

Introduction

The ES-U-xxxx-x family of converters provide a quick and simple way to add serial communication ports to your computer. They connect to a single USB port on your computer to instantly provide up to 32 serial ports. They take advantage of the plug-and-play and hot-plug features of the USB bus to make it easier than ever to add communication ports to your system.

Installation is easy. There are no IRQ & COM port conflicts as the port doesn't require any additional IRQ, DMA or memory resources on the system. Each RS-232 or RS-422/RS-485 port functions as a native Windows COM port, and is compatible with Windows serial communication applications.

The ES-U-xxxx-x converters provide instant connectivity to RS-232 or RS-422/RS-485 compatible devices, including factory automation equipment, multi-drop data collection devices, barcode readers, time clocks, scales, data entry terminals and a variety of other devices in industrial environments.

This user guide covers the following models:

USB to RS-232 converters

- Single channel (ES-U-1001, ES-U-1001-A, ES-U-1001-M, ES-U-1101-M)
- Dual channel (ES-U-1002, ES-U-1002-A, ES-U-1002-M)
- Quad channel (ES-U-1004)
- 8-channel (ES-U-1008)
- 16-channel (ES-U-1016-RM)
- 32-channel (ES-U-1032-RM)

USB to RS-422/485 converters

- Single channel (ES-U-2001, ES-U-2001B, ES-U-2101, ES-U-2101B, ES-U-2101-M)
- Dual channel (ES-U-2002, ES-U-2002-M, ES-U-2102, ES-U-2102-M)
- Quad channel (ES-U-2004, ES-U-2104-M)
- 8-channel (ES-U-2008-M)
- 16-channel (ES-U-2016-RM)

USB to RS-232/422/485 converters

- Single channel (ES-U-3001-M)
- 8-channel (ES-U-3008-RM)
- 16-channel (ES-U-3016-RM)

Specifications

Standard Features

- Internal Transmit and Receive buffers
- Requires no IRQ, DMA, I/O port
- DB-9 male serial connectors *
- LEDs for each port indicate TxD and RxD
- Virtual COM port drivers available for Windows 7, Windows Server 2008, Windows Vista, Windows XP, Windows 2000, Windows Server 2003, Mac, Linux and WinCE (4.2 – 6.0)
- Operating temperature range of 0 – 55°C

USB to RS-232 Features (available on ES-U-1xxx and ES-U-30xx)

- Adds RS-232 ports via USB connection
- Data rates up to 921.6Kbps depending on model
- RS-232 data signals : DCD, RxD, TxD, DTR, GND, DSR, RTS, CTS, RI

USB to RS-422/RS-485 Features (available on ES-U-20xx and ES-U-30xx)

- Adds RS-422 / RS-485 ports via USB connection
- Data rates up to 1Mbps depending on model
- Auto transmit buffer control for 2-wire RS-485 half-duplex operation
- Internal termination and bias resistors on some models (enabled by jumper)
- RS-422 data signals : TX-, TX+, RX+, RX-, GND, RTS-, RTS+, CTS+, CTS-
- RS-485 signals (half duplex) : Data+, Data-, GND
- RS-485 signals (full-duplex) : TX-, TX+, RX-, RX+, GND

Additional Opto-isolation Features (available on ES-U-11xx and ES-U-21xx)

- Each RS-232 or RS-422/RS-485 port is individually isolated with 2000 volt DC optical isolation
- Each RS-232 or RS-422/RS-485 port is individually protected by a surge protector to withstand electrostatic discharge and power surges up to 25KV ESD

Interfaces supported

The USB-serial converters in the ES-U-xxxx-x family support the following interfaces:

ES-U-10xx-x	USB – RS-232
ES-U-11xx-x	USB – RS-232 (with opto-isolation)
ES-U-20xx-x	USB – RS-422 or RS-485 **
ES-U-21xx-x	USB – RS-422 or RS-485 (with opto-isolation) **
ES-U-30xx-x	USB – RS-232 or RS-422 or RS-485 **

* ES-U-1032-RM has RJ45 ports which can be converted to DB-9 male if required using the supplied cables

** Support multiple serial protocols - Jumpers or DIP switches are used to select the required serial protocol

Features by Model

The table below summarises the features for each model in the ES-U-xxxx-x family.

Model Number		Serial Interfaces				Case		Power Supply	Opto Isolated	Additional features and Notes
Current EasySYNC Model number	Original EasySYNC Model number	Ports	RS232	RS422	RS485	Metal	Rack			
ES-U-1001	USB-COM	1	Y	-	-	-	-	USB	-	
ES-U-1001-A	USB-COM-PL	1	Y	-	-	-	-	USB	-	
ES-U-1001-M	USB-COM-M	1	Y	-	-	Y	-	USB	-	
ES-U-1101-M	USB-COM-SI-M	1	Y	-	-	Y	-	USB	Y	
ES-U-1002	USB-2COM	2	Y	-	-	-	-	USB		
ES-U-1002-A	USB-2COM-PL	2	Y	-	-	-	-	USB	-	
ES-U-1002-M	USB-2COM-M	2	Y	-	-	Y	-	USB	-	5V 150mA output on 2-way screw terminal
ES-U-1004	USB-4COM	4	Y	-	-	-	-	Ext	-	5VDC (2A) power adapter (barrel plug) *
ES-U-1008	USB-8COM	8	Y	-	-	-	-	Ext	-	5VDC (2A) power adapter (barrel plug) *
ES-U-1016-RM	USB-16COM-RM	16	Y	-	-	Y	Y	Int	-	
ES-U-1032-RM	USB-32COM-RM	32	Y	-	-	Y	Y	Int	-	RJ45 serial connectors
ES-U-2001	USB-COMi	1	-	Y	Y	-	-	USB	-	
ES-U-2001B		1	-	Y	Y	-	-	USB	-	Revision B of ES-U-2001
ES-U-2101	USB-COMi-SI	1	-	Y	Y	-	-	USB	Y	ES-U-2001 with isolation
ES-U-2101B		1	-	Y	Y	-	-	USB	Y	Revision B of ES-U-2101
ES-U-2101-M	USB-COMi-SI-M	1	-	Y	Y	Y	-	USB	Y	6-way screw terminal
ES-U-2102	USB-2COMi-SI	2	-	Y	Y	-	-	Ext	Y	6VDC (2.1A) power adapter (barrel plug) *
ES-U-2002	USB-2COMi	2	-	Y	Y	-	-	Ext	-	5VDC (2A) power adapter (barrel plug) *
ES-U-2004	USB-4COMi	4	-	Y	Y	-	-	Ext	-	5VDC (2A) power adapter (barrel plug) *
ES-U-2002-M	USB-2COMi-M	2	-	Y	Y	Y	-	USB	-	5-way screw terminals
ES-U-2102-M	USB-2COMi-SI-M	2	-	Y	Y	Y	-	USB	Y	ES-U-2002-M with isolation
ES-U-2104-M	USB-4COMi-SI-M	4	-	Y	Y	Y	-	Ext	Y	5VDC (2A) power adapter (barrel plug) *
ES-U-2008-M	USB-8COMi-M	8	-	Y	Y	Y	-	Ext	-	12VDC (1.5A) power adapter (3-pin terminal) *
ES-U-2016-RM	USB-16COMi-M	16	-	Y	Y	Y	Y	Int	-	
ES-U-3001-M	USB-COMi-M	1	Y	Y	Y	Y	-	USB	-	6-way screw terminal, 5V output
ES-U-3008-RM	USB-8COMi-RM	8	Y	Y	Y	Y	Y	Int	-	
ES-U-3016-RM	USB-16COMi-RM	16	Y	Y	Y	Y	Y	Int	-	

Table 1 Features of the ES-U-xxxx-x converters

Power supply types are USB (USB powered), Ext (external power adapter) or Int (internal power supply)

* Power adapter voltages and currents shown in the comments column are for indication only and are subject to change. To avoid damage, always use the adapter which was provided with your converter to ensure that you are supplying the correct voltage for operation.

ES-U-2x01B Adapters (Plastic enclosure)

This section applies to the following adapters:

- ES-U-2001B (see note below)
- **ES-U-2101B** (see note below)

Note: This section applies only to revision B units which have part number ES-U-2001B and ES-U-2101B. For the ES-U-2001 and ES-U-2101, please refer to Section 5.2 above.

This section does not apply to ES-U-2xxx-M (metal case) adapters. Please see sections 5.4 and 5.5 for these products.

ES-U-2x01B Differences

ES-U-2x01B units look similar to the ES-U-2x01 externally but have the following additional features:

- 3-way DIP switch to select the mode and a 7 x 3 header block with jumpers to select the termination and biasing. (ES-U-2x01 has a single 10 x 2 header to select mode and termination). The switches and header block are located inside the plastic enclosure.
- Internal biasing resistors which can be enabled using jumpers (ES-U-2x01 does not have these resistors)
- Tx and Rx LEDs are located near to the USB connector and are yellow and green (ES-U-2x01 has red and green LEDs located in the centre of the enclosure)



See the General Notes and Warnings on page 14 before changing settings or opening the cover. The jumpers should be set to select the correct serial mode before connecting the converter to your RS-422/RS-485 serial bus.

DIP Switch Settings

On the inside of the unit, there are three DIP switches, which are used to select the required serial mode (RS-422 or RS-485).

	Operation Mode	S1	S2	S3
RS-422	4 Wire with handshaking	ON	ON	ON
RS-485	Full Duplex (4 wire)	OFF	ON	ON
	Half Duplex (2 wire) with Echo	OFF	OFF	ON
	Half Duplex (2 wire) without Echo	OFF	OFF	OFF

Table 4 RS-422 & RS-485 Mode Configuration

Jumper Settings

Inside the unit, there is a 7x3 (21 pin) header block. Jumpers are used to select features such as 120 Ohm termination on Tx, Rx and CTS, and 750 Ohm biasing resistors on Tx and Rx. You will need to open up the cover and set the jumpers as per the requirements of your application.

Jumper	Function
1 - 2	Enable Tx+/- Termination with 120 Ohm. This jumper should be populated for RS-485 half-Duplex mode
2 - 3	Disable Tx+/- Termination
4 - 5	Pull-up Tx+ to VCC by 750 Ohm Bias resistor. This jumper should be populated to enable pull-up of Tx+
5 - 6	Disable Pull-up of Tx+ to VCC
7 - 8	Pull-down Tx- to GND by 750 Ohm Bias resistor This jumper should be populated to enable pull-down of Tx-
8 - 9	Disable Pull-down of Tx- to GND
10 - 11	Enable Rx+/- Termination with 120 Ohm. This jumper should be populated for RS-422 and RS-485 Full-Duplex mode
11 - 12	Disable Rx+/- Termination
13 - 14	Pull-up Rx+ to VCC by 750 Ohm Bias resistor. This jumper should be populated to enable pull-up of Rx+
14 - 15	Disable Pull-up of Rx+ to VCC
16 - 17	Pull-down Rx- to GND by 750 Ohm Bias resistor. This jumper should be populated to enable pull-down of Rx-
17 - 18	Disable Pull-down of Rx- to GND
19 - 20	Enable CTS Termination with 120 Ohm. This jumper should be populated for RS-422 mode
20 - 21	Disable CTS Termination

Note: If biasing of an RS-485 half-duplex bus is required, enable Rx biasing only (Pull-up Rx+ to VCC by 750 Ohm Bias resistor and Pull-down Rx- to GND by 750 Ohm Bias resistor). Tx biasing should not be used as this would provide two sets of biasing resistors on the bus.

Table 5 Jumpers to select termination and biasing