Technical Documentation and Software Documentation VCSKB Small Keyboard

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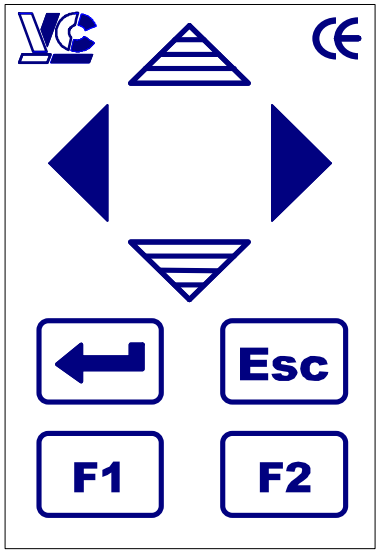
1. General information

VCSKB is a small keyboard with a serial RS232 interface. It was designed as an input device for VC series smart cameras. 4 cursor keys (up, down, left, right) may be used to control the movement of a cursor or similar graphical items. The ESC (escape) and CR (carriage return) keys may be used for controlling menus. Two additional function keys (F1, F2) may be used for miscellaneous features.
The keyboard conforms to a standard character set, i.e. you may use a PC with a terminal emulation for development and simply replace the PC by the keyboard for target systems.



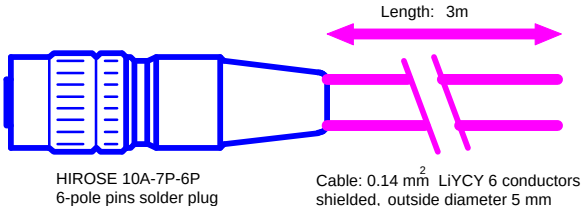
2. Power supply

The keyboard needs two voltages for correct operation: +12V (2 mA max) as main supply voltage and -12V (1 mA max) for the RS232 output driver. Both voltages have fairly high tolerances of +/- 25 %.
Since the circuit features a low power consumption of less than 30 mW, it may be easily supplied by camera signals. V+ is therefore connected to the +12V line of the V24 connector (approx. 10V eff.), V- is connected to the RTS line which must be switched to a negative voltage for this purpose by software.

3. Pin Assignment for the V24 (RS232) interface

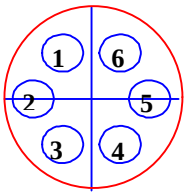
Signal	cable color	Pin (external Hirose connector)	Pin (internal connector)	signal direction	remark
V24 RxD	white	3	3	keyb. → camera	serial data line
V24 TxD	brown	2	-		not connected
V24 CTS	green	1	-		not connected
V24 RTS	yellow	6	1	camera → keyb.	neg. supply -12V
V24 GND	gray	5	4		
V24 +12V	pink	4	2	camera → keyb.	pos. supply +12V

V24 (RS232) Cable



Signal	Pin No.	Cable color
V24 RxD	3	white
V24 TxD	2	brown
V24 CTS	1	green
V24 RTS	6	yellow
V24 GND	5	gray
V24 +12V Out	4	pink

Hirose plug pin assignment (top view)



V24 plug (pin) pin

4. Transmission parameters

Transmission parameters for the keyboard are **fixed** to the following values:

9600 baud, no parity, 1 start bit, 1 stop bit

5. Character set

key name	symbol	character string (Hex Code)
up	↑	0x1b 0x5b 0x41
down	↓	0x1b 0x5b 0x42
right	→	0x1b 0x5b 0x43
left	←	0x1b 0x5b 0x44
ESC	**ESC**	0x1b
CR	**CR**	0x0d
F1	**F1**	0x1b 0x4f 0x71
F2	**F2**	0x1b 0x4f 0x72

6. Auto repeat function

All keys are subject to the auto repeat function. If a key is pressed longer than the auto repeat delay, the keyboard starts sending characters with the autorepeat frequency.

auto repeat delay: 800 msec
auto repeat frequency: 50 characters per second

7. Technical Specifications VCSKB

keys:	4 cursor keys (up, down, left right), ESC, CR, F1, F2
baudrate:	9600 baud
protocol:	RS232, 8 bit, no parity, 1 stop bit
DC power voltage:	+12V, -12V (+/- 25%)
DC power current:	2 mA max (+12V), 1 mA max (-12V)
auto repeat frequency:	50 cps
auto repeat delay:	800 msec
cable length:	3m
connector:	6 pin HIROSE connector
operating temperature:	-5 C to 55 C, 80% rel. humidity, non-condensing
storage temperature::	-25 C to 55 C, 95% rel. humidity, non-condensing
shock acceleration:	< 70g
vibrations:	< 7g (11 - 200 Hz)
dimensions:	105x58x19 mm
weight:	100g

8. Connecting a compatible PC

The VCSKB was intended to be used with VC series cameras. It may, however, be connected to a PC or any other computer using a different connector. Care should be taken to provide the correct voltages on the signals „DTR“ and „RTS“, since these are used as power supply for the keyboard

PC with a 9-pin D sub plug

Signal (PC)	cable color	Pin (PC, DSUB9)	Pin (internal connector)	signal direction	remark
PC DCD		1			
PC RxD	white	2	3	keyb. → PC	serial data line
PC TxD		3			not connected
PC DTR	pink	4	2	PC → keyb.	pos. supply +12V
PC GND	gray	5	4		
PC DSR		6			
PC RTS	yellow	7	1	PC → keyb.	neg. supply -12V
PC CTS		8			not connected
PC RI		9			

PC with a 25-pin D sub plug

Signal (PC)	cable color	Pin (PC, DSUB25)	Pin (internal connector)	signal direction	remark
PC TxD		2			not connected
PC RxD	white	3	3	keyb. → PC	serial data line
PC RTS	yellow	4	1	PC → keyb.	neg. supply -12V
PC CTS		5			not connected
PC DSR		6			
PC GND	gray	7	4		
PC DTR	pink	20	2	PC → keyb.	pos. supply +12V

9. CE Sticker

The keyboards have the CE sticker. It certifies that numerous measurements were made proving the device complies with the appropriate EC regulations. Only electromagnetic compatibility was decisive for this product.
This means that the devices are not permitted to radiate electromagnetic waves in excess of a boundary value layed down in the standard. They must also be insensitive to external radiation (e.g. from cellular telephones). They must not be sensitive to static discharges, etc.

Unfortunately, it is not possible to limit the question of electromagnetic compatibility to just one device or component. The entire system must always be considered.

Thus, the accessories such as cables, power supplies, etc., play a significant role.

The manufacturer guarantees the boundary values for CE compliance only if the original accessories are used.

10. Software

ResetKeypad **initialize keypad communication**

synopsis `void ResetKeypad()`

description The function `ResetKeypad()` reads out and empties the receive buffer for the serial communication and sets the RTS hardware signal to a negative voltage, which is required for the correct operation of the keyboard.

memory none

ReadKeypad **read command from keypad**

synopsis `int ReadKeypad()`

description The function `ReadKeypad()` reads out characters from the keyboard. The function uses a built-in timeout function to detect if a single character or a character string has been sent.
In any case the function returns exactly one integer value for each key pressed. The function will return the following values:

return value	key pressed
-1	invalid key
0	CR
1	ESC
2	F1
3	F2
4	↑
5	↓
6	→
7	←

memory none