

Versalent

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KBOB Keyboard Interface for XBOB-4 Video Overlay

Version 1.00
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General Description

KBOB is a small module (2.6" x 1.7" x 0.8") that translates PS2 PC keyboard output to the standard XBOB-4 (by www.decadenet.com) RS232 command set to embed text in a video stream – with no computer needed. The XBOB-4 offers a text insertion/editing command set with each command typically consisting of several characters to move the cursor, delete a character, insert a line, and all the other simple editing functions needed to embed and edit text on a video screen. KBOB provides single-keystroke entry for all of the common editing commands and requires nothing more than a standard PC keyboard. With a PC keyboard and the KBOB connected to the XBOB you can quickly enter text in various fonts, create reverse video, flash some of the text etc.

KBOB connects to a standard PC keyboard through the standard 6-pin PS2 keyboard connector, and to the XBOB through a standard DB9 cable which is supplied with each XBOB. KBOB analyzes the keyboard's scan set 2 keycodes (the keyboard's default scan code set) and outputs the ASCII character printed on the key for all of the alpha-numeric keys and other 'printable' characters. These appear on the video screen at the XBOB's current cursor position. Keys such as the UP/DOWN/LEFT/RIGHT arrow keys provide cursor movement and these keys send the appropriate XBOB command strings to cause the cursor to move as expected. Function keys F1-F8 send the XBOB commands to select one of the 8 fonts stored within the XBOB. A full list of the 'command' keys is shown in table 1, and you will notice that none of the alpha-numeric keys are used since these must remain available for your on-screen text entries.

Keyboard power is provided through the KBOB's PS2 connector, and therefore through KBOB. To allow the XBOB and KBOB to operate from a single wall-supply, a Y power-cable is provided with each KBOB. Basic operation is simple. Move the cursor with the arrow keys, and type text to the screen. CAPS lock operates normally, and the KBOB even manages the keyboard LEDs (which is normally the function of an attached computer) for a visual indication of the state of CAPS Lock. Optionally you can surround characters with the BOLD, FLASH, or REVERSE (CTRL-B, CTRL-F, CTRL-R) markers which cause that area of text to display that feature.

A green LED which is visible on the top side of the unit flashes approximately once per second to indicate that it is powered and operating.

NOTE: The first time CTRL-F (flash the text) is used, the XBOB is automatically configured to allow flashing (blinking). This reconfiguration causes the XBOB to clear the screen. So all existing text is lost. If blinking text will be used, it is recommended that at least some of the blinking text be placed on the screen first – to prevent losing any of the non-blinking entries.

KBOB's Key Commands for XBOB-4

Keyboard Key	Video Screen Function (Executed by XBOB-4)
UP ARROW	Move video cursor 1 line UP
DN ARROW	Move video cursor 1 line DOWN
RT ARROW	Move video cursor 1 character RIGHT
LF ARROW	Move video cursor 1 character LEFT
F9	Toggle on-screen video cursor ON/OFF
Insert	Insert new video line at cursor, shift all lower lines down one
Delete	Delete entire line which cursor is on
Home	Clear entire video screen, set cursor to top left
Page UP	Delete from cursor position to top of screen
Page DN	Delete from cursor position to bottom of screen
End	Delete from cursor position to end of cursor line
F1	Select XBOB Font 1 (small font)
F2	Select XBOB Font 2
F3	Select XBOB Font 3
F4	Select XBOB Font 4
F5	Select XBOB Font 5
F6	Select XBOB Font 6
F7	Select XBOB Font 7
F8	Select XBOB Font 8
CTRL-B	Start/End BOLD text
CTRL-R	Start/End REVERSE video text
CTRL-F	Start/End FLASH (blinking text) **
ENTER	Sends CR-LF to move the cursor to the start of the next line
BackSpace	Deletes the character immediately to the left of the cursor

TABLE 1

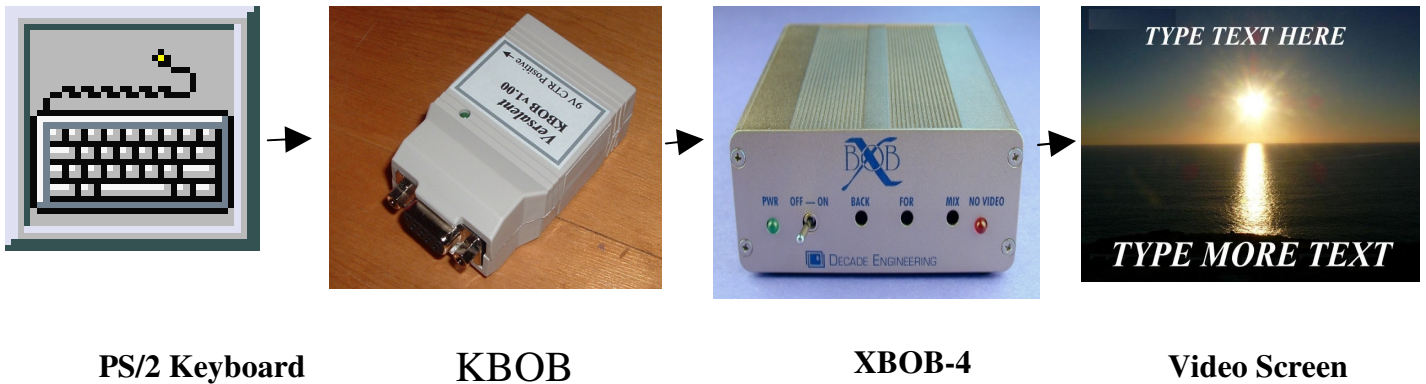
Notes

- 1) The on-screen video cursor is a slow-flashing Underscore character
- 2) When setting blinking text, the first CTRL-F sent to the KBOB reconfigures the XBOB to allow blinking text (by default, XBOB has this disabled). When reconfigured, XBOB clears its screen so any existing text is lost. To prevent this, if blinking text will be used on a screen, issue the CTRL-F command at least once before any other text.
- 3) When moving the cursor on the screen, any underlying text will be replaced with the cursor character as if flashes. To move the cursor through existing text without altering it, hit F9 to turn the cursor OFF, and move the cursor to an empty area of the screen before re-enabling the cursor (with F9 again).

These single-key functions make on-screen editing easy. By placing the keyboard templates which are provided with the XBOB on your keyboard, there is no need to refer to manuals or guides to design text screens quickly. Once the cursor is where you want your text, simply type it in.

Reliability Features:

KBOB implements an internal watchdog timer, and an internal brown-out detector. Should its circuits get disrupted through static discharge or other temporary interference, the watchdog will automatically reset the unit so that normal operation resumes with no user intervention. Or should power droop below an operational threshold the brown-out detector will suspend operation until power is restored to a normal level. At that point it will resume operation from a reset state again with no user intervention.



Typical Application

Baud Rate/Parity Control:

KBOB can be set to any of the baud rates/parity settings shown in TABLE 1. To configure it the plastic case is opened, and 5 internal shunt blocks are moved to the positions shown. These settings are also noted on the inside of the case cover. Note that the 3 shunt blocks on the left control the baud rate and the right two select parity. The table shows shaded blocks where shunts are to be installed to select the specified settings. After changing these settings the KBOB must be powered off/on to reset and accept the new serial settings.

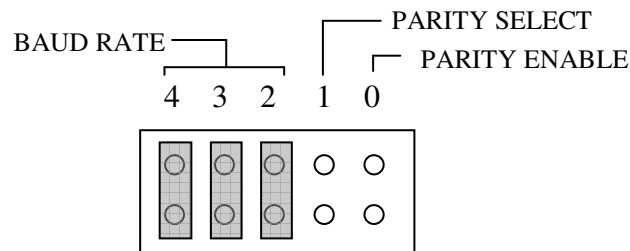


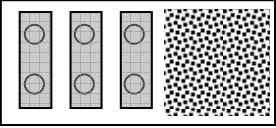
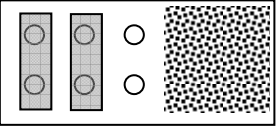
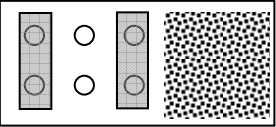
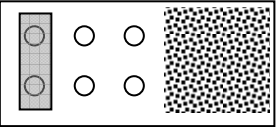
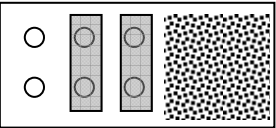
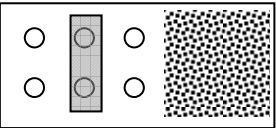
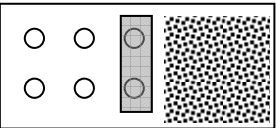
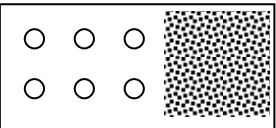
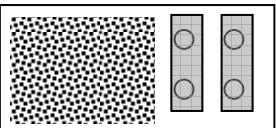
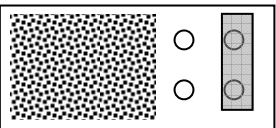
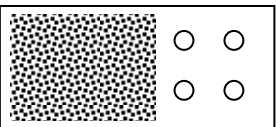
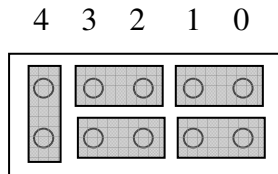
DIAGRAM	BAUD RATE	PARITY
	2400 bps	See below
	2400 bps	See below
	4800 bps	See below
	9600 bps	See below
	19.2k bps	See below
	38.4k bps	See below
	57.6k bps	See below
	115k bps	See below
	See above	Parity Enabled, ODD Parity
	See above	Parity Enabled, EVEN Parity
	See above	Parity Disabled

TABLE 2

Note that any shunt blocks in a horizontal orientation have no effect on serial settings and are typically used for storing the shunts. KBOB devices are shipped in the following default configuration .. 9600 baud, no parity. (All the horizontal blocks have no effect; the only effective one is the vertical one to the far left.) This matches the default settings of the XBOB so no adjustments are required.



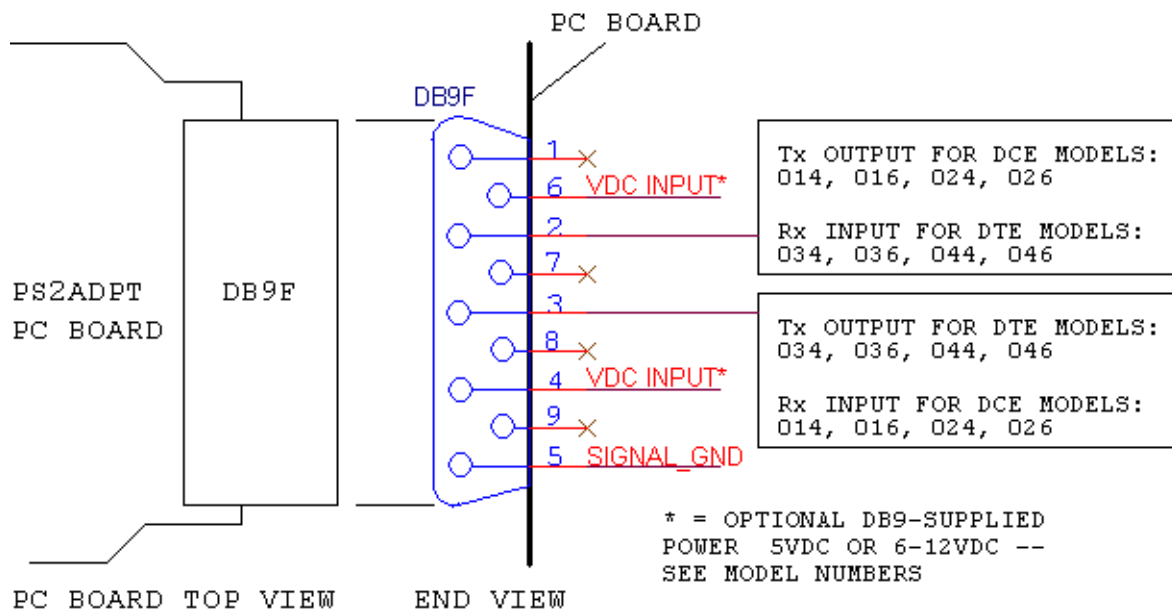
Power Control:

- 1) The standard PS2 keyboard requires +5VDC to operate. The KBOB contains an internal power regulator so that the +9VDC which powers the KBOB (as well as the XBOB) also provides the +5VDC needed for the keyboard. The maximum keyboard current allowed is 150mA or the internal regulator can overheat. Most keyboards require only about 30-40mA so this limit is usually not a restriction.

KBOB Physical, Electrical, Environmental Specifications

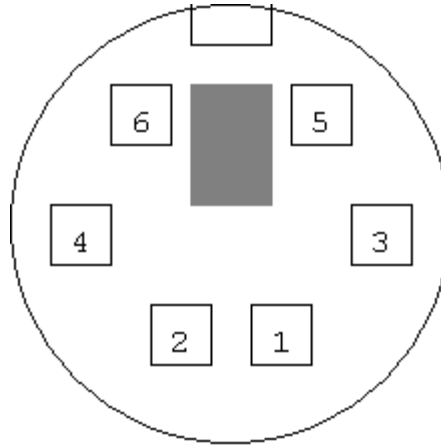
Physical:

Size:	2.6" X 1.7" X 0.8"
Weight:	2.6 oz
Keyboard Connector:	Standard PS2 6-pin mini DIN (female)
Host Connector:	Standard DB9 (female)
Case Color:	Ivory (Black available special order)
Power Connector:	5mm X 2.1 mm CP (male, CP=Ctr Positive)



KBOB DB9 (Female) Pin Assignments Diagram

(KBOB is configured as DTE)



KBOB PS2 (Female) Connector Pin Assignments Diagram
(Mates to standard PS2 6-pin Male Keyboard Connector)

Electrical:

Absolute Maximum Input Voltage	+15VDC
Power Supply Input Voltage:	9VDC +/- 20%
Power Supply Current:	10mA maximum plus keyboard current
Baud Rate:	2400 to 115k selectable via shunt blocks
Parity:	Selectable ODD/EVEN/NONE
DB9 Connector Configuration:	DTE (Data Terminal Equipment)

The KBOB is designed for simplicity – it generally outputs a single ASCII character (the one printed on the keyboard key) when the key is pressed. Or if one of the editing keys is pressed it outputs the compatible XBOB string required to perform the function. If the key is held and the keyboard auto-repeats the key, then the KBOB also auto-repeats its output. Although the keyboard itself sends multiple keycodes when keys are pressed, and even when keys are released, the KBOB does not. It only sends the serial-character information you are interested in which is when a key is pressed or when the keyboard auto-repeats a key which is held pressed.

Environmental:

Max Operating Temperature:	+85°C Derate by 12°C per 100mW Power dissipation
Min Operating Temperature:	-30°C
Max Storage Temperature:	+100°C
Min Storage Temperature:	-40°C
Humidity:	Non-condensing at all temperatures

$$\text{Power Dissipation} = (\text{Input Voltage} - 5) * (\text{keyboard current} + 0.010\text{A})$$

(Input Voltage = 9 when using standard XBOB power supply)

Derating Example:

$$\text{Keyboard Current} = 65\text{mA}, \text{ Input Voltage} = 9\text{VDC}$$

$$\text{Power Dissipation} = (9 - 5) * (.065 + .01) = 300\text{mw}$$

$$\text{Required derating} = 12^\circ\text{C} * (300\text{mw}/100\text{mw}) = 36^\circ\text{C}$$

$$\text{Max Ambient Operating Temp} = +85^\circ\text{C} - 36^\circ\text{C} = 49^\circ\text{C}$$

How to Configure KBOB for Custom Character/String Output

Using the programmable feature of the KBOB allows you to include any particular XBOB feature not already provided. This requires an understanding of the detailed command sequences of the XBOB .. please refer to that manual available from <http://www.decadenet.com>

(Note that the KBOB uses the PS2PRO configuration program since the programming sequence is identical).

- 1) Download and install 'PS2PRO Config Windows program
- 2) Connect KBOB to a PC COM port
- 3) Set COM port to same serial communication settings as KBOB
- 4) For up to 16 keys, click the mouse in the Keyboard Key box and type the single keyboard key for which you want a custom output. Immediately to its right enter the 0-6 character string to be output instead of the default character output.
- 5) Click 'Send Key Outputs to PS2PRO', which also performs a Verify.
- 6) At any time you can verify that the configured key outputs stored in the KBOB match those on-screen. So for instance if you have SAVED your set of key configurations to a disk file (using the FILE menu), you can later open that file, and use the 'Verify Key Outputs' button to check that they match.

Although you can override character outputs for keys such as F1 thru F8 as described above, those keys are already allocated to providing XBOB command features, so you should avoid reprogramming the keys listed in Table 1 above.

More Details For Each Step Above:

Step 1: The *PS2PRO Config* program is available from the DOWNLOADS section of the <http://www.versalent.biz> website.

Step 2: The KBOB is provided in DTE configuration (to mate directly to the XBOB). To connect to a PC for key reconfiguration requires the use of a null modem adapter.

Step 3: Change the serial settings of the *PS2PRO Config* program to match the current configuration of the KBOB (default from the factory is 9600,N,8,2).

Step 4: The *PS2PRO Config* program is very easy to use. You can override the default output for 0-16 keyboard keys. Place the cursor in a Keyboard Key box and hit the key you wish to override (ASCII key or F1 – F12 keys only).. Then place the cursor in the Output String box to its right and enter the desired output string for this key. You can type ASCII characters into this box .. and you can even enter non-ASCII, 8-bit non-printable characters by enclosing the hexadecimal value of the character in {} brackets. So a Line Feed character can be entered as {0A}. Note that the default key output is completely replaced by your string. So if you leave the Output String box empty, there is no output for the specified key. If you want the key to output its default value followed by a Line Feed you would have

to enter the default output character then the Line Feed character. For example to make the Enter key output CRLF, you would enter {0D}{0A} as the Output String. Notice that each {xx} sequence represents just one character of the possible 6 available to you. (Do not enter {00} – this represents an ASCII NULL characters and is a reserved character.)

Step 5: To send this configuration to the KBOB simply click the Send Key Outputs button. A checkmark will appear next to each of the 16 possible override entries as the written value is auto-verified after writing.

Step 6: At any time you can verify that the key outputs stored in the KBOB match your on-screen values. For example if you are unsure if you configured a KBOB, you can either

- a) Click the “Read Existing Key Outputs’ button which will load the screen with the key outputs stored in the KBOB so you can verify them visually – or—
- b) Open a file that you previously SAVED using the FILE menu (which loads those values to the screen), then click the ‘Verify Key Outputs’ button which will compare those stored in the KBOB with those onscreen. **Green** checkmarks appear next to those that match, and **Red** question marks appear next to those which do not match.

Additional Configuration Notes:

You may assign a key-output to any of the 16-positions on the screen , leaving any or all others empty. So for instance you can add an entry to the # 5 position only, or to #2, and #9 only. There is no need to fill them sequentially or consecutively. KBOB simply scans through all 16 entries for every keyboard key press and looks for a matching key in any position. The first match it finds will be used, and if no match is found then the currently pressed key is not overridden, and will output the default character (the one printed on the keyboard key).

Verifying KBOB Custom Character/String Outputs

After configuring the KBOB, you can confirm that correct output characters/strings are being generated for the programmed keys by using another Versalent Utility called Simple Term which is also available for download from <http://www.versalent.biz>

With the KBOB still connected to the PC COM port, close the *PS2PRO Config* program, start *Simple Term* and change its COM settings to match the KBOB. With a keyboard connected to the KBOB, type the keys which have been overridden and you will see the characters/strings which were just programmed. Notice that non-printable characters appear as hexadecimal values enclosed by [] brackets, and the special control characters such as NUL, ESC, SOH, BEL etc appear as [NUL], [ESC] etc. 8-bit characters which have no such ASCII defined symbols appear as hexadecimal values enclosed by [] brackets, i.e. [97] .

Document Revision Record:

Revision #	Revision Date	Description
V1.00	Feb 18,2009	Initial release of KBOB modified from PS2PRO