



AN10428

UART-SPI Gateway for Philips SPI slave bridges

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Application note

Document information

Info	Content
Keywords	UART-SPI Gateway, UART to SPI, RS-232 to SPI
Abstract	The UART-SPI Gateway enables a PC that has a UART port to communicate with a SPI slave device using an RS-232 terminal. With the HyperTerminal software in the Windows operating system, the users will be able to control the SPI slave device remotely from the PC. The usage of the UART-SPI Gateway board in terms of connection diagram, board connectors, and firmware code are discussed in this document. This application note is applicable to the following Philips Semiconductors Bridge ICs: SC16IS740/750/760/752/762 (SPI slave to high-speed UART(s)); and SC18IS600/601 (SPI slave to I ² C-bus controller).

Revision history

Rev	Date	Description
01	20060307	Application note; initial version.

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1. Introduction

The Serial Peripheral Interface (SPI) offers easy interface for inter-processor communications. The SPI bus is a full-duplex interface that enables data to be transmitted in two ways simultaneously. Also, it is low cost, and a very common serial data bus for high-speed communication between the host processors such as a microcontroller and multiple SPI slave devices such as a SC18IS600/601 Bridges (which are SPI slave to I²C-bus controller devices), and SC16IS740/750/760/752/762 Bridges (which are SPI slave to high-speed UART(s) devices). For more information about the Bridges devices, please visit Philips Standard ICs website.

The UART-SPI Gateway application shown in [Figure 1 "Connection diagram"](#) allows the users to debug and test an SPI slave device by using manually-controlled communication via a standard RS-232 terminal such as a HyperTerminal, which is a serial port terminal running on a computer with the Windows operating system. It is easy to use and a useful tool to help the users to speed their time for verifying the SPI slave device.

2. Connection diagram

To execute the functionality test of the UART-SPI Gateway board, the following devices are required: a computer, RS-232 cable, UART-SPI Gateway board, wires for SPI bus, and SPI slave device such as SC18IS600/601. A connection diagram is depicted in [Figure 1](#).

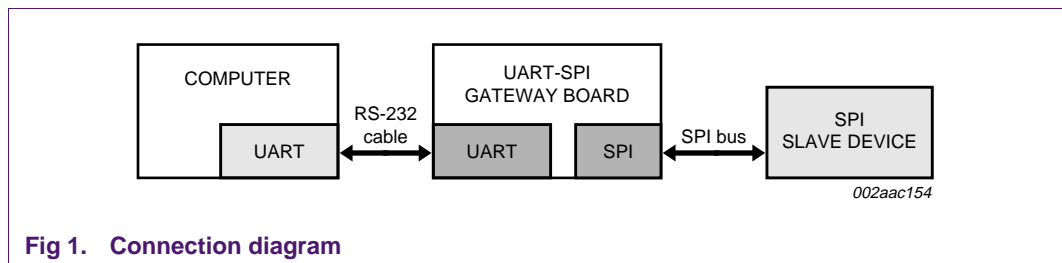
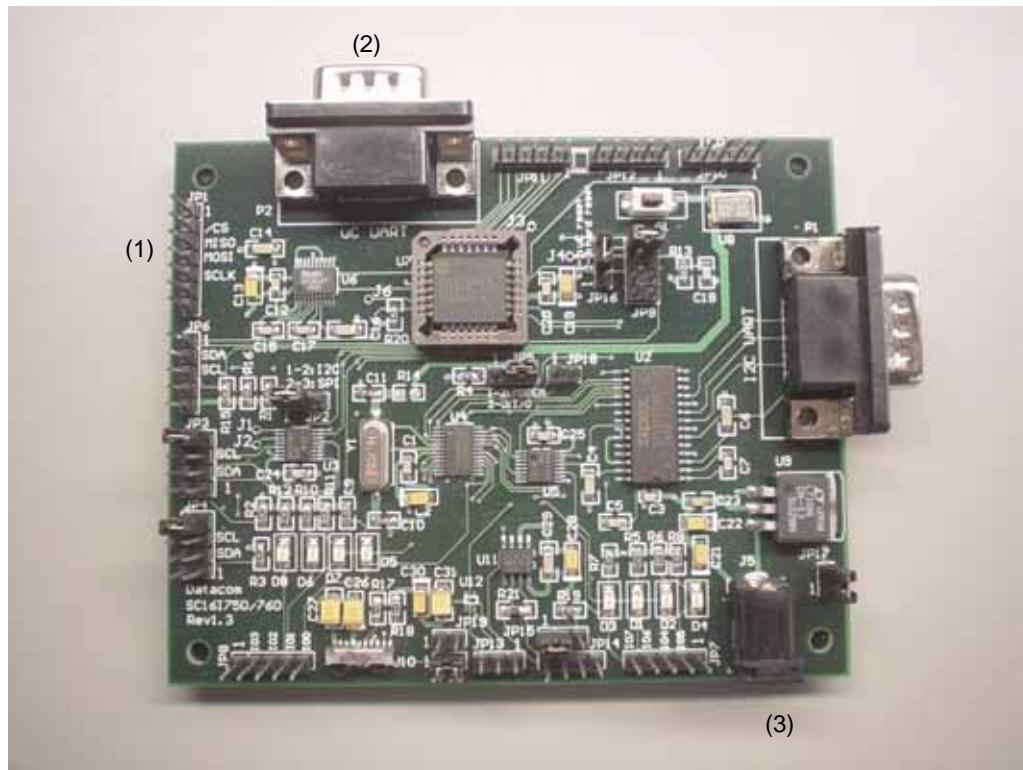


Fig 1. Connection diagram

3. PCBA view

[Figure 2](#) shows an example of the Printed-Circuit Board Assembly (PCBA) of the UART-SPI Gateway board, which can be used for interfacing between a PC and an SPI slave device. The board is powered by an external power supply and supports In-System Programming (ISP) to download the firmware code.



The parts on the board are described as follows:

- (1) **JP1 header** - This connector is used to connect an SPI slave device such as SC18IS600/601. Some wires are needed to connect the SPI bus signals between the SPI slave device and JP1 header. The SPI bus signals need to be connected are power (V_{CC}), chip select (\overline{CS}), Master Input Slave Output (MISO), Master Output Slave Input (MOSI), SPI clock (SCLK), and ground (GND). An interrupt (\overline{INT}) signal may optionally be connected.
This \overline{INT} signal on JP1 is an interrupt signal output from SC18IS600/601 chip. If an interrupt method is used, the \overline{INT} signal should be connected to the input interrupt of the UART-SPI Gateway board as a master/host for servicing the interrupt when occurred.
- (2) **DB9 serial port** - This connector is used to connect the 'UART-SPI Gateway' board to a PC via RS-232 cable. Typical serial port terminal software such as HyperTerminal, which is mostly available in Windows operating system, can be used for communication with the SPI slave device through the UART-SPI Gateway.
- (3) **J5** - This connector is used to power the UART-SPI Gateway board with a 9 V external power supply.

Fig 2. Printed-circuit board assembly

4. UART-SPI Gateway commands

An RS-232 terminal such as HyperTerminal (shown in [Figure 3](#)) is available in the Windows operating system. It can be used as a graphical user interface (GUI) to control an SPI slave device such as SC18IS600/601 via the UART-SPI Gateway board and it should be configured as an ANSI type. Following connection to the terminal, pressing the hardware reset on the UART-SPI Gateway board will result in a 'welcome' message being displayed on the terminal.

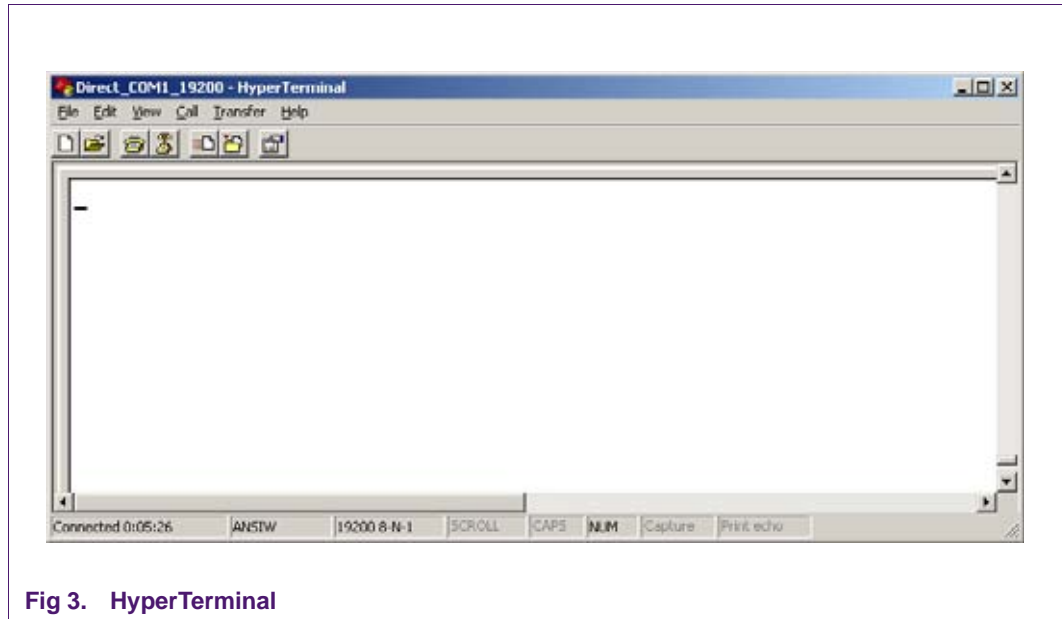


Fig 3. HyperTerminal

Using HyperTerminal, the user can easily type a command to operate the SPI slave device. The example UART-SPI Gateway commands in [Table 1](#) are for controlling an SPI slave device such as SC18IS600/601 demo board. The detailed command list for SC18IS600/601 SPI slave to I²C-bus controller device is available in the user manual of SC18IS600/601.

Table 1: UART-SPI Gateway commands

Command	Description
g	turn on the I ² C-bus blinking LEDs
a	turn off the I ² C-bus blinking LEDs
b	write data to the I ² C-bus EERPOM
c	read data from the I ² C-bus EEPROM
?	Display all available commands

5. Conclusion

The UART-SPI Gateway board is suitable for users who want to operate an SPI slave device such as SC18IS600/601 easily and remotely from a PC using a standard serial communication such as a UART. The UART-SPI Gateway board provides a function to control SPI data transfer to the SPI slave device by enabling the chip and sending the SPI commands.

The board shows the circuit connection of the PC to the SPI slave device through the UART-SPI Gateway. For more information on Philips' Bridge serial interface solutions such as SC18IS600/601 (SPI slave to I²C-bus controller) and SC16IS740/750/760/752/762 (SPI slave to high-speed UART(s)) Bridge ICs can be found on the Philips Semiconductors Standard ICs website.

6. Abbreviations

Table 2: Abbreviations

Acronym	Description
PC	Personal Computer
UART	Universal Asynchronous Receiver/Transmitter
SPI	Serial Peripheral Interface
I ² C-bus	Inter Integrated Circuit bus
PCB	Printed-Circuit Board
PCBA	Printed-Circuit Board Assembly
ISP	In-System Programming

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