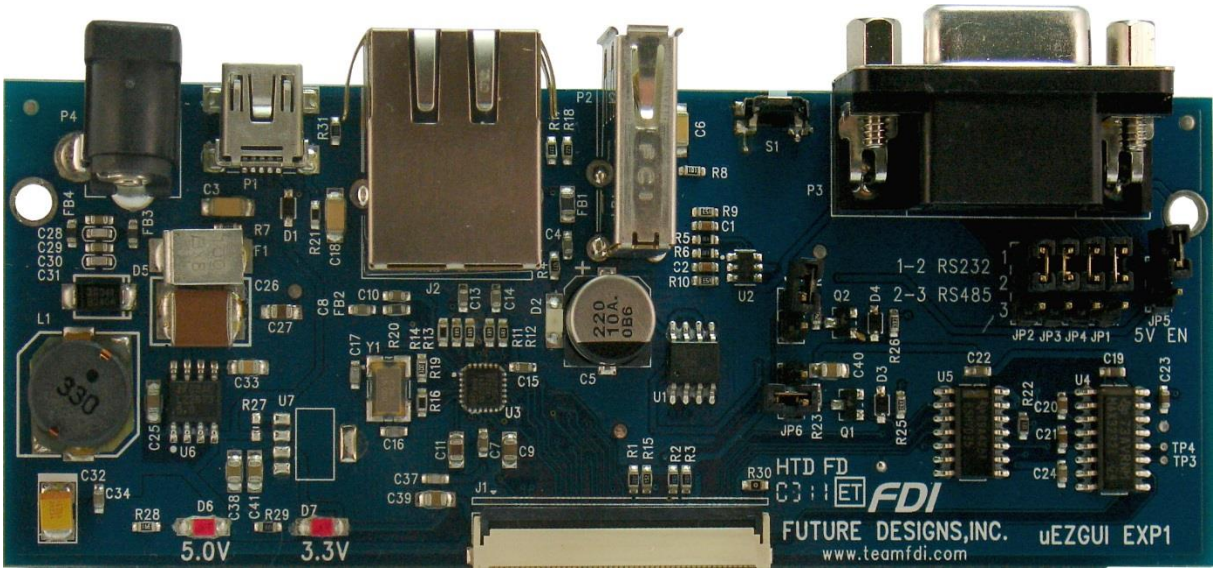
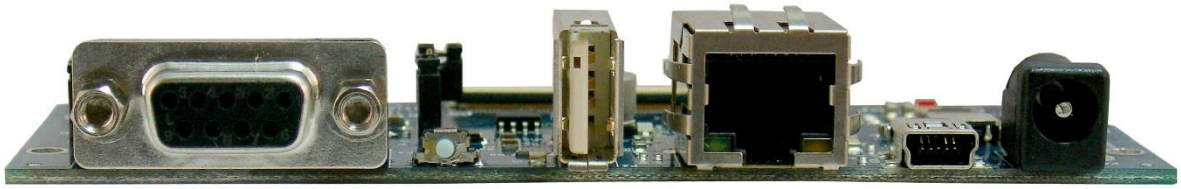
µEZGUI User's Manual

Covers the following products:

uEZGUI-EXP1





FDI Future Designs, Inc.
Your Development Partner
996 A Cleaner Way, Huntsville, AL 35805

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NOTE: The inclusion of vendor software products in this kit does not imply an endorsement of the product by Future Designs, Inc.

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Introduction

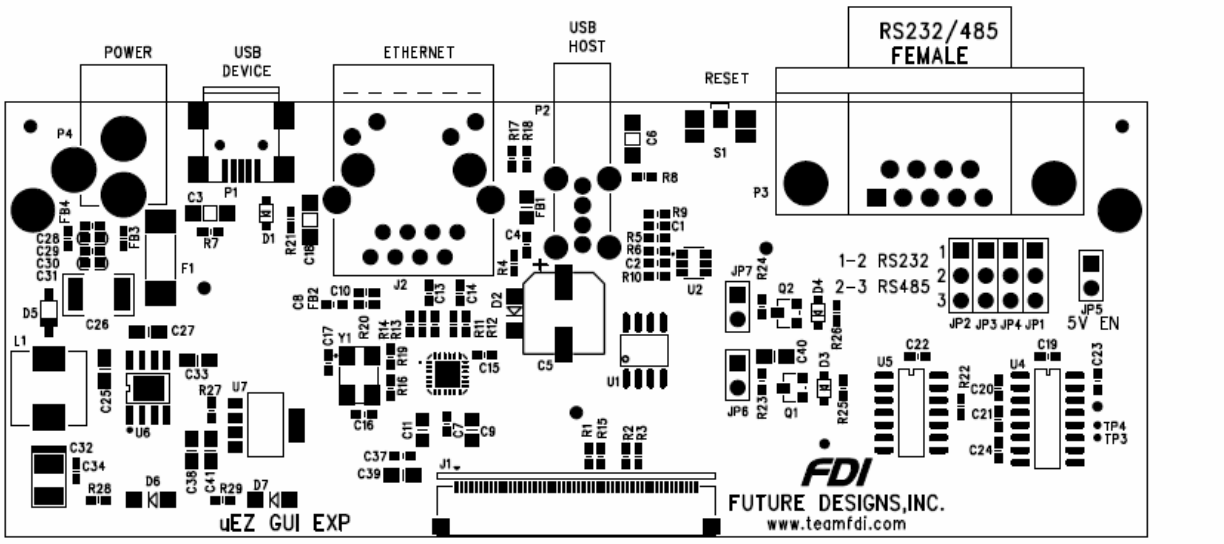
The uEZGUI-EXP1 is a quick and easy solution for adding additional hardware to the uEZGUI family of products. The uEZGUI-EXP1 offers the hardware necessary for USB Host and Device, Ethernet, RS232, and RS485.

Functional Description

- RS232/RS485 Serial communication
- USB Host and Device
- 10/100 Ethernet

Expansion Board Capabilities

The uEZGUI Expansion Board enhances the capabilities of the standard uEZGUI board to include additional IO capabilities. The Expansion Board is connected to the uEZGUI main board via a 50pin FPC cable.



Orderable part numbers

The uEZGUI-EXP1 is available by itself, or as part of the uEZGUI-43-H01 production module.

Please see FDI's website for the latest purchasing and distributor information.

Expansion Connector

FDI's uEZGUIs include a 50 pin FPC Expansion Connector that provides a wide variety of capabilities for user expansion, ranging from 10/100 Ethernet to USB Host, etc. The part number used for the FPC connector is **OMRON XF2M-5015-1A**. The table below provides the pin out and signal used on the uEZGUI-EXP1: (see the corresponding uEZGUI schematics for the up-to-date listings of all pin capabilities)

Pin #	Pin Name	Pin Description	Input/output
1 – 2	**3p3 volts (3V3)**	3.3 Volts DC Input to EXP1 from uEZGUI	Power
3 – 5	**5volts (5V0)**	5.0 Volts DC Output to uEZGUI	Power
6	**USBD_VBUS**	**VBUS** – Monitors the presence of USB bus power. **Note:** Must be HIGH for USB reset to occur. (USB Device port on uEZGUI-EXP1)	Input
7	**USBD_DM**	**USB_D-2** – USB port 2 bidirectional D –line (USB Device port on uEZGUI-EXP1)	Input / Output
8	**USBD_DP**	**USB_D+2** – USB port 2 bidirectional D+ line (USB Device port on uEZGUI-EXP1)	Input / Output
9	**P0.2_TXD0**	**TXD0** – Transmitter output for UART0. (for RS232)	Output
10	**P0.3_RXD0**	**RXD0** – Receiver input for UART0. (for RS232)	Input
11	**ISP_ENTRY**	**I/O** – P2[10] – General purpose digital input/output pin. **Note:** LOW on this pin on NXP LPCXXXX while RESET is LOW forces on-chip boot loader to take over control of the part after a reset.	Input / Output
12	**GND**	**Ground**	Power
13	**P1.0_ENET_TXD0**	**ENET_TXD0** – Ethernet transmit data 0 (RMII/MII interface)	Output
14	**P1.1_ENET_TXD1**	**ENET_TXD1** – Ethernet transmit data 1 (RMII/MII interface)	Output
15	**P1.4_ENET_TXEN**	**ENET_TX_EN** – Ethernet transmit data enable (RMII/MII interface)	Output
16	**P1.8_ENET_CRSDV**	**ENET_CRS_DV/ENET_CRS** – Ethernet Carrier Sense/Data Valid (RMII interface)/ Ethernet Carrier Sense (MII interface)	Input
17	**P1.9_ENET_RXD0**	**ENET_RXD0** – Ethernet receive data 0 (RMII/MII interface)	Input
18	**P1.10_ENET_RXD1**	**ENET_RXD1** – Ethernet receive data 1 (RMII/MII interface)	Input
19	**3p3 volts (3V3)**	3.3 Volts DC Input to EXP1 from uEZGUI	Power
20	**P1.14_ENET_RX_ER**	**ENET_RX_ER** – Ethernet receive error (RMII/MII interface)	Input
21	**P1.15_ENET_REFCLK**	**ENET_REF_CLK/ENET_RX_CLK** – Ethernet Reference Clock (RMII interface)/ Ethernet Receive Clock (MII interface)	Input
22	**GND**	**Ground**	Power
23	**P1.16_ENET_MDC**	**ENET_MDC** – Ethernet MIIM clock	Output
24	**P1.17_ENET_MDIO**	**ENET_MDIO** – Ethernet MIIM data input and Output	Input / Output
25	**Unused**		
26	**Unused**		
27	**RESET_OUT**	**RSTOUT** – This is a 3.3 V pin. LOW on this pin indicates LPC1788 being in Reset state	Output
28	**RESET_IN**	External reset input**:** A LOW on this pin resets the device, causing I/O ports and peripherals to take on their default states, and processor execution to begin at address 0. TTL with hysteresis	Input
29	**GND**	**Ground**	Power
30	**Unused**		
31	**Unused**		
32	**Unused**		
33	**Unused**		
34	**Unused**		
35	**Unused**		
36	**USB1H_PPWR**	**USB_PPWR1** – Port Power enable signal for USB port 1. (USB Host port on uEZGUI-EXP1)	Output
37	**USB1H_OVC**	**USB_OVC** – Overcurrent detection (USB Host port on uEZGUI-EXP1)	Input
38	**USB1H_PWRD**	**USB_PWRD** – 5V power detection (USB Host port on uEZGUI-EXP1)	Input
39	**USB1_DP**	**USB_D+1** – USB port 1 bidirectional D+ line. (USB Host port on uEZGUI-EXP1)	Input / Output
40	**USB1_DM**	**USB_D-1** – USB port 1 bidirectional D--line. (USB Host port on uEZGUI-EXP1)	Input / Output
41	**GND**	**Ground**	Power
42	**P0.15_TXD1**	**TXD1** – Transmitter output for UART1. (for RS485)	Output
43	**P0.16_RXD1**	**RXD1** – Receiver input for UART1. (for RS485)	Input
44	**P0.17_CTS1**	**CTS1** – Clear to Send input for UART1. (for RS485)	Input
45	**P0.22_RTS1**	**RTS1** – Request to Send output for UART1. (for RS485)	Output
46	**Unused**		
47	**Unused**		
48	**Unused**		
49	**Unused**		
50	**GND**	**Ground**	Power

Expansion Connector Cable Details

The maximum length for the expansion connector cables is as follows:
General Purpose IO, TTL, Serial, etc = 6” recommended maximum, 8” absolute maximum
Ethernet, high-speed IO, etc = 3” recommended maximum, 4” absolute maximum

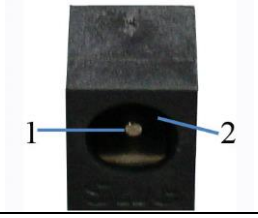
The following table provides example part numbers for the expansion cables:

Description	Mfg	Mfg PN	Digi-Key Pn
3” 50-pin 0.5mm	Molex	21020-7650	WM10231-ND
6” 50-pin 0.5mm	Molex	21020-0548	WM10223-ND

Note: These lengths are only recommendations. The actual lengths utilized will be dependent on the expansion board circuitry, layouts and general environment of the application. It is up to the customer to test and validate the functional operation and use of the expansion connectors.

DC Power Input – P4

The uEZGUI-EXP1 supports a 7VDC-24VDC 1A (min) Power Supply. The connector is 2.1mm with center positive.



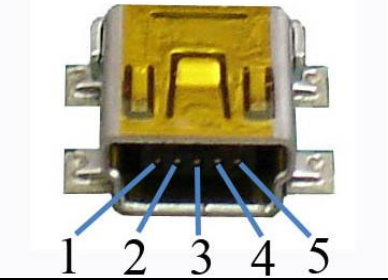
Pin Number	Description
1	**7VDC to 24VDC, +/- 10%, 1.0A (min)**
2	**Power Supply Ground**

USB Device – P1

The UEZGUI-EXP1 Board includes one USB Device Interface allowing the unit to be connected to a USB Host, such as a PC. Through this connection, the uEZGUI represents a peripheral to the USB Host. The operational mode of the port is dependent on the software utilized (i.e. Mass Storage or Human-Interface).

Note: The USB Device connector of the Expansion Board is connected in parallel to the USB Device connector of the uEZGUI Main board. **To avoid damage or improper operation, do not connect both of these at the same time**.

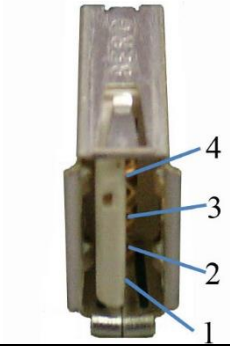
The UEZGUI-EXP1 Board may also be powered via the USB Device connector. Care must be taken to not overload the USB Host since 500mA is the maximum current allowable via USB.



Pin Number	Description
1	**USB 5V**
2	**D-**
3	**D+**
4	**NC**
5	**Signal Ground**

USB Host – P2

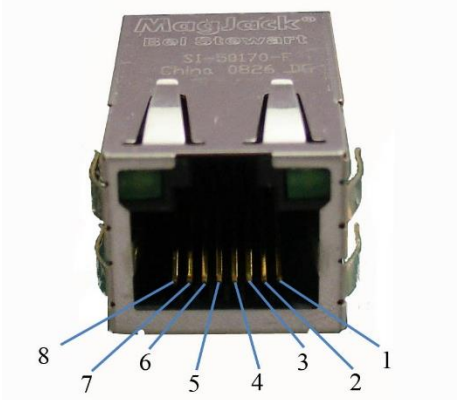
The uEZGUI-EXP1 Board includes one USB Host Port allowing the unit to interface to various USB peripherals such as a USB Flash Drive (Thumb Drive). The operational mode of this port is dependent on the software utilized (i.e. driver support)



Pin Number	Description
1	USB VBus
2	D-
3	D+
4	Signal Ground

Ethernet – J2

The UEZGUI-EXP1 Board includes one 10/100 Ethernet Port to interface to a local area network via CAT5 cable. Please refer to the specific details of the LPC1788 processor being utilized for support of the Ethernet Port function.



Pin Number	Description
1	Tx+
2	Tx-
3	Rx+
4	75 ohm terminated
5	75 ohm terminated
6	Rx-
7	75 ohm terminated
8	75 ohm terminated

Supported uEZGUIs

The uEZGUI-EXP1 is currently supported on the following uEZGUIs:

- uEZGUI-1788-43WQR
- uEZGUI-4088-43WQN
- uEZGUI-1788-70WVT
- uEZGUI-1788-70WVM
- uEZGUI-1788-56VI
- uEZGUI-RX62N-35QT

Serial Port – P3

The uEZGUI-EXP1 Board includes one female DB9 Serial Port Connector. This connector may operate in either RS232 or RS485 (Full-duplex) interface levels depending on jumper settings of JP1 through JP4.

Jumpers JP1 – JP4 select the operating mode of the serial port;

Jumper 1-2 for RS232 levels, using UART0

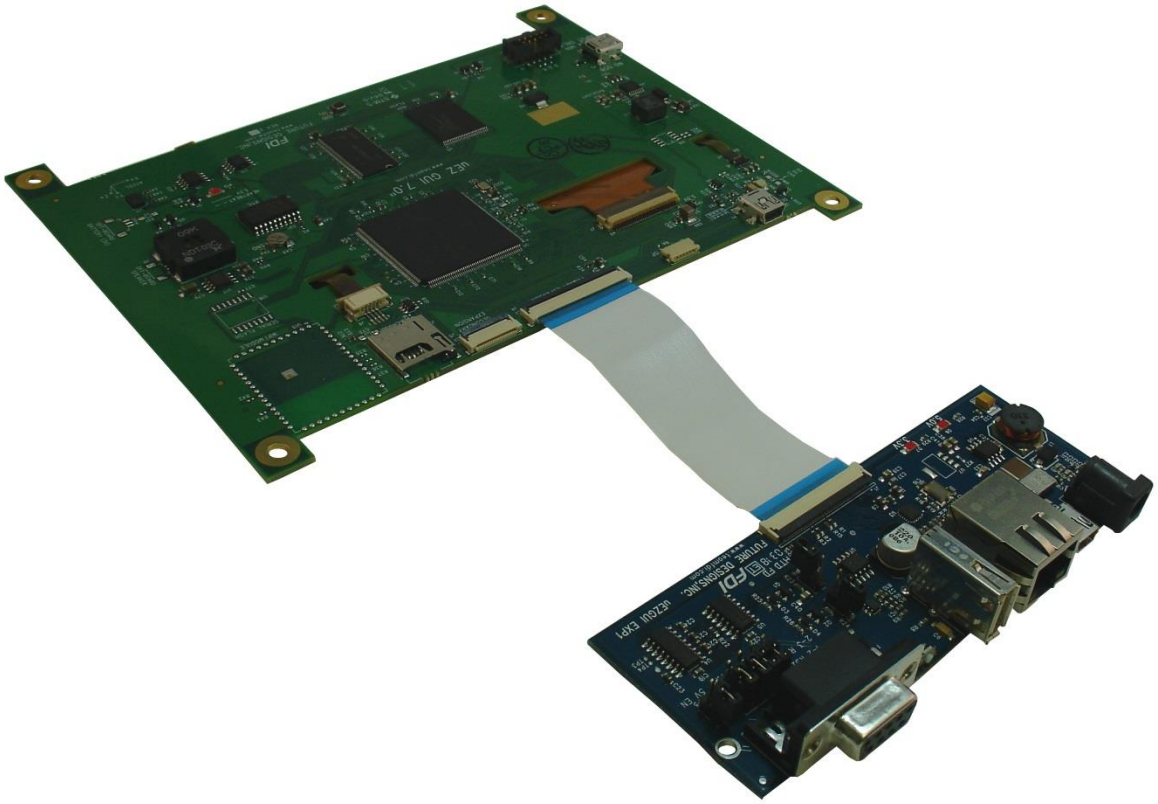
Jumper 2-3 for RS485 levels, using UART1

When operating as RS232, the serial port may also be optionally configured to support ISP programming of the LPC1788 using FlashMagic Software. To enable ISP programming, jumper JP6 & JP7 must be loaded. Note that with these jumpers loaded, operation of the LPC1788 may be affected by the RS232 interface signals. Refer to the FlashMagic user manual for details.

Pin Number	RS485 Mode	RS232 Mode
1	No Connect	No Connect
2	485_RDB-	TXD (Output)
3	485_TDA+	RXD (Input)
4	Signal Ground	No Connect
5	Signal Ground	Signal Ground
6	Signal Ground	Signal Ground
7	485_RDA+	(OPT) RTS
8	485_TDB-	(OPT) CTS
9	(OPT 5V)	No Connect

Example Connections to the uEZGUI Boards

uEZGUI-1788-43WQR example connection with uEZGUI-EXP1



uEZGUI-1788-70WVT example connection with uEZGUI-EXP1

uEZGUI-43-H01 production module: uEZGUI-1788-43WQR with uEZGUI-EXP1 mounted in OEM Housing