Officina Turini

High Performance I/O Module

OT-1000

FEATURES

- Operating frequency 0 to 150MHz.
- 18 bit bidirectional port
- 4 bit Unit address
- 8 LEDs for status or monitor
- Dual time base 4MHz and 50MHz
- Low power consumption.
- Low price.
- Small size (15.2x25.4x5mm).
- Automatic reset signal
- 3.3 volt power supply

APPLICATIONS

- I/O Port
- Diagnostics
- Real Time Interface
- Smart Port
- Sequencer
- Pulse Generator
- Quadrature encoder
- Ultrasound interface
- Parallel to serial and viceversa
- Smart timer
- Period meter
- Frequency meter
- Fast counter
- Radar

DESCRIPTION

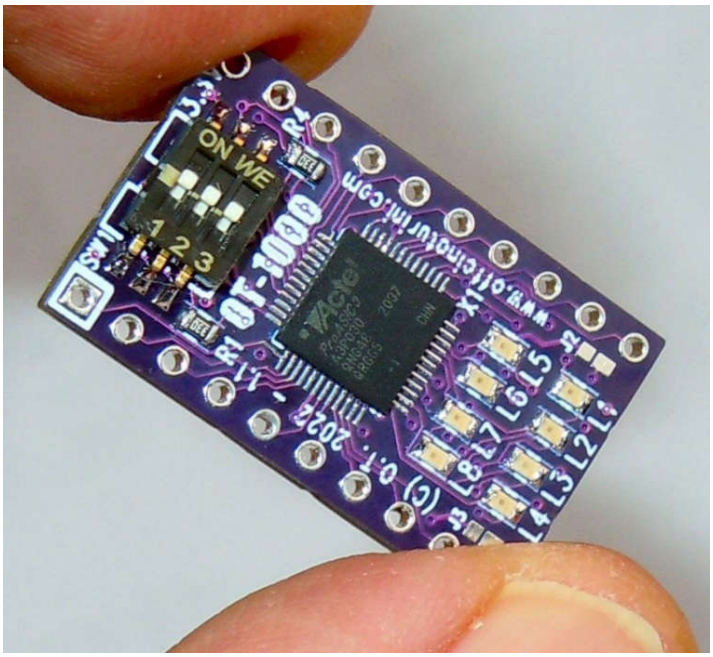
OT-1000 is a small (15.2x25.4 mm) DIP module which powered at 3.3V offers the possibility of implement complex functions in a small space.

It has 18 port bits, configurable as input or output.

Inside there are also two time bases at 4 and 50MHz, 8 LEDs to use as status or monitor of the implemented function and a 4-bit address selector.

The module is also sold without any function loaded in the FLASH, but they are also available many functions ready to use.

Its main purpose is to reduce the overload of the main micro controller or to allow to this functions not easily implemented with similar characteristics.



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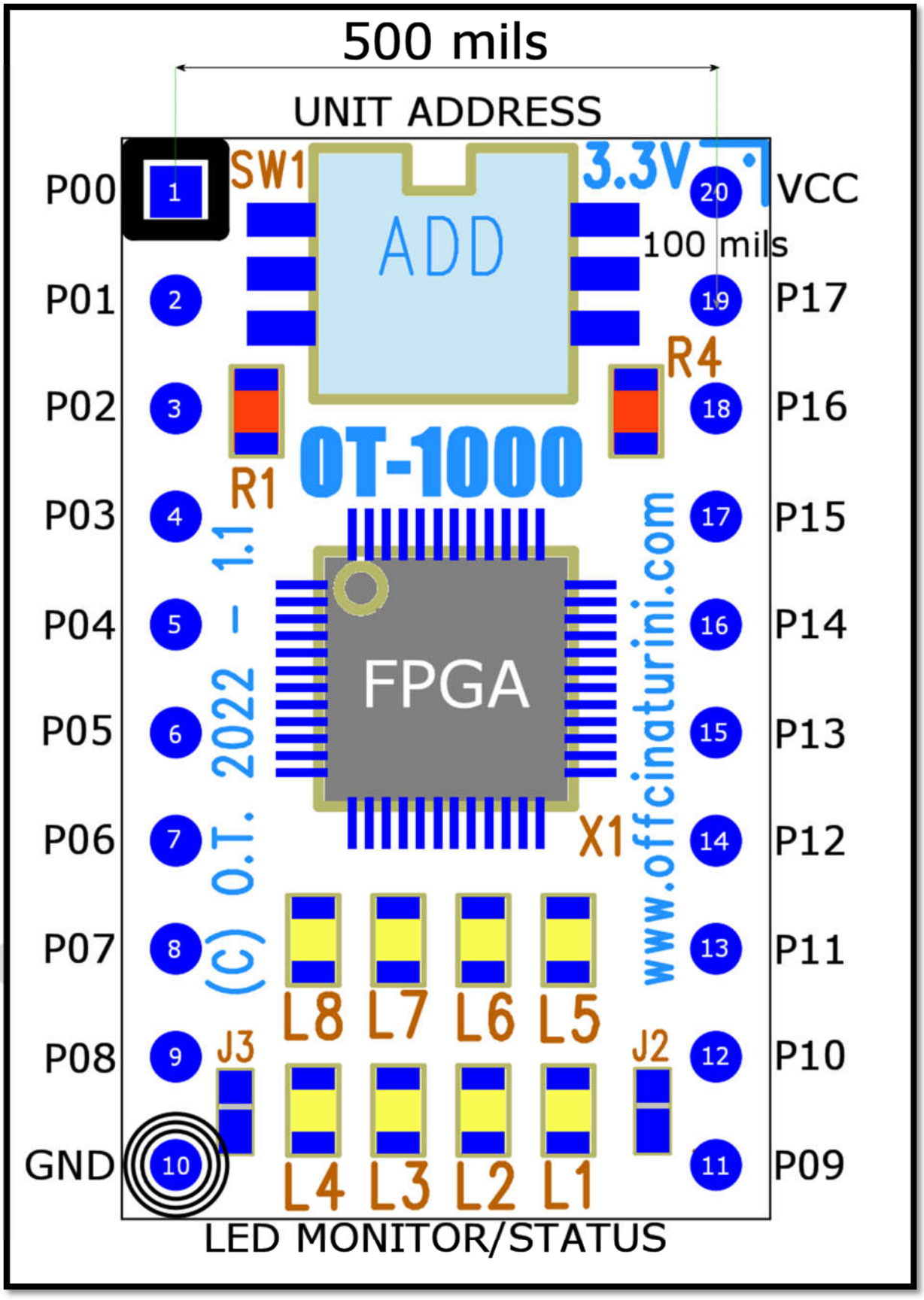
LAYOUT



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SIGNALS

PIN	SIGNAL	DESCRIPTION
1	P00	Bidirectional port LVTTL
2	P01	Bidirectional port LVTTL
3	P02	Bidirectional port LVTTL
4	P03	Bidirectional port LVTTL
5	P04	Bidirectional port LVTTL
6	P05	Bidirectional port LVTTL
7	P06	Bidirectional port LVTTL
8	P07	Bidirectional port LVTTL
9	P08	Bidirectional port LVTTL
10	GND	Power return
11	P09	Bidirectional port LVTTL
12	P10	Bidirectional port LVTTL
13	P11	Bidirectional port LVTTL
14	P12	Bidirectional port LVTTL
15	P13	Bidirectional port LVTTL
16	P14	Bidirectional port LVTTL
17	P15	Bidirectional port LVTTL
18	P16	Bidirectional port LVTTL
19	P17	Bidirectional port LVTTL
20	VCC	Power supply 3.3V

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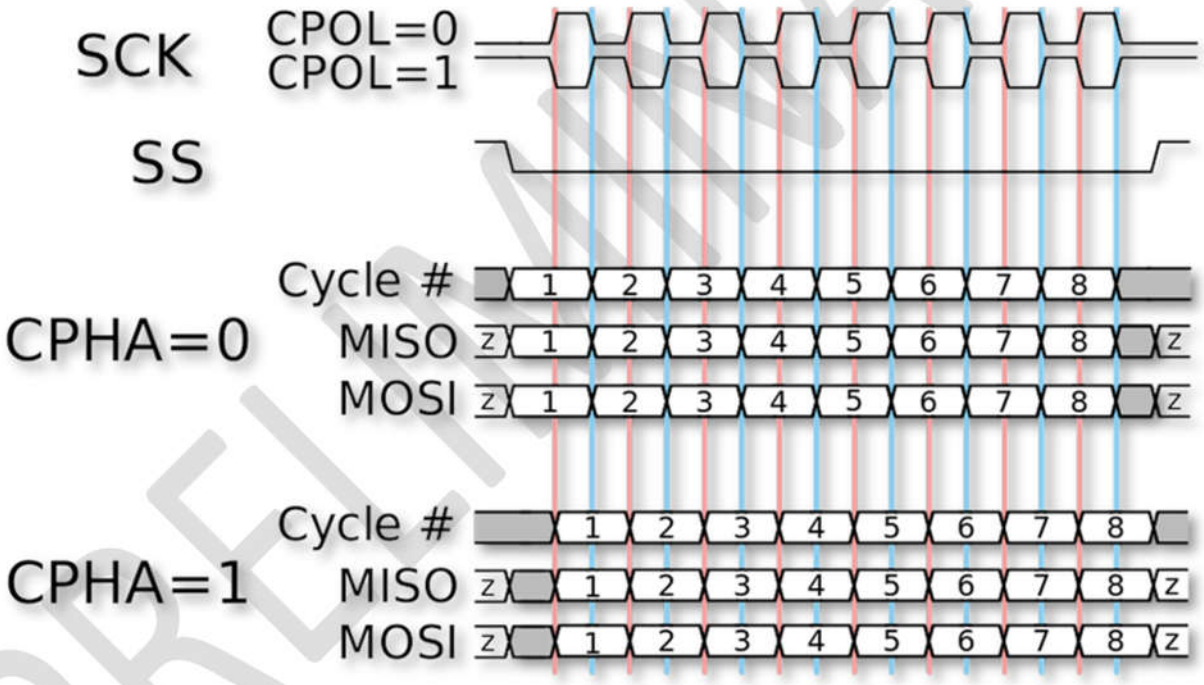
APPLICATIONS

Many of the available functions interface with the microcontroller through an SPI, this uses a maximum frequency of 10MHZ and uses the mode CPOL = 0 and CPHA = 0.

The SW1 switch allows you to have up to a maximum of 8 peripherals on the same bus.

SW1			ADDRESS
1	2	3	
OFF	OFF	OFF	0
ON	OFF	OFF	1
OFF	ON	OFF	2
ON	ON	OFF	3
OFF	OFF	ON	4
ON	OFF	ON	5
OFF	ON	ON	6
ON	ON	ON	7



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OT-1000 DC and Switching Characteristics

Operating Conditions

Stresses beyond those listed in Table 2-1 may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Absolute Maximum Ratings are stress ratings only; functional operation of the device at these or any other conditions beyond those listed under the Recommended Operating Conditions specified in Table 2-2 on page 2-2 is not implied.

***Table 2-1* • Absolute Maximum Ratings**

Symbol	Parameter	Limits	Units
VCC	DC core supply voltage	–0.3 to 1.65	V
VJTAG	JTAG DC voltage	–0.3 to 3.75	V
VPUMP	Programming voltage	–0.3 to 3.75	V
VCCPLL	Analog power supply (PLL)	–0.3 to 1.65	V
VCCI	DC I/O output buffer supply voltage	–0.3 to 3.75	V
VMV	DC I/O input buffer supply voltage	–0.3 to 3.75	V
VI	I/O input voltage	–0.3 V to 3.6	V
TSTG[2]	Storage temperature	–65 to +150	°C
TJ[2]	Junction temperature	+125	°C

Notes:

1. The device should be operated within the limits specified by the datasheet. During transitions, the input signal may undershoot or overshoot according to the limits shown in Table 2-4 on page 2-3.

***Table 2-2* • Recommended Operating Conditions [1,2]**

Symbol	Parameter		Commercial	Industrial	Units
TA	Ambient temperature		0 to +70	-40 to +85	°C
TJ	Junction temperature		0 to 85	-40 to 100	
VCC [2]	1.5 V DC core supply voltage		1.425 to 1.575	1.425 to 1.575	V
VJTAG	JTAG DC voltage		1.4 to 3.6	1.4 to 3.6	V
VPUMP	Programming voltage	Programming Mode	3.0 to 3.6	3.0 to 3.6	V
		Operation [3]	0 to 3.6	0 to 3.6	V
VCCPLL	Analog power supply (PLL)		1.4 to 1.6	1.4 to 1.6	V
VCCI and VMV	1.5 V DC supply voltage		1.425 to 1.575	1.425 to 1.575	V
	1.8 V DC supply voltage		1.7 to 1.9	1.7 to 1.9	V
	2.5 V DC supply voltage		2.3 to 2.7	2.3 to 2.7	V
	3.3 V DC supply voltage		2.7 to 3.6	2.7 to 3.6	V
	3.3 V wide range DC supply voltage [4]		3.0 to 3.6	3.0 to 3.6	V
	LVDS/B-LVDS/M-LVDS differential I/O		2.375 to 2.625	2.375 to 2.625	V
	LVPECL differential I/O		3.0 to 3.6	3.0 to 3.6	V

Notes:

1. All parameters representing voltages are measured with respect to GND unless otherwise specified.

2. The ranges given here are for power supplies only.

3. VPUMP can be left floating during operation (not programming mode).

4. 3.3 V wide range is compliant to the JDEC8b specification and supports 3.0 V VCCI operation.

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Table 2-3 **• Flash Programming Limits – Retention, Storage and Operating Temperature[1]**

Product Grade	Program Retention (biased/unbiased)	Maximum Storage Temperature TSTG (°C) 2	Maximum Operating Junction Temperature TJ (°C) 2
Commercial	20 years	110	100
Industrial	20 years	110	100

Notes:
1. This is a stress rating only; functional operation at any condition other than those indicated is not implied.
2. These limits apply for program/data retention only. Refer to Table 2-2 for device operating conditions and absolute limits.

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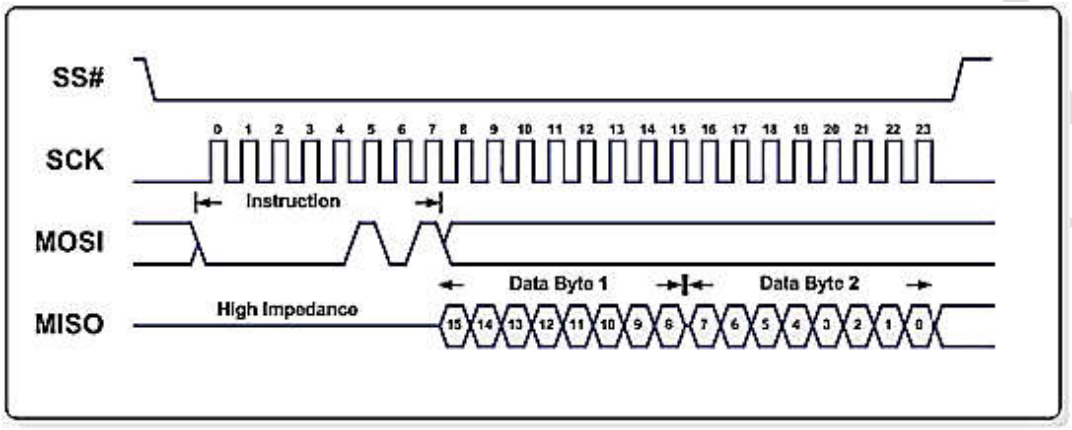
OT-1000-ENC – INCREMENTAL ENCODER INTERFACE

This IP allows you to read up to 4 incremental encoders simultaneously.
The 16-bit counters used allow the use of encoders up to 15000 steps/rev, this will give readings of 60000 counts per revolution in quadrature.
It is also possible to use encoders with zero position with relative signal.

The communication protocol through SPI foresees to transmit a first byte to select the desired unit and the encoder connected to it, then another two bytes are sent to read the contents of the selected counter.



INSTRUCTION COMMAND

D7	D6	D5	D4	D3	D2	D1	D0
A2	**A1**	**A0**	**E1**	**E0**	**CLEAR**	**X**	**X**

A[2:0] Unit selection. Must be the same of SW1
E[1:0] Encoder selection
CLEAR If 1 clear selected encoder counter

For CLEAR operations it is enough to send only one byte.

SIGNALS

SS#	IN -	Chip select active low
MOSI	IN -	Master Output Slave Input
MISO	OUT -	Master Input Slave Output
SCK	IN -	Serial clock
CFG[1:0]	IN -	Sampling frequency
PHA A [4:1]	IN -	Encoder phase A
PHA B [4:1]	IN -	Encoder phase B
PHA C [4:1]	IN -	Encoder zero position. Pull down if not used.

CFG1	CFG0	FREQUENCY
0	0	2MHz
0	1	500KHz
1	0	100KHz
1	1	50KHz

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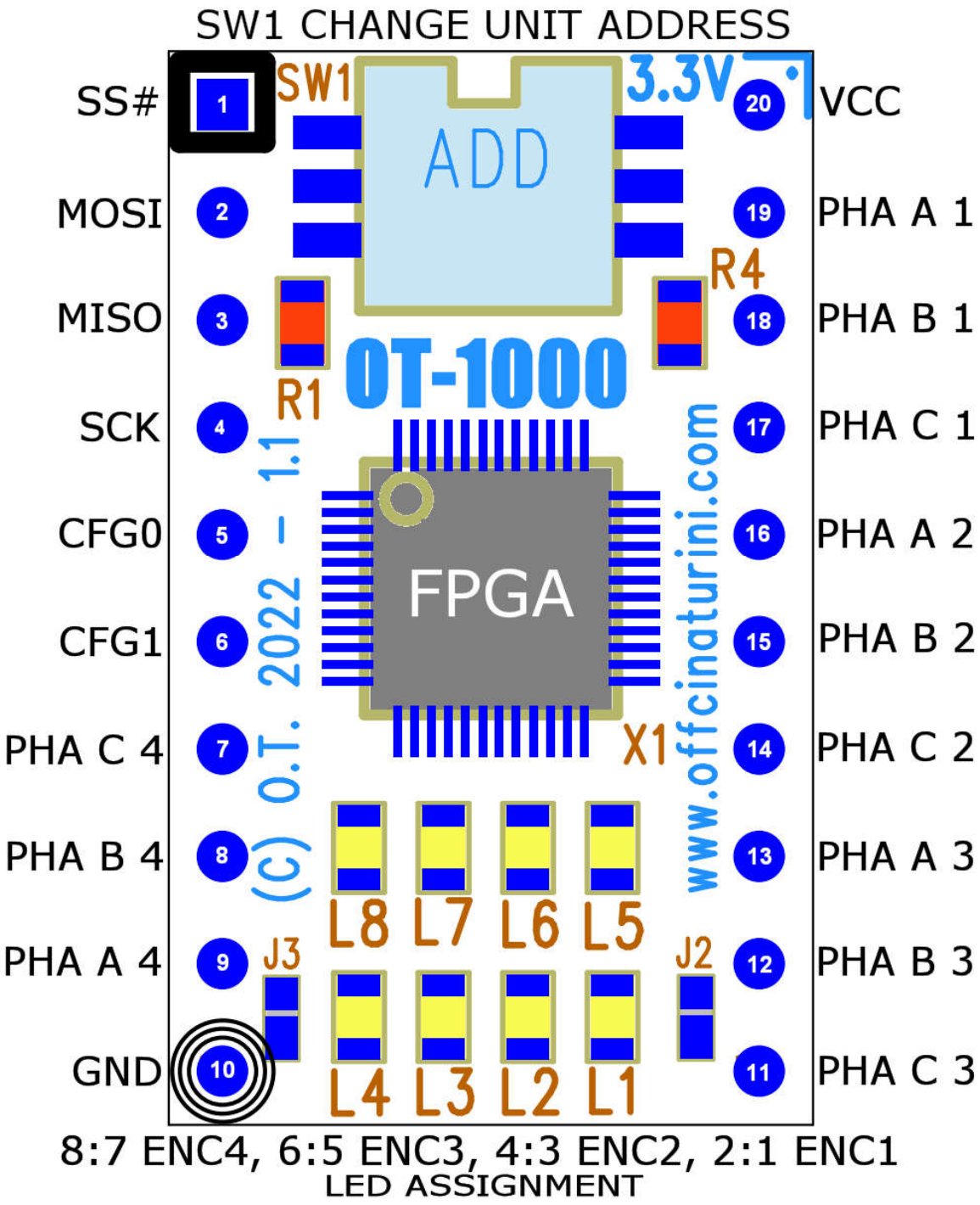
OT-1000-ENC – PIN USAGE



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