How to program 82C55 in mode 2 to talk to the ESP32 module

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Registers:

1. 0xD2 = Port C address (byte level)
2. 0xD0 = Address to read/write from the EP32 module
3. 0xD3 = Address of the 82C55 control word.
4. 0xD3 = address to set/reset PORT C bits individually (bit level)

Writing to the ESP32 module

1. Power-on H89 system with H89-FujiNet board installed
2. Load onto ESP32 "fujinet-H89-v1.5.1-five-nops.zip" using FujiNet Flasher
   a. https://github.com/FujiNetWIFI/fujinet-flasher/releases/

Note: Put the H89 ESP32 in "Download Boot" to flash the FW with FujiNet Loader.

1. **Out 0xD2, 0x04   /* EN/RESET = 1, IO0 = 0, IO2 = 0 */**
2. **Out 0xD2, 0x00   /* strobe the reset line */**
3. **Out 0xD2, 0x04   /* EN/RESET = 1, IO0 = 0, IO2 = 0 */**

When done, put it onto SPI boot mode:

1. **Out 0xD2, 0x06   /* EN/RESET = 1, IO0 = 1, IO2 = 0 */**
2. **Out 0xD2, 0x02   /* strobe the reset line */**
3. **Out 0xD2, 0x06   /* EN/RESET = 1, IO0 = 1, IO2 = 0 */**

3. Setup 82C55 to Mode 2:
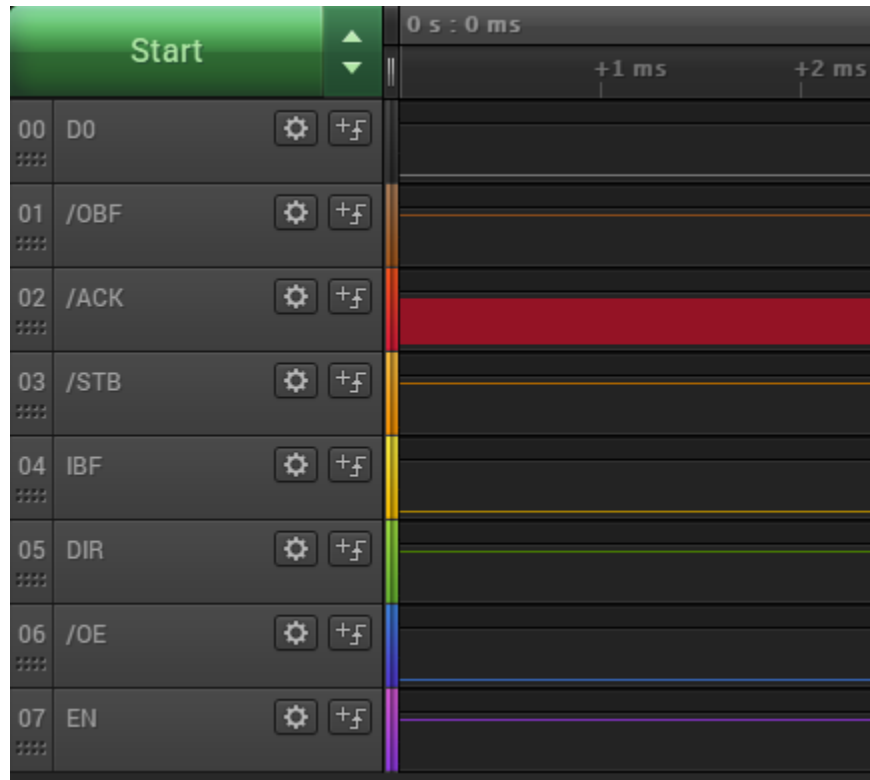   a. out 0xD3, 0xC0 - /* mode 2, port B mode 1 out, port C0-2 out */

4. Setup LVC245 direction to send data to the ESP32
   a. Out 0xD3, 0x01 /* SET "DIR= 1" */

b. Out 0xD3, 0x02 /* Set "/OE=0" */

5. Setup "EN" to be High (1) to enable ESP32
   a. Out 0xD3, 0x05 /* EN = HIGH */

6. Send a data byte to the ESP32
   a. Out 0xD0, 0xAA
   b. ESP32 receives the data.


```
Available heap: 4278856
Setup complete @ 114 (111ms)
[src/main.cpp:473] main_setup(): Low Heap: 212107
WiFiManager::start() complete
Wait for OBF to go high.
WIFI_EVENT_STA_START
BUTTON_A: LONG PRESS
OBF Low
        Setting ACK LOW
Waited 1us, sampling D0-D7
LOW: 10101010
Setting /ACK high again.
Waiting for OBF to go high
OBF now high. Sampling bus.
 HI: 10101010
Looping back around...
Wait for OBF to go high.
```
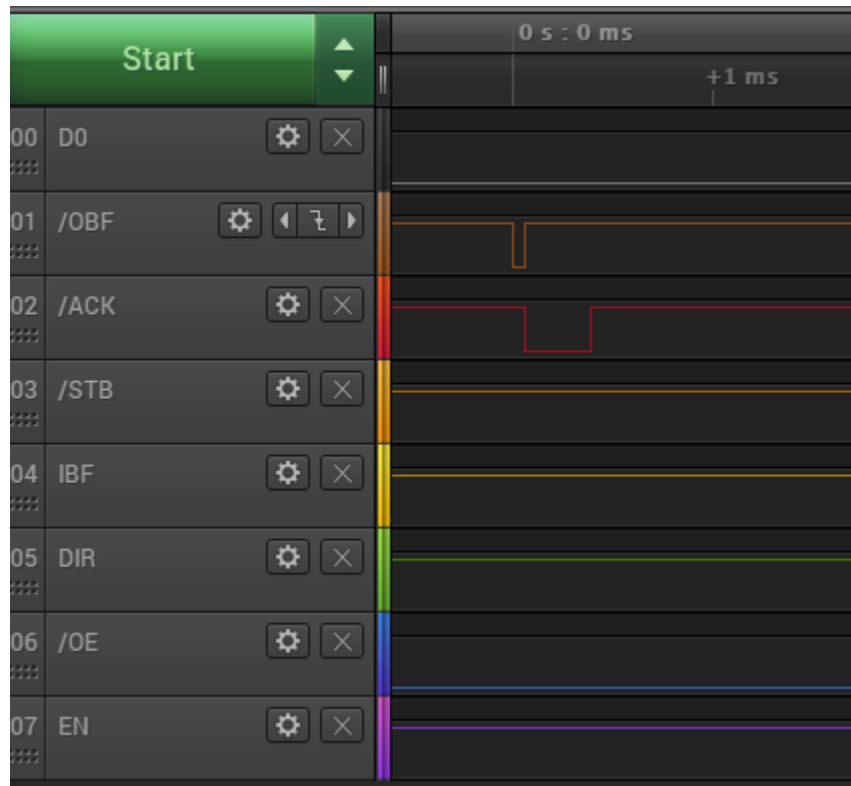
7. Go to step 8 to send another byte.

Reading from the ESP32 module

1. Load onto ESP32 "fujinet-H89-v1.5.1-tx-invert-the-bits.zip" using FujiNet Flasher
   a. https://github.com/FujiNetWIFI/fujinet-flasher/releases/

Note: Put the H89 ESP32 in "Download Boot" to flash the FW with FujiNet Loader.

4. **Out 0xD2, 0x04**   **/* EN/RESET = 1, IO0 = 0, IO2 = 0 */**
5. **Out 0xD2, 0x00**   **/* strobe the reset line */**
6. **Out 0xD2, 0x04**   **/* EN/RESET = 1, IO0 = 0, IO2 = 0 */**

When done, put it onto SPI boot mode:

4. **Out 0xD2, 0x06**   **/* EN/RESET = 1, IO0 = 1, IO2 = 0 */**
5. **Out 0xD2, 0x02**   **/* strobe the reset line */**
6. **Out 0xD2, 0x06**   **/* EN/RESET = 1, IO0 = 1, IO2 = 0 */**

2. Setup LVC for Input from the ESP32.
   a. Out 0xD3, 0x00 /* Set DIR =0 */
   b. Out 0xD3, 0x02 /* Set "/OE=0" */

3. Reset ESP32

```
            FujiNet v1.5.1 2025-09-08 07:43:48 (H89) Started @ 3
Starting heap: 4366304
[src/main.cpp:158] main_setup(): Heap: 223703

Detected Hardware Version: Unknown
Button A Enabled on IOO
Button B Disabled
Button C (Safe Reset) Disabled
E (10) gpio: GPIO_PIN mask error
LittleFS mounted.
SD mounted.
fnConfig::load
No config found - starting fresh!
H89 SETUP
Setting GPIO #15 (/ACK) to high.GPIO #4 (/STB) SET HIGH.
                                            GPIO CONFIGURED
                                                      Creating
a default printer using FS_SDFAT storage and type 1

Available heap: 4279012
Setup complete @ 113 (110ms)
[src/main.cpp:473] main_setup(): Low Heap: 212263
WiFiManager::start() complete
Set byte to: 0xAA
Set STB To low
Wait for IBF to go HIGH
Set STB to HIGH
Wait for IBF to go LOW
WIFI_EVENT_STA_START
```

4. Read a byte from the ESP32
   a. In 0xD0
      i. H89 receives 0xAA and so on…

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```
Set byte to: 0xAF
Set STB To low
Wait for IBF to go HIGH
Set STB to HIGH
Wait for IBF to go LOW
Increment xbyte and go again...
Set byte to: 0xB0
Set STB To low
Wait for IBF to go HIGH
Set STB to HIGH
Wait for IBF to go LOW
Increment xbyte and go again...
Set byte to: 0xB1
Set STB To low
Wait for IBF to go HIGH
Set STB to HIGH
Wait for IBF to go LOW
Increment xbyte and go again...
Set byte to: 0xB2
Set STB To low
Wait for IBF to go HIGH
Set STB to HIGH
Wait for IBF to go LOW
```