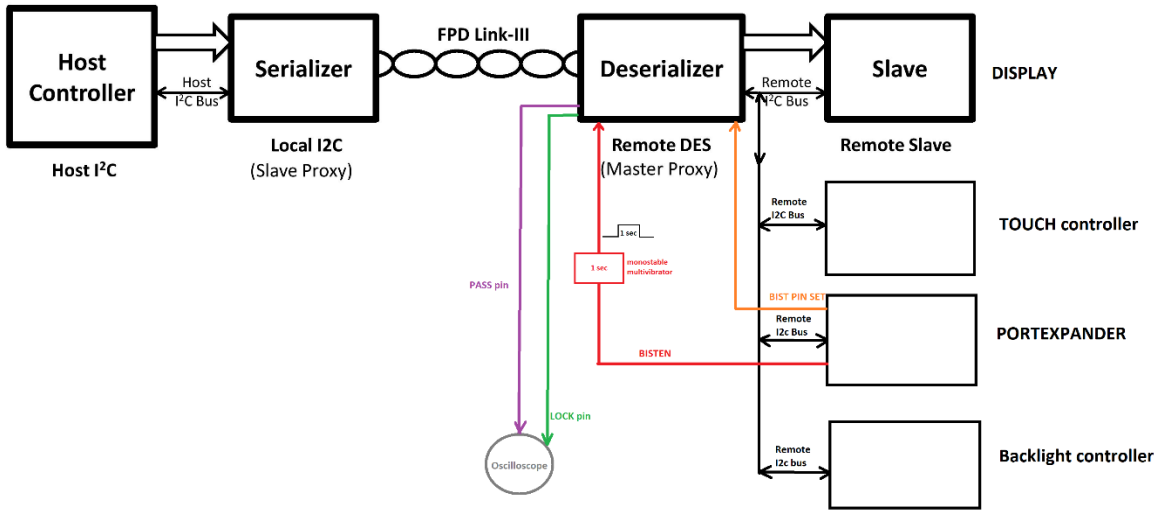
Hardware settings:



This is how it looks. We use the DS90UB949-Q1 and DS90UB948-Q1 ser/des pair to drive some displays in our IVI device. On the image above I have added what I consider essential in BIST performing case. We are trying to use BIST function to check the FPD-Link quality and status during the device operation. The BIST mode is enabled at the deserializer by pin (BISTEN) not by register. BIST PULSE EN pin on portexpander triggers monostable multivibrator that holds deserializer BISTEN pin HIGH right 1 sec. Before BIST is enabled, D_GPIO0 (pin 19) is strapped HIGH and D_GPIO[3:1] (pins 16, 17 and 18) are strapped LOW. Those pins were set using BIST PIN SET pin on portexpander. You can see details about that on schematics I attached again. BISTC pin is not connected so it has weak internal pulldown.

BIST procedure:

Just to mention, if BIST is not enabled, everything works fine. Serializer, deserializer and other modules on I2C bus are configured and all modules can communicate through I2C bus normally. It seems everything works as it should without any issue. The problem occurs when I try to perform BIST. This is what we do in software to perform BIST:

1. **Start BIST on serializer**
    a. Write value **0xA0** to reg ***0x04*** (clear counters, failsafe State has default value)
    b. Wait **100ms**
    c. Write value **0x80** to reg ***0x04*** (back to normal operation, failsafe State has default value)
    d. Wait **100ms**
2. **Start BIST on deserializer**
    a. Write value **0x41** to reg ***0x34*** (select port 0)
    b. Wait **100ms**
    c. Write value **0x00** to reg ***0x1D*** (configure GPIO_0 as output in functional mode to read PASS)
    d. Wait **100ms**
    e. Write value **0x42** to reg ***0x34*** (select port 1)
    f. Wait **100ms**
    g. Write value **0x33** to reg ***0x1E*** (configure GPIO_1 and GPIO_2 as input)
    h. Wait **100ms**
    i. Set **BIST PIN SET** on Portexpander to prepare pins 16-19 on deserializer for BIST ***(checked via oscilloscope, pins are set correctly)***
    j. Wait **100ms**
    k. **Make registers dump (shown on images below)**

    l. Set **BIST PULSE EN** on Portexpander to start BIST with BISTEN pin on deserializer ***(checked via oscilloscope, BISTEN pin on deserializer is HIGH right 1 sec and then goes LOW and stays LOW)***
    m. Wait **100ms**

```
Select port 0<CR><LF>
Addr 0x00: 18 <CR><LF>
Addr 0x01: 00 <CR><LF>
Addr 0x03: 9a <CR><LF>
Addr 0x04: 80 <CR><LF>
Addr 0x05: 00 <CR><LF>
Addr 0x06: 60 <CR><LF>
Addr 0x07: 00 <CR><LF>
Addr 0x08: 00 <CR><LF>
Addr 0x0a: 00 <CR><LF>
Addr 0x0b: 00 <CR><LF>
Addr 0x0c: 05 <CR><LF>
Addr 0x0d: 20 <CR><LF>
Addr 0x0e: 00 <CR><LF>
Addr 0x0e: 00 <CR><LF>
Addr 0x0e: 00 <CR><LF>
Addr 0x0e: 00 <CR><LF>
Addr 0x0f: 00 <CR><LF>
Addr 0x0f: 00 <CR><LF>
Addr 0x10: 00 <CR><LF>
Addr 0x10: 00 <CR><LF>
Addr 0x11: 00 <CR><LF>
Addr 0x11: 00 <CR><LF>
Addr 0x12: 00 <CR><LF>
Addr 0x13: 98 <CR><LF>
Addr 0x14: 00 <CR><LF>
Addr 0x15: 01 <CR><LF>
Addr 0x16: fe <CR><LF>
Addr 0x17: 9e <CR><LF>
Addr 0x18: 7f <CR><LF>
Addr 0x19: 7f <CR><LF>
Addr 0x1a: 01 <CR><LF>
Addr 0x1b: 00 <CR><LF>
Addr 0x1c: 00 <CR><LF>
Addr 0x1d: 00 <CR><LF>
Addr 0x1e: 01 <CR><LF>
Addr 0x1f: 00 <CR><LF>
Addr 0x20: 0b <CR><LF>
Addr 0x21: 00 <CR><LF>
Addr 0x26: 03 <CR><LF>
Addr 0x30: 00 <CR><LF>
Addr 0x31: 00 <CR><LF>
Addr 0x32: 00 <CR><LF>
Addr 0x33: 00 <CR><LF>
Addr 0x34: 00 <CR><LF>
Addr 0x35: 00 <CR><LF>
Addr 0x36: 00 <CR><LF>
Addr 0x37: 00 <CR><LF>
Addr 0x40: 14 <CR><LF>
Addr 0x41: 55 <CR><LF>
Addr 0x42: 00 <CR><LF>
Addr 0x48: 00 <CR><LF>
Addr 0x49: 00 <CR><LF>
Addr 0x4a: 00 <CR><LF>
Addr 0x4b: 00 <CR><LF>
Addr 0x4c: 00 <CR><LF>
Addr 0x4d: 00 <CR><LF>
Addr 0x4e: 00 <CR><LF>
Addr 0x4f: 00 <CR><LF>
Addr 0x50: 9e <CR><LF>
Addr 0x51: a1 <CR><LF>
Addr 0x52: 1e <CR><LF>
Addr 0x53: 00 <CR><LF>
Addr 0x54: 08 <CR><LF>
Addr 0x55: 0c <CR><LF>
Addr 0x5a: cd <CR><LF>
Addr 0x5b: 20 <CR><LF>
Addr 0x5c: 02 <CR><LF>
Addr 0x5d: 06 <CR><LF>
Addr 0x5e: 44 <CR><LF>
Addr 0x5f: 45 <CR><LF>
Addr 0x60: 22 <CR><LF>
Addr 0x61: 02 <CR><LF>
Addr 0x62: 00 <CR><LF>
Addr 0x64: 10 <CR><LF>
Addr 0x65: 00 <CR><LF>
Addr 0x66: 00 <CR><LF>
Addr 0x67: 00 <CR><LF>
Addr 0x70: 00 <CR><LF>
Addr 0x71: 00 <CR><LF>
Addr 0x72: 00 <CR><LF>
Addr 0x73: 00 <CR><LF>
Addr 0x74: 00 <CR><LF>
Addr 0x75: 00 <CR><LF>
Addr 0x76: 00 <CR><LF>
Addr 0x77: 00 <CR><LF>
Addr 0x78: 00 <CR><LF>
Addr 0x79: 00 <CR><LF>
Addr 0x7a: 00 <CR><LF>
Addr 0x7b: 00 <CR><LF>
Addr 0x7c: 00 <CR><LF>
Addr 0x7d: 00 <CR><LF>
Addr 0xc6: 00 <CR><LF>
Addr 0xc7: e0 <CR><LF>
Addr 0xf0: 5f <CR><LF>
Addr 0xf1: 55 <CR><LF>
Addr 0xf2: 42 <CR><LF>
Addr 0xf3: 39 <CR><LF>
Addr 0xf4: 34 <CR><LF>
Addr 0xf5: 39 <CR><LF>
```

```
Select port 1<CR><LF>
Addr 0x00: 1a <CR><LF>
Addr 0x01: 00 <CR><LF>
Addr 0x03: 92 <CR><LF>
Addr 0x04: 80 <CR><LF>
Addr 0x05: 00 <CR><LF>
Addr 0x06: 60 <CR><LF>
Addr 0x07: 00 <CR><LF>
Addr 0x08: 00 <CR><LF>
Addr 0x0a: 00 <CR><LF>
Addr 0x0b: 00 <CR><LF>
Addr 0x0c: 05 <CR><LF>
Addr 0x0d: 27 <CR><LF>
Addr 0x0e: 37 <CR><LF>
Addr 0x0e: 37 <CR><LF>
Addr 0x0e: 37 <CR><LF>
Addr 0x0e: 37 <CR><LF>
Addr 0x0f: 07 <CR><LF>
Addr 0x0f: 07 <CR><LF>
Addr 0x10: 00 <CR><LF>
Addr 0x10: 00 <CR><LF>
Addr 0x11: 00 <CR><LF>
Addr 0x11: 00 <CR><LF>
Addr 0x12: 00 <CR><LF>
Addr 0x13: 98 <CR><LF>
Addr 0x14: 00 <CR><LF>
Addr 0x15: 01 <CR><LF>
Addr 0x16: fe <CR><LF>
Addr 0x17: 9e <CR><LF>
Addr 0x18: 7f <CR><LF>
Addr 0x19: 7f <CR><LF>
Addr 0x1a: 01 <CR><LF>
Addr 0x1b: 00 <CR><LF>
Addr 0x1c: 00 <CR><LF>
Addr 0x1d: 00 <CR><LF>
Addr 0x1e: 02 <CR><LF>
Addr 0x1f: 00 <CR><LF>
Addr 0x20: 0f <CR><LF>
Addr 0x21: 00 <CR><LF>
Addr 0x26: 03 <CR><LF>
Addr 0x30: 00 <CR><LF>
Addr 0x31: 00 <CR><LF>
Addr 0x32: 00 <CR><LF>
Addr 0x33: 00 <CR><LF>
Addr 0x34: 00 <CR><LF>
Addr 0x35: 00 <CR><LF>
Addr 0x36: 00 <CR><LF>
Addr 0x37: 00 <CR><LF>
Addr 0x40: 14 <CR><LF>
Addr 0x41: 55 <CR><LF>
Addr 0x42: 00 <CR><LF>
Addr 0x48: 00 <CR><LF>
Addr 0x49: 00 <CR><LF>
Addr 0x4a: 00 <CR><LF>
Addr 0x4b: 00 <CR><LF>
Addr 0x4c: 00 <CR><LF>
Addr 0x4d: 00 <CR><LF>
Addr 0x4e: 00 <CR><LF>
Addr 0x4f: 00 <CR><LF>
Addr 0x50: 9e <CR><LF>
Addr 0x51: a1 <CR><LF>
Addr 0x52: 1e <CR><LF>
Addr 0x53: 00 <CR><LF>
Addr 0x54: 08 <CR><LF>
Addr 0x55: 0c <CR><LF>
Addr 0x5a: cd <CR><LF>
Addr 0x5b: 20 <CR><LF>
Addr 0x5c: 02 <CR><LF>
Addr 0x5d: 06 <CR><LF>
Addr 0x5e: 44 <CR><LF>
Addr 0x5f: 45 <CR><LF>
Addr 0x60: 22 <CR><LF>
Addr 0x61: 02 <CR><LF>
Addr 0x62: 00 <CR><LF>
Addr 0x64: 10 <CR><LF>
Addr 0x65: 00 <CR><LF>
Addr 0x66: 00 <CR><LF>
Addr 0x67: 00 <CR><LF>
Addr 0x70: 00 <CR><LF>
Addr 0x71: 00 <CR><LF>
Addr 0x72: 00 <CR><LF>
Addr 0x73: 00 <CR><LF>
Addr 0x74: 00 <CR><LF>
Addr 0x75: 00 <CR><LF>
Addr 0x76: 00 <CR><LF>
Addr 0x77: 00 <CR><LF>
Addr 0x78: 00 <CR><LF>
Addr 0x79: 00 <CR><LF>
Addr 0x7a: 00 <CR><LF>
Addr 0x7b: 00 <CR><LF>
Addr 0x7c: 00 <CR><LF>
Addr 0x7d: 00 <CR><LF>
Addr 0xc6: 00 <CR><LF>
Addr 0xc7: 40 <CR><LF>
Addr 0xf0: 5f <CR><LF>
Addr 0xf1: 55 <CR><LF>
Addr 0xf2: 42 <CR><LF>
Addr 0xf3: 39 <CR><LF>
Addr 0xf4: 34 <CR><LF>
Addr 0xf5: 39 <CR><LF>
```

SERIALIZER register dump

Figure 1 SERIALIZER register dump just before BIST is enabled

```
Select PORT_0 <CR><LF>
Addr 0x00: 60 <CR><LF>
Addr 0x01: 04 <CR><LF>
Addr 0x02: 00 <CR><LF>
Addr 0x03: 78 <CR><LF>
Addr 0x04: 08 <CR><LF>
Addr 0x05: 9e <CR><LF>
Addr 0x06: 02 <CR><LF>
Addr 0x07: 18 <CR><LF>
Addr 0x08: 00 <CR><LF>
Addr 0x09: 00 <CR><LF>
Addr 0x0a: 00 <CR><LF>
Addr 0x0b: 00 <CR><LF>
Addr 0x0c: 00 <CR><LF>
Addr 0x0d: 00 <CR><LF>
Addr 0x0e: 00 <CR><LF>
Addr 0x0f: 00 <CR><LF>
Addr 0x10: 00 <CR><LF>
Addr 0x11: 00 <CR><LF>
Addr 0x12: 00 <CR><LF>
Addr 0x13: 00 <CR><LF>
Addr 0x14: 00 <CR><LF>
Addr 0x15: 00 <CR><LF>
Addr 0x16: 00 <CR><LF>
Addr 0x17: 00 <CR><LF>
Addr 0x18: 00 <CR><LF>
Addr 0x19: 01 <CR><LF>
Addr 0x1a: 00 <CR><LF>
Addr 0x1b: 00 <CR><LF>
Addr 0x1c: 1b <CR><LF>
Addr 0x1d: 10 <CR><LF>
Addr 0x1e: 11 <CR><LF>
Addr 0x1f: 01 <CR><LF>
Addr 0x20: 99 <CR><LF>
Addr 0x21: 11 <CR><LF>
Addr 0x22: 40 <CR><LF>
Addr 0x23: 30 <CR><LF>
Addr 0x24: 88 <CR><LF>
Addr 0x25: 00 <CR><LF>
Addr 0x26: 83 <CR><LF>
Addr 0x27: 84 <CR><LF>
Addr 0x28: 11 <CR><LF>
Addr 0x29: 00 <CR><LF>
Addr 0x2a: 00 <CR><LF>
Addr 0x2b: 00 <CR><LF>
Addr 0x2e: 00 <CR><LF>
Addr 0x34: 41 <CR><LF>
Addr 0x35: 00 <CR><LF>
Addr 0x37: ae <CR><LF>
Addr 0x3a: 00 <CR><LF>
Addr 0x3b: 01 <CR><LF>
Addr 0x41: 03 <CR><LF>
Addr 0x43: 00 <CR><LF>
Addr 0x44: 60 <CR><LF>
Addr 0x45: 88 <CR><LF>
Addr 0x49: 82 <CR><LF>
Addr 0x4b: 08 <CR><LF>
Addr 0x52: 00 <CR><LF>
Addr 0x56: 00 <CR><LF>
Addr 0x57: 00 <CR><LF>
Addr 0x63: 00 <CR><LF>
Addr 0x64: 10 <CR><LF>
Addr 0x65: 00 <CR><LF>
Addr 0x66: 00 <CR><LF>
Addr 0x67: 00 <CR><LF>
Addr 0x68: 00 <CR><LF>
Addr 0x69: 00 <CR><LF>
Addr 0x6e: 00 <CR><LF>
Addr 0x6f: 00 <CR><LF>
Addr 0xf0: 5f <CR><LF>
Addr 0xf1: 55 <CR><LF>
Addr 0xf2: 42 <CR><LF>
Addr 0xf3: 39 <CR><LF>
Addr 0xf4: 34 <CR><LF>
Addr 0xf5: 38 <CR><LF>
```

```
Select PORT_1 <CR><LF>
Addr 0x00: 60 <CR><LF>
Addr 0x01: 04 <CR><LF>
Addr 0x02: 00 <CR><LF>
Addr 0x03: 78 <CR><LF>
Addr 0x04: 08 <CR><LF>
Addr 0x05: 9e <CR><LF>
Addr 0x06: 02 <CR><LF>
Addr 0x07: 18 <CR><LF>
Addr 0x08: 00 <CR><LF>
Addr 0x09: 00 <CR><LF>
Addr 0x0a: 00 <CR><LF>
Addr 0x0b: 00 <CR><LF>
Addr 0x0c: 00 <CR><LF>
Addr 0x0d: 00 <CR><LF>
Addr 0x0e: 00 <CR><LF>
Addr 0x0f: 00 <CR><LF>
Addr 0x10: 00 <CR><LF>
Addr 0x11: 00 <CR><LF>
Addr 0x12: 00 <CR><LF>
Addr 0x13: 00 <CR><LF>
Addr 0x14: 00 <CR><LF>
Addr 0x15: 00 <CR><LF>
Addr 0x16: 00 <CR><LF>
Addr 0x17: 00 <CR><LF>
Addr 0x18: 00 <CR><LF>
Addr 0x19: 01 <CR><LF>
Addr 0x1a: 00 <CR><LF>
Addr 0x1b: 00 <CR><LF>
Addr 0x1c: 1b <CR><LF>
Addr 0x1d: 13 <CR><LF>
Addr 0x1e: 33 <CR><LF>
Addr 0x1f: 03 <CR><LF>
Addr 0x20: 99 <CR><LF>
Addr 0x21: 11 <CR><LF>
Addr 0x22: 40 <CR><LF>
Addr 0x23: 30 <CR><LF>
Addr 0x24: 88 <CR><LF>
Addr 0x25: 00 <CR><LF>
Addr 0x26: 83 <CR><LF>
Addr 0x27: 84 <CR><LF>
Addr 0x28: 11 <CR><LF>
Addr 0x29: 00 <CR><LF>
Addr 0x2a: 00 <CR><LF>
Addr 0x2b: 00 <CR><LF>
Addr 0x2e: 00 <CR><LF>
Addr 0x34: 42 <CR><LF>
Addr 0x35: 00 <CR><LF>
Addr 0x37: ae <CR><LF>
Addr 0x3a: 00 <CR><LF>
Addr 0x3b: 01 <CR><LF>
Addr 0x41: 03 <CR><LF>
Addr 0x43: 00 <CR><LF>
Addr 0x44: 60 <CR><LF>
Addr 0x45: 88 <CR><LF>
Addr 0x49: 82 <CR><LF>
Addr 0x4b: 08 <CR><LF>
Addr 0x52: 00 <CR><LF>
Addr 0x56: 08 <CR><LF>
Addr 0x57: 00 <CR><LF>
Addr 0x63: 00 <CR><LF>
Addr 0x64: 10 <CR><LF>
Addr 0x65: 00 <CR><LF>
Addr 0x66: 00 <CR><LF>
Addr 0x67: 00 <CR><LF>
Addr 0x68: 00 <CR><LF>
Addr 0x69: 00 <CR><LF>
Addr 0x6e: 01 <CR><LF>
Addr 0x6f: 00 <CR><LF>
Addr 0xf0: 5f <CR><LF>
Addr 0xf1: 55 <CR><LF>
Addr 0xf2: 42 <CR><LF>
Addr 0xf3: 39 <CR><LF>
Addr 0xf4: 34 <CR><LF>
Addr 0xf5: 38 <CR><LF>
```

DESERIALIZER register dump

Figure 2 DESERIALIZER register dump just before BIST is enabled

3. Wait 1,2 sec to be sure BIST is disabled. ***(checked via oscilloscope, BISTEN pin on deserializer is HIGH right 1 sec and then goes LOW and stays LOW as you can see in waveforms below)***
4. Exit from BIST
    a. Try to clear **BIST PIN SET** on Portexpander to return pins 16-19 on deserializer to default values. ***NOT ABLE TO COMMUNICATE WITH PORTEXPANDER.*** **MCU(Host controller that is on serializer side) puts Portexpander address on the bus but on ninth clock pulse(ACK) no one send acknowledge. It looks like portexpander does not exist on bus.**
    b. Wait **100ms**
    c. Try to write value **0x42** to reg ***0x34 on DESERIALIZER***(select port 0). ***NOT ABLE TO COMMUNICATE WITH DESERIALIZER. The same behavioral as in step a)***
    d. Wait **100ms**
    e. Try to write value **0x13** to reg ***0x1E*** (configure GPIO_2 as output). ***NOT ABLE TO COMMUNICATE WITH DESERIALIZER. The same behavioral as in step a)***
    f. Wait **100ms**
5. Check BIST result on **serializer**
    a. Write value **0x01** to reg ***0x1E*** (select port 0)
    b. Wait **100ms**
    c. Read register **GENERAL_STATUS 0x0C** => value **0x0F**
    d. Wait **100ms**
    e. Read register **BIST BC Error Count 0x1B** => value **0x04**
    f. Wait **100ms**
    g. Read register **CRC Errors LSB 0x0A** => value **0x0A**
    h. Wait **100ms**
    i. Read register **CRC Errors MSB 0x0B** => value **0x00**
    j. Wait **100ms**
    k. Write value **0x02** to reg ***0x1E*** (select port 1)
    l. Wait **100ms**
    m. Read register **GENERAL_STATUS 0x0C** => value **0x0F**
    n. Wait **100ms**
    o. Read register **BIST BC Error Count 0x1B** => value **0x05**
    p. Wait **100ms**
    q. Read register **CRC Errors LSB 0x0A** => value **0x09**
    r. Wait **100ms**
    s. Read register **CRC Errors MSB 0x0B** => value **0x00**
    t. Wait **100ms**
    u. **Make serializer registers dump (shown on images below)**
    v. Wait **100ms**

I can normally communicate with serializer which is on MCU local I2C bus.

```
Select port 0<CR><LF>
Addr 0x00: 18 <CR><LF>
Addr 0x01: 00 <CR><LF>
Addr 0x03: 9a <CR><LF>
Addr 0x04: 80 <CR><LF>
Addr 0x05: 00 <CR><LF>
Addr 0x06: 60 <CR><LF>
Addr 0x07: 00 <CR><LF>
Addr 0x08: 00 <CR><LF>
Addr 0x0a: 0a <CR><LF>
Addr 0x0b: 00 <CR><LF>
Addr 0x0c: 0f <CR><LF>
Addr 0x0d: 20 <CR><LF>
Addr 0x0e: 00 <CR><LF>
Addr 0x0e: 00 <CR><LF>
Addr 0x0e: 00 <CR><LF>
Addr 0x0e: 00 <CR><LF>
Addr 0x0f: 00 <CR><LF>
Addr 0x0f: 00 <CR><LF>
Addr 0x10: 00 <CR><LF>
Addr 0x10: 00 <CR><LF>
Addr 0x11: 00 <CR><LF>
Addr 0x11: 00 <CR><LF>
Addr 0x12: 00 <CR><LF>
Addr 0x13: 98 <CR><LF>
Addr 0x14: 00 <CR><LF>
Addr 0x15: 01 <CR><LF>
Addr 0x16: 01 <CR><LF>
Addr 0x17: 9e <CR><LF>
Addr 0x18: 7f <CR><LF>
Addr 0x19: 7f <CR><LF>
Addr 0x1a: 01 <CR><LF>
Addr 0x1b: 04 <CR><LF>
Addr 0x1c: 00 <CR><LF>
Addr 0x1d: 00 <CR><LF>
Addr 0x1e: 01 <CR><LF>
Addr 0x1f: 00 <CR><LF>
Addr 0x20: 0b <CR><LF>
Addr 0x21: 00 <CR><LF>
Addr 0x26: 03 <CR><LF>
Addr 0x30: 00 <CR><LF>
Addr 0x31: 00 <CR><LF>
Addr 0x32: 00 <CR><LF>
Addr 0x33: 00 <CR><LF>
Addr 0x34: 00 <CR><LF>
Addr 0x35: 00 <CR><LF>
Addr 0x36: 00 <CR><LF>
Addr 0x37: 00 <CR><LF>
Addr 0x40: 14 <CR><LF>
Addr 0x41: 55 <CR><LF>
Addr 0x42: 00 <CR><LF>
Addr 0x48: 00 <CR><LF>
Addr 0x49: 00 <CR><LF>
Addr 0x4a: 00 <CR><LF>
Addr 0x4b: 00 <CR><LF>
Addr 0x4c: 00 <CR><LF>
Addr 0x4d: 00 <CR><LF>
Addr 0x4e: 00 <CR><LF>
Addr 0x4f: 00 <CR><LF>
Addr 0x50: 9e <CR><LF>
Addr 0x51: a1 <CR><LF>
Addr 0x52: 1e <CR><LF>
Addr 0x53: 00 <CR><LF>
Addr 0x54: 08 <CR><LF>
Addr 0x55: 0c <CR><LF>
Addr 0x5a: cd <CR><LF>
Addr 0x5b: 20 <CR><LF>
Addr 0x5c: 02 <CR><LF>
Addr 0x5d: 06 <CR><LF>
Addr 0x5e: 44 <CR><LF>
Addr 0x5f: 45 <CR><LF>
Addr 0x60: 22 <CR><LF>
Addr 0x61: 02 <CR><LF>
Addr 0x62: 00 <CR><LF>
Addr 0x64: 10 <CR><LF>
Addr 0x65: 00 <CR><LF>
Addr 0x66: 00 <CR><LF>
Addr 0x67: 00 <CR><LF>
Addr 0x70: 00 <CR><LF>
Addr 0x71: 00 <CR><LF>
Addr 0x72: 00 <CR><LF>
Addr 0x73: 00 <CR><LF>
Addr 0x74: 00 <CR><LF>
Addr 0x75: 00 <CR><LF>
Addr 0x76: 00 <CR><LF>
Addr 0x77: 00 <CR><LF>
Addr 0x78: 00 <CR><LF>
Addr 0x79: 00 <CR><LF>
Addr 0x7a: 00 <CR><LF>
Addr 0x7b: 00 <CR><LF>
Addr 0x7c: 00 <CR><LF>
Addr 0x7d: 00 <CR><LF>
Addr 0xc6: 00 <CR><LF>
Addr 0xc7: 00 <CR><LF>
Addr 0xf0: 5f <CR><LF>
Addr 0xf1: 55 <CR><LF>
Addr 0xf2: 42 <CR><LF>
Addr 0xf3: 39 <CR><LF>
Addr 0xf4: 34 <CR><LF>
Addr 0xf5: 39 <CR><LF>
```

```
Select port 1<CR><LF>
Addr 0x00: 1a <CR><LF>
Addr 0x01: 00 <CR><LF>
Addr 0x03: 92 <CR><LF>
Addr 0x04: 80 <CR><LF>
Addr 0x05: 00 <CR><LF>
Addr 0x06: 60 <CR><LF>
Addr 0x07: 00 <CR><LF>
Addr 0x08: 00 <CR><LF>
Addr 0x0a: 09 <CR><LF>
Addr 0x0b: 00 <CR><LF>
Addr 0x0c: 0f <CR><LF>
Addr 0x0d: 27 <CR><LF>
Addr 0x0e: 37 <CR><LF>
Addr 0x0e: 37 <CR><LF>
Addr 0x0e: 37 <CR><LF>
Addr 0x0e: 37 <CR><LF>
Addr 0x0f: 07 <CR><LF>
Addr 0x0f: 07 <CR><LF>
Addr 0x10: 00 <CR><LF>
Addr 0x10: 00 <CR><LF>
Addr 0x11: 00 <CR><LF>
Addr 0x11: 00 <CR><LF>
Addr 0x12: 00 <CR><LF>
Addr 0x13: 98 <CR><LF>
Addr 0x14: 00 <CR><LF>
Addr 0x15: 01 <CR><LF>
Addr 0x16: 01 <CR><LF>
Addr 0x17: 9e <CR><LF>
Addr 0x18: 7f <CR><LF>
Addr 0x19: 7f <CR><LF>
Addr 0x1a: 01 <CR><LF>
Addr 0x1b: 05 <CR><LF>
Addr 0x1c: 00 <CR><LF>
Addr 0x1d: 00 <CR><LF>
Addr 0x1e: 02 <CR><LF>
Addr 0x1f: 00 <CR><LF>
Addr 0x20: 0f <CR><LF>
Addr 0x21: 00 <CR><LF>
Addr 0x26: 03 <CR><LF>
Addr 0x30: 00 <CR><LF>
Addr 0x31: 00 <CR><LF>
Addr 0x32: 00 <CR><LF>
Addr 0x33: 00 <CR><LF>
Addr 0x34: 00 <CR><LF>
Addr 0x35: 00 <CR><LF>
Addr 0x36: 00 <CR><LF>
Addr 0x37: 00 <CR><LF>
Addr 0x40: 14 <CR><LF>
Addr 0x41: 55 <CR><LF>
Addr 0x42: 00 <CR><LF>
Addr 0x48: 00 <CR><LF>
Addr 0x49: 00 <CR><LF>
Addr 0x4a: 00 <CR><LF>
Addr 0x4b: 00 <CR><LF>
Addr 0x4c: 00 <CR><LF>
Addr 0x4d: 00 <CR><LF>
Addr 0x4e: 00 <CR><LF>
Addr 0x4f: 00 <CR><LF>
Addr 0x50: 9e <CR><LF>
Addr 0x51: a1 <CR><LF>
Addr 0x52: 1e <CR><LF>
Addr 0x53: 00 <CR><LF>
Addr 0x54: 08 <CR><LF>
Addr 0x55: 0c <CR><LF>
Addr 0x5a: cd <CR><LF>
Addr 0x5b: 20 <CR><LF>
Addr 0x5c: 02 <CR><LF>
Addr 0x5d: 06 <CR><LF>
Addr 0x5e: 44 <CR><LF>
Addr 0x5f: 45 <CR><LF>
Addr 0x60: 22 <CR><LF>
Addr 0x61: 02 <CR><LF>
Addr 0x62: 00 <CR><LF>
Addr 0x64: 10 <CR><LF>
Addr 0x65: 00 <CR><LF>
Addr 0x66: 00 <CR><LF>
Addr 0x67: 00 <CR><LF>
Addr 0x70: 00 <CR><LF>
Addr 0x71: 00 <CR><LF>
Addr 0x72: 00 <CR><LF>
Addr 0x73: 00 <CR><LF>
Addr 0x74: 00 <CR><LF>
Addr 0x75: 00 <CR><LF>
Addr 0x76: 00 <CR><LF>
Addr 0x77: 00 <CR><LF>
Addr 0x78: 00 <CR><LF>
Addr 0x79: 00 <CR><LF>
Addr 0x7a: 00 <CR><LF>
Addr 0x7b: 00 <CR><LF>
Addr 0x7c: 00 <CR><LF>
Addr 0x7d: 00 <CR><LF>
Addr 0xc6: 00 <CR><LF>
Addr 0xc7: 00 <CR><LF>
Addr 0xf0: 5f <CR><LF>
Addr 0xf1: 55 <CR><LF>
Addr 0xf2: 42 <CR><LF>
Addr 0xf3: 39 <CR><LF>
Addr 0xf4: 34 <CR><LF>
Addr 0xf5: 39 <CR><LF>
```

SERIALIZER register dump

Figure 3 SERIALIZER register dump AFTER BIST

5a) **Sometimes I get different register dump of serializer**

The registers that have different values from first dump are marked black. Please check these values. Some of them seem weird.

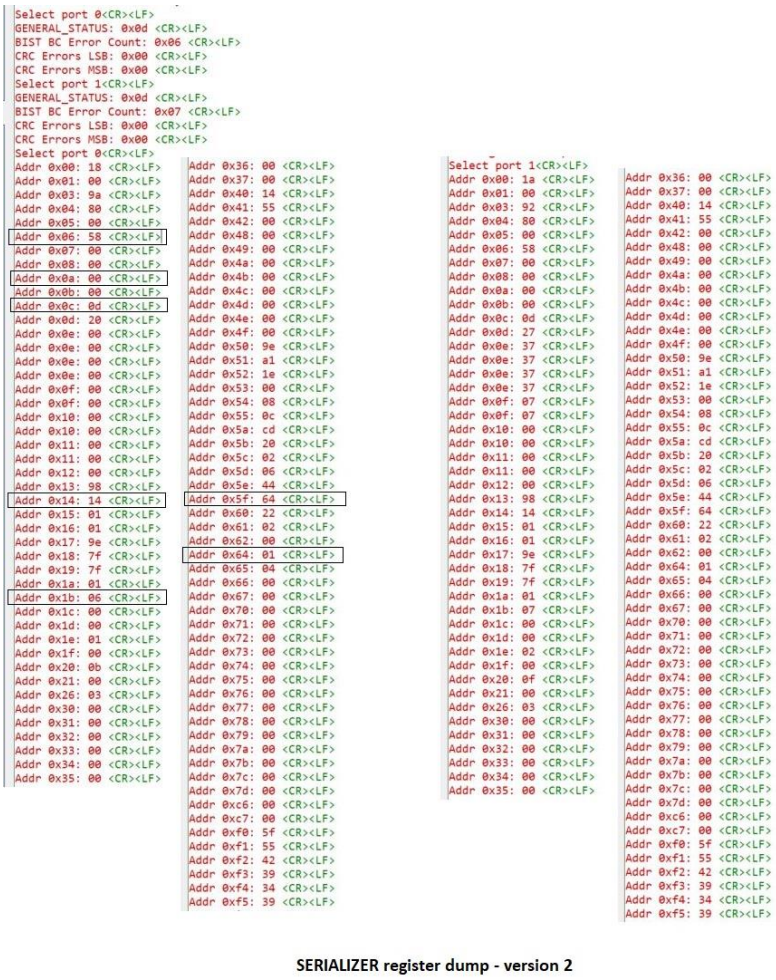


Figure 4 Another SERIALIZER register dump

6. Check BIST result on **deserializer**
    a. Try to write value **0x41** to reg ***0x34*** (select port 0) ***NOT ABLE TO COMMUNICATE WITH DESERIALIZER.***
    b. Wait **100ms**
    c. Try to read deserializer registers… ***NOT ABLE TO COMMUNICATE WITH DESERIALIZER.***

Here are the waveforms during BIST:

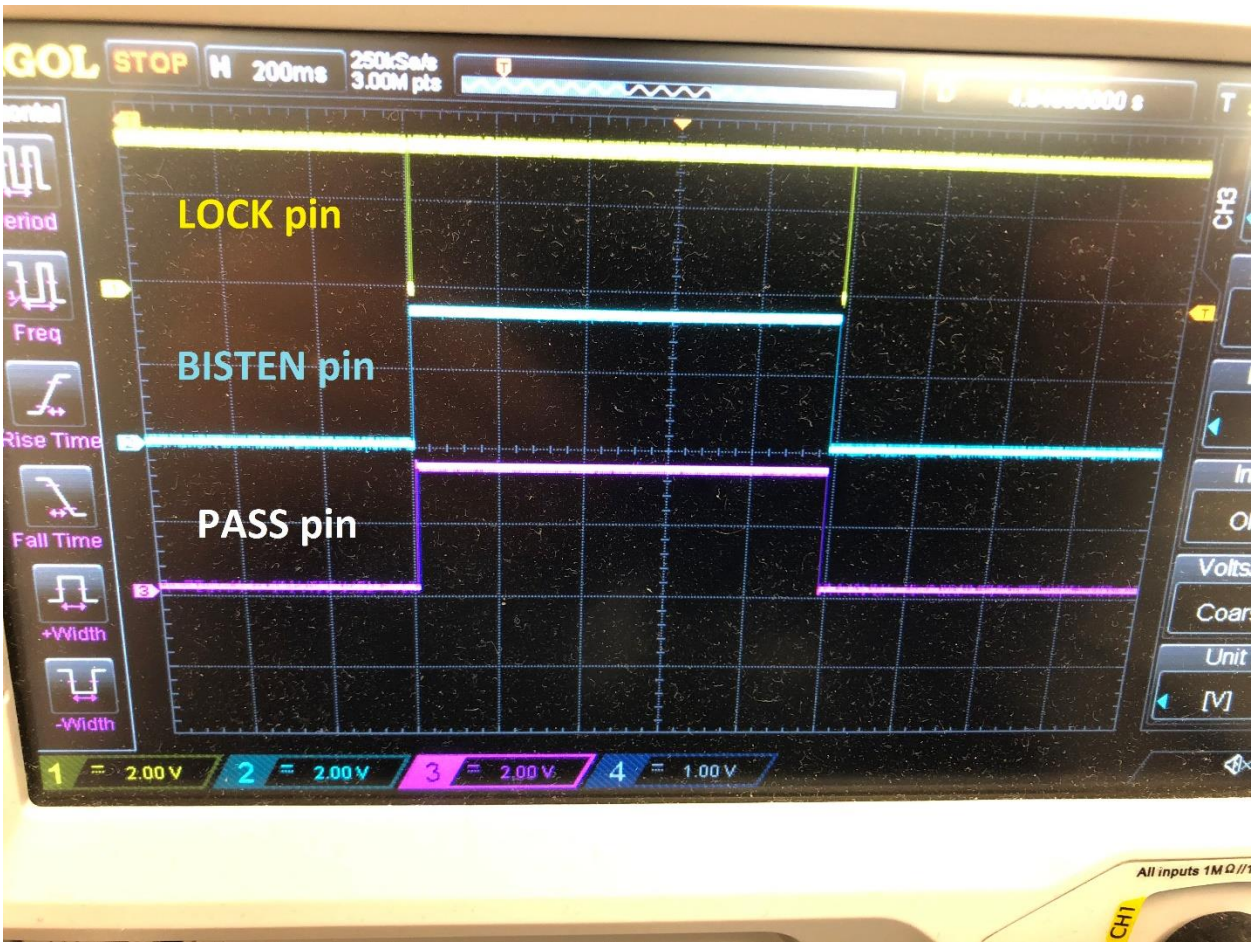


Figure 5 BIST waveforms

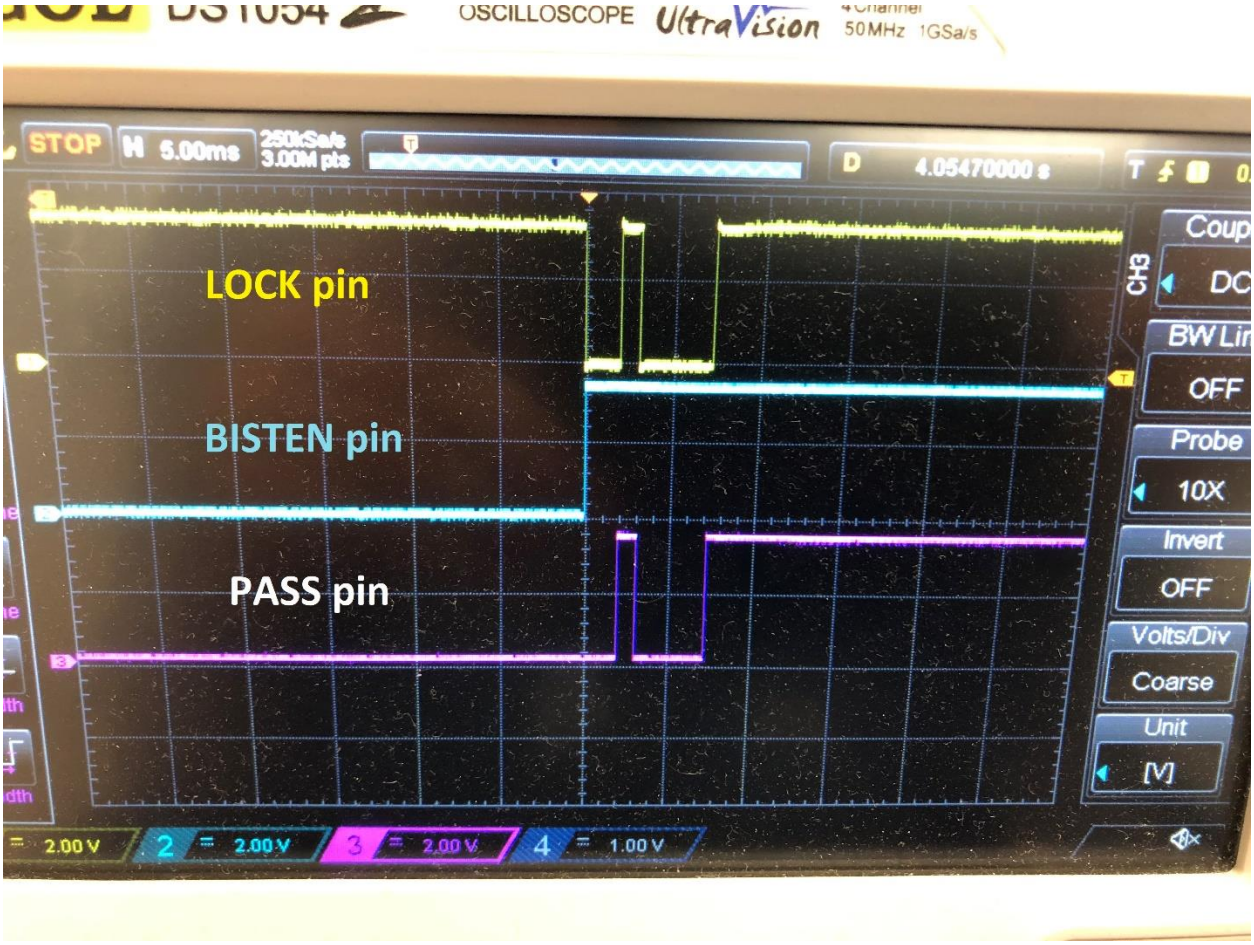


Figure 6 Waveforms from the moment BIST is enabled

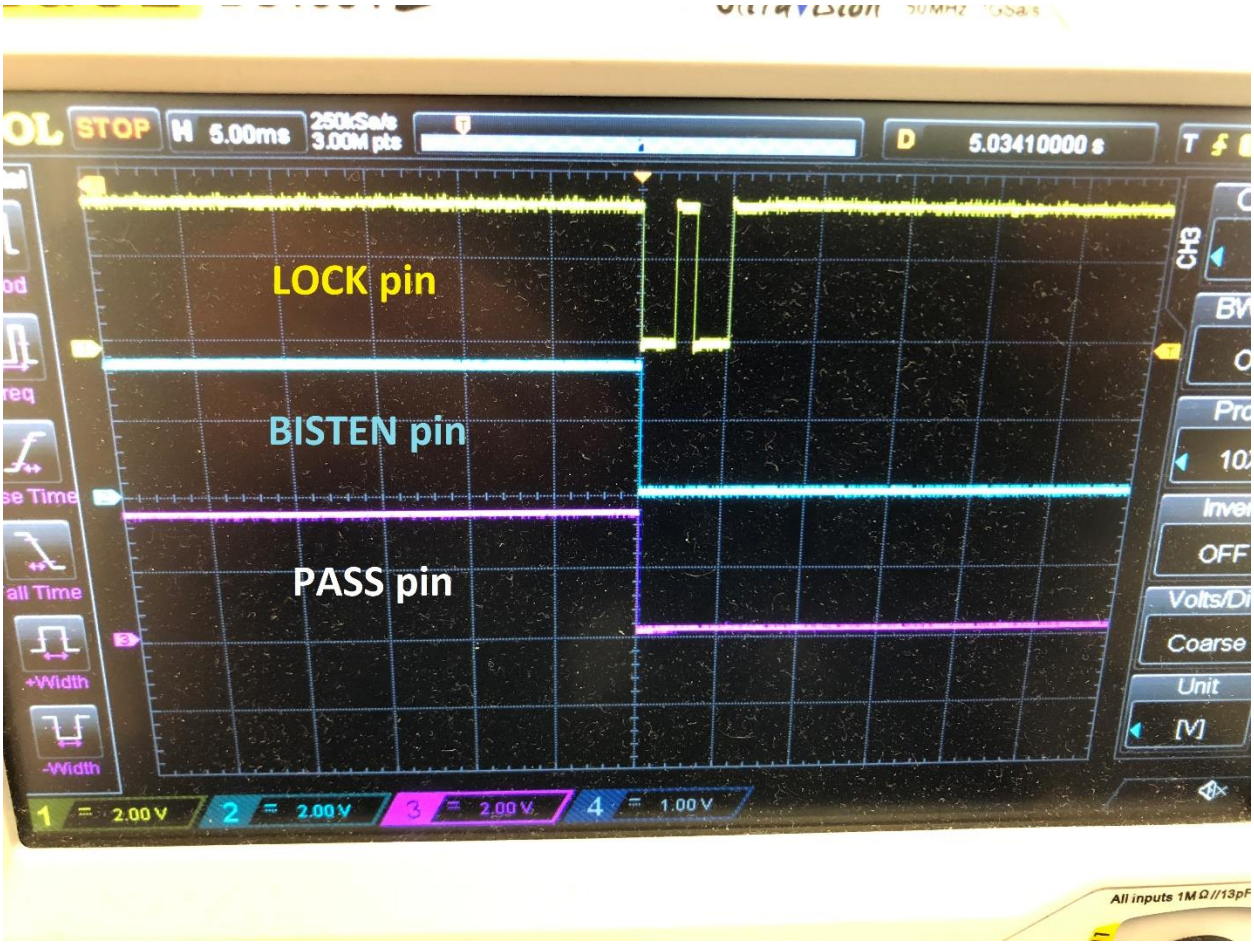


Figure 7 Waveforms from the moment BIST is disabled

ISSUES

- Communication between MCU and any device on remote I2C bus after BIST is disabled is not possible!!!!
- There are some CRC errors during normal operation and CRC errors on BC during BIST read from Serializer registers. PASS pin is LOW after BIST is performed.