SGS-THOMSON MICROELECTRONICS

ST16S-EMU

DEVELOPMENT SYSTEM
FOR ST16XYZ, MCU BASED SMARTCARD IC FAMILY

BRIEF DATA

HARDWARE

☐ Supports the whole ST16XYZ Smartcard IC family including low voltage range products and cryptographic products when ST16S-CEXT cryptographic extension board is connected

☐ Support of all ST16XYZ mask options and memory sizes

☐ Real time emulation

☐ 64K bytes of emulation memory

☐ Up to 16 breakpoints

☐ Tracing of 32 bits including 4 external lines

☐ Trace triggering events defined with up to 32 bits

☐ 3 triggering events with associated counters

☐ 2 synchronization outputs

☐ Emulation with external or internal clocks

SOFTWARE

☐ Window based interfaces and menus

☐ Assembler-linker

☐ Macro call and conditional assembly

☐ Relocatable or absolute output files

GENERAL DESCRIPTION

The ST16S-EMU is an advanced real time development system designed and configured to provide comprehensive support for the ST16XYZ products, a family of MCU based Smartcard IC products. This one box system contains the CPU part emulating the ST16XYZ CPU core, and the Memory part emulating all security logic and secure memory, which may be implemented inside any ST16XYZ device.

The software provided enables the hardware to be driven by any PC compatible host computer through 2 serial ports.

CPU EMULATION

The source software can be prepared in a modular fashion to enable good testability and fast debugging. It can be written using any word processing package and then assembled and linked by the assembler-linker. Assembly directives and macro functions are available.

Figure 1 ST16S-EMU System Configuration
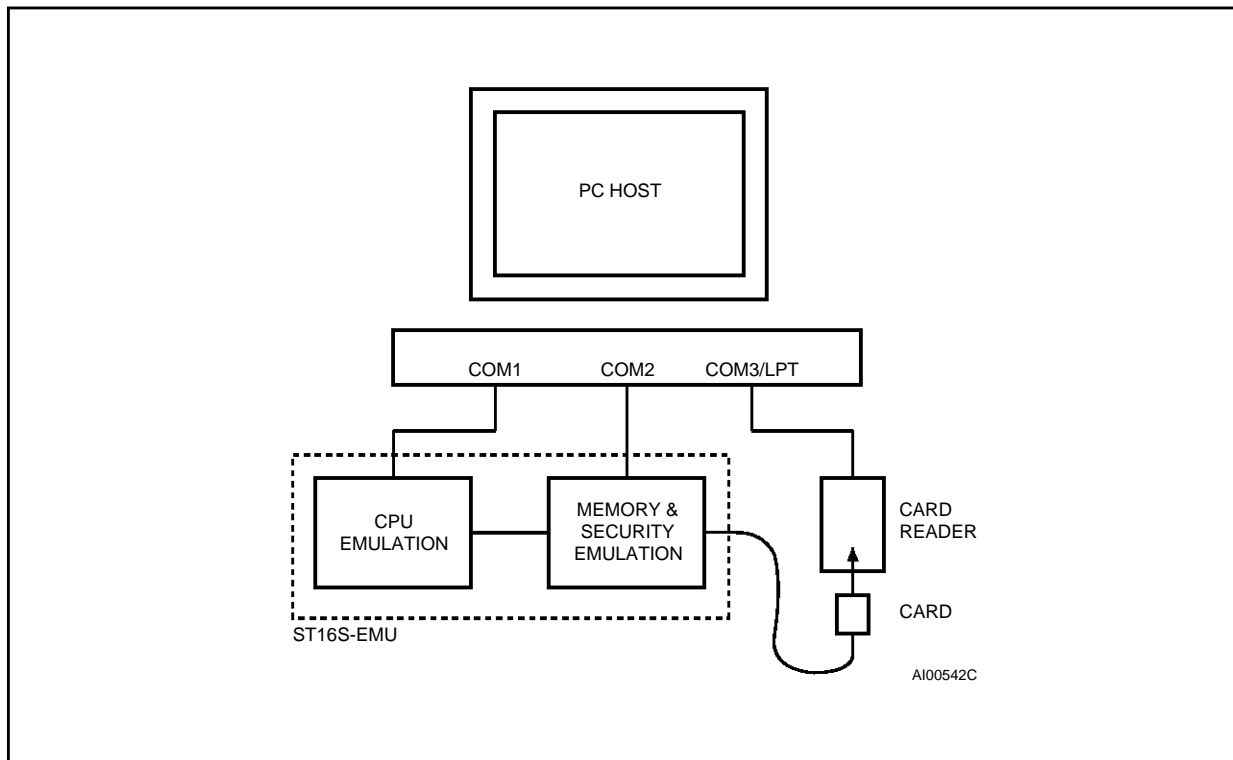
CPU EMULATION (cont'd)

Hardware and software breakpoints allow the user to stop the MCU whenever the application ROM code execution reaches selected addresses, addresses within a selected range, or on data fetch cycles. The user is then able to read and modify any register or memory location within the simulated memory, inspect trace or place other breakpoints or triggers.

The logic analyser can be used when real time emulation is needed. It allows the recording of 32 bits words, including address bus, data bus, control bits and 4 external signals. Up to 1024 states per bit can be stored into the 32 Kbyte emulation memory.

Using the powerful triggering conditions of the logic analyser, it is possible to only record cycles which are of interest to the user. Events are defined as a pattern of up to 32 bits occurring up to 64,000 times.

The acquisition mode can be defined by up to 3 events. The following examples show the powerful capabilities of this logic analyser:

– Records status of all specified bits until 'N' occurrences of event 1.

– Records 'N' cycles within a specified address range.

– Records status of all specified bits until 'N' occurrences of event 1, then records 'M' cycles within a range and finally, records everything until 'P' cycles after event 3.

Such a powerful tool enables the user to detect and trap any pattern and thus quickly debug the application. The trapping of random patterns is greatly improved by the capability to temporarily quit the emulation session while the emulator continues to run the application software. The whole memory of the PC is then available for any use, while the trace function continues to track defined events.

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MEMORY EMULATION

The Memory part of the ST16S-EMU emulates the ROM, RAM and EEPROM memories, the security logic of the family of devices, and support the mask options simulation for the ST16XYZ family.

ST16S-EMU is configured with the help of a window menu allowing the user to define the size and partitioning of each block of the emulated memory: ROM, RAM and EEPROM. A control of each memory block accesses is automatically performed by the Memory part when running the ROM code (real time emulation), any access out of a defined memory block is signalled on the screen of the host computer.

The EEPROM programming time is monitored by an internal time base and a warning is given to the user if a programming delay is shorter than the specified value. This value is set by default to nominal 3ms, and can be adjusted by the user to any value up to 100ms.

Warnings are also supplied if the programming sequence is not correct.

FRONT PANEL

The ST16S-EMU front panel displays the status of the chip external ISO 7816-3 compatible signals (VCC, RST, CLK, I/O). It also provides an access to internal signals of the emulated ST16xyz which are not normally accessible.

CARD READER

A card reader can be connected to the host computer through either serial or parallel link. The ST16S-EMU command interpreter directs each command either towards the CPU or Memory part of the ST16S-EMU, or the card reader. This enables the development loop to be closed, and complete applications to be emulated on a single host computer.

ORDERING INFORMATION

Part Number	Description
ST16S-EMU	ST16xyz Family Emulator

Note : The ST16S-EMU is delivered with all necessary software for use on a PC or compatible host computer.

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