User Instructions for the
USB-311 and USB-312 "SmartWye"™ PC USB Keyboard Encoders

Congratulations on your purchase of a VETRA USB Keyboard Encoder! This quality product is designed and built by us in the USA and is backed by a VETRA Three-year Warranty and unlimited free technical support. We invite your comments, please e-mail us at sales@vetra.com or call us at the numbers given at the end.

DESCRIPTION

The "SmartWye"™ PC USB Keyboard Encoders make it easy to convert switch or contact closures to standard USB keyboard codes for input to a PC's USB port. The USB keyboard encoders enumerate as a standard HID keyboard, and support USB bus suspend and remote wake-up. If enabled by the USB host, an input contact closure will generate a remote wake-up signal on the USB bus. The USB Encoder model USB-312 contains an on-board USB hub providing an input for an USB peripheral. If any device is connected to the hub, its current draw must not exceed 400 mA.

OPERATION

The encoder detects and debounces switch closures, generates appropriate key codes, and sends them to the PC. When the switch is opened, the encoder sends a code indicating that the key is open.

GENERATED CODES

The USB Keyboard Encoder can generate one of four different USB keyboard code output configurations, selected by settings of jumpers JP3 and JP4. Jumpers **MUST BE** set prior to applying power to USB Keyboard Encoder for correct keyboard code configuration outputs. The USB codes generated are shown in the table below:

Jumper JP3	Jumper JP4	Keyboard Code Configuration
Not Installed	Not Installed	USB-311/312 Matrix Key Codes, see Table 2
Installed	Not Installed	USB-311/312 Function Key Codes, see Table 1, column –24F
Not Installed	Installed	USB-311/312 Numeric Key Codes, see Table 1, column –24N
Installed	Installed	USB-311/312 Alpha Key Codes, see Table 1, column –24A

The keyboard code generated for a given switch closure is shown in the two tables (maps) below in terms of US keyboard key cap legends. J3 is the switch input connector to the USB PC keyboard encoder.

The first table, Table 1, shows three standard maps for the keyboard encoder models that accept up to 24 discrete contact closures to ground. The key code is generated when the J3 pin in the table is closed to the GND pin. The "A" (ALPHA) map generates mostly alphabetic keys, the "F" (FUNCTION) map generates functions keys, and the "N" (NUMERIC) map generates numeric keys.

Table 2 applies to matrix-connected switches, such as found on many membrane keypads. The matrix configuration of the keyboard encoder contains the complete Windows 104 keys of the standard PC keyboard with switches connected in an 8 by 13 matrix.

PREPARE FOR OPERATION

1. Set-up: You can connect the "SmartWye" USB Keyboard Encoder to the PC at any time (plug-and-play). You do not have to power-down the PC to make this connection. Use a standard USB Type A-B cable (may be purchased separately from Vetra) to connect the keyboard encoder to any convenient USB port on the PC. The USB Keyboard Encoder is powered from the PC via this cable. After plug-in, the Pc takes a short time to recognize (enumerate) the USB Keyboard Encoder; then the USB Keyboard Encoder is ready for operation. Jumpers (JP3 and JP4) must be set prior to applying power to the encoder board for correct keyboard code configuration. To set the encoder for a different key code output configuration, the encoder must be unplugged from the PC, jumpers reconfigured and than plug the encoder back into

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1

the PC.

2. Alternative host connection: Connection via the J1 connector location is provided if a connection other than USB Type A-B cable is required. Vetra does not manufacture an Interface cable for this connection. (See the pin out information at end of these instructions for connections to J1).

3. Hub Connection (USB-312 Encoders only): Connect an USB keyboard or any low or full-speed USB device to the built-in USB hub on the encoder at connector J6. The device can be connected at any time. The PC takes a short time to recognize (enumerate) the device, and then is ready for operation. The total current draw of the device connected to the hub must not exceed 400 mA.

4. Alternative Hub connection: Connection via the J2 connector location is provided if a connection other than USB Type A connection is required. Vetra does not manufacture an Interface cable for this connection. (See the pin out information at end of these instructions for connections to J2).

Table 1
Encoding Map for USB-311/312-24 Configurations
(Code generated when J3 pin is connected to Ground)

Model	-24A	-24F	-24N
J3 Pin #	Alpha	Function	Numeric
1	a	ESC	NUM /
2	b	F1	NUM *
3	c	F2	NUM -
4	d	F3	NUM +
5	e	F4	NUM ENTER
6	f	F5	NUM 0
7	g	F6	NUM 1
8	h	F7	NUM 2
9	i	F8	NUM 3
10	j	F9	NUM 4
11	k	F10	NUM 5
12	l	F11	NUM 6
13	m	F12	NUM 7
14	n	LEFT SHIFT	NUM 8
15	o	SPACE	NUM 9
16	p	ENTER	NUM .
17	q	PAGE UP	UP ARROW
18	r	PAGE DOWN	DOWN ARROW
19	s	UP ARROW	LEFT ARROW
20	t	DOWN ARROW	RIGHT ARROW
21	u	LEFT ARROW	LEFT SHIFT
22	SPACE	RIGHT ARROW	LEFT ALT
23	LEFT SHIFT	z	LEFT CTRL
24	ENTER	y	ESC
25	COMMON	COMMON	COMMON

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2

Table 2

Encoding Table for USB-311/312 Matrix Configuration

J3 PINS	8	7	6	5	4	3	2	1
9	NUM 0	NUM 1	NUM 2	NUM 3	UP ARROW	DN ARROW	LF ARROW	RT ARROW
10	NUM 4	NUM 5	NUM 6	NUM 7	ESC	L SHIFT	LF ALT	LF CTL
11	NUM 8	NUM 9	NUM ENT	NUM .	F1	F2	F3	F4
12	NUM +	NUM -	NUM *	NUM /	F5	F6	F7	F8
13	a	b	c	d	k	l	m	n
14	e	f	g	h	o	p	q	r
15	i	j	INS	DEL	s	t	u	v
16	HOME	END	PAGE UP	PAGE DOWN	w	x	y	z
17	F9	F10	F11	F12	,	.	/	[
18	1	2	3	4	]	`	TAB	NUM LK
19	5	6	7	8	SCR LK	CAPS LK	-	=
20	9	0	ENTER	BK SP	\	;	'	SPACE
21	WINAPP	RTWIN	LFTWIN	PRT SCR	PSE	RT SHIFT	RT CNTL	RT ALT
22								
23								
24								

Table 2

The "SmartWye" USB Keyboard Encoders also support Num Lock, Caps Lock, and Scroll Lock status indicating LED's. By adding the J4 header, the "SmartWye" USB Keyboard Encoders can be configured to support keyboard indicator LED's. The encoders will source 2 mA on the following pins:

J4-1	Scroll Lock
J4-2	Caps Lock
J4-3	Num Lock

Pin Out Information for J1 and J2 connections to the USB-311/312 USB Keyboard Encoders

J1-1 Vcc	J2-1 Vcc
J1-2 USB D-	J2-2 USB D-
J1-3 USB D+	J2-3 USB D+
J1-4 Not Used	J2-4 Not Used
J1-5 Shield	J2-5 Shield
J1-6 Ground	J2-6 Ground

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3