≡scannex⫼

ip.buffer App Note
AN013 : Serial Connections

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1. Introduction

The ip.buffer has an excellent electronic circuit that detects the wiring pin-out of the serial cable connected. This means that null-modems are not required, and straight pin-to-pin cables can be used in all installations.

However, some PBXs have non-standard wiring that requires some kind of adaptor or cable to make it conform the industry-standard RS232 pin-outs. If the PBX adaptor is not fitted then the ip.buffer may be unable to detect the receive pin and may not receive good data[1].

PBXs that may require such special adaptors or cables are:
Nortel Meridian Option 61C/81C, Toshiba Strata DK, and others.

When diagnosing serial connection issues it is extremely useful to have a Patton D9 LED light box available. Ideally this piece of test equipment should be in every engineer's kit box!

Patton "Model 51" available from www.patton.com

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[1] Sometimes a PC connected might be able to receive data. This is usually because the PC is earthed and therefore "hides" some of the cabling error.

2. Preliminary checking with the ip.buffer

Before proceeding with the Patton LED box you can make some initial checks with the ip.buffer:

- Open up the ip.buffer Status web page

- Click on the Source, e.g. "COM1"

    ◦ Set the "Rx/Tx" setting to "Auto"

    ◦ Set the "Rx Flow" setting to "RTS"

    ◦ Set the "On Passthrough" setting to "None"

    ◦ Save the change and go back to the Status page

- Hover the mouse over the Source, e.g. "COM1"

    ◦ Check the "Rx Pin" setting

        ▪ 0: the ip.buffer cannot see a negative voltage on either pin 2 or pin 3. There is possibly nothing connected.

        ▪ 2*: the ip.buffer is seeing negative voltage on both pin 2 and 3. If the ip.buffer is not connected with a Y-lead in parallel with another collection device then this indicates a cabling fault.

        ▪ 2 or 3: the ip.buffer has detected a negative voltage on a pin. The cabling is likely correct. However, if the detected Rx Pin value changes – e.g. when data arrives, or randomly – then there is probably a cabling fault.

    ◦ Check the "RTS/CTS" and "DTR/DSR" values.

        ▪ The first number for each indicates the level that the ip.buffer is outputting. Normally this will start with "1/"

        ▪ The second number indicates the received value from the PBX

            • You should see either the CTS and/or the DSR set at 1.

            • If <u>both</u> are at 0 then this possibly indicates a cabling fault.

- If in doubt, save the Diagnostics Dump from the ip.buffer

    ◦ The Diagnostics Dump contains information that can help Scannex advise in cabling fault situations.

3. Using the LED box

3.1. Setup

- Disconnect the serial cable from the ip.buffer
- Connect the Patton LED box to the cable
  - The LED box is in place of the ip.buffer
  - The ip.buffer is <u>not</u> connected
- Examine the LED pattern on the LED box.

3.2. Diagnosis

With a correct connection, there should be LEDs lit on *either* the "TD" row or the "RD" row. There should not be LEDs on both rows.

<u>Some examples of good connections:</u>

3.2.1. Notes

- The color of the handshake[2] lines is not necessarily important.
  - Some PBXs will show one green and one red (indicating that the PBX is there, but you should not send data to it)
  - Some PBXs will only output one handshake line. Normally this will be green – indicating that the PBX is there and alive.
- When data is being transmitted from the PBX the TD or RD light will flash rapidly.
  - It will appear an orange colour when flashing (toggling between red and green).

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[2] The handshake lines are DTR/DRS and RTS/CTS.

4. Common situations

Some common situations and errors:

4.1. Both TD and RD rows have LEDs lit

When the ip.buffer cable is wired in parallel with a Y-lead to another collection device then both rows of LEDs will light.

Disconnect the other collection device and check the LED box again. If there is definitely nothing else connected between the LED box and the PBX then there is a cabling fault.

> • The ip.buffer can handle Y-lead situations. However, the Rx Pin setting must be forced to either DCE or DTE – otherwise the ip.buffer may 'lock onto' the transmit pin of the other collection device.

4.2. Green TD or RD

If either pin 2 or pin 3 are showing as solid green there is a cabling fault.

The idle voltage of the transmit from the PBX should be negative – shown as red on the LED box.

4.3. TD and RD off but flash with data

A small number of PBX outputs are not true RS232, but are TTL levels. In this case the LEDs for TD and RD will be normally off (though you should see at least one handshake line lit green). When data is transmitted, the LED will flash green.

The ip.buffer can receive from TTL-level devices but you have to force the "`Rx Pin`" setting to either "`DTE: Rx2/Tx3`" or "`DCE: Rx3/Tx2`".

5. Connecting to the ip.buffer

5.1. LED box check

When the LED box is showing a good configuration, you can try connecting the LED box into the ip.buffer.

After a second or two the ip.buffer should detect the pin configuration and enable its output – both rows of LEDs on the LED box should light.

> • Double check that the ip.buffer "Rx/Tx" setting is on "Auto".

5.2. Status page check

The Status web page can be checked:

- Hover over the Source, e.g. "COM1"

- The "Rx Pin" setting should show either "2" or "3"

- The values for "CTS" and "DSR" should normally show at least one of them at "1"

5.3. Data Check

With the LED box and the Status page showing good values you should be able to receive data.

- Generate a test call

- When you close down, examine the RD or TD LEDs on the LED box
    - You may be able to see the light flash briefly
    - It may be necessary to enable the CDR output on the PBX before data is seen.

- Check the "Live Record View" (on the ip.buffer Tools page)
    - You should see good call data arriving
    - If not, ensure you have the appropriate "Protocol" set for the given PBX[3].
    - Additionally, check that Autobauding is enabled.
        - The ip.buffer will normally lock onto the baud rate and serial protocol within one or two CDR records.

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[3] For example, the NEC may output data encapsulated in the STX...ETX characters. You have to use the NEC NEAX protocol for this data format. Other PBXs may output in binary or other encoded or protocol-based formats.