PS/2 KEYBOARD EMULATOR

Datasheet

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DOCUMENT INFORMATION

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0	Dohnal J.	14 July 2017	Document creation
1	Baroš J.	27 July 2017	Reworking the document
2	Navrátil J.	4 August 2017	Editing the final version
3	Navrátil J.	23 August 2017	Editing connection block diagram
4	Pařez J.	8 March 2018	Transforming to the new template
-	Navrátil J.	6 November 2018	English version
5	Jandásek V.	6 May 2019	Image update

Appendixes

Notes

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1 KEY FEATURES AND PRODUCT DESCRIPTION

- Receiving data from two hardware keyboards with PS/2 communication interface
- Forwarding data from both connected PS/2 keyboards to a PC
- Displaying communication between keyboards and a PC in a terminal
- Simulation of pressing any key by using a command sent to the serial port

The PS/2 keyboard emulator allows up to two standard hardware keyboards to be connected to a host PC; both are active at the same time and can be used without switching. For example, a host PC that is a part of a technology/production line control system can be operated from two different locations. At the same time, it is possible to simulate pressing of any key using the command sent through the serial port from master PC. Thanks to this feature, older technologies that lack other communication capabilities can also be upgraded and enhanced with a superior control system. For example, production quality control with cameras and image processing, where simulated keystroke replaces an operator at the time of detecting a defective piece or other problem. The communication between the host PC and the keyboard can be monitored by listing individual key codes on the serial port, making it easy to debug the entire system.

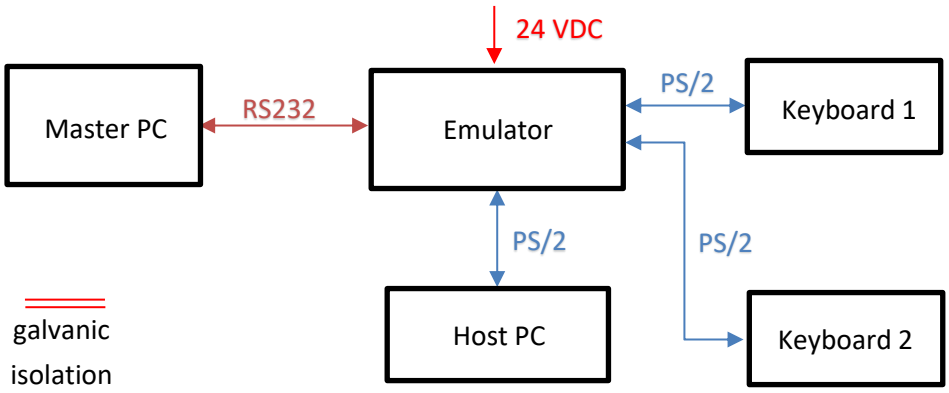

Fig. 1 - Block diagram of integrating keyboard emulator into technology

2 TECHNICAL SPECIFICATION

The device offers a customization option that does not require 24 V power supply and is powered from the PS/2 port of the host PC. Due to the current limitation of PC motherboards, each set of PC and keyboard must be individually tested prior to its deployment. The emulator is supplied in a compact aluminium housing along with a permanently attached PS/2 cable to the host PC.

Name	Value
Supply voltage	24 V DC ± 10 %, galvanically isolated from RS232 and PS/2
Current consumption	Max. 100 mA
Dimensions	23 x 54 x 85 mm
Communication interface	PS/2, RS232 – galvanically isolated from PS/2

Tab. 1 – Technical specification

Fig. 2 - PS/2 keyboard emulator without connected keyboards

3 Description of controls and indicators

Item	Label	Description
Button	RESET	Reset button
LED	PWR	Bottom LED - indication of the supply voltage Upper LED - reserved for future use
D-SUB9 female	RS232	Serial port connector
Power supply connector	GND	24 V DC power supply connector (Phoenix Contact 1803578 counterpart)
	24V	

Tab. 2 – Back panel

Fig. 3 – Back panel of the device

Item	Label	Description	
PS/2 male on the cable	PC	Connection to the host computer	
PS/2 female	KB1	Connecting keyboard No. 1	
PS/2 female	KB2	Connecting keyboard No. 2	
LED	KB2	Indication of communication with keyboard No. 2	Upper LED – PS/2 Clock
	KB1	Indication of communication with keyboard No. 1	Bottom LED – PS/2 Data
	PC	Indication of communication with PC	
	-	2 LEDs reserved for future use	

Tab. 3 – Front panel

Fig. 4 – Front panel

4 START-UP PROCEDURE, INITIALIZATION OF KEYBOARDS

Start-up procedure:

1) Verify that the host device (PC) is off.
2) Connect the keyboards, RS232 connector to the master PC and the emulator to the host device.
3) Connect the power supply.
4) Turn the host PC on.

For the proper functioning of the emulator and connected PS/2 keyboards, it is necessary to initialize them after the host PC starts. It is first performed by BIOS and then by the operating system; the initialization process may vary depending on both BIOS and operating system version. The emulator and keyboard can be initialized additionally after connecting to a running PC, but this may not always work.

Summary of initialization options:

1) *Automatically after turning the PC on*
   The PC automatically sets the character set, the LED indication, the delay before repetition and the repeat speed of the pressed key.
2) *With space bar*
   If the product is connected to the PC which is already running, you need to press the space bar or send the space bar command to the serial port. When it is pressed, the keypad is initialized. **If this does not happen, it is necessary to press the RESET button with a thin object on the emulator. If the keyboards still do not work, you need to restart the host PC.**

5 SERIAL PORT SETTINGS

To power the galvanically isolated serial interface and for proper communication functionality, the DTR and RTS control signals on the master PC must be switched on.

Baud rate	Data size	Parity	Handshake	Mode
115,200	8	None	OFF	Free

Tab. 4 – Serial port settings

6 LIST OF CONTROL COMMANDS

Every command is terminated with the following two characters: <CR><LF> that is Carriage Return (ASCII code 0x0D) and Line Feed (ASCII code 0x0A).

Command	Description	Response
„IDN<CR><LF>“	Device identification	*„OK“* *„PS2 keyboard emulator and reader 1.0“*
„RDA0<CR><LF>“	Turning the communication list off.	*„OK“*
„RDA1<CR><LF>“	Turning the communication list on.	*„OK“* Example of a keystroke record: *„KB to PC: 29“* *„KB to PC: F0“* *„KB to PC: 29“*
„SPC:<HEX><CR><LF>“	Sending the simulated keystroke to the PC. Hexadecimal code is in text format and can take values of 0-9 and a-f or A-F.	*„OK“*

Tab. 5 – List of commands

7 KEYSTROKE SIMULATION

To simulate pressing any key use the following command "SPC:<numeric hex code><CR><LF>". The following table is a list of keys and their codes; the number before the parenthesis is for pressing the key and the number in parentheses for releasing the key. If the code for releasing a key is not sent, the host PC will still consider the key to be pressed and will, for example, repeatedly write in the text editor using the interval set in the operating system.

For example, to press and release the space bar, the command will look like this:

„SPC:29F029<CR><LF>“

Key	Code	Key	Code	Key	Code
ESC	76 (F076)	**T**	2C (F02C)	**Ctrl (left)**	14 (F014)
F1	05 (F005)	**Y**	35 (F035)	**Windows (left)**	E01F (E0F01F)
F2	06 (F006)	**U**	3C (F03C)	**Alt (left)**	11 (F011)
F3	04 (F004)	**I**	43 (F043)	**Spacebar**	29 (F029)
F4	0C (F00C)	**O**	44 (F044)	**Alt (right)**	E011 (E0F011)
F5	03 (F003)	**P**	4D (F04D)	**Windows (right)**	E027 (E0F027)
F6	0B (F00B)	**[**	54 (F054)	**Menus**	E02F (E0F02F)
F7	83 (F083)	**]**	5B (F05B)	**Ctrl (right)**	E014 (E0F014)
F8	0A (F00A)	****	5D (F05D)	**Insert**	E070 (E0F070)
F9	01 (F001)	**Caps Lock**	58 (F058)	**Home**	E06C (E0F06C)
F10	09 (F009)	**A**	1C (F01C)	**Page Up**	E07D (E0F07D)
F11	78 (F078)	**S**	1B (F01B)	**Delete**	E071 (E0F071)
F12	07 (F007)	**D**	23 (F023)	**End**	E069 (E0F069)
Prt Scr	E012E07C (E0F07CE0F012)	**F**	2B (F02B)	**Page Down**	E07A (E0F07A)
Scroll Lock	7E (F07E)	**G**	34 (F034)	**Up Arrow**	E075 (E0F075)
Pause/Break	E11477E1F014E077 (None)	**H**	33 (F033)	**Left Arrow**	E06B (E0F06B)
`	0E (F00E)	**J**	3B (F03B)	**Down Arrow**	E072 (E0F072)
1	16 (F016)	**K**	42 (F042)	**Right Arrow**	E074 (E0F074)
2	1E (F01E)	**L**	4B (F04B)	**Num Lock**	77 (F077)
3	26 (F026)	**;**	4C (F04C)	**/**	E04A (E0F04A)
4	25 (F025)	**'**	52 (F052)	*****	7C (F07C)
5	2E (F02E)	**Enter**	5A (F05A)	**-**	7B (F07B)

6	36 (F036)	**Shift (Left)**	12 (F012)	**7**	6C (F06C)
7	3D (F03D)	**Z**	1A (F01A)	**8**	75 (F075)
8	3E (F03E)	**X**	22 (F022)	**9**	7D (F07D)
9	46 (F046)	**C**	21 (F021)	**+**	79 (F079)
0	45 (F045)	**V**	2A (F02A)	**4**	6B (F06B)
-	4E (F04E)	**B**	32 (F032)	**5**	73 (F073)
=	55 (F055)	**N**	31 (F031)	**6**	74 (F074)
Backspace	66 (F066)	**M**	3A (F03A)	**1**	69 (F069)
Tab	0D (F00D)	**,**	41 (F041)	**2**	72 (F072)
Q	15 (F015)	**.**	49 (F049)	**3**	7A (F07A)
W	1D (F01D)	**/**	4A (F04A)	**0**	70 (F070)
E	24 (F024)	**Shift (Right)**	59 (F059)	**.**	71 (F071)
R	2D (F02D)			**Enter**	E05A (E0F05A)

Tab. 6 – Codes for individual keys

8 LIST OF ERROR CODES

Error code	Description
„ERR01<CR><LF>“	Maximum command range was exceeded (30 characters)
„ERR02<CR><LF>“	Incorrect input or unknown command
„ERR03<CR><LF>“	SPC command: The number of hex code characters is not even
„ERR04<CR><LF>“	SPC command: hex code contains disallowed characters

Tab. 7 – List of error codes

9 PRODUCT VARIANTS

Order number	Name
69983000	PS/2 keyboard emulator

Tab. 8 – Product variants