



**GEB Enterprise S.r.l.**

General Electronics Business

Via Rocca di Papa, 21 - 00179 Roma, Italy  
Email: [info@geb-enterprise.com](mailto:info@geb-enterprise.com) - Web: [www.geb-enterprise.com](http://www.geb-enterprise.com)

# Preliminary Product Specifications

## IOTMIO-C10-48

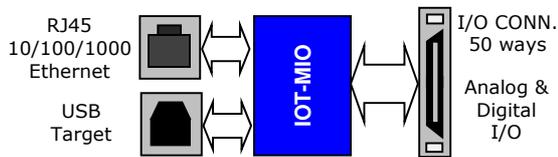
### Internet Of Things, Input Output Module, 48 general purpose I/O

The forty industrial revolution is happening; here you can find that you need to make able your equipments to follow the trend allowing you to pick opportunities are escaping your competitors...

Today an equipment that cannot be connected, managed, configured and updated through the network appear obsolete... appellatives such as IOT or Industry 4.0 ready associated to your equipment will create an image of state of art product. It can make the difference between your products and the others.

The forecast are that the forty industrial revolution is that major part of equipments won't be replaced but will be updated to be connected to the network. The challenge is how you can simply add these the network capability and your equipment without redesign and spend too much time and money.

The IOT-I/OB (Internet of Things Input Output Board) is a building block that has been thought to help you to make your next equipment an IOT Industry 4.0 Ready. The IOT-IO is a bridge between an Ethernet port (or USB port) and your peripherals or sensors or actuators by a parallel I/O connector, it makes available many interfaces port (parallel, I2C, SPI, UART and so on) with multiple interface levels (LVTTTL, RS485, RS422, LVDS). The onboard firmware allows a simple management of the peripherals by simple script also. Fpga programmable logic and MCU firmware add more flexibility.



### Features

- 1x 10/100/1000 Ethernet port
- 1x USB2.0 Port
- 1x 50Pins 2mm I/O pitch connector hosted IOT-I/OB carrier board on (\*1) that makes available
  - Up to **6xRS422/RS485** I/O pairs, with software programmable termination
  - Up to **2xRS232** In and Out pairs.
  - **Up to 4x50 Ohm** Coax Driver
  - Up to 48 LVTTTL digital I/O
    - Some LVDS I/O Pair, with programmable termination, available by customization (14 pairs).
  - Up to 8 Analog (0-2V) inputs, 50 Ksps@14bits
- Power Supply: Wide Range 12VDC Nominal, Min 6V. Max 36V.
- Fully programmable and **customizable** at multiple levels:
  - Configuring the hardware on the FPGA
  - Loading executable firmware on MCU
  - Loading simple command scripts on EEPROM
  - Writing program on the host and sending commands to the standard MCU firmware, by USB or TCP/IP on Ethernet
  - Remote firmware upgrade by USB or Ethernet
- Many pre compiled Fpga I/O System make available
- FLEXIO Basic System (FLEXIO-1) can host up to
  - 2xI2C
  - 2xSPI Master
  - 1xUART, LVTTTL levels
  - 32XGPIO, LVTTTL Digital I/O, programmable IN or OUT bit a bit
  - 8XAnalog input 0..2Volt, 10 bits (use a SPI CS)
  - 2xFIFO
- Device Remote Power On
  - By Solid State Relè contact, Max 48VDC@100ma
- Programmable timer allows scheduled polling of I/O resources
- 100 MHz on Board MCU with 16MBytes Data storage
- Size 100x75x38mm

Note (\*1): The I/O connector is an 3M-1025055H3PC



### Description

The IOT-IO architecture is oriented to the modularity; it is reached both in hardware both in software. The hardware is a classic GEB 2 pieces architecture:

- The IOT-PSOM control board is a Pico-Som Fpga based; it hosts also the Ethernet and USB physical, the SSRAM, the EEPROM and other ancillaries.

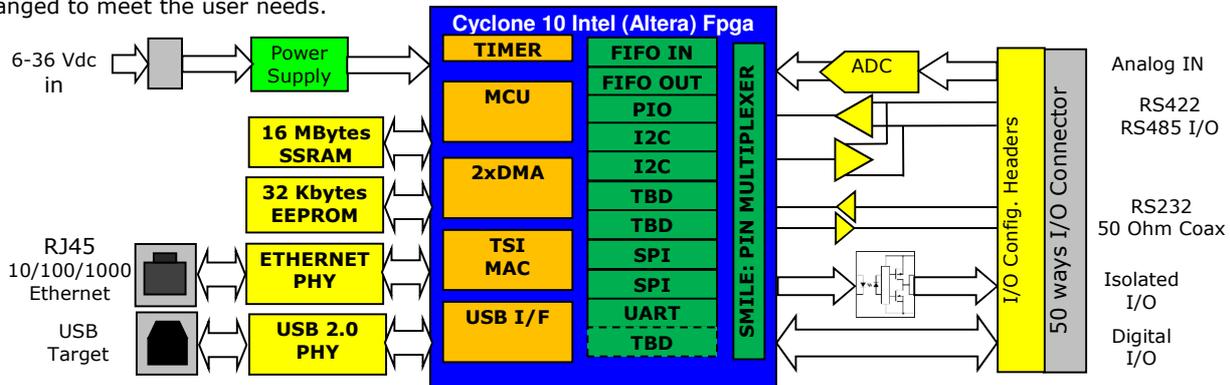
- The IOT-I/OB interface board that hosts the RS422/RS485 transceivers, the ADC, the power supply and the remote power on actuator.

Together to the two hardware actors, there are two others protagonists, the programmable logic loaded inside the fpga and the programmable firmware running on MCU hosted on FPGA.

The fpga programmable logic, also called Fpga-Sys, is composed of two main sections:

- The standard section, that have the Microcontroller (MCU), the Triple speed MAC (TSI MAC), USB interface, DMA channels, Timers, Memory controllers. This section will be invariable in more applications.
- The variable section composed of some IP and a programmable pin multiplexer (SMILE), able to route the IP pins to the appropriate Fpga pins. This section will be different in each Fpga-Sys.

In the following figure the standard parts are in orange, the variable one is in dark green. The names of are referred to the first flexible system called FLEXIO1, some question marks are present to remember that the variable part can be changed to meet the user needs.



The programmable firmware is able to manage command received from Ethernet or USB, the commands can be single operation commands (so-com), such as:

- "WR <RegAdr>, <data>": Write data value to register at RegAdr.
- "RD <RegAdr>, <header>": Read Back Data from register at RegAdr.
- "DF <Symb>, <Value>": Define a symbol.
- "DM <Symb>": Define a Macro name.

Commands can be complex, such as:

- "EE-Format": Format (clear) EEprom.
- "EE-Store: <MacroName> < so-com >.....<MacroName> < so-com >... EE-EndStore": Store Macros and symbols
- "<OnEvent> <MacroName>: On Event, i.e. Timer, run the macro MacroName

## Ordering Information

The Part Name is composed of IOTIO-XX-YYY-SSS where:

- XX are the IOT-PSOM code, currently C1 only is allowed:
  - C1: Cyclone 10 10CL025YU256I7G Fpga, 25KLE
- YYY are the IOT-I/OB code:
  - D01:R6A804-A1, Up to 48TTL, Up to 1xIsolated Relè Contact.
  - D02:R6A804-A2, Up to 48TTL, 6 RS422/RS485 with soft programmable termination, 8 Analogic inputs, 4 Isolated Relè Contact, 2 RS232 pairs, 4 Coax drivers (50 Ohm).
- SSS are the Fpga system code, S01..S03 indicates the standard systems currently available:
  - S01: FLEXIO-S5P3, 2xSPI, 2xI2C, 1xUart, 1x32 Bits PIO, 1x8Bits Fifo In & s Fifo Out, 8xAnalogic In
  - S02: FIFO-32-32, Configurable Fifo 32In, 32Out, 16In+16Out, 24In+8Out, 8Out+24In. 8Bits FIFO controls can be routed on the LVDS pins. 8xAnalogic In.
  - S03: PIO48, 6x8Bits Ports, 4 bits are RS485, the others LVTTTL, No LVDS I/O, 8Analogic In

## Customization

Custom part can be obtained by one or more customized parts: by custom IOB that allows changes on I/O connectors and interfaces levels, by FPGA system, changing the interface protocols or adding hardwired signal processing, by MCU firmware, adding more complex and custom commands. These customization are cheaper than you are thinking, please contact GEB, Astuccioni Debora, [a.debora@geb-enterprise.com](mailto:a.debora@geb-enterprise.com) for more informations

GEB Code	Part Name	Description
180418A1	IOTMIO-C1-D01-S01	Cyclone10 25KLE fpga, 12VDC, FLEXIO-S5P3 Fpga system, R6A804-A1 Interface
180418A2	IOTMIO-C1-D02-S01	Cyclone10 25KLE fpga, 12VDC, FLEXIO-S5P3 Fpga system, R6A804-A2 Interface



**GEB Enterprise S.r.l.**  
**General Electronics Business**  
 Via Rocca di Papa, 21 - 00179 Roma, Italy  
 Phone: 06 7827464  
 Email: [info@geb-enterprise.com](mailto:info@geb-enterprise.com)  
 Web: [www.geb-enterprise.com](http://www.geb-enterprise.com)

GEB Enterprise s.r.l. reserves the right to make changes in design or specification at any time without notice.  
 Document Rev. 0.7, Printed 01-09-2018 ©2008 GEB-Enterprise S.r.l.

All brand names or product names mentioned are trademarks or registered trademarks of their respective owners