

TOSHIBA

TOSHIBA Original CMOS 16-Bit Microcontroller

TLCS-900/L1 Series

TMP91FY27

TOSHIBA CORPORATION

Semiconductor Company

Preface

Thank you very much for making use of Toshiba microcomputer LSIs.
Before use this LSI, refer the section, "Points of Note and Restrictions".
Especially, take care below cautions.

****CAUTION****

How to release the HALT mode

Usually, interrupts can release all halts status. However, the interrupts = (NMI, INT0, INTRTC), which can release the HALT mode may not be able to do so if they are input during the period CPU is shifting to the HALT mode (for about 5 clocks of f_{FPH}) with IDLE1 or STOP mode (IDLE2 is not applicable to this case). (In this case, an interrupt request is kept on hold internally.)

If another interrupt is generated after it has shifted to HALT mode completely, halt status can be released without difficultly. The priority of this interrupt is compare with that of the interrupt kept on hold internally, and the interrupt with higher priority is handled first followed by the other interrupt.

CMOS 16-Bit Microcontrollers

TMP91FY27U

1. Outline and Features

TMP91FY27 is a high-speed 16-bit microcontroller designed for the control of various mid- to large-scale equipment.

TMP91FY27U comes in a 64-pin flat package. Listed below are the features.

- (1) High-speed 16-bit CPU (900/L1 CPU)
 - Instruction mnemonics are upward-compatible with TLCS-90/900
 - 16 Mbytes of linear address space
 - General-purpose registers and register banks
 - 16-bit multiplication and division instructions; bit transfer and arithmetic instructions
 - Micro DMA: 4 channels (1.0 μ s/2 bytes at 16 MHz)
- (2) Minimum instruction execution time: 148 ns (at 27 MHz)
- (3) Built-in RAM: 16 Kbytes
Built-in ROM: 256-Kbyte Flash memory
2-Kbyte mask ROM (used for booting)
- (4) External memory expansion
 - Expandable up to 16 Mbytes (shared program/data area)
 - Can simultaneously support 8-/16-bit width external data bus (Dynamic data bus sizing)
- (5) 8-bit timers: 6 channels
- (6) 16-bit timers: 1 channel
- (7) General-purpose serial interface: 2 channels
 - UART/Synchronous mode: 2 channels
 - IrDA Ver.1.0 (115.2 kbps) mode selectable: 1 channel
- (8) Serial bus interface: 1 channel
 - I²C bus mode/clock synchronous mode selectable

030619EBP1

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
- In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.
- For a discussion of how the reliability of microcontrollers can be predicted, please refer to Section 1.3 of the chapter entitled Quality and Reliability Assurance/Handling Precautions.



Purchase of TOSHIBA I²C components conveys a license under the Philips I²C Patent Rights to use these components in an I²C system, provided that the system conforms to the I²C Standard Specification as defined by Philips.

- (9) 10-bit AD converter (sample hold circuit is inside): 4 channels
- (10) Watchdog timer
- (11) Timer for real-time clock (RTC)
- (12) Chip select/Wait controller: 4 blocks
- (13) Interrupts: 34 interrupts
 - 9 CPU interrupts: Software interrupt instruction and illegal instruction
 - 21 internal interrupts: 7 priority levels are selectable
 - 4 external interrupts: 7 priority levels are selectable
(among 3 interrupts are selectable edge mode)
- (14) Input/output ports: 53 pins
- (15) Stand-by function
 - Three Halt modes: IDLE2 (programmable), IDLE1 and STOP
- (16) Clock controller
 - Clock gear function: Select a High-frequency clock f_c to $f_c/16$
 - RTC ($f_s = 32.768$ kHz)
- (17) Operating voltage
 - $V_{cc} = 2.85$ V to 3.6 V (f_c max = 27 MHz)
- (18) Package
 - P-LQFP64-1010-0.50D

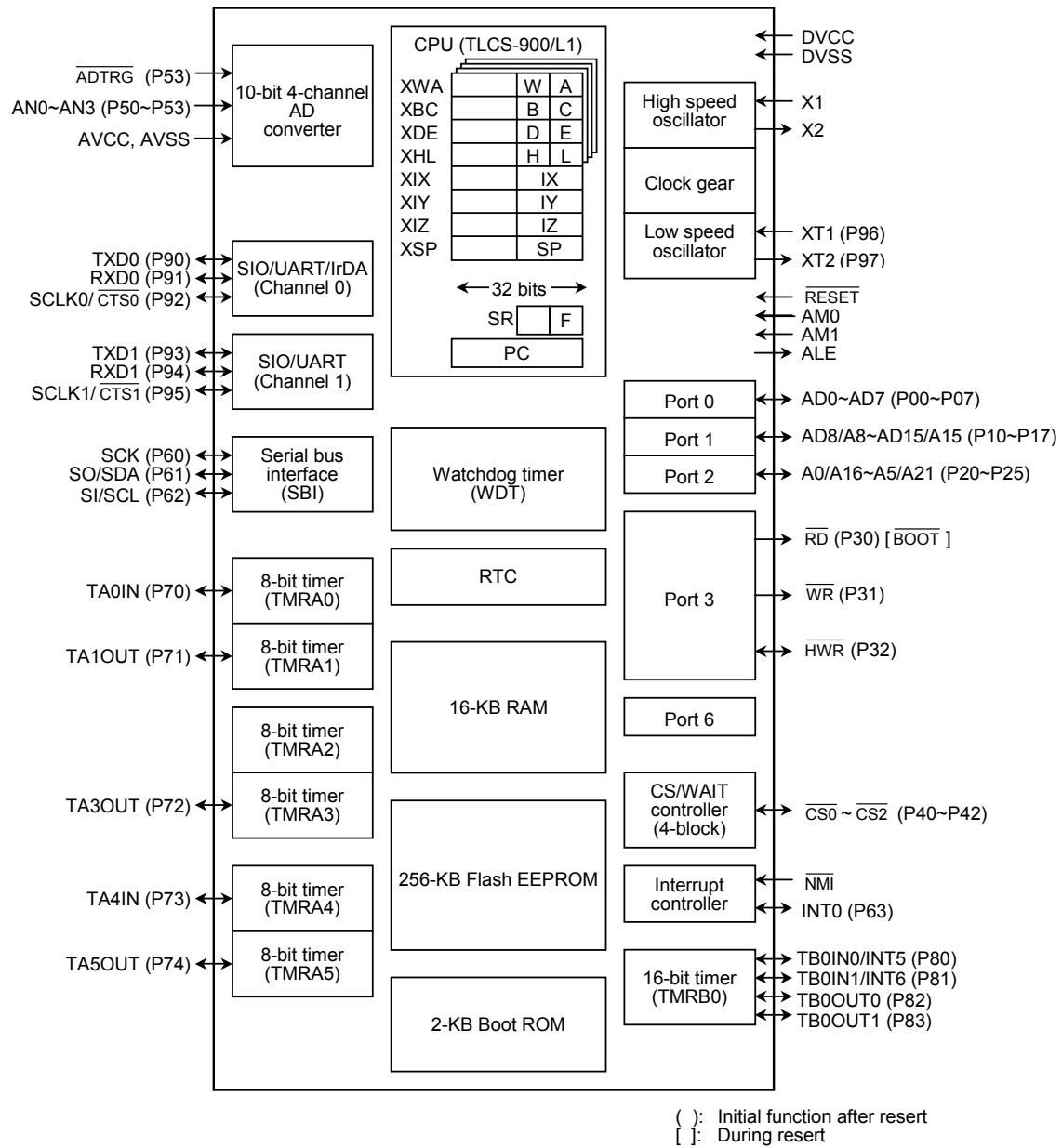


Figure 1.1 TMP91FY27 Block Diagram