

NEW CONTROL SOFTWARE FOR CERBERUS 3D NANOINDENTATION SYSTEM

by

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INTRODUCTION:-

In this phases was to develop a concrete strategy for the hardware connection. After thorough with my supervisor , we reached to the conclusion that considering the time frame and other issues it is best not to make any hardware changes.

So, the final solution came out to use RS-232 (serial cable) to transfer the binary data. Now, there are many issues regarding serial communication which are discussed later.

SERIAL (RS-232) COMMUNICATION:

There are three main issues regarding serial communication:

1. CABLING:

We have options of 9 pin or 25 pin serial communication.

Some Common 25-Pin Cables

| | | | | |
|--------|----------|------------------|-----------------------|---------------|
| Shield | 1 — 1 | 1 — 1 | 1 — 1 | 1 — 1 |
| Tx | 2 — 2 | 2 — 2 | 2 — 2 | 2 — 2 |
| Rx | 3 — 3 | 3 — 3 | 3 — 3 | 3 — 3 |
| RTS | 4 — 4 | 4 — 4 | 5 — 20 | 5 — 20 |
| CTS | 5 — 20 | 5 — 5 | 6 — 5 | 6 — 5 |
| DSR | 6 — 8 | 6 — 6 | 20 — 6 | 8 — 6 |
| GND | 7 — 7 | 7 — 7 | 7 — 7 | 20 — 8 |
| CD | 8 — 5 | 8 — 8 | 4 — 4 | 7 — 7 |
| DTR | 20 — 6 | 20 — 20 | 8 — 8 | |
| RI | 22 — 22 | 22 — 22 | | |
| | HP17255D | Straight Through | Tektronix 012-1285-00 | MISCO 0294M/F |

Some Common 9-Pin Cables

| | | |
|-----|------------|------------------|
| Tx | 3 — 3 | 3 — 3 |
| Rx | 2 — 2 | 2 — 2 |
| RTS | 7 — 7 | 7 — 7 |
| CTS | 8 — 8 | 8 — 8 |
| DSR | 6 — 6 | 6 — 6 |
| GND | 5 — 5 | 5 — 5 |
| CD | 1 — 1 | 1 — 1 |
| DTR | 4 — 4 | 4 — 4 |
| RI | 9 — 9 | 9 — 9 |
| | Null Modem | Straight Through |

2. HANDSHAKING:

There are two main handshaking protocols in serial communication:

XON/XOFF Handshaking:

1. When the buffer is about full, XOFF is sent.
2. When there is room again in the buffer, XON is sent.

Hardware Handshaking:

1. If the receive buffer is empty, turn on DTR and wait for a character to arrive.
2. Get a character from the receive buffer and turn off DTR.

3. COMMUNICATION PARAMETERS:

Plugging the cable between the computer and the device is not all that is required to make them talk. The devices must speak the same language in order to understand each other. It doesn't matter what it is, but it is essential they be the same! The language consists of the baud rate, data bits, parity, and stop bits. We must determine which of these parameters can be set on the device, what they can be set to, and how they are set. Typically, you would choose the highest baud rate that both the device and the computer support, one stop bit, eight data bits, and no parity.

4. DATA FORMATS:

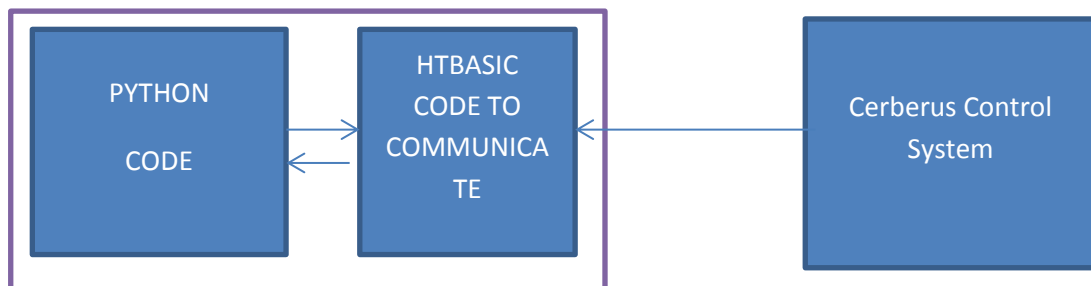
Once the computer and device are communicating correctly, it is still possible to get incorrect data if the data is formatted by the device in one way and interpreted by the computer in another or vice versa. The easiest way to get things working is to instruct the device to send data in ASCII, with CR/LF terminating each data item. However, the fastest way to exchange data is to do so in binary.

RESULTS AND DISCUSSIONS:

After lot of discussion and thought the final parameters were decided, which are as follows:

1. Use 9 pin serial interface.
2. XON/XOFF Handshaking.
3. Com Params:
Baud Rate : 9600
Data Bits: 8
Parity: 1
Stop Bits: None
4. Since data in Cerberus is binary so binary data format is chosen.

FINAL MODEL:



CONCLUSION:

Now the next step is to test this model.