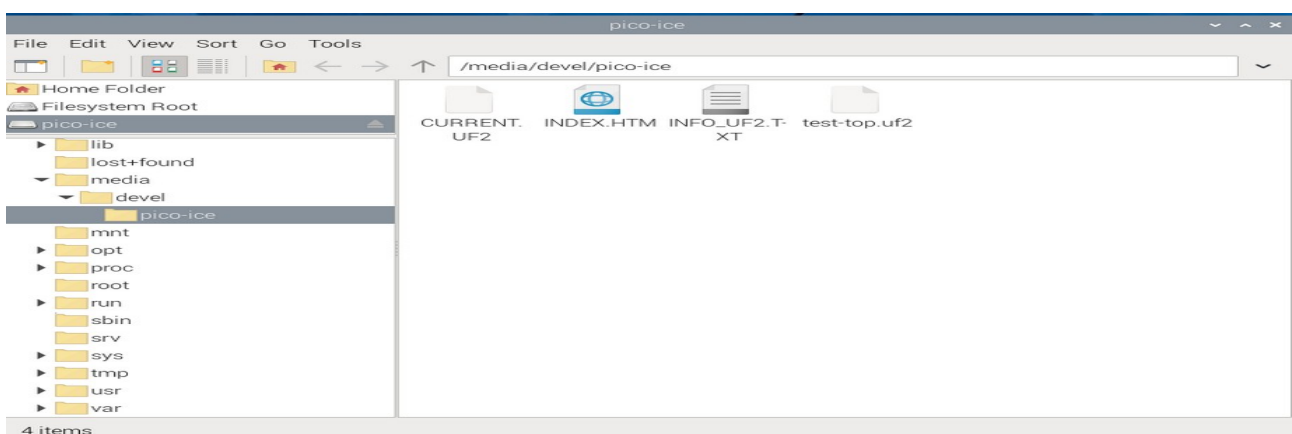
Open pico-ice



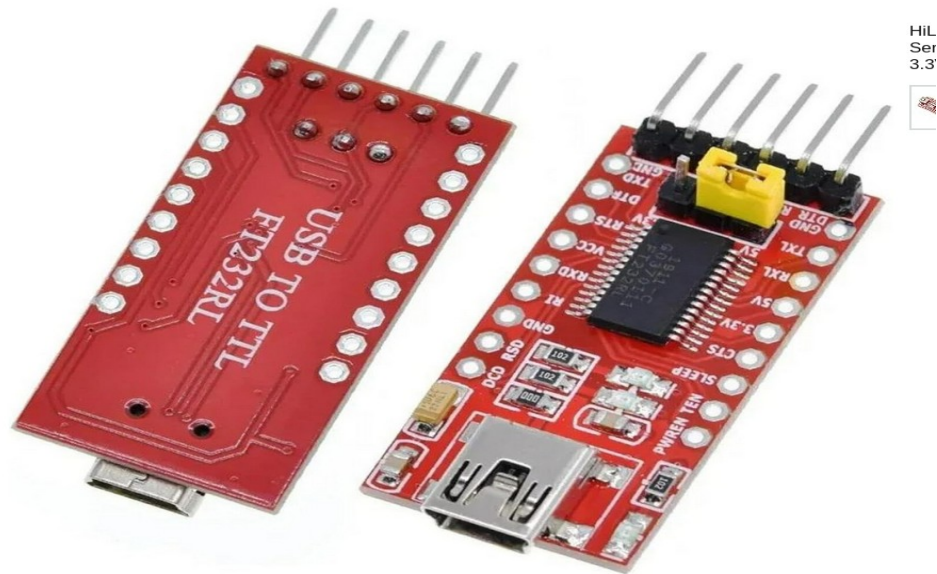
Select test-top.uf2



Paste test-top.uf2 in pico-ice.



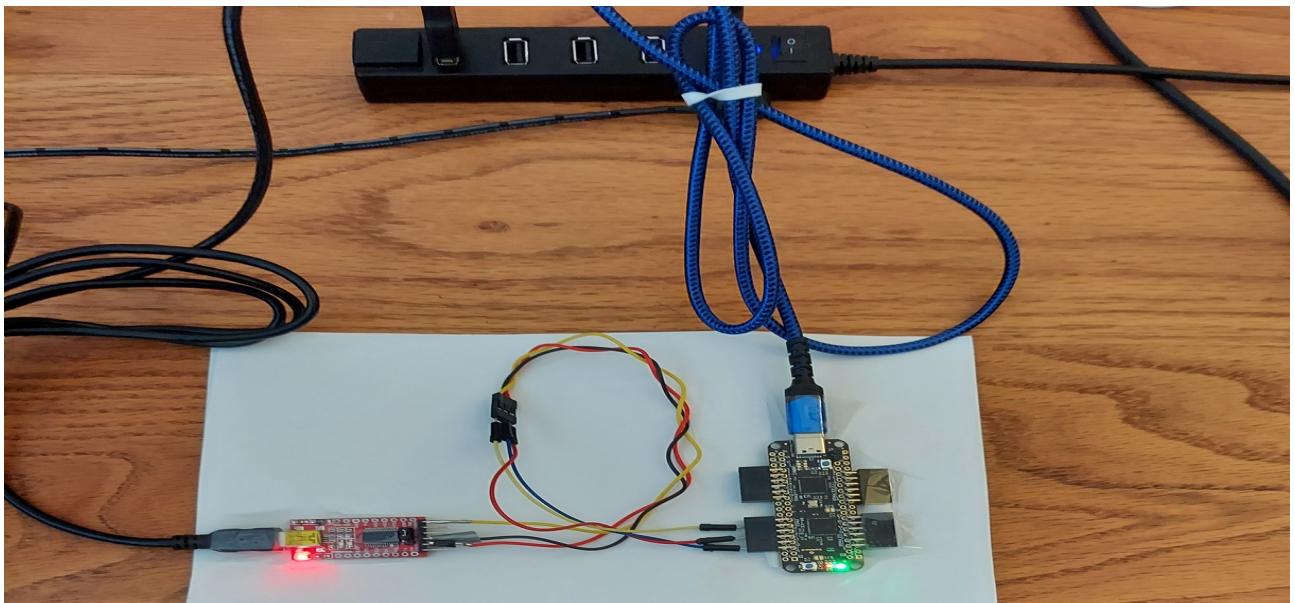
# HiLetgo FT232RL Mini USB to TTL Serial Converter Adapter Module 3.3V/5.5V



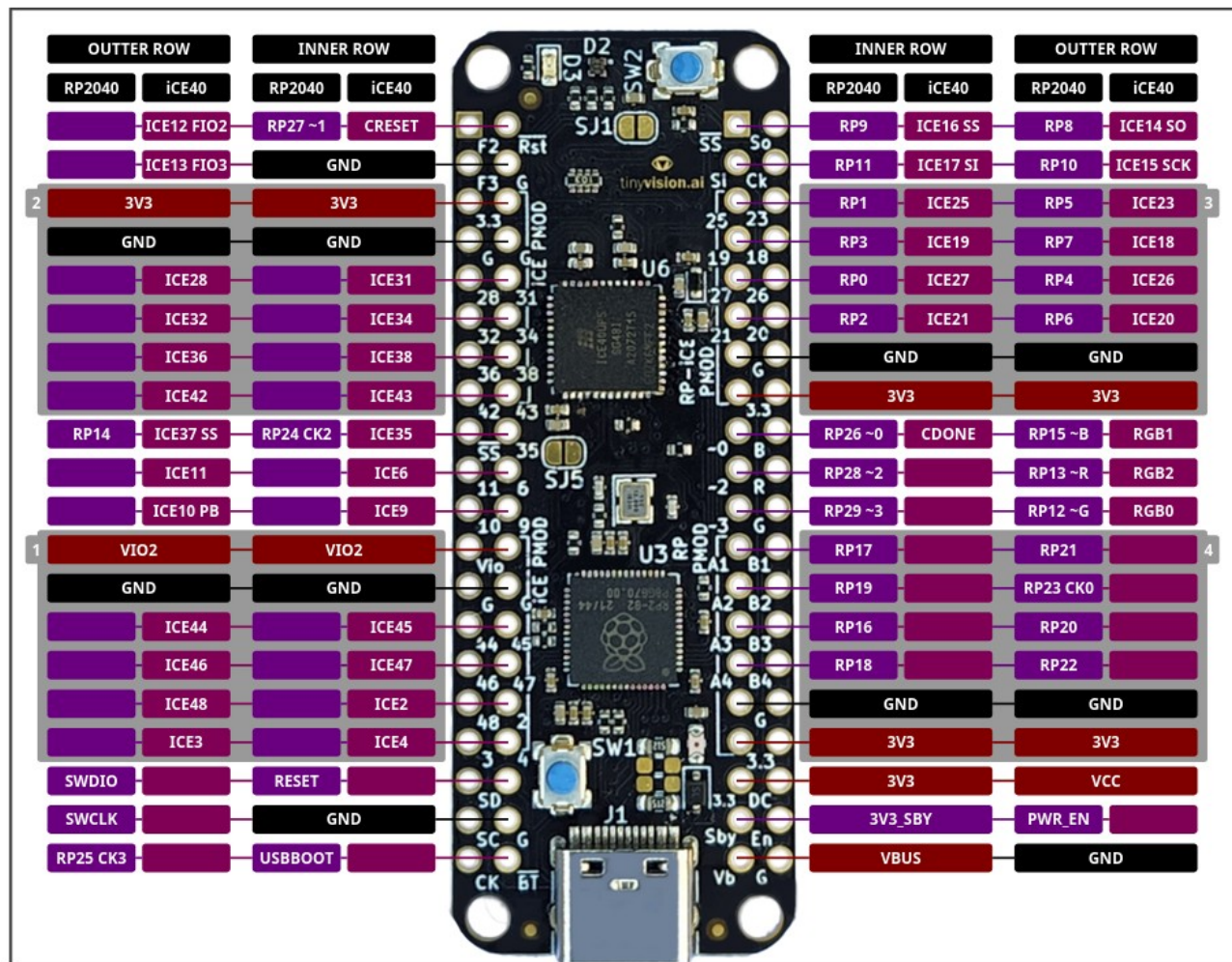
Below are the connections between the USB to FTDI

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.



The tx from left is connect pico-ice PMOD ICE\_25 and rx is MOD ICE\_27 see the pico-ice Pinout Diagram above.

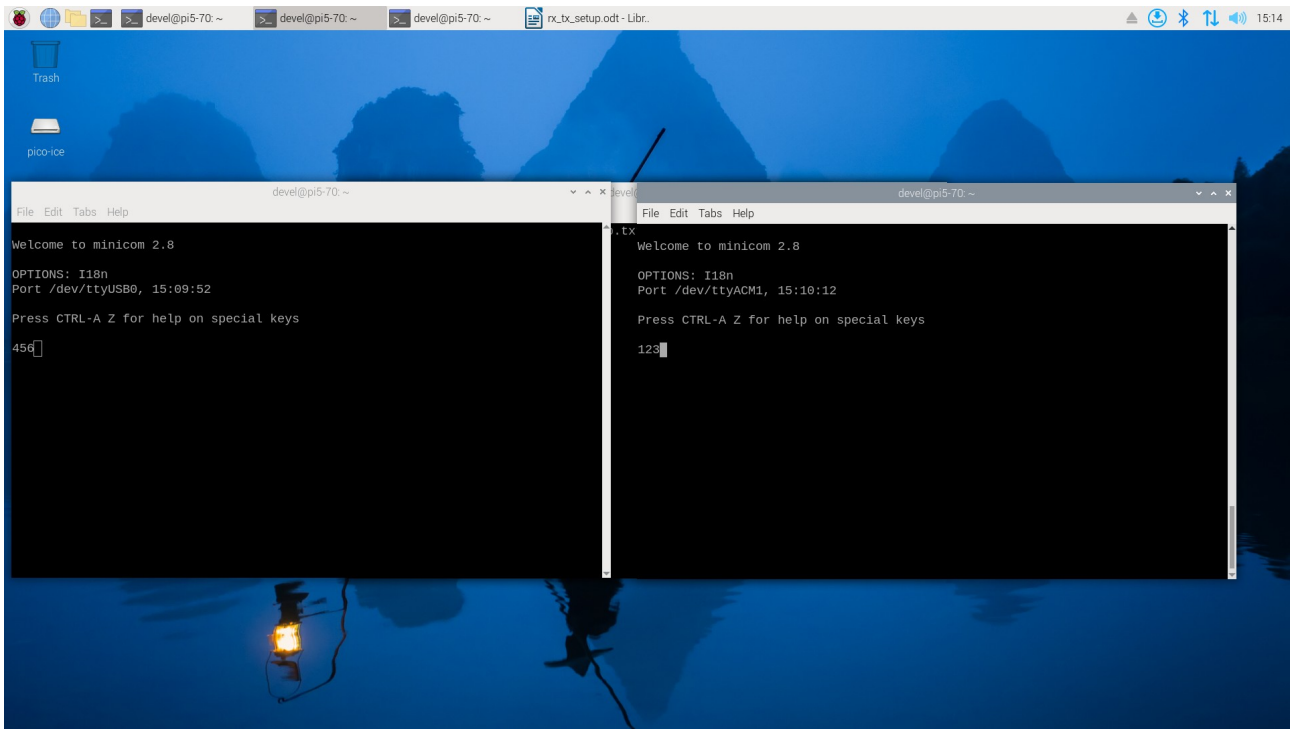
With minor changes to the top.sv to detect the toggle of ICE\_25 the blinking green led of the pico-ice show a spec of red.

```
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.



