ST7 Family

USB / Serial Port Bridge Evaluation Board

GETTING STARTED

March 2002

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ST72 USB MICROCONTROLLER

USB/Serial Port Bridge Evaluation Board

INTRODUCTION

The objective of the USB/Serial Port Bridge Evaluation Board is to provide you with a complete reference design for a serial port bridge. This application is used to interface between devices with a serial port (RS-232 type) and a host computer USB port. USB data transfers comply with HID-class protocols.

The bridge is based on a USB low-speed microcontroller manufactured by STMicroelectronics which provides a maximum USB transfer rate of 800 bytes per second. Flow control has therefore been implemented to ensure data transfer integrity when interfacing with the serial port at rates up to 57600 bits per second (bps).

The bridge application is evaluated on a PC by running a dedicated applet that controls and monitors data transfers on both the USB and serial COM ports.

The included hardware provides In-Circuit Programming (ICP) capabilities for the microcontroller. This is used to modify certain firmware parameters for evaluation or customization purposes.

The following development tools can be ordered separately: assembler, linker, C compiler, source level debugger, hardware emulator, programming boards and gang programmer. For ordering information, see our website at http://mcu.st.com or contact your local sales office.

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1 GETTING STARTED

1.1 SYSTEM REQUIREMENTS

In order to use the USB/Serial Port Bridge Evaluation Board with the Windows operating system, a recent version of Windows, such as Windows 98, Windows Millennium or Windows 2000 must be installed on the PC.

The version of the Windows OS installed on your PC may be determined by clicking on the “System” icon in the Control Panel.

IMPORTANT: When running the HID evaluation board applet provided in the package, verify that the correct version of the HID.dll file is installed:

– Windows 98: HID.dll - Version 4.10.1998
– Windows 98 SE: HID.dll - Version 4.10.2222
– Windows Millennium: HID.dll - Version 4.90.300.1
– Windows 2000: HID.dll - Version 5.00.2134.1

For other operating systems, please refer to the CD-ROM for more information.

1.2 PACKAGE CONTENTS

The USB/Serial Port Bridge Evaluation Board includes the following items:

- Hardware content:
  – One ST72F623F2B1 Low-speed USB microcontroller device (DIP20 package). This is a FLASH device allowing up to 100 reprogramming cycles. The ST72F623F2B1 is delivered already programmed with the evaluation firmware.
  – One evaluation board.
- Software content (Contact the Sales Office or www.st.com for the most recent version)
  – PC executable software for evaluating the USB/Serial Port Bridge. The source file, written in Delphi, is provided as an application example using the HID driver.
  – ST7 firmware (C source code) for the ST72F623F2B1 (HiWare Compiler)
- Documentation (Contact the Sales Office or www.st.com for the most recent version)
  – USB Library Interface documentation (Version 4.x).
  – ST7262 and ST7261 Datasheets.
  – Application Note AN1071.

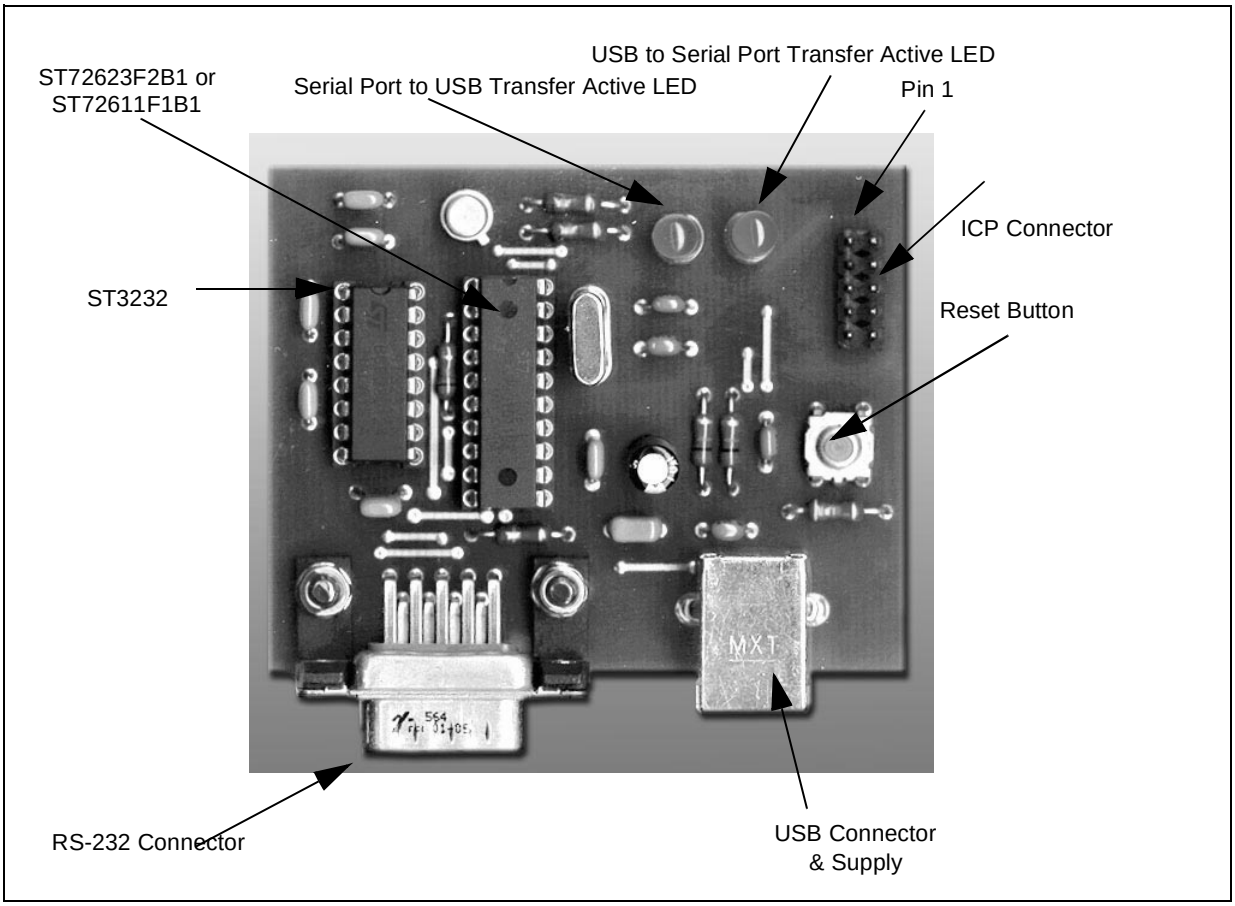
1.3 SOFTWARE INSTALLATION

Install the Bridgels.exe file on your computer.

1.4 HARDWARE INSTALLATION

Figure 1 shows the location of the main components of the evaluation board. The schematic drawing is given in “USB/Serial Port Bridge Evaluation Board Diagram” on page 12.

Figure 1. Evaluation Board Layout



1.4.1 Power Supply

The USB/Serial Port Bridge Evaluation Board is directly supplied by the USB Connector (bus-powered) and therefore does not require an external voltage supply.

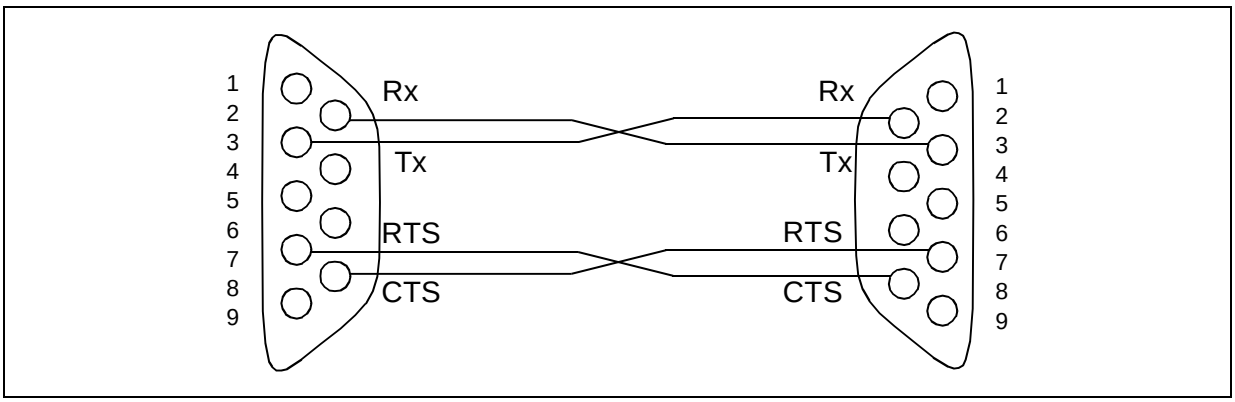
1.4.2 Data Transfer via PC Serial Port

When connected to a PC serial port for data transfer purposes, a DTE (Data Terminal Equipment) to DTE configuration is required. As a result, a cross-wired RS-232 cable must be used as shown in Figure 2.

The USB/Serial Port Bridge Evaluation Board is equipped with two LEDs that display the data transfer status:

– Orange LED: Serial Bus to USB transfer is active,
– Green LED: USB to Serial Bus transfer is active.

Figure 2. USB/Serial Port Connection Diagram



1.4.3 In-Circuit Programming (ICP)

The 10-pin connector must be connected to an ST7MDTU2-EPB tool in order to program or erase the microcontroller Flash memory.

Note that the USB cable must be plugged in to supply the board with voltage.

2 RUNNING THE USB/SERIAL PORT BRIDGE EVALUATION BOARD

2.1 INTRODUCTION

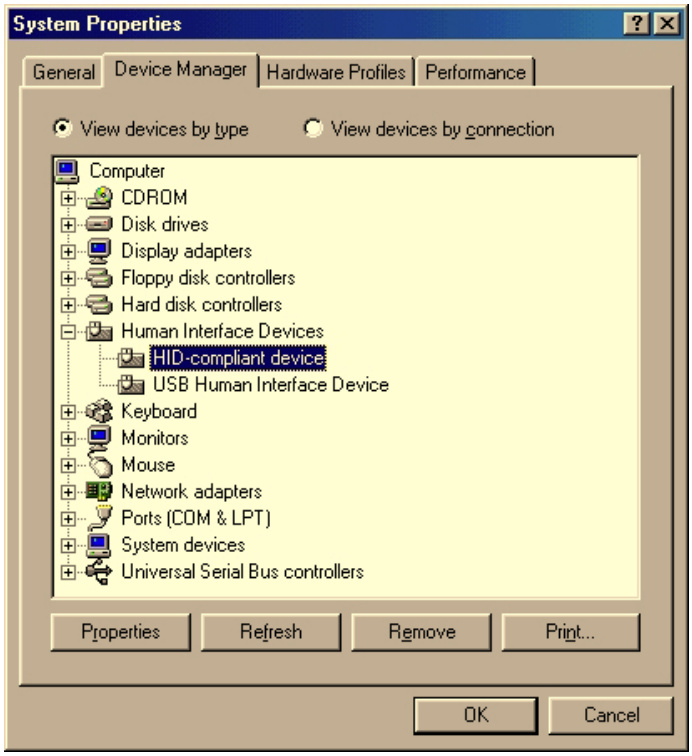
The USB/Serial Port Bridge Evaluation Board consists of two main parts:

– the physical board,

– the USB-to-Serial Port Evaluation software running on your PC.

First connect the evaluation board to the PC via the USB cable. As a result, the evaluation board is enumerated as a USB HID device as shown Figure 3, and is ready to use. You may be required to insert your Windows CD-ROM.

Figure 3. Enumeration Result



When you start the USB/Serial Port Bridge Evaluation Program on the PC, a graphical interface is displayed for controlling and monitoring the data transfers on the USB and serial ports of the PC. This PC software is also used to evaluate the enumeration process and to set the communication parameters.

2.2 USB/SERIAL PORT BRIDGE EVALUATION PROGRAM

2.2.1 Device Selection

2.2.1.1 USB Enumeration

The Device Selection window, shown in Figure 4, displays the following information:

– Available USB HID devices
All USB HID devices connected to the PC are displayed in this window. Device data is based on the Report ID. The ST7 USB/Serial Port Bridge will be displayed if the enumeration has been successfully completed.

– Device information
This information, obtained during the enumeration phase, refers to the highlighted device in the “Available USB HID Device” window: Vendor ID, Product ID and Version numbers. (Refer to the USB Specification version 1.1 or higher). Additionally, as string information is supported, the Manufacturer name, Product and Serial Number are displayed.

2.2.1.2 COM Port Settings

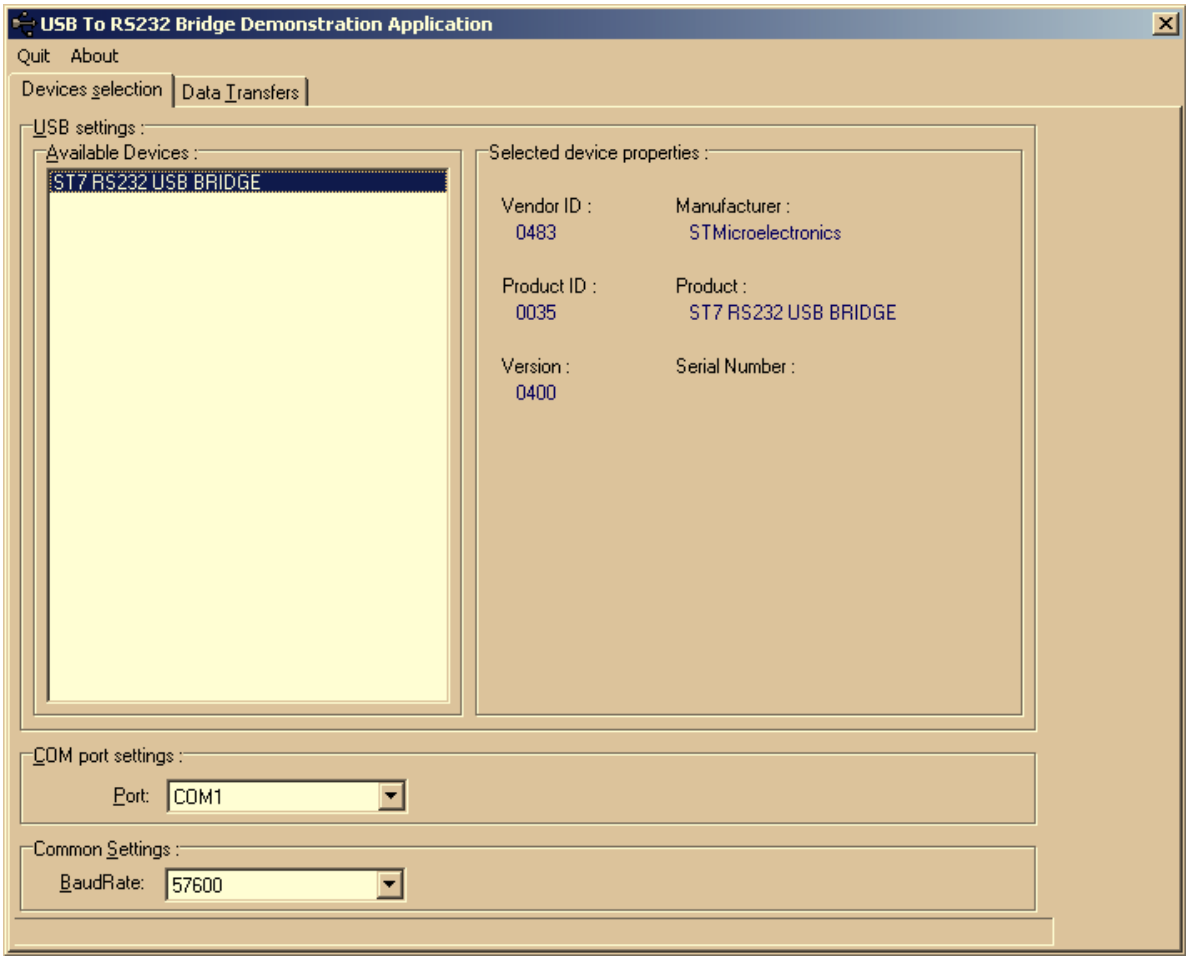
This function selects the COM port used by the USB/Serial Port Bridge Evaluation Program to emulate a serial port communication. When “None” is selected, the serial port can be managed by any other application on the same PC or by another PC.

2.2.1.3 Common Settings

This function is used to select the baudrate of the bridge in the bridge firmware.

If the applet is used to emulate the serial port, it also configures the COM port of the PC. Otherwise, the serial port baudrate must be defined at the same value in the other applet or device.

Figure 4. Device Selection Window



2.2.2 Data Transfers

2.2.2.1 Serial Port

The two following items do not apply if **None** has been selected in the “COM Port Setting” box of the Device Selection window.

– **PC Flow Control** defines the flow control method used by the COM port when the applet controls the COM port of the PC.

– **Automatic received (USB) to sent (Serial) comparison** verifies that the data received by the USB port is equal to the data sent by the COM port of the PC.

– **Loop: Send Serial, Receive USB** is used to perform serial to USB transfers in Loop mode. Unchecking this box during the data transfer will abort the transfer.

If the serial port is handled by another applet or PC, the **Automatic received...** box must not be checked and the **Loop** box must be checked, depending on the required configuration.

2.2.2.2 USB Port

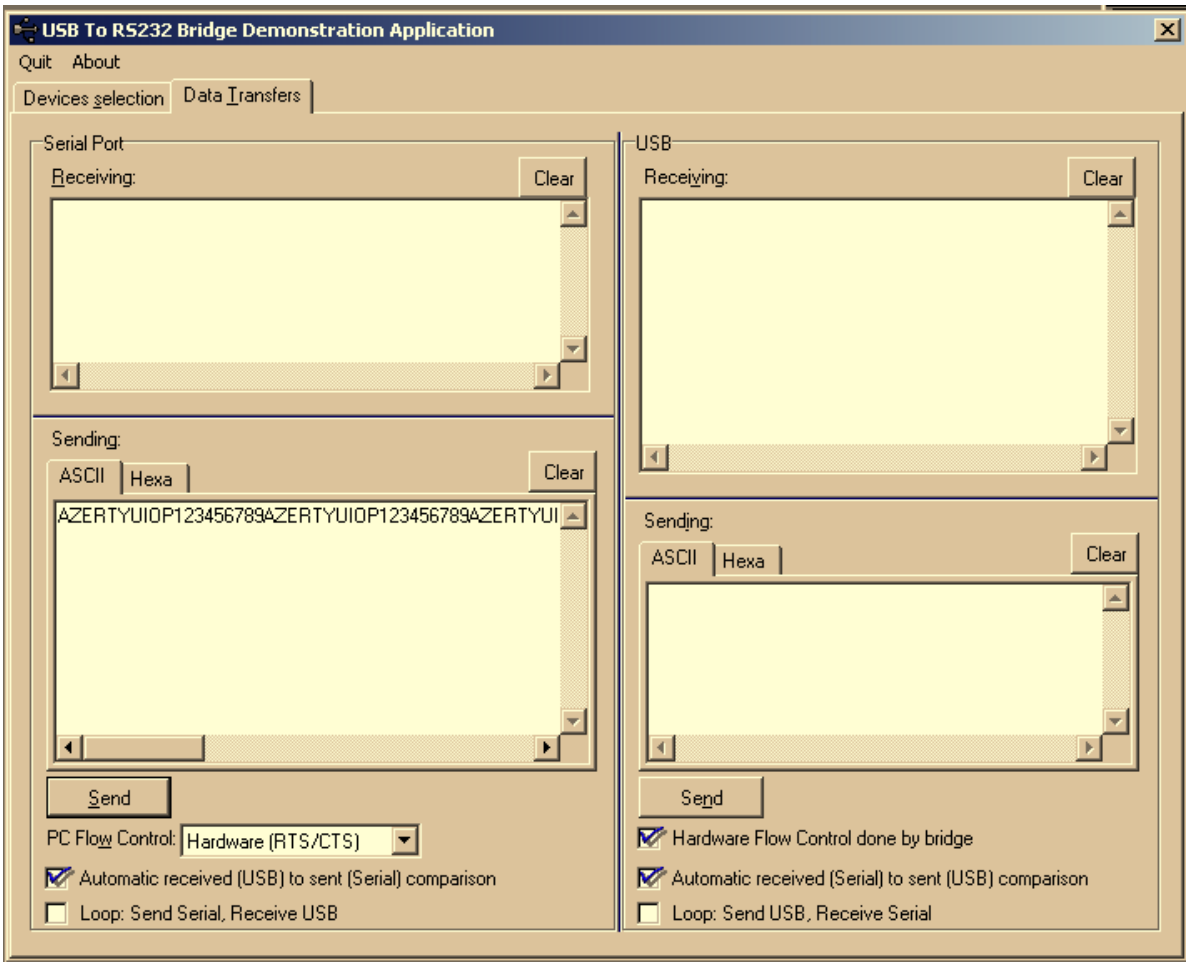
These items are validated only if the bridge is connected to the USB port.

– **Hardware Flow Control done by bridge** is used to enable/disable the RTS/CTS flow control performed by the bridge on the serial port.

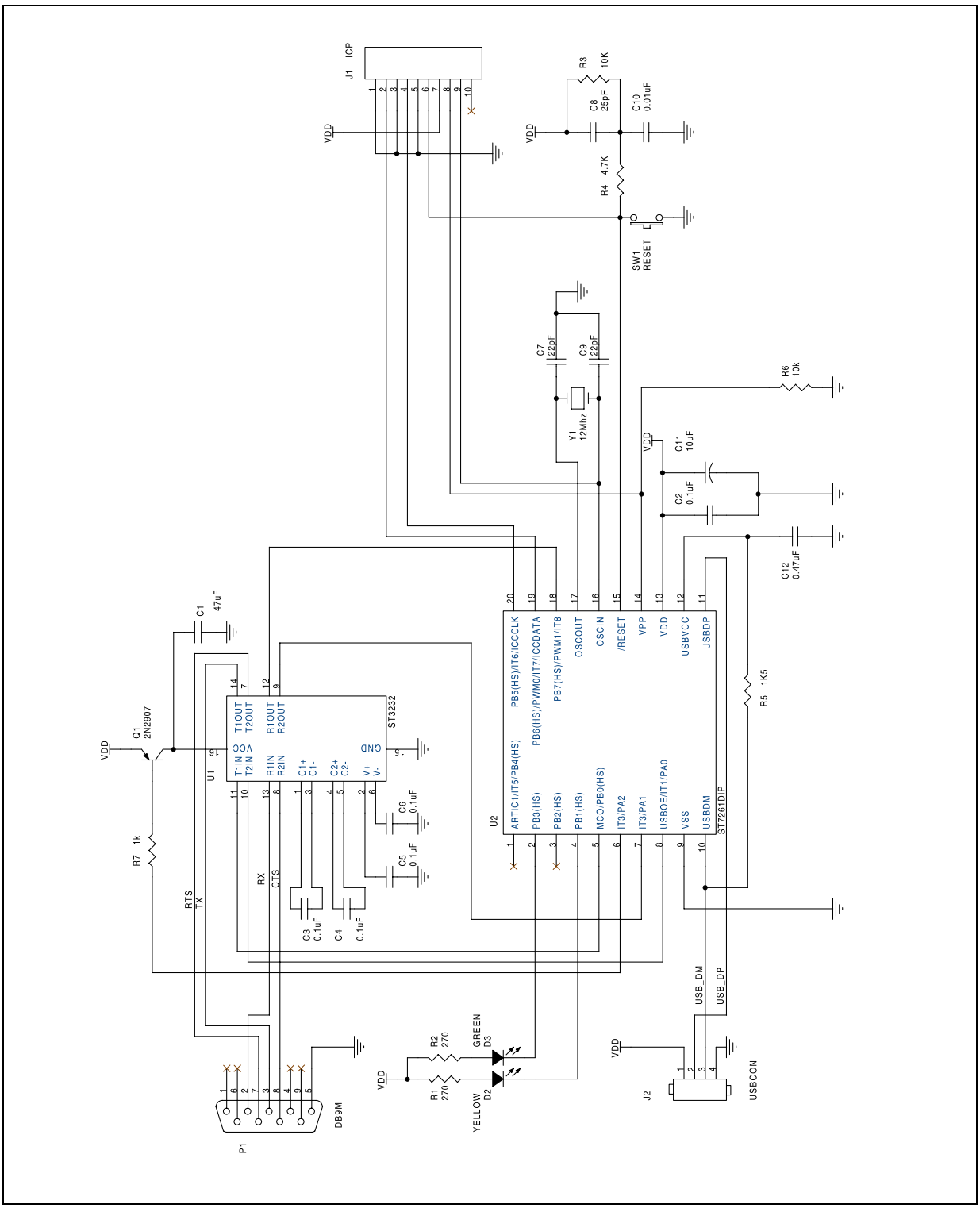
– **Automatic received (Serial) to sent (USB) comparison** verifies that the data received by the serial port is equal to the data sent by the USB port.

– **Loop: Send USB, Receive Serial** is used to is used to perform USB to serial transfers in Loop mode. Unchecking this box during the data transfer will abort the transfer.

Figure 5. Data Transfer Window



2.3 USB/SERIAL PORT BRIDGE EVALUATION BOARD DIAGRAM



3 REVISION HISTORY

Table 1. Summary of Modifications

Revision	Date	Modification
1.0	January 2002	First Issue
1.1	March 2002	Modification of Section 2.3 USB/Serial Port Bridge Evaluation Board Diagram and addition of Section 3 Revision History.

NOTES:

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