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XBOB-4 Quick-Start Guide
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Introduction

XBOB-4 prints information from RS-232 serial data sources to ordinary NTSC and PAL TV monitors. From the viewpoint of the data generator, XBOB-4 behaves much like a conventional serial printer.

This little tutorial walks you through detailed steps to establish communication between a PC and XBOB-4, so you can immediately type text onto the TV screen and begin using commands described in the XBOB-4 Application Guide.

An extended version of this document gives special attention to challenges often encountered by Point-of-Sale (POS) video security equipment installers. This material is directly applicable to many applications where a pre-existing data source cannot be custom-programmed for best results with XBOB-4.

Preparation

A video signal source at the video input to XBOB-4 is not strictly required, because XBOB-4 can generate video on-board, but you should have one if you wish to investigate video overlay performance. Cameras and DVD players with composite video output (yellow RCA jack) generally work well. In any case, a TV monitor or TV receiver with video input must be connected to the video output jack on XBOB-4. It's ideal to have access to more than one TV monitor, because some flat-screen models can be quirky.

XBOB-4 normally ships with its default baud rate and other communication parameters matching the terminal configuration instructions below. If it's shipped from Decade Engineering configured differently, then a custom configuration sticker will be found on the cabinet bottom and this information should be used instead for terminal setup.

The XBOB-4 data port pin assignment is for a standard male/female 9-pin modem cable with all pins wired straight through to a PC serial COM port. This hookup will not work with null-modem cables. To follow this guide closely, use a Windows PC with available serial COM port or USB/Serial adapter, and Bray's Terminal software. I/O Gear USB adapters such as model GUC232A are recommended, but most adapter brands are acceptable for this exercise. Bray's Terminal is a free download and provides a useful macro capability.

Power up the TV monitor and select the correct video input if necessary. Make sure that XBOB-4 is connected to a PC serial COM port, via USB adapter if necessary, and power it up. A big "BOB-4" logo will appear on the TV monitor unless the factory default bootscript has been cleared.

Using Bray's Terminal

We're going to use what is arguably the simplest and most direct method to make XBOB-4 print text on the TV monitor: a terminal emulation program running on your PC. Terminal programs make the PC behave like a dumb serial terminal — once the standard user interface for central 'mainframe' computers. These exercises were developed with Bray's Terminal V1.9B running on a Win7 Pro 64-bit machine. Terminal doesn't require 'installation.' Just place the downloaded .exe file in a convenient location and launch it. Depending on version, the Terminal window looks something like this:
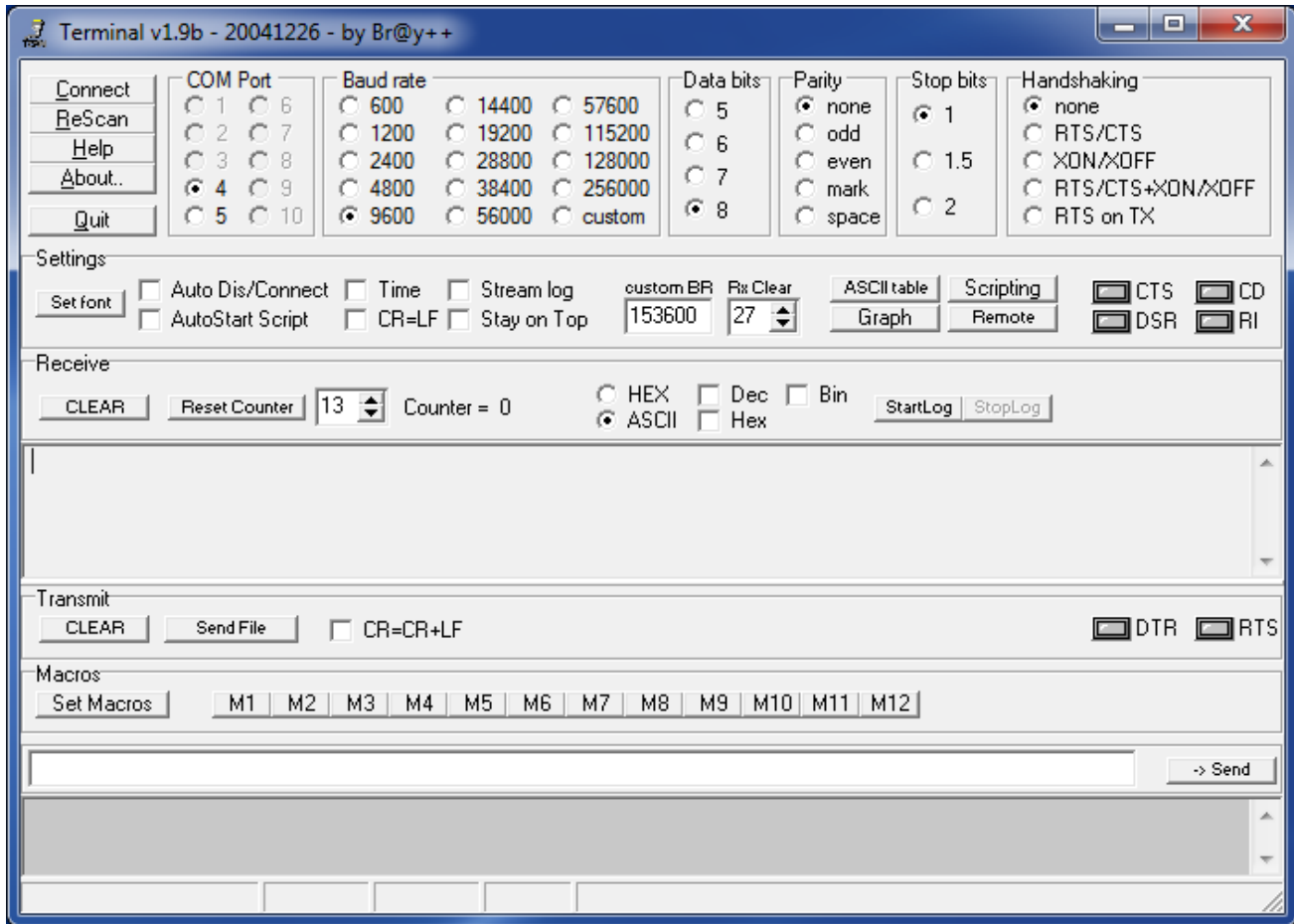
Terminal should find available COM Ports automatically. If the port number buttons are all gray, confirm that another program isn't using the desired port and click the ReScan button. As shown above, select an available COM Port, set Baud Rate to 9600, Data bits to 8, Parity to none, Stop bits to 1, and Handshaking to none. Click **Connect** – the same button should now say **Disconnect**. The **CTS** indicator turns green at this time, but it's safely ignored.

In case your PC has assigned a COM port number beyond Terminal's range, open Device Manager > Ports (COM & LPT), and double-click the desired port. A window titled "USB Serial Port (COMx) Properties" should appear. Click the "Port Settings" tab and then click the "Advanced…" button. In the COM Port Number drop-down menu, select an available port assignment within Terminal's range and then click "OK." Click the "ReScan" button in Terminal, which should now recognize the modified port.

To confirm Terminal communication with XBOB-4, type some text into the **Send** edit box and click the **Send** button. If your hookup is working, the big BOB-4 logo clears and your text immediately prints with the default 12x13 font in the upper left corner of the TV screen. Garbage printing often indicates a baud rate mismatch.

Now let's learn to transmit commands to XBOB-4. One of the most common application requirements is to clear the screen. XBOB-4 obediently does this upon receipt of the **J** command. Here's the **J** command syntax statement as it appears in the XBOB-4 Application Guide:

    `<CSI>nJ`

<CSI> stands for Control Sequence Introducer, which must be entered as "**$1b[**" or "**$1B[**" in Terminal. 1B is the ASCII Escape code as a hexadecimal number, while the dollar sign commands translation into ASCII. Other terminal emulators may handle this issue differently. In Bray's Terminal's **Send** edit box, a complete **J** command looks like:

    `$1b[2J`

The **n** parameter in the syntax statement was given a value of 2 in order to clear the entire screen instead of a portion. Click **Send** to transmit the command. If you send another string of printable text after clearing the screen, you will see that print position was also restored to the upper left corner by this version of the **J** command. See the **J** command entry in the XBOB-4 Commands section of the App Guide for details.

Carriage-Return <CR> and Line-Feed <LF> codes may be embedded in printable text sent via Terminal in the same way that Escape <ESC> was entered, that is, <CR> is entered as **`$0D`**, and <LF> is entered as **`$0A`**. Try them out!

It's often useful to review XBOB-4's current configuration. For that purpose, send

    `$1b[5}`

Yup, the right-brace is another command specifier. This command also provides a convenient way to test outbound communication. The lengthy configuration report scrolls beyond the receive window in Terminal, but you can easily scroll back to the beginning if desired. Here's an example report:

```
BOB4 (software v4.3.5, boot v4.3.1, logic rev.22, board v4.2)

Running parameters:
 video mode: local NTSC non-interlaced
 pixel rate: 9.375 MHz
 first pixel position: 123
 last pixel position: 539
 pixels per line: 416
 first line: 39
 last line: 246
 lines per frame: 208
 SPI memory device 0: none (0 bytes)
 SPI memory device 1: none (0 bytes)
 SPI memory device 2: none (0 bytes)
 SPI memory device 3: none (0 bytes)
 slave SPI mode: 0
 comms ACR pins: 0x9 (SPI master, rate = conf)

Configuration:
 NTSC (16=0)
 interlaced: no (17=0)
 external video mode: automatic (18=3)
 external video mode follow: yes (19=1)
 high pixel rate: yes (20=1)
 underscan restriction: yes (21=1)
 frame buffer size: 3 (34560 bytes) (22=3)
 pixel rate: 0 MHz (23=0)
 horizontal position: 0 (24=0)
 horizontal size: 0 (25=0)
 vertical position: 0 (26=0)
```

```
        early lines: 0 (36=0)
        vertical size: 0 (27=0)
        overlay enabled: yes (28=1)
        local horizontal adjustment: 54 (29=54)
        NTSC chroma rate: 100.000 % (30=100000)
        PAL chroma rate: 100.000 % (31=100000)
        blinking enabled: no (32=0)
        blink period: 10 (33=10)
        blink duty: 50 (34=50)
        screen flip: normal (35=0)
        BOB-4 only mode: yes (9=1)
        STX allowed for string start: no (10=0)
        CR/LF mode: not set (11=0)
        config baud rate: 9600 (40=9600)
        flow control: XON/OFF (41=1)
        8 bits, 1 stop bit, no parity, echo mode off (42=4)
        slave SPI signaling mode: (pin configured) (44=4)
        boot script size: 13 bytes (8=13)
        l0: low (48=0)
        l1: low (49=0)
        l2: low (50=0)
        l3: low (51=0)
        l4: low (52=0)
        SPI memory device 0: none (rate=8) (56=0)
        SPI memory device 1: none (rate=8) (57=0)
        SPI memory device 2: none (rate=8) (58=0)
        SPI memory device 3: none (rate=8) (59=0)

     Fonts:
        0: bob3         304 chars  12 x 13   2 bpp   internal
        1: 8x13          96 chars  8 x 13    2 bpp   internal
        2: target        14 chars  13 x 13   2 bpp   internal
        3: misc          96 chars  8 x 14    1 bpp   internal
        4: 6x10          96 chars  6 x 10    2 bpp   internal
        5: 13x34         96 chars  13 x 34   2 bpp   internal
        6: 20x40         96 chars  20 x 40   2 bpp   internal
        7: bob4           1 chars  136 x 33  2 bpp   internal
```

This information is highly condensed. Configuration statements such as "16=0" mean that configuration item 16 is set to zero, making XBOB-4 compatible with NTSC video rather than PAL video. All of the corresponding **v** commands are listed and described in the App Guide by parameter **n** value, e.g. 16. The example setting could have resulted from a user command entered like this, where parameter **m** is zero:

$1b[16;0v

Many of the **v** commands don't take effect until they're saved into flash memory and XBOB-4 is rebooted. The configuration save command may be issued just once after a salvo of configuration setting commands. Here it is:

$1b[1v

More Information

Here's an extended version of this document that wrangles with issues commonly encountered in Point-of-Sale (POS) video security systems. It's highly relevant to many other XBOB-4 applications with existing data source equipment.