2023

UC Touch Panel Display and Controller

PROGRAMMER GUIDE

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USB Interface:

The control USB interface is based on FTDI245RL and all the documents and library are available on FTDI website.

Data Frame (Packet) :

All the communication with the software will done using a standard data frame:

BG: beginning of the frame is always equal to 2

Len: total frame length

CMD: Command

D: Data

LRC: LRC value for error handling (refer to LCR formula)

*Each box is represented of one byte.

By sending a frame device at the first step calculate the LRC and check the equality with received LRC to be sure that the data is not corrupted. then recognize the required action by frame command value and send specified answer. there is two type of frame, the frame for an action for example start test, in this case device send back the received frame as an answer so software can check the received frame which should be as same as sent one. The other type of frame is for reading or writing data and settings value so for reading frame, device send back specific answer according to the received command. In all condition it is better to calculate the LRC and checked with received LRC to be sure that data is not corrupted.

LRC Formula:

It is a standard method for determine the data corruption. For calculate LRC, you have to XOR bytes of the frame and the final result will be LRC. Note that BG and LRC should not use in LRC calculation.

LRC=Len(XOR)CMD(XOR)D0(XOR)Dn

For example, in test frame LRC is equal to 52:

LRC=4(XOR)48=52

Frame Description:

- **Sample:** all the sample data will include in this frame; command value will indicate read or write action:

  Send Read Command: 02 04 50 LRC

  Receive Read Answer: 02 59 50 Data LRC

  Send Write Command: 02 59 51 Data LRC

  Receive Write Answer: as same as sent frame.

  Data:

  D0…D10 = Sample ID **|** D11= Sample Type **|** D12…D14 = Date **|** D15…D17= Time

- **Test:** all the data of test parameter will include in this frame; command value will indicate read or write action:

  Send Read Command: 02 04 48 LRC

  Receive Read Answer: 02 17 48 Data LRC

  Send Write Command: 02 17 49 Data LRC

  Data:

  D0=Test Type **|** D1…D4= Test Speed **|** D5…D6= Max Load **|** D7= Unit **|** D8=Load Drop

  D9…D12= Failure Threshold

- **Read Channel data:** Analog channel readings and device status include in this frame.

  Send Read Command: 02 04 34 LRC

  Receive Read Answer: 02 16 34 Data LRC

  D0= Status1 **|** D1=Status2| D2= Digital Out | D3=Digital In **|** D4…D8=Load **|** D9…D12= Disp

  *Load and Displacement value are float.
  *Digital IN/Out: bit0…bit3 are don't care | bit4=port1 , bit 5=port2 , bit6=port3 , bit7=port4

- **Read Sensor Data:**

  Send Read Command: 02 04 52 LRC

  Receive Read Answer: 02 12 52 Data LRC

  D0= CH1 Type **|** D1=CH2 Type| D2=CH1 Unit | D3=CH2 Unit **|** D4= CH1 Decimal **|** D1=CH2 Decimal**|** D2=CH1 Cal Type **|** D3=CH2 Cal Type

  ***Type:** Load=0 | Dip=1
  ***Load Unit:** N=0 | kN=1 | kgf=2 | Ton=3 | kPa=4
  ***Dsip Unit:** um=0 | mm=1 | cm=2 | m=3 | mL=4

- **Set Analog Channel to Zero:**

  Send Read Command: 02 05 32 ChNo LRC

  Receive Read Answer: 02 05 32 ChNo LRC

  *ChNo: CH1=0 | CH2=1

- **Set Pulse Counter to Zero:**

  Send Read Command: 02 04 33 LRC

  Receive Read Answer: 02 05 33 LRC

- **Main Screen Up:**
  Send Read Command: 02 04 17 LRC
  Receive Read Answer: 02 04 17 LRC
- **Main Screen Down:**
  Send Read Command: 02 04 18 LRC
  Receive Read Answer: 02 04 18 LRC

- **Main Screen Stop:**
  Send Read Command: 02 04 16 LRC
  Receive Read Answer: 02 04 16 LRC

- **Test Screen:**
  Send Read Command: 02 04 02 LRC
  Receive Read Answer: 02 04 02 LRC

- **Run Test TARGET (load Control):**
  Send Read Command: 02 04 03 LRC

Receive Read Answer: 02 04 03 LRC

- **Run Test RAMP (Displacement Control):** Send Read Command: 02 04 05 LRCReceive Read Answer: 02 04 05 LRC

- **Target (Load Set Point, 4-byte float number):**
  Send Read Command: 02 08 06 D0 D1 D2 D3 LRC
  Receive Read Answer: 02 08 06 D0 D1 D2 D3 LRC

- **Speed (Disp. Ramp Speed, 4-byte float number):**
  Send Read Command: 02 08 07 D0 D1 D2 D3 LRC
  Receive Read Answer: 02 08 07 D0 D1 D2 D3 LRC

- **Left Jog (Fast):**
  Send Read Command: 02 04 08 LRC
  Receive Read Answer: 02 04 08 LRC

- **Left Jog (Normal):**
  Send Read Command: 02 04 09 LRC
  Receive Read Answer: 02 04 09 LRC

- **Right Jog (Fast):**
  Send Read Command: 02 04 10 LRC
  Receive Read Answer: 02 04 10 LRC

- **Right Jog (Normal):**
  Send Read Command: 02 04 11 LRC
  Receive Read Answer: 02 04 11 LRC

- **Stop Test:**
  Send Read Command: 02 04 04 LRC
  Receive Read Answer: 02 04 04 LRC

- **Exit:**
  Send Read Command: 02 04 01 LRC
  Receive Read Answer: 02 04 01 LRC

* in Triaxial mode use UP and Down command instead of Run Test:

- **UP (in Triaxial):**

Send Read Command: 02 04 03 LRC
Receive Read Answer: 02 04 03 LRC

- **Down (in triaxial):**

Send Read Command: 02 04 05 LRC
Receive Read Answer: 02 04 05 LRC

*In Load control mode, the parameter speed in test structure use as load set point and by using following command you will be able to change the set point after start test:

Send Read Command: 02 04 26 D0 D1 D2 D3 LRC
Receive Read Answer: 02 04 26 D0 D1 D2 D3 LRC
D0..D3 is a 4 byte float number

- **Get Device Serial Number:** As the serial number is saved on USB interface chip, FT245, so you have to use FTDI library to get the device serial number, the command is as follow:

VB:

```
FT_GetDeviceString(DeviceIndex, TempDevString, FT_LIST_BY_INDEX Or
FT_OflEN_BY_SERIAL_NUMBER)
FT_Serial_Number = Microsoft.VisualBasic.Left(TempDevString, InStr(1,
TempDevString, vbNullChar) - 1)
```

C#:

```
FTDI fd = new FTDI();
fd.GetSerialNumber(out sn);
```