CBL-USB-RS232KM-6

RS-232 to USB Keyboard/Mouse Cable

Reference Guide

Crestron Electronics, Inc.

Contents

CBL-USB-RS232KM-6: RS-232 to USB Keyboard/Mouse Cable

Introduction

The CBL-USB-RS232KM-6 is a product designed to allow RS-232 serial communication to produce keystroke and mouse actions on a target computer.

NOTE: This product can be used only with 3-Series® control systems.

Crestron® programming software has a two-way serial driver programming module to send mouse and keyboard commands from the control system's RS-232 port. This document provides information on sending custom serial commands that are not part of the module.

For information on installing the cable, refer to the CBL-USB-RS232KM-6 Installation Guide (Doc. 7853) at www.crestron.com/manuals.

Producing Mouse Action on the Target Computer

Various mouse actions may be generated by sending special command bytes to the CBL-USB-RS232KM-6. The following tables show the values to use for the commands that can be sent to the CBL-USB-RS232KM-6.

Cursor Actions

VALUE	COMMAND
0x42	Mouse cursor left
0x43	Mouse cursor right
0x44	Mouse cursor up
0x45	Mouse cursor down

NOTE: The cursor movement is set by the 0x6D and 0x6F commands shown below. The 0x6D command is the default setting.

Cursor Action Magnitude Settings

VALUE	DESCRIPTION
0x6D	Set mouse cursor movement magnitude to the smallest movement for each of the Mouse Cursor Up, Down, Left, or Right commands. This is always the default value for the cursor movement upon power up. When the 0x6D command is used, the movement magnitude remains at this setting until a 0x6F command is given.
0x6F	Set mouse cursor movement magnitude to larger steps for each of the Mouse Cursor Up, Down, Left, or Right commands. When the 0x6F command is used, the movement magnitude remains at this setting until a 0x6D command is given, or until the unit is unplugged or reset.

Scroll Wheel Actions

VALUE	COMMAND
0x57	Scroll wheel up
0x58	Scroll wheel down

Mouse Button Actions

VALUE	COMMAN
0x49	Left button on
0xC9	Left button off
0x4A	Right button on
0xCA	Right button off
0x4D	Middle button on
0xCD	Middle button off

After each command is sent to the CBL-USB-RS232KM-6, the CBL-USB-RS232KM-6 returns a response code, which is the 1's complement of the command received. Use this response byte to indicate when the next command may be sent to the CBL-USB-RS232KM-6.

Producing Keystrokes on the Target Computer

Keystrokes are generated on the target computer by sending special key code bytes. Each standard key of the computer keyboard is assigned a "make" code to emulate the press of the key, and a "break" code, which releases the key. The table on the following page lists each of the supported keys and their corresponding make and break codes.

As shown in the key code table, send the value of 02 (0x02) to the unit to generate the make code for pressing and holding the 1 key. Sending a byte with a value of 130 (0x82) releases the 1 key. The CBL-USB-RS232KM-6 responds to each byte received with a byte that is a 1's complement of the byte received. Use this response as the indication that the next byte may be sent to the CBL-USB-RS232KM-6.

NOTE: Any key press "make" code must be followed with a corresponding "break" code. Failure to send the corresponding break code will leave the key in the down state on the target computer, which may result in unintended keystrokes when new commands are sent. The last key left in the make state without a break will repeat until the break code is sent. Never command more than six keys in the "make" state at the same time as this will exceed the standard USB protocol keyboard buffer length for this keyboard device.

The use of make and break codes allows the user to create virtually any keystroke combination. For example, if a sequence of CTRL+ALT+F1 is needed, the following codes are sent:

58 (L Ctrl make), 60 (L Alt make), 112 (Make F1), 240 (Break F1), 188 (Break L Alt), 186 (Break L Ctrl).

NOTE: The example above assumes that the response character from the CBL-USB-RS232KM-6 is received before the next command byte is sent.

When sending data to the CBL-USB-RS232KM-6 to generate keystrokes, use the values shown in the following table to produce the make and break codes for the corresponding key(s).

Key Code Table

KEY	MAKE	BREAK	KEY	MAKE	BREAK	KEY	MAKE	BREAK
`~	0x1	0x81	J	0x25	0xA5	R Arrow	0x59	0xD9
1!	0x2	0x82	K	0x26	0xA6	NumLock	0x5A	0xDA
2@	0x3	0x83	L	0x27	0xA7	7 (Num)	0x5B	0xDB
3#	0x4	0x84	;:	0x28	0xA8	4 (Num)	0x5C	0xDC
4$	0x5	0x85	'"	0x29	0xA9	1 (Num)	0x5D	0xDD
5%	0x6	0x86	Enter	0x2B	0xAB	/ (Num)	0x5F	0xDF
6^	0x7	0x87	L Shift	0x2C	0xAC	8 (Num)	0x60	0xE0
7&	0x8	0x88	Z	0x2E	0xAE	5 (Num)	0x61	0xE1
8*	0x9	0x89	X	0x2F	0xAF	2 (Num)	0x62	0xE2
9(	0xA	0x8A	C	0x30	0xB0	0 (Num)	0x63	0xE3
0)	0xB	0x8B	V	0x31	0xB1	* (Num)	0x64	0xE4
-_	0xC	0x8C	B	0x32	0xB2	9 (Num)	0x65	0xE5
=+	0xD	0x8D	N	0x33	0xB3	6 (Num)	0x66	0xE6
BS	0xF	0x8F	M	0x34	0xB4	3 (Num)	0x67	0xE7
Tab	0x10	0x90	,<	0x35	0xB5	. (Num)	0x68	0xE8
Q	0x11	0x91	.>	0x36	0xB6	- (Num)	0x69	0xE9
W	0x12	0x92	/?	0x37	0xB7	+ (Num)	0x6A	0xEA
E	0x13	0x93	R Shift	0x39	0xB9	Enter (Num)	0x6C	0xEC
R	0x14	0x94	L Ctrl	0x3A	0xBA	Esc	0x6E	0xEE
T	0x15	0x95	L Alt	0x3C	0xBC	F1	0x70	0xF0
Y	0x16	0x96	Space	0x3D	0xBD	F2	0x71	0xF1
U	0x17	0x97	R Alt	0x3E	0xBE	F3	0x72	0xF2
I	0x18	0x98	R Ctrl	0x40	0xC0	F4	0x73	0xF3
O	0x19	0x99	L Win	0x46	0xC6	F5	0x74	0xF4
P	0x1A	0x9A	R Win	0x47	0xC7	F6	0x75	0xF5
[{	0x1B	0x9B	Win APL	0x48	0xC8	F7	0x76	0xF6
]}	0x1C	0x9C	Insert	0x4B	0xCB	F8	0x77	0xF7
|	0x1D	0x9D	Delete	0x4C	0xCC	F9	0x78	0xF8
Caps	0x1E	0x9E	L Arrow	0x4F	0xCF	F10	0x79	0xF9
A	0x1F	0x9F	Home	0x50	0xD0	F11	0x7A	0xFA
S	0x20	0xA0	End	0x51	0xD1	F12	0x7B	0xFB
D	0x21	0xA1	Up Arrow	0x53	0xD3	Prt Scr	0x7C	0xFC
F	0x22	0xA2	Dn Arrow	0x54	0xD4	Scrl Lk	0x7D	0xFD
G	0x23	0xA3	Page Up	0x55	0xD5	Pause/Break	0x7E	0xFE
H	0x24	0xA4	Page Dn	0x56	0xD6			

An international key number table is available on the CD provided with the CBL-USB-RS232KM-6.
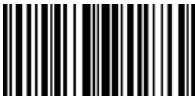
Additional Keyboard Commands

The CBL-USB-RS232KM-6 features two additional commands for keyboard action. The first command provides a way to clear the USB buffer and is useful for ensuring that no keys are left in the "on" state. The second command allows for the polling of the keyboard status LED states. This polling command is useful for checking shift case changes, or for verifying the Num Lock state before using keys affected by the Num Lock state.

Additional Keyboard Commands

VALUE	DESCRIPTION
0x38	USB Buffer Clear Command. Sending 0x38 to the CBL-USB-RS232KM-6 serial port clears the device's internal USB keyboard buffer. Use of this command ensures that all made keys currently in the USB buffer are released. The CBL-USB-RS232KM-6 responds to this command with 0xC7, which is the 1's complement of the command.
0x7F	Status LED Read Command. Sending 0x7F to the CBL-USB-RS232KM-6 serial port returns a character in the range of ASCII "0" through "7". The CBL-USB-RS232KM-6 response character reflects the current state of the Scroll Lock, Caps Lock, and Num Lock LEDs as listed in the chart below.

ASCII Response	Scroll Lock Status	Caps Lock Status	Num Lock Status
"0"	Off	Off	Off
"1"	Off	Off	On
"2"	Off	On	Off
"3'	Off	On	On
"4"	On	Off	Off
"5"	On	Off	On
"6"	On	On	Off
"7"	On	On	On