User Instructions for the VIP-335 "SmartPipe"™ Protocol Converter

FEDERAL COMMUNICATIONS COMMISSION

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE

This equipment has been tested and found to conform to the directives and standards for a Class A Information Technology Equipment type and for the Commercial and Light Industrial equipment class.

INTRODUCTION

The VIP-335 "SmartPipe"™ protocol converters change RS-232 data to standard PC keyboard signals so it can be fed directly into a PC's keyboard port. A standard PS/2 keyboard (or an AT style keyboard with an adapter) can also be connected to the "SmartPipe" and will be merged with the RS-232 data. The keyboard connection is optional and not necessary for the VIP-335 to operate. The VIP-335 is powered from the PC.

PREPARE FOR OPERATION

There are five steps to prepare the Converters for operation.

ALL CONNECTIONS SHOULD BE MADE WITH THE PC POWER OFF!!

1. **Selection of baud rate:** Set the baud rate using configuration DIP switch "SW1", which is located at one end of the converter, next to the DB-9 pin connector. The selection of six different baud rates is available – 19200, 9600 (factory setting), 4800, 2400, 1200, and 300. To change the factory setting of 9600 baud, use switches 1, 2, and 3 of SW1 as shown in the Baud Rate Selection diagram to set a new baud rate. For a new baud rate to take effect, the converter must be powered off and then powered on again.

2. **Set data translation mode:** The converter can be set to data translation mode or no data translation mode, using the configuration DIP switch "SW1" (factory setting is **no translation** switch 4 of SW1 **DOWN**). To change the factory setting, set switch 4 of SW1 **UP** to select data translation. More information on this subject is given later.

3. **Connect the PC:** Use the male-male 6 pin Mini-DIN PC keyboard extension cable supplied with the Converter to connect the Converter to the PC's keyboard connector. This cable should be connected from the connector marked "TO PC KBD PORT" to the PC. The Converter is powered from the PC via this cable. An adapter the VIP-301-5M6F (may be purchased separately) is needed for connection to an AT style PC. The Converter should be connected to the PC only while the PC is powered down.

4. **Connect the Keyboard (optional):** Use the keyboard's cable to connect the keyboard to the female 6 pin DIN connector of the Converter marked "KEYBOARD IN". The keyboard will be powered from the PC via the Converter and via the keyboard cable. It is not necessary for a keyboard to be connected for the Converter to operate. An adapter such as the VIP-301-5F6M, which may be purchased separately, will be needed if an AT style keyboard is to be used.

VETRA SYSTEMS CORPORATION
275 MARCUS BLVD Suite J, HAUPPAUGE, NY 11788 USA
Tel: 631-434-3185 Fax: 631-434-3516
www.vetra.com email: sales@vetra.com

5. **Connect the RS-232 device:** Use an appropriate cable to make this connection. A female DB-9 connector on the

cable is needed to connect to the Converter. The Converter accepts (receives) RS-232 data on pin 2. The table below shows the pins used by the Converter. See Data Throughput discussion below to determine if you need to connect and us the CTS (clear To Send) signal.

RS-232 PIN UTILIZATION

Pin	Function
2	Converter receives data on this pin
5	Ground
7	CTS - Clear TO Send. The Converter controls this pin to indicate when RS-232 data can be sent to it. The PC may inhibit keystroke reception. The Converter then makes this pin inactive. No data should be sent to the Converter unless this pin is active. Data is lost otherwise.

The DATA FORMAT accepted by the Converters is one start bit, eight (8) data bits, least significant bit first, one stop bit, no parity.

OPERATION

Data Translation Mode

With SW1 switch 4 **UP** the Converters accept ASCII codes on their RS-232 input, which is a male DB-9 connector. The Converters then change these codes into equivalent PC keyboard scan codes and output the scan codes on the DIN connector marked "TO PC KBD PORT". In this fashion, ASCII-coded RS-232 devices can be used to drive a PC's keyboard input. The conversion of ASCII codes to equivalent PC keyboard keystrokes is shown in the ASCII to Keyboard Conversion Table.

No Data Translation (Clear) Mode

With SW1 switch 4 **DOWN** (factory setting) the Converters accept 8-bit data bytes on their RS-232 input, which is a male DB-9 connector. The Converters change these codes from the asynchronous RS-232 protocol and from RS-232 voltage to the bit-synchronous protocol and +5 volt level acceptable to a standard PC keyboard input. The converted bytes are output on the DIN connector marked "TO PC KBD PORT". Since no data translation takes place, for most applications, the RS-232 data should be the scan codes generated by the PC keyboard.

BAUD RATE SELECTION DIAGRAM - SW1 SETTINGS

BAUD RATE	UP	DOWN
19200	1,2,3	
9600		1,2,3
4800	2	1,3
2400	1	2,3
1200	1,2	3
300	3	1,2

NOTE: SW1-4 controls Data Translation Mode - see text above

Data Throughput

The PC accepts keyboard data at a limited rate, which is significantly slower than the possible RS-232 ASCII character input rate. The Converter provides a 64 byte buffer, but unless CTS is obeyed, the maximum number of characters that can be sent without loss is limited. In addition, ASCII characters that require a PC shift for proper representation, require the simulation of the Shift key, introducing additional delay. The table below gives maximum burst sizes in ASCII characters that can be sent without loss under the best conditions. Caution in needed in using the data from the table, since certain PC applications can be quite slow in accepting keyboard data. In such cases, the burst sizes will be less than given in the table. The table should be used only as a guide in estimating whether CTS should be used to assure data integrity.

BAUD RATE	MAX. BURST SIZE ALL UNSHIFTED	MAX. BURST SIZE ALL SHIFHTED
19200	64	64
9600	65	65
4800	66	65
2400	68	66
1200	72	69
300	117	91

MAXIMUM BURSTS THAT CAN BE SENT WITOUT HONORING CTS
ACTUAL PERFORMANCE MAY BE LESS, DEPENDING ON APPLICATION

1. No Translation is made for blank Table entries. 2. M - Make code only (simulates "stuck" key); B - Break code only (releases "stuck" key). 3. C/A/D - results on soft reset combination: Control/Alt/Delete. 4. LCNT/RCNT - left/right Control keys; LSHF/RSHF - left/right Shift keys: LALT/RALT - left/right Alt keys: NUM LK - Num Lock key; CAP LK - Caps Lock key; SCROLL LK - Scroll Lock key. 5. NUM prefix denotes keys from NUM pad. 6. PRT SCR is Print Screen key. 7. LFTWIN, RTWIN, WINAPP are the Windows 95 keys. 8. Keys are specified by US English keyboard keycap legends.

ASCII CODE TO PC KEY TRANSLATION TABLE

MOST SIGNIFICANT HEX DIGIT

	0	1	2	3	4	5	6	7
0			SPACE	0	@	P	'	p
1			!	1	A	Q	a	q
2			"	2	B	R	b	r
3			#	3	C	S	c	s
4			$	4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			`	7	G	W	g	w
8	BS		(	8	H	X	h	x
9	TAB		)	9	I	Y	i	y
A			*	:	J	Z	j	z
B		ESC	+	;	K	[	k	{
C			,	<	L	\	l	|
D	ENTER		-	=	M	]	m	}
E			.	>	N	^	n	~
F			/	?	O	_	o	

MOST SIGNIFICANT HEX DIGIT

	8	9	A	B	C	D	E	F
0	C/A/D		F1	NUM LK	NUM ENT	INS	LFTWIN	
1	M LCTL	B LCTL	F2	CAP LK	NUM /	HOME	RTWIN	
2	M LSHF	B LSHF	F3	SCROLL LK	NUM *	END	WINAPP	
3	M LALT	B LALT	F4		NUM 9	PGUP		
4	M RCNT	B RCNT	F5		NUM 8	PGDN		
5	M RSHF	B RSHF	F6		NUM 7	UP ARROW		
6	M RALT	B RALT	F7		NUM 6	DN ARROW		
7	M SCLK	B SCLK	F8		NUM 5	LF ARROW		
8	M LWIN	B LWIN	F9		NUM 4	RT ARROW		
9	M RWIN	B RWIN	F10		NUM 3	PRT SCR		
A			F11		NUM 2	PAUSE/BRK		
B			F12		NUM 1	DEL		
C					NUM 0			
D					NUM -			
E					NUM +			
F					NUM .			

VETRA Systems Corporation, 275 Marcus Blvd. Suite J, Hauppauge, NY 17788 USA
Tel: 631-434-3185 Fax: 631-434-3516
www.vetra.com e-mail: sales@vetra.com