

## **PoNET kbd48CNC v2 - User's manual**



Version: 12/8/2020

## SAFETY INFORMATION



This product is intended for integration by the user into a computer numerical control (CNC) machine. It is the user's responsibility to assess the overall system design and address all safety considerations that affect the users and equipment. The user assumes all responsibility for system design, including compliance with regulatory standards and codes issued by the applicable entities. PoLabs do not make any claims as to the suitability of this equipment for the user's application. Serious personal injury or equipment damage can occur from the improper integration, installation or operation of this product.

This product is not guaranteed to be fail-safe. The system that this equipment is used with shall be fitted with a separate means of fail-safe protection, emergency-stop capability and/or system power removal. This equipment may be connected to dangerous power sources, including electrical power sources. Dangerous voltage levels may be present at this equipment or at connected devices. Measures must be taken to prevent persons from contacting voltage sources which may be present. Equipment should be housed inside an enclosure suitable for the intended environment. Safety interlocks should be provided to prevent any and all dangers to personnel.

CNC machine tools are inherently dangerous, and can cause injury to operators and maintenance personnel. Operators and maintenance personnel shall be properly trained in the safe use, operation and maintenance of such machines. Automated machines that this equipment may be used with can move at any time. All persons exposed to such machines must understand the dangers that are present.

## **Description**

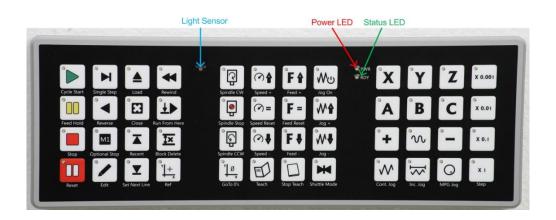
PoNET kbd48CNC v2 is a new upgraded version of PoNET kbd48CNC keyboard, an excellently machined extension keyboard for PoKeys devices in CNC machines. The keyboard has 48 buttons with graphics that equal to most commonly used symbols and functions of a CNC machine. For providing additional feedback functionality, each key is equipped with a red LED backlight, which can indicate various states of the CNC machine. The upgraded version improves on the reliability of the operation in machining environments and allows longer connecting cables to be used.

Keyboard can be customized and used as a general-purpose matrix keyboard without any additional software. However, applications that are aware of the keyboard (e.g. PoKeys Mach3 or Mach4 plugins) can make a full use of its functionality.

Two LEDs on the keyboard are used to indicate power supply and device status. »Power LED« (red color) switches on immediately after power supply is connected, while »Status LED« (green color) signals the current status of the device:

- Solid On: device is connected and working normally
- Slow blinking: no connection to Pokeys device
- Fast blinking: bootloader operation
- Solid Off: device disabled

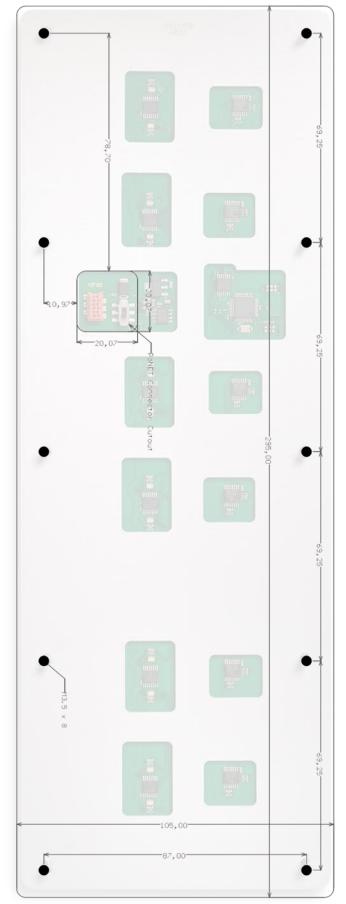
The keyboard is also equipped with a light sensor, which can be used to monitor the level of the ambient light and adjust the brightness of the LEDs.



## **Specifications**

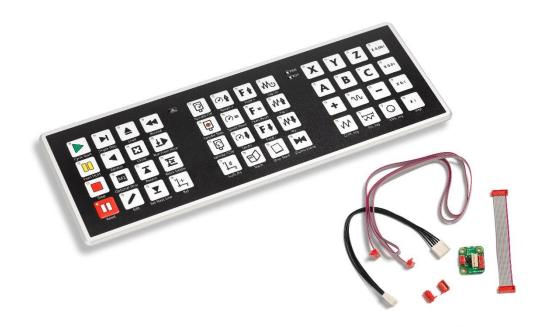
Dimensions:	295mm X 105mm X 4mm
Power supply:	5V ±10%
Power consumption:	max 500mA (depending on number and brightness of output diodes)
Number of keys/LEDs:	48 arranged in 3 groups of 4x4
Interface:	PoNET via adapter (supported by PoKeys57 devices), maximum cable length: 3000 mm

## Front panel cutout dimensions



## What is included in the package

The kbd48CNC v2 comes packaged with a cable pack and adapter board. The adapter board enables the connection between the keyboard and adapter board to be extended beyond the 300 mm limitation of the original kbd48CNC device. The connection between the keyboard and the adapter board is made either with a supplied 6-wire flat cable or can be custom made using the provided set of connectors.

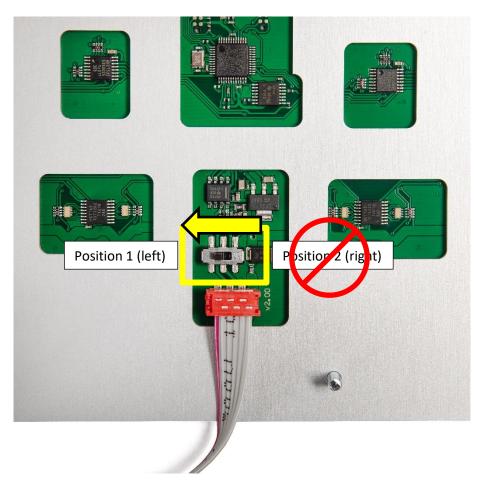


Contents of the package:

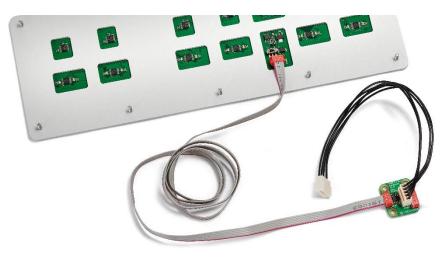
- kbd48CNC v2 keyboard
- adapter board (PoNET\_I2C Extender)
- 1000 mm 6-wire flat cable with attached connectors
- 100 mm 10-wire flat cable with attached connectors (for use with PoExtension bus)
- 200 mm 5-wire PoNET connection cable
- 2x 6-pin Micro-MaTch red connector (part number 215083-6) for custom cable crimping (for cable length exceeding the included length of 1000 mm)

## **Connecting to PoKeys device and configuration**

First, make sure that the configuration switch on the back of the device is in position 1, as indicated below.



Then, connect the keyboard with the provided 6-wire flat cable with the adapter board and install the 5-wire PoNET cable, as indicated in the picture below. The cables provide both power and communication.



Then, connect the PoNET cable to the 5-pin PoNET connector on the PoKeys device.

PoKeys configuration software must be used to initialize the connection between kbd48CNC and PoKeys device. Run PoKeys configuration software, connect to PoKeys device and go to Peripherals > PoNET menu. The following dialog will appear:

PoExtBus Pro devices: Refresh Re-initialize	Selected device
Unconfigured device - double	Device type:       (device type)         Number of inputs:       [inputs]         Number of outputs:       [outputs]         Assigned 12C address:       [i2c address]         Device options:
	PoEBkb device test:         LED test mode         Backlight test         Light sensor test

Figure 1: PoNet configuration dialog showing a unconfigured device

On the left, all PoNET devices are listed. Unconfigured PoNET devices will be listed as illustrated above. To configure the new device, double click on *Unconfigured device* icon and press any key on the device that you want to add (you have a 10 seconds time window to do that). If configuration process for a device was successful, the green »status LED« will stop to blink and will be constantly lit. The device will also be listed as »configured device« in the dialog.

To change the settings of the device, click on the configured device in the list on the left. If you will be using the kbd48CNC with a PoKeys Mach3 or Mach4 plugins, see detailed step by step instructions in the later part of this user manual. Close the dialog and click the button 'Send settings to device', which will save the configuration.

The settings	
PoNET devices:       Refresh       Re-initialize         Configured devices	Selected device         Device type:       PoNET kb48CNC v1.0         Number of inputs:       48         Number of outputs:       48         Assigned I2C address:       1         Device options:       Image: Complex and the second
Status: Ready	.::

Figure 2: Settings for a configured device

## Standalone operation as a matrix keyboard

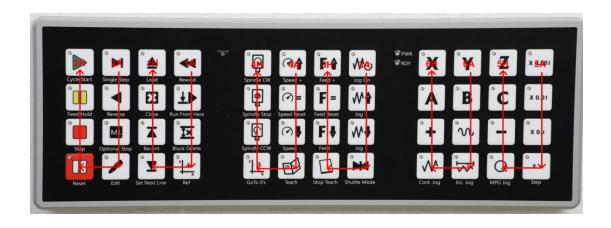
If you wish to configure the keyboard manually without the use of the 'kbd48CNC aware' application, check the option *Enable mapping to matrix keyboard* option in the PoNET device settings. Then, close this dialog and click 'Send to device' button and restart the application.

Open the Peripherals > Matrix Keyboard menu, where you can track your keyboard actions and define key mapping options.

Matrix	keybo	ard sett	tings						×
Pleas	e selec	st matrix	x keyba	oard siz	e		Mat	rix keyb	oard present at Pol2C device
Num	ber of ro	ows: 6	* *	Numbe	er of colu	umns: 8	3	\$	Enable keys with alternate function
	Α	В	С	D	Ε	F	G	Н	Fn+ key input pin: 📉 🗸
1	A1	B1	C1	D1	E1	<b>F1</b>	G1	H1	Selected key settings
2	A2	B2	C2	D2	E2	F2	G2	H2	O Direct key mapping
3	A3	B3	C3	D3	E3	F3	G3	НЗ	Triggered mapping
4	A4	<b>B4</b>	C4	D4	E4	F4	G4	H4	Down key: 😽
5	A5	<b>B5</b>	C5	D5	E5	F5	G5	H5	Modifiers: 🗌 Ctrl 🗌 Alt 📄 Alt Gr
6	A6	B6	C6	D6	E6	F6	G6	H6	Shift 🔲 Win
									Up key:
									Modifiers: 🗌 Ctrl 📄 Alt 📄 Alt Gr
									Shift Win
									<ul> <li>Mapped to macro</li> </ul>
									Macro:
									Edi macros
									Close

The following naming scheme is used for buttons on the kbd48CNC

### Matrix keyboard key indexing:



# Connecting kbd48CNC to the PoKeys device and configuring it in Mach3/Mach4

- 1. Connect the kbd48CNC to the PoKeys device as described in the previous chapter
- 2. Connect the PoKeys device to PC
- 3. Open PoKeys configuration software and connect to your device

File Periphera Mode	Ils Settings Device Pulse engine Assigment Not connected		Assigment	Mode
1				
2	Send to device		54	
<u> </u>	Pin settings		53	
4	Inactive Analog input		52	
5	🗌 Invert pin 🔘 Analog output 🔘		51	
6 —	<ul> <li>Triggered input</li> <li>Control</li> </ul>	nnection signal	50	
	Enable Counter Rising Dire	ction pin:	49 48	
	i u = ig	· · ·	48	
Select device				
	ase select device Keys56E - U	Seria	vare version: I number:	v3.0.28 25000
		Firmv Seria Lock Netw		
Refresh list	Configure Conner	Firmv Seria Lock Netw	l number: status: ork address:	25000 unlocked 192.168.8 Full access
Refresh list Network settings	Configure Conner	Firmv Seria Lock Netw	I number: status: ork address: rity status: 37 36	25000 unlocked 192.168.8 Full access
Policy         Policy           Refresh list            Network settings            20            21	Configure Conner Configure Conner	Firmv Seria Lock Netw Secu	I number: status: ork address: rity status: 37 36 36 35	25000 unlocked 192.168.8 Full access
Poince         Poince           Refresh lat         Image: Comparison of the sector of th	Configure Conner Configure Conner	Firmv Seria Lock Netw Secu	I number: status: ork address: rity status: 	25000 unlocked 192.168.8 Full access
Poince         Poince           Refresh lat         Image: Constraint of the second secon	Configure Conner Configure Conner	Firmv Seria Lock Netw Secu	I number: status: ork address: rity status: 37 36 35 35 34 33	25000 unlocked 192.168.8 Full access
Poince         Poince           Refresh lat         Image: Comparison of the sector of th	Keys56E - U Configure Connect Key repeat options Frepeat key if held down for more than repeat after m	Firmv Seria Lock Netw Secu	I number: status: ork address: rity status: 	25000 unlocked 192.168.8 Full access
Poince         Poince           Refresh list         Image: Constraint of the second seco	Keys56E - U Configue Conner Key repeat options Repeat key if held down for more than repeat after repeat afte	Firmv Seria Lock Netw Secu	I number: status: ork address: rity status: 	25000 unlocked 192.168.8 Full access
Poince         Poince           Refresh lst         Image: Comparison of the settings           Network settings         19           20         21           21         22           22         23           23         24           24         23           25         25	Keys56E - U Configue Conner Key repeat options Repeat key if held down for more than repeat after repeat afte	macros	I number: status: ork address: rity status: 	25000 unlocked 192.168.8 Full access

4. Go to Peripherals > PoNET settings...

NET devices:	le-initialize Selected device
Unconfigured device	Device type: (device type)
Unconfigured device - double click to add	Number of inputs: (inputs) Number of outputs: (outputs) Assigned I2C address: (i2c address)
	Device options:
	PoNET Keyboard device test:         LED test mode       LED test mode 2 (random)         Backlight test       LED intensity:       10         Light sensor test       (light)

If 'Unconfigured device' display is not present, please check the cable connections and click 'Refresh' button.

5. Double click on the 'Unconfigured device – double click to add' entry and press any key on the kbd48CNC within 10 seconds. If device was recognized, the following will appear and the green LED on the kbd48CNC will stop blinking

NET devices:	Refresh Re-initialize	Selected device	
Configured devices		Device type:	PoNET kbd48CNC v1.0
PoNET kbd48CNC (v4) at 1		Number of inputs: Number of outputs: Assigned I2C address:	48 48 : 1
		Device options:	
			inalik keyboard
		PoNET Keyboard de	
		LED test mode	LED test mode 2 (random)
		Backlight test	LED intensity: 10
		Light sensor test	(light)

- 6. Check the 'Assigned I2C address' display. If it does not display 1, click the 'Re-initialize' button and repeat step 5.
- When using kbd48CNC with Mach3/Mach4, <u>'Enable mapping to matrix keyboard' should not</u> <u>be checked</u>. In the bottom part of the dialog, various test modes are available to test the keyboard (these will function only when the 'PoNET settings' dialog is open).
  - a. LED test mode: any key press will start a wave like pattern radiating from the key that was pressed
  - b. LED test mode 2 (random): LEDs will be randomly blinked
  - c. Backlight test: ambient light sensor is used to set the LED brightness
  - d. Light sensor test: (light) displays the amount of ambient light detected
- 8. Close PoNET settings dialog and click 'Send to device' button to save the settings. Then close the PoKeys application.

### **Configuring the keyboard with Mach4**

The easiest was to configure kbd48CNC with Mach4 plugin is to enable 'kbd48CNC' as one of the peripherals in the 'New device wizard' when adding the PoKeys device to the plugin configuration. If this configuration is being done afterwards, follow these steps:

- 1. Open PoKeys plugin settings and double-click on the PoKeys device with the kbd48CNC device attached.
- 2. Switch to 'Pendant' tab and enable 'Enable pendant mode', 'Map pandant signals to Mach4' and 'kbd48CNC' options.

This will configure the plugin with the default functionality of the kbd48CNC device. Note that some functions may not be available in Mach4.

### **Default functionality in Mach4**

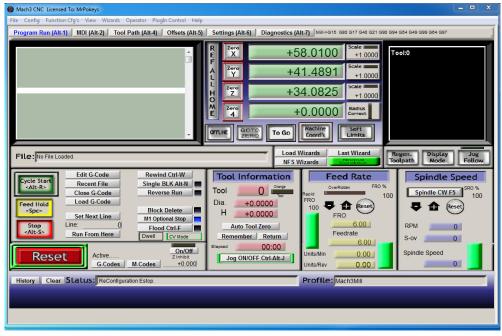
This is the default functionality supported:

- Cycle start: start the cycle
- Feed hold: pause
- Stop: stop immediately
- Reset: enable/disable function
- Optional stop: enable/disable optional stop feature
- Close: close current file
- Rewind: rewind the current job to beginning
- Block delete: block delete function in Mach4
- Goto 0's: move to position 0 started if pressed for 1 second
- Spindle CW, Stop, CCW: start/stop spindle
- Spindle speed adjustment: increase/decrease or reset (100%) the spindle speed
- Feedrate adjustment: increase/decrease or reset (100%) the federate
- Jog On: enable/disable jogging
- Jog speed adjustment (Jog+/Jog-): increase/decrease jog speed
- Jog mode selection: switch between Continuous, Incremental or MPG jogging modes
- Jog axis selection: select between axes X, Y, Z, A, B or C
- Jog step selection: switch between preset step sizes in incremental or MPG jogging modes (configurable in Mach4 config)
- Jog action (+ / keys)
- Rapid jog (between + / keys): enable/disable rapid jog function

Other functions can be customized - to customize the behavior of the kbd48CNC device, IO signal mapping or LUA scripting can be used – keyboard key statuses and LED indicators are available via 'PoKeys\_[serial number]\_kbd48CNC' device.

## **Configuring the keyboard with Mach3**

1. Open Mach3 (it Mach3 PoKeys plugin is not yet installed, follow the steps in 'PoKeys Mach3 plugin manual' to install it.



2. Go to Config -> Config plugins... and click yellow 'CONFIG' button for the PoKeys plugin

Config Function Cfg's View Wizards Operato	r PlugIn Control Help	
gram Run (Alt-1) MDI (Alt-2) Tool Path (	Alt-4) Offsets (Alt-5) Settings (Alt-6) Diagnostics (Alt-7)	Mill->G15 G80 G17 G40 G21 G90 G94 G54 G49 G99 G84 G97
	Plugin Control and Activation	Scale I
Le: No File Loaded. vcle Start Alt-R ed Hold (Spc) Stop Alt-S Test Next Line Line: 0 Run From Here Reset de Active	Enabled Plugin Name Flash-FlashScreen-SWF-Plugin-A.Fenety-8Barker JoyStick-JoyStick-Plugin-Art-Fenety-Ver-1.0a Pokeys-PoLabs-v0.01 PrinterScope-Tort-Scope-1.00.046 TurnDiags-Turn-Diags-1.00.1 VideoB.Barker-Ver-1.0 VideoB.Barker-Ver-1.0	Config CONFIG
G-Codes M-C		Rev 0.00 0 0

3. Select your PoKeys device and click Configure

PlugIn Contr	ol and Activation	04.00	Scale 0000
Enabled	PoKeys plugin settings PoKeys devices: PoKeys [20023] not detected PoKeys [25002] not detected	Add new Configure OK Cancel	NFIG NFIG NFIG NFIG NFIG NFIG NFIG NFIG
	On/Off	00:00	ок

If no device is displayed, follow the steps in the 'PoKeys Mach3 plugin manual' to add it.

4. Go to 'Import/Export tab' and select kbd48CNC mapping. Then click Import and select the kbd48CNC.xml file that is available as file kbd48CNC\_SettingsNew.xml in the package 'kbd48CNC Mach3 plugin' from polabs.com (please download the file and use WinZip or similar program to extract the contents of the file).

Device settings	Scale X	То
PoKeys mapping   Encoders settings   Matrix keyboard settings   Pulse	e engine settings Import/Export settings	
PoKeys pin mapping		
Encoders settings and mapping		
Matrix keyboard settings and mapping		
PoExtBus mapping		
kbd48CNC mapping		
Pulse engine settings		
-		Re
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re Import	Export	
ode	OK Creat L Arch	
	OK Cancel Apply	
Configuration Estop.	FI UTILE INACTOMI	

5. The previous step will load the default configuration for the keyboard. To change the default setup, go to 'PoKeys mapping' tab and find kbd48CNC. This section is used to setup the buttons in all three sections of the keyboard. Function of a button is simply changed by selecting a different LED or button mapping from the list of available OEM LEDs or buttons.

	Function	LED		Button	D	RO 🖌
🕀 🚞 PoKeys pins						
Hatrix keyboard						
	1				_	=
Cycle Start	Key	none		Button 1000: Cycle start	-	
			• •			
	Key	none	_	-		-
	Key	none	•	Button 1003: Stop		
⊢ ▷ Reset	Key	none	-	Button 1021: Reset	-	
→ Single Step	Key	none	-	Button 1004: Single	-	-
→ ▷ Reverse	Key	none	•	Button 279: Run reverse	•	-
P Detional	Key	none	-	Button 177: Optional Stop "s	-	-
⊢ ▷ Edit	Key	none	-	Button 115: Edit G-code	•	-
└── ▷ Load	Key	none	•	Button 216: Load G-code	•	-
─ ▷ Close	Key	none	-	Button 169: Close current file	-	-
► ▷ Recent	Kev	none	-	Button 214: Show recent G-c	-	- 1
∢		III				P.

6. To setup the keyboard LEDs under the keys, go to 'kbd48CNC LED' section.

	Function	LED	Button	
🖽 🚞 PoKeys pins				
🖽 🚞 Matrix keyboar	d			
🕀 🧰 PoExtBus				
🖽 🚞 kbd48CNC				
🖵 🖻 kbd48CNC LED	s			=
- 🖓 🖾 Left				
Cycle Sta	rt Key LED	LED 804: Start LED	-	
Feed Hol	d Key LED	LED 805: Pause LED	<b>•</b>	
→ ▷ Stop	Key LED	none	<b>•</b>	
── ▷ Reset	Key LED	LED 800: Reset LED	<b>•</b>	
→ Single Ste	ep Key LED	LED 82: Single Step mode Active L	-	
Reverse	Key LED	LED 97: Running in reverse (dupli	-	
	Key LED	LED 65: Optional Stop On LED	<b>•</b>	
⊢ ▷ Edit	Key LED	none	-	
⊢ ▷ Load	Key LED	none	<u> </u>	
	Kev I FD	none	<b>•</b>	*

7. To save the settings, click OK.

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