Universal EXTension connector (UEXT)

What is UEXT?

Back in 2000 we started to design different development boards, there were many features which we wanted to implement to all boards like wireless communication, relay output, opto-isolated inputs, audio, RS485 etc, but we realized that not all customers will need all these features at once, so why to put all this on every board and customer pay for all features but use only few? For instance one will need Zigbee, other will need Bluetooth, we asked ourself how to make our boards so everyone is happy but to not make the boards unnecessary expensive?
Then we start thinking for some kind of universal connector where we know which pin where is connected and we can develop different modules which to connect to this connector and to be available to every board.

Every decent microcontroller has **RS232**, **SPI** and **I2C**, these are basic peripherals and they give quite the freedom to connect to a number of modules.

This is how UEXT (Universal-Extension-Connector) was born. We started including this connector in every board designed after 2004.

To summarize: UEXT is a board to board connector which supports three serial communication interfaces I^{2}C, SPI and RS232. It is a great way to add features to the development boards so customer can choose which feature he want to use.

Physical characteristics:

For the physical connector of UEXT interface we choose dual row [BH10S](BH10S) male connector, 10 pins (two rows x 5) with row spacing 0.100" (2.54 mm). These are very common and cheap so can be sourced from many different sources.

As UEXT have RS232 and the Rx and Tx signals should be crossed we can say that UEXT on the board is with HOST ; UEXT on the module is with SLAVE/DEVICE layout.

With UEXT on board you can connect any of our modules (boards with MOD-prefix) which are listed below for additional functionality.

UEXT host is 10-pin MALE connector, the modules may be 10-pin female connector if plug directly to the host UEXT or can be made also with male 10-pin connector if they are to be connected with 10-pin ribbon IDC10 cable

Electrical characteristics:

The UEXT connector gives user an opportunity to connect different modules to the host via I^{2}C, SPI and RS232 interfaces with CMOS levels. The interface you will use depends on the module supported interface.

If you don't use the special function of some pins then they are used as GPIO's.

Note that some of UEXT interfaces may be shared with other peripheral of the host. For example host's UEXT SPI interface can be shared at other chip select with on board LCD, SD/MMC card etc.

Connector pins description:

Pin #	Signal Name
1	3.3V
2	GND
3	TXD
4	RXD
5	SCL
6	SDA
7	MISO
8	MOSI
9	SCK
10	SSEL
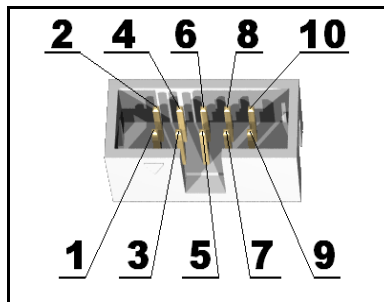
- If you use RS232 interface of host's UEXT, then RXD is an input and TXD is an output.
- If you use SPI interface of host's UEXT, then the host is a master and the module is slave, i.e. MISO is an input and MOSI is an output.
- The I^{2}C signals (SDA and SCL) of host's UEXT are pulled-up with resistors

Note! The correct way to connect HOST boards with SLAVE/DEVICE/MOD boards is to first power down the HOST, connect the boards with the ribbon cable and THEN power up the HOST again. Else you will get the host probably restarting due to the initial power required from some SLAVE/DEVICE/MOD boards to power up.

OLIMEX Modules with UEXT:

Now we have lot of modules developed and many new are to come.

Wireless:

MOD-NRF24L	- this is 2.4Ghz module with nordic nRF24L01
MOD-BT	- bluetooth module with NXP BGB203
MOD-BLECC2540	- bluetooth low energy module with CC2540
MOD-nRF8001	- bluetooth low energy module with nrf8001
MOD-MRF24J40	- Microchip's IEEE 802.15.4™ Standard compliant 2.4 GHz RF module with SPI interface allow boards to connect to Zigbee networks
MOD-WIFI	– board with ZG2100M Wi-Fi module with SPI interface, allow boards to connect to WiFi internet
MOD-ZIGBEE-UEXT	- Microchip's MRF24J60 RF module + Zigbee stack implemented on PIC
MOD-ZIGBEE-PIR	- Microchip's MRF24J60 RF module + Zigbee stack implemented on PIC + PIR detection
MOD-GSM	- Quad band GSM module with SIM340DZ
MOD-GSM-EDGE	- Quad band GSM module with SIM700 and 236Kbps
MOD-CCRF	- 868/915 RF transciever with CC430F5137
MOD-CCRFLCD	- 868/915 RF transciever with CC430F5137 with temperature sensor and LCD
MOD-HRF2.4	- low cost RFM70 2.4GHz RF module

Ethernet:

MOD-ENC28J60	- Ethernet with ENC28J60 10 Mbit
MOD-ENC624J600	- Ethernet with ENC624J600 100 Mbit

RFID:

MOD-RFID125-BOX	- 125 kHz RFID reader
MOD-RFID1356-BOX	- 13.56 Mhz RFID reader

LCD:

MOD-NOKIA6610	- Nokia 6610 LCD
MOD-NOKIA3310	- Nokia 3310 LCD
MOD-LCD1x9	- 9 alphanumeric character LCD
MOD-LCD4.3"	- 4.3"LCD with LPC2478

IO:

MOD-IO	- addressable and stackable 4 relays, 4 optoisolated inputs module
MOD-IO2	- 2 relays and 7 GPIOs
MOD-AD	- 24 bit ADC and DAC module

MOD-USB-RS232	- USB to UEXT convertor can act as host and slave and a allows any of our modules or board with UEXT to be connected to PC via USB
MOD-RS485	- RS485 converter
MOD-RS485-ISO	- galvanic isolated RS485 converter
MOD-SD-MMC	- allows modules which can be placed on MMC card to be interfaced
MOD-IRDA	- reads IR and sends IR commands (demo with MOD-USB-RS232 takes IR remote TV controller and act as HID keyboard)
MOD-HDPMT	- measures pressure and magnetic compass
MOD-HRH	- measures RH

Navigation:

MOD-GPS	- SirfstarIII low power GPS module
MOD-SMB380	- digital 3-axes accelerometer
MOD-MAG	- digital 3-axes magnetometer
MOD-WII	- wii nunchunk controller for ICSP or UEXT port

Bio-feedback:

MOD-EKG	- EKG heartbeat sensor module
MOD-PULS	- pulseoximeter and heart-rate monitor

Audio:

MOD-MP3-X	- VS1053 MP3 player controllable through RS232 commands easy embedded voice/music to your project

Power:

MOD-PWRMTR	- Google power metering add-on board
MOD-PWRLN	- power line network modem

Time:

MOD-RTC	- Real-time clock

Temperature:

MOD-TC	- Simple thermocouple

FAQ:

Q: Can I implement UEXT on my own board?
A: Absolutely, we encourage anyone to implement UEXT to their products, but to follow the host/slave and electrical layouts.

Q: Is UEXT for only 3.3V modules?
A: yes, UEXT is designed for 3.3V and most of our modules will be destroyed if more than 3.3V is applied

Q: Is there power supply restriction for the 3.3V host?
A: we never defined power consumption, but we have many different boards with capability to supply from 100 to 500mA, so the host power supply capabilities depend on the board implementation. If you want to develop your UEXT modules do not make them more than 100mA power hungry as they may not work with all of our boards

Q: Should I pay royalities or taxes to Olimex if I use or develop UEXT modules?
A: No, this is open project and there are no taxes nor royalities to use UEXT