

Keypad - PCF8574 / MCP23017 / PCA8575

Plugin details

Type: Keypad

Name: PCF8574 / MCP23017 / PCA8575

Status: TESTING

GitHub: [P061_KeyPad.ino \(https://github.com/letscontrolit/ESPEasy/blob/mega/src/_P061_KeyPad.ino\)](https://github.com/letscontrolit/ESPEasy/blob/mega/src/_P061_KeyPad.ino)

Maintainer: .

Used libraries: .

Supported hardware

This plugin is used to get input from buttons/keys or a keypad transformed to a ScanCode, that can be handled in rules. The keys are connected directly or in a matrix to an 8 or 16 port I2C I/O chip. Currently supported chips are PCA8574/PCA8574A (8 I/O ports), MCP23017 and PCA8575 (16 I/O ports). Depending on the configuration, this allows to connect up to 72 keys to a single I/O chip (9*8 matrix). The PCA8575 chip doesn't have internal pull-up resistors, so these must be added externally.

Direct chip mode means that each I/O port is connected to a key, and connects to GND when pressed.

Matrix chip mode means that a matrix is created with half of the I/O ports as row and the other half as columns. At every crossing of the matrix, a key can be connected, connecting the row and column wires when pressed. The extra, 9th, row is formed by GND.

The plugin generates a ScanCode, depending on either the button-order in 'direct' mode, or the row/column position in the 'matrix' mode.

When pressing multiple keys at the same time, the lowest ScanCode value is returned, any other key(s) are ignored.

From the source-code:

Connecting KeYPad matrix to MCP23017 / PCF8575 chip:

row 0 = GND (optional if 9 rows needed)

row 1 = GPA0 / P00

row 2 = GPA1 / P01

...

row 8 = GPA7 / P07

column 1 = GPB0 / P10

column 2 = GPB1 / P11

...

column 8 = GPB7 / P17

Typical Key Pad:

C1 C2 C3

R1 [1] [2] [3]

R2 [4] [5] [6]

R3 [7] [8] [9]

R4 [*] [0] [#]

Connecting KeYPad matrix to PCF8574 chip:

row 0 = GND (optional if 5 rows needed)

row 1 = P0

row 2 = P1

row 3 = P2

row 4 = P3

column 1 = P4

column 2 = P5

column 3 = P6

column 4 = P7

Connecting KeYPad direct to PCF8574 / MCP23017 / PCF8575 chip:

common = GND

key 1 = P0 / GPA0 / P00

key 2 = P1 / GPA1 / P01

...

key 8 = P7 / GPA7 / P07

For 16 bit I/O expanders

key 9 = -- / GPB0 / P10

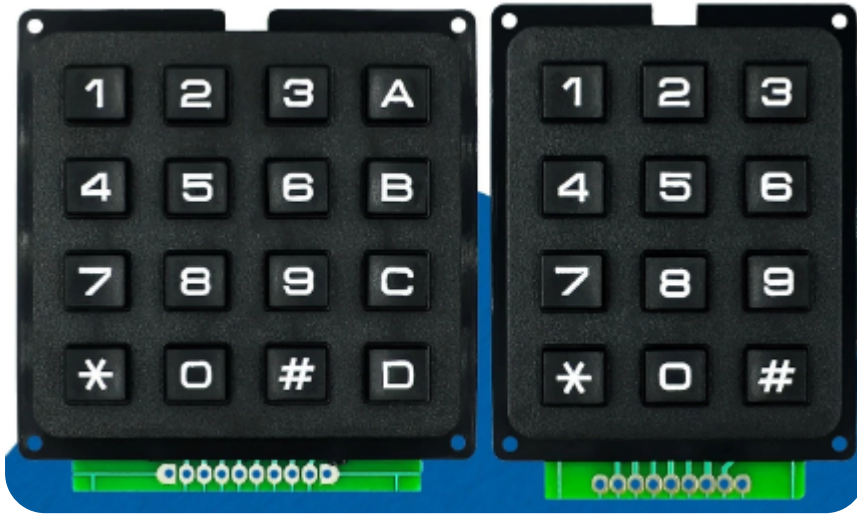
key 10 = -- / GPB1 / P11

...

key 16 = -- / GPB7 / P17

NB: PCF8575 needs pull-up resistors on all 16 ports to work as intended, as the chip doesn't

Often used matrix keypads, in 16 and 12 key configuration:



(Image sourced from Aliexpress)

Configuration

Task Settings

Device:

Keypad - PCF8574 / MCP23017 / PCF8575 [TESTING] ? i

Name:

Keypad

Enabled:

☐

I2C options

I2C Address:

0x20 (32) - (default) ▾

Force Slow I2C speed:

☐

Device settings

Chip (Mode):

MCP23017 (Matrix 9x8) ▾

Data Acquisition

Single event with all values:

☐

Note: Unchecked: Send event per value. Checked: Send single event (taskname#All) containing all values

Send to Controller

☐

i

IDX:

0

Interval:

0

[sec] (Optional for this Device)

Values

#	Name
1	ScanCode

Close

Submit

Delete

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- **Name** A unique name should be entered here.
- **Enabled** The device can be disabled or enabled. When not enabled the device should not use any resources.

I2C Options

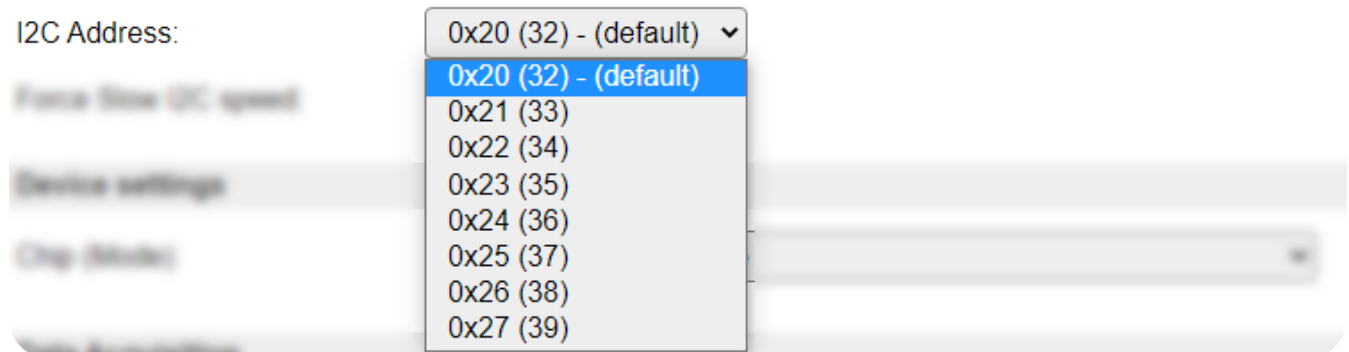
The available settings here depend on the build used. At least the **Force Slow I2C speed** option is available, but selections for the I2C Multiplexer can also be shown. For details see the Hardware page (../Hardware

/Hardware.html#hardware-page)

I2C Address: The address the device is using. Usually, for this type of I/O boards, the I2C address can be configured by connecting A0 / A1 / A2 to either GND or VCC.

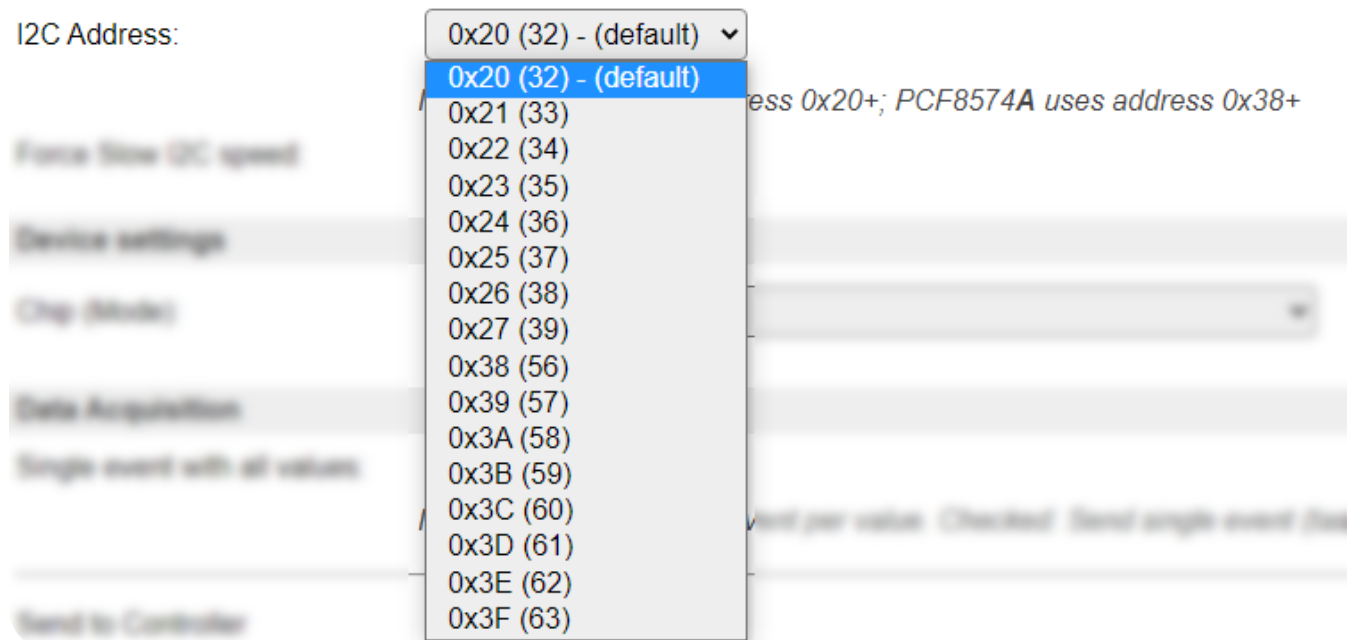
Depending on the chip used, different sets of I2C addresses are available to select from.

For MCP23017 and PCA8575, these are the available addresses:



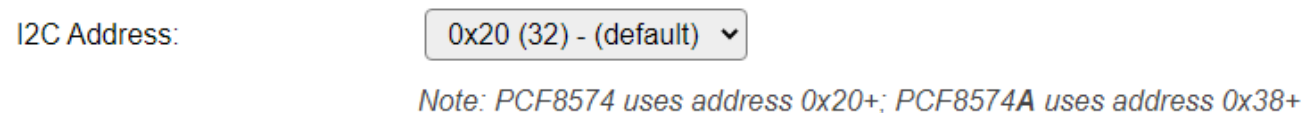
The screenshot shows a web interface with a dropdown menu for 'I2C Address'. The menu is open, displaying a list of addresses: 0x20 (32) - (default), 0x21 (33), 0x22 (34), 0x23 (35), 0x24 (36), 0x25 (37), 0x26 (38), and 0x27 (39). The first option, 0x20 (32) - (default), is highlighted in blue. In the background, other settings like 'Force Slow I2C speed', 'Device settings', and 'Chip (Mode)' are visible but blurred.

For PCA8574 and PCA8574A, these are the available addresses:



The screenshot shows a web interface with a dropdown menu for 'I2C Address'. The menu is open, displaying a list of addresses: 0x20 (32) - (default), 0x21 (33), 0x22 (34), 0x23 (35), 0x24 (36), 0x25 (37), 0x26 (38), 0x27 (39), 0x38 (56), 0x39 (57), 0x3A (58), 0x3B (59), 0x3C (60), 0x3D (61), 0x3E (62), and 0x3F (63). The first option, 0x20 (32) - (default), is highlighted in blue. To the right of the dropdown, a note is visible: 'Address 0x20+; PCF8574A uses address 0x38+'. In the background, other settings like 'Force Slow I2C speed', 'Device settings', 'Chip (Mode)', 'Data Acquisition', and 'Send to Controller' are visible but blurred.

If a **Chip (Mode)** for PCA8574 is selected, an extra message is shown, as the A version of that chip uses a different address-range:



The screenshot shows a web interface with a dropdown menu for 'I2C Address'. The menu is closed, and the selected option is '0x20 (32) - (default)'. Below the dropdown, a note is displayed: 'Note: PCF8574 uses address 0x20+; PCF8574A uses address 0x38+'. The note is in a smaller font and italicized.

Device Settings

- **Chip (Mode):** Select the configuration needed.

Available options:

Chip (Mode):

MCP23017 (Matrix 9x8) ▼

MCP23017 (Matrix 9x8)

PCF8574 (Matrix 5x4)

PCF8574 (Direct 8)

MCP23017 (Direct 16)

PCF8575 (Matrix 9x8)

PCF8575 (Direct 16)

Data Acquisition

The Data Acquisition, Send to Controller and Interval settings are standard available configuration items. Send to Controller is only visible when one or more Controllers are configured.

- **Interval** By default, Interval will be set to 0 sec.

Values

The key scan code is available in `ScanCode` . After releasing the key, the ScanCode is reset to 0.

Change log

Changed in version 2.0: ...

added 2022-01-23 Add support for PCA8575 chip, and multi-instance use of the plugin.

added Major overhaul for 2.0 release.

New in version 1.0: ...

added Initial release version.

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