

# RS232 & USB to SPI

## RS232/USB-SPI

Bi-Directional Converter: RS232<-->SPI or USB<-->SPI

### The Big Deal

- Allows Bi-Directional communication between USB or RS232 to SPI
- Easy-to-use, quick-loading GUI and API objects for programmers - compatible with 32/64 Bit operating systems
- Accessory cables for all three ports included.
- SPI cables for either ZX76 Digital Step Attenuators or general purpose



Case Style: LK1578



Installation CD with Software included



### Product Overview

Mini Circuits' RS232/USB-SPI is a compact digital convertor allowing two way communication with SPI devices using either a USB or RS232 port. The model operates at 330kbit/sec with 1 to 16 data bits (specified by user) per word. For SPI communication standard TTL levels are used and the model can handle all voltage levels defined in the RS232 protocol. Power to the Converter is supplied via the USB port from either the USB bus or the supplied power adaptor when using RS232 control. This model is constructed in a plastic case (size of 2.53" X 1.68" X 0.92") with a USB type B female port, a digital snap fit SPI port matching our ZX76 Digital Step Attenuators, and a 9-pin D-Sub female port for the RS232 signals.

The RS232/USB-SPI is supplied along with a software CD containing a graphical user interface program and programming APIs for 32 and 64 bit environments. Also included are a 2.7ft. USB cable, a 6ft. D-Sub 9 male-female cable, a 5ft. Digital Snap Fit(male) to either Pigtail or Digital Snap Fit(male) cable and a power adaptor with a USB A female connector, suitable for US, EU, and other power systems - see page 4 for details. Longer USB cables and additional Digital Snap Fit cables are available as additional options.

### Key Features

| Feature                                         | Advantages                                                                                                  |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Bi-Directional communication                    | Allows full two way communication from any USB or RS232 port to an SPI device.                              |
| 5V <sub>DC</sub> Operating voltage              | The RS232/USB-SPI uses 5V operating voltage, supplied from either the USB BUS or an external power adaptor. |
| USB HID (Human Interface Device)                | Plug-and-Play (no need to install a driver for the device).                                                 |
| 32/64 Bit operating systems                     | Compatible with Windows® and Linux® operating systems using 32 and 64 bit architecture.                     |
| Software CD, cables, and power adaptor included | Includes a full set of accessories for immediate use, with no hidden costs.                                 |



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# RS232 & USB to SPI Converter

## Bi-Directional Converter: RS232<-->SPI or USB<-->SPI

### Features

- USB or RS232 control
- Full two way communication to SPI slave devices
- Powered from either the USB bus or a power adaptor
- Communication rate 330kbit/sec
- Compatible with 32/64-bit Windows® or Linux® operating systems
- ActiveX com object and .Net class library for use with other software: C++, C#, CVI®, Delphi®, LabVIEW® 8 or newer, MATLAB® 7 or newer, Python, Agilent VEE®, Visual Basic®, Visual Studio® 6 or newer, AutoIT and more<sup>1</sup>
- Friendly Windows Graphical User Interface



Installation CD with  
Software included

## RS232/USB-SPI

| Model No.                   | Description                               | Price        | Qty.  |
|-----------------------------|-------------------------------------------|--------------|-------|
| RS232/USB-SPI               | USB & RS232 to SPI Conv.                  | \$244.95 ea. | (1-4) |
| <b>Included Accessories</b> |                                           |              |       |
| PC-ADP-CD                   | Software CD                               |              | 1     |
| USB-CBL-AB-3+               | 2.7 ft USB cable                          |              | 1     |
| USB-AC/DC-5                 | AC/DC 5V <sub>DC</sub> Adapter            |              | 1     |
| CBL-DSF-XX-5+               | 5 ft SPI cable (See Ordering Information) |              | 1     |
| D-SUB9-MF-6+                | 6 ft 9 pin D-Sub cable (RS232)            |              | 1     |

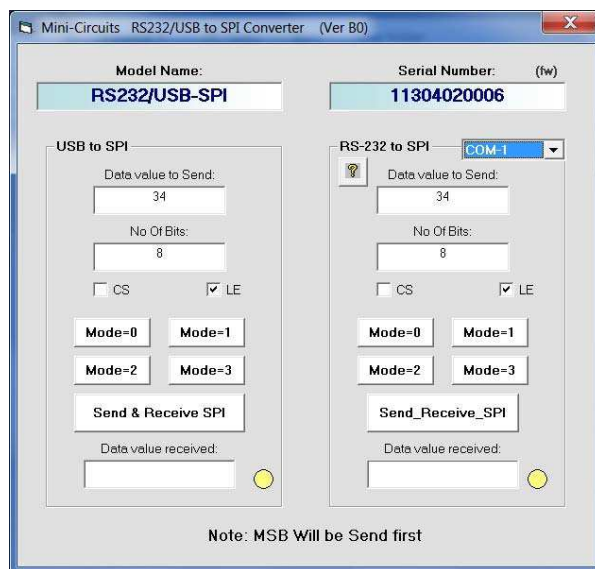
### Applications

- Lab
- Control systems

#### RoHS Compliant

See our web site for RoHS Compliance methodologies and qualifications

### User-friendly GUI for RS232/USB-SPI-N Converter



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Rev. B  
M141865  
EDR-10976F1  
RS232/USB-SPI  
RAV  
130602  
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## Electrical Specifications

| Parameter                                                                                    | Connectors                 | Conditions            | Min. | Typ. | Max. | Units    |
|----------------------------------------------------------------------------------------------|----------------------------|-----------------------|------|------|------|----------|
| RS232 port <sup>2</sup>                                                                      |                            |                       |      |      |      |          |
| Baud rate 9600; 8 bit word; even parity; stop bit = ‘1’                                      |                            |                       |      |      |      |          |
| Logic levels                                                                                 | 9 pin D-Sub                | Meets RS232 standard  |      |      |      |          |
| SPI port <sup>3</sup>                                                                        |                            |                       |      |      |      |          |
| Data transferred on rising clock edge, clock signal duty cycle 50% regardless of pulse width |                            |                       |      |      |      |          |
| Pulse width (set by user)                                                                    | Digital Snap Fit Connector | With supplied program | 0.08 |      | 255  | μSec     |
| Transmission rate                                                                            |                            | –                     | –    | 330  | –    | kbit/sec |
| Logic high                                                                                   |                            | Output                | 2.4  | –    | 5.2  | V        |
| Logic Low                                                                                    |                            |                       | 0    | –    | 0.3  |          |
| Current Source (per pin)                                                                     |                            | Pin 3,7 or 9          | –    | –    | 25   | mA       |
| Current Sink (per pin)                                                                       |                            | Pin 4 or 6            | –    | –    | 25   |          |
| USB port                                                                                     |                            |                       |      |      |      |          |
| Supply Voltage <sup>2</sup>                                                                  | USB                        | –                     | –    | 5    | –    | V        |
| USB current draw (depends on SPI load)                                                       |                            | –                     | –    | 50   | 135  | mA       |

<sup>2</sup> When using the Converter as a RS232 to SPI or SPI to RS232 Converter, supply voltage can be provided from either the computer's USB port or the provided power adaptor. When used to convert USB signals, all power is supplied via the computer's USB port.

<sup>3</sup> The converter is the SPI master both when transmitting and receiving data.

## Minimum System Requirements

|                       |                                                                                                                                                                                                         |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface             | USB HID                                                                                                                                                                                                 |
| Host operating system | <b>32 Bit operating system:</b> Windows 98®, Windows XP®, Windows Vista®, Windows 7®<br><b>64 Bit operating system:</b> Windows Vista®, Windows 7®<br><b>Linux® support:</b> 32/64 Bit operating system |
| Hardware              | Pentium® II or better                                                                                                                                                                                   |

## Coaxial Connections

|        |                               |
|--------|-------------------------------|
| USB    | (USB B female)                |
| RS232* | (9 Pin D-Sub female)          |
| SPI**  | ( Digital Snap Fit connector) |

## \* 9 Pin D-Sub Pin Connections

| PIN Number | Function |
|------------|----------|
| 2          | Transmit |
| 3          | Receive  |
| 5          | GND      |

## \*\* Digital Snap Fit Pin Connections

| PIN Number | Function    |
|------------|-------------|
| 3          | Load Enable |
| 4          | Data In     |
| 6          | Chip Select |
| 7          | Clock       |
| 9          | Data out    |
| 2,5,8      | GND         |

## Absolute Maximum Ratings

| Parameter                           | Ratings                |
|-------------------------------------|------------------------|
| Operating Temperature               | 0°C to +50°C           |
| Storage Temperature                 | -20°C to +60°C         |
| Voltage input at RS232 receive pin  | -30V to +30V           |
| Input Voltage at output contacts    | 0V to $V_{CC}$         |
| Input Voltage at SPI Input contacts | -0.3V to $V_{CC}+0.3V$ |
| $V_{CC}$ Max.                       | 6V                     |

Permanent damage may occur if any of these limits are exceeded.



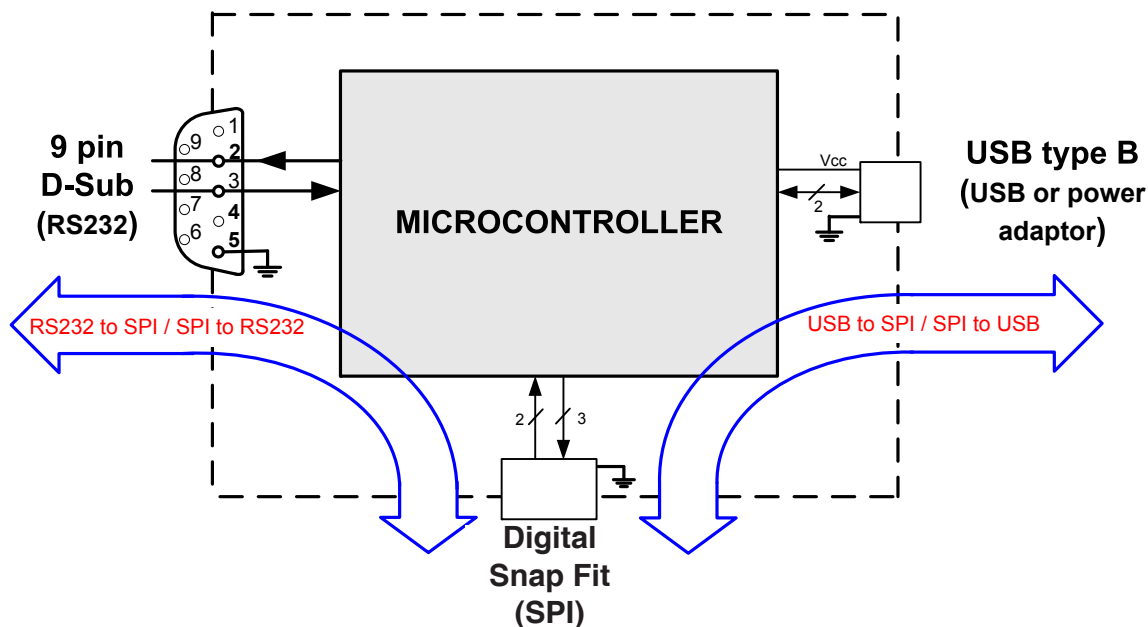
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## Block Diagram



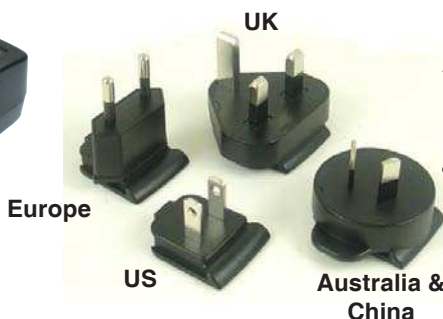
\*When using the Converter as a RS232 to SPI or SPI to RS232 Converter, supply voltage can be provided from either the computer's USB port or the provided power adaptor. When used to convert USB signals, all power is supplied via the computer's USB port.

## Accessories Included



**USB Cable: USB type A(Male) to USB type B(Male)**

- MCL P/N: USB-CBL-AB-3+ (2.7ft.)



**AC/DC 5V<sub>DC</sub> Power Adaptor with US, EU, UK AUS & China two pin power connectors**  
( $I_{max}=1A$ , Operating Temp. 0°C to +45°C)

- MCL P/N: USB-AC/DC-5

**Mini-Circuits®**  
ISO 9001 ISO 14001 AS 9100 CERTIFIED

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## Accessories Included (continued)



**RS232 cable: 9 pin D-sub(Male) to 9 pin D-sub(Female)**  
(Wire gauge 28<sub>AWG</sub>, Operating Temp. -20 to+60 °C)

- MCL P/N: D-SUB9-MF-6+ (6ft.)

When ordering the RS232/USB-SPI, please select one of the SPI cables below.



**SPI cable: Digital Snap Fit for use with Mini-Circuits ZX76 Digital Step Attenuator (male-male)**  
(Wire gauge 28<sub>AWG</sub>, Operating Temp. -30 to +80 °C)

- MCL P/N: CBL-DSF-MM-5+ (5ft.)

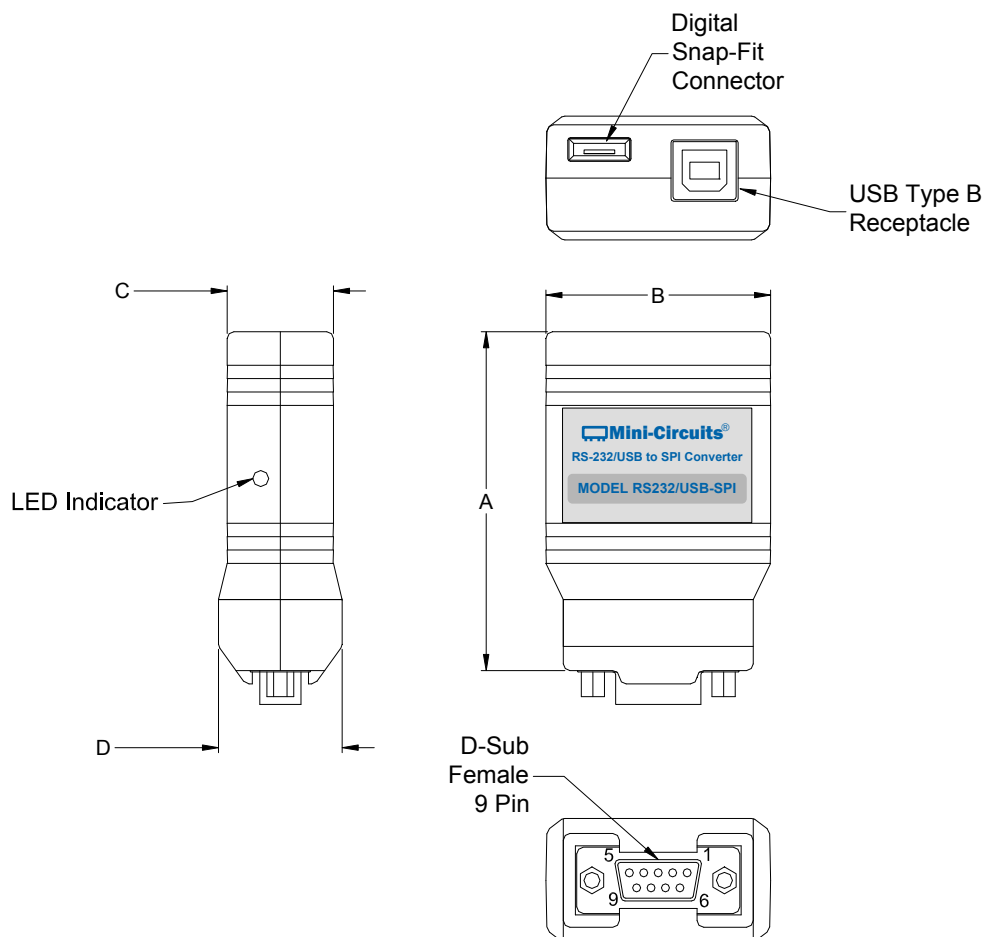


**SPI cable: Digital Snap Fit(male) to Pigtail for mating with customer provided connector**  
(Wire gauge 28<sub>AWG</sub>, Operating Temp. -30 to +80 °C)

- MCL P/N: CBL-DSF-PT-5+ (5ft.)

| Pin Number | Function | Description                   | Pigtail Wire Color |
|------------|----------|-------------------------------|--------------------|
| 2          | GND      | Ground connection             | BLACK              |
| 3          | LE       | Latch Enable Output           | GREEN              |
| 5          | GND      | Ground connection             | BLUE               |
| 7          | Clock    | Serial Interface clock Output | RED                |
| 8          | GND      | Ground connection             | ORANGE             |
| 9          | Data     | Serial Interface data Output  | WHITE              |

## Outline Drawing: (LK1578)



## Outline Dimensions ( $\frac{\text{inch}}{\text{mm}}$ )

| A    | B    | C    | D    | WT.<br>GRAMS |
|------|------|------|------|--------------|
| 2.53 | 1.68 | .79  | .92  | 36           |
| 64.3 | 42.7 | 20.2 | 23.5 |              |

## Ordering, Pricing & Availability Information see our web site

| Model         | Description                                            |
|---------------|--------------------------------------------------------|
| RS232/USB-SPI | Bi-Directional converter for RS232<->SPI and USB<->SPI |

| Included Accessories | Description                                                                      |
|----------------------|----------------------------------------------------------------------------------|
| USB-CBL-AB-3+        | 2.7 ft (0.8 m) USB Cable                                                         |
| PC-ADP-CD            | Installation CD                                                                  |
| USB-AC/DC-5+         | AC/DC +5V power adaptor with USB connector                                       |
| CBL-DSF-XX-5+        | 5 ft SPI cable assembly <i>(Select one cable from below with each converter)</i> |
| D-SUB9-MF-6+         | 6 ft 9 pin D-Sub(M) to 9 pin D-Sub(F) cable assembly (RS232)                     |

| SPI Cables    | Description                                              |
|---------------|----------------------------------------------------------|
| CBL-DSF-MM-5+ | 5 ft Digital Snap Fit(male-male) cable assembly (SPI)    |
| CBL-DSF-PT-5+ | 5 ft Digital Snap Fit(male-Pigtail) cable assembly (SPI) |

| Optional Accessories  | Description                                                  |
|-----------------------|--------------------------------------------------------------|
| USB-CBL-AB-3+ (Spare) | 2.7 ft (0.8 m) USB cable                                     |
| USB-CBL-AB-7+         | 6.8 ft (2.1 m) USB cable                                     |
| USB-CBL-AB-11+        | 11 ft (3.4 m) USB cable                                      |
| USB-AC/DC-5+ (spare)  | AC/DC +5V power adaptor with USB connector                   |
| CBL-DSF-MM-5+ (spare) | 5 ft Digital Snap Fit(male-male) cable assembly (SPI)        |
| CBL-DSF-PT-5+ (spare) | 5 ft Digital Snap Fit(male-Pigtail) cable assembly (SPI)     |
| D-SUB9-MF-6+ (spare)  | 6 ft 9 pin D-Sub(M) to 9 pin D-Sub(F) cable assembly (RS232) |



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