
TOKN MEDIA - TOKN KB16
Low cost 16-port keyboard I/O encoder/expander
Hardware rev 08, Firmware datecode 0301 (Jan 2003)
ReleaseManagement version 8.1.0.0
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Mounting and ESD precautions

Always use proper ESD "static" precautions when handling the PCB.
Mount on a non-conductive surface to avoid shorting the pins on the bottom of
the PCB. Mounting holes are sized for standard #6 machine or wood screw.

Wiring

All 16 inputs are identical and are intended for normally open switch
connections. Keycodes are sent to the PC when any one of the 16 pairs of
contacts are shorted together. The ground system is multiplexed so wire each
switch ground independently. A standard flat or round floppy cable can be used
to connect to the pin header. Cut the floppy cable and split adjacent pairs of
wires. Connect each wire pair to the normally open (NO) and common (COM)
connectors on the arcade button or joystick using crimp .187" quick disconnects.

Pinout

This is our suggested setup for a 1 player 2 player alternating classic arcade.
The joystick MUST be wired in the order UDLR starting on an odd pin number.
Wire gameplay and administrative buttons to the remaining inputs.
Make sure that no two inputs share the same keycode else the PC's keyboard
controller may get confused. Placing two buttons left of the joystick and six to
the right covers ASTEROID™/SPACEWAR™ style gameplay as well as DEFENDER™.

pin	emulator input	default keycode
1	JOYSTICK UP	UP ARROW
2	JOYSTICK DOWN	DOWN ARROW
3	JOYSTICK LEFT	LEFT ARROW
4	JOYSTICK RIGHT	RIGHT ARROW
5	BUTTON 1	LEFT CTRL (restricted key on firmware 0301, reassign!)
6	BUTTON 2	LEFT ALT
7	BUTTON 3	SPACE
8	BUTTON 4	LEFT SHIFT
9	BUTTON 5	Z
10	BUTTON 6	X
11	BUTTON 7	C
12	BUTTON 8	V
13	1P START	1
14	2P START	2
15	COIN 1	5
16	ESC	ESC

This is our suggested setup for a 2 player simultaneous classic arcade.
AKA the JOUST™/CONTRA™/ROBOTRON™ layout.

pin	emulator input	default keycode
1	1P JOYSTICK UP	UP ARROW
2	1P JOYSTICK DOWN	DOWN ARROW
3	1P JOYSTICK LEFT	LEFT ARROW
4	1P JOYSTICK RIGHT	RIGHT ARROW
5	2P JOYSTICK UP	R
6	2P JOYSTICK DOWN	F
7	2P JOYSTICK LEFT	D
8	2P JOYSTICK RIGHT	G
9	1P BUTTON 1	LEFT CTRL
10	1P START	1 (staggered admin)
11	1P BUTTON 2	LEFT ALT
12	2P START	2 (staggered admin)
13	2P BUTTON 1	A
14	COIN 1	5 (staggered admin)
15	2P BUTTON 2	S
16	ESC	ESC (staggered admin)

Diode Rules - Some layouts don't need diodes, others do. Use this as a guide.

- 1) Joystick inputs do NOT need external diodes as long as you wire the switches in the order of up, down, left, right starting on an odd pin as shown in the wiring diagrams.
- 2) Administrative buttons such as ESC, PAUSE, 1P start, 2P start, COIN1, COIN2, TAB, ENTER, F1-F12, etc. do NOT need diodes unless you have a need to press three or more at once.
- 3) Gameplay buttons that connect together on an odd-even pin pair DO need diodes to prevent ghosting.
- 4) A Gameplay button that resides on an odd-even pin pair with an Administrative button does NOT need a diode. This technique is referred to as "staggering" and can be used to reduce the number of overall diodes needed in the layout of your choice.

We give you four great layouts in our wiring diagram document that minimize or eliminate the need for diodes altogether. In addition to that, each encoder comes with one 1N4001 diode per input to give you all the flexibility you need when designing your game panel. Either way, we give you the strategies and tools to guarantee 100% ghost free operation. Enjoy!

Changing key assignments

The 16 default key assignments are printed on the silk screen. To change a key assignment do the following. Press and release scroll lock to enter calibration mode. Press an arcade button and keyboard key simultaneously for two or more seconds. The LED will illuminate 600ms to acknowledge the new key assignment. Unplug from the PC to remove power and exit calibration mode. This method also works when cascading boards in series with DIN cables. All boards in the chain will see the scroll lock press. The rule of thumb is typematic at passthrough and typematic at pin header more than 2 seconds == assign a new keycode to that input and store to EEPROM.

Multi-function LED

The LED will illuminate 600msec for the following events.

- 1) Upon Power up.
- 2) When BIOS and/or Windows sends keyboard reset command.
- 3) Immediately after new key assignment is stored to EEPROM.
- 4) When an emulated game has credits and is awaiting 1P/2P start.
Centipede™ is one of the ROMs known to do this.

The LED will blink 50msec for the following events.

- 1) Button or keyboard press
- 2) Button or keyboard release
- 3) Button or keyboard typematic repeat.
- 4) Replies to host PC commands.

Series connections

Any combination of TOKN KB32 and/or TOKN KB16 may be stacked in series for more joystick and gameplay button inputs. The boards connect in series by simply connecting the boards together with the included mini DIN cables.

TOKN KB16 TOKN KB32

Your keyboard ---> KBDIN PCDIN ---> KBDIN PCDIN ---> Your PC

Combine a KB16 and a KB32 for a super 4 player joystick setup.

Use the KB16 for all the administrative functions such as coin 1-4, start 1-4, esc, OK, tab, enter, pause, and tilt. Use the KB32 for all gameplay inputs.

You can also go head to head by connecting completely separate desktop consoles in the same fashion. When you're done, simply unplug and take your console home for some SoloMax™ desktop gaming.

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Restricted Keys Note -

This release of the firmware has a restriction on the use of two keys, Ctrl and Print Screen. Print Screen is not supported at all.

Ctrl key usage is supported but not in conjunction with other keys.

It can be used as an administrative key but it can not be used for player 1, button 1 gameplay which is the default for some gaming emulators.

The workaround is to assign some other alpha numeric key to P1 B1.

Unpredictable keycodes will result if this key restriction is not observed. Plans are in place to support this in future releases.

Keyboard LEDs Note -

PC to keyboard LED commands terminate at the first TOKN KB16 in the series. As a result, your keyboard LEDs will not illuminate when toggling Num, Caps, and Scroll. The "ON" state of each one of these LEDs is reflected in a 600ms on time of the TOKN KB16 LED. The off state is reflected in a 50ms blip of the TOKN KB16 LED. Plans are in place to support forwarding of these LED commands through the chain of encoders in future releases.

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