Fastest 32-bit Color Display CISC Microcontroller

Highlights

- High-performance CISC core, 80 MHz, includes 32 x 32 + 64-bit MAC

- TFT/STN Display Controller, 4K-STN/16M-TFT

- 288KB RAM on-board, 1-clock access

- MLC-NAND Flash controller

- SD Card I/F

- Large number of software IPs available, including JPEG decode and animation, MP3 and TTS (Text To Speech)
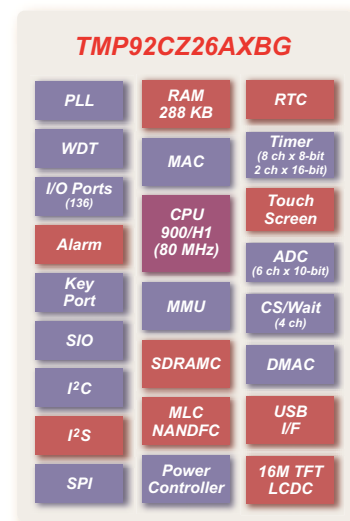
Description

The Toshiba TMP92CZ26AXBG is a new 32-bit CISC MCU that runs at 80 MHz internally to achieve 40 MIPS computing performance with power consumption of only 80 mW. This is the best processing performance and lowest power consumption of any MCU in this product category.

Features

- CPU: 32-bit CPU
  - High-speed 900/H1 CPU
  - Minimum instruction execution 12.5 ns
  - Internal RAM: 288 KB (program, data and display)
  - Internal Boot-ROM: 8 KB, load program from USB, UART to internal RAM
  - 80 MHz : 0°C - +50°C
  - 60 MHz : 0°C - +70°C
  - Memory controller, 4 channel CS
- Timers
  - 8-bit timers: 8 channels
  - 16-bit timer: 2 channel
  - Timer for real-time clock (RTC)
  - Watch dog timer
- Serial interfaces:
  - USB (universal serial bus)
  - SIO
  - UART/synchronous mode
  - IrDA ver1.0 (115.2 kbps)
  - I2C bus mode only
  - I2S (Inter-IC Sound) interface: 2 ch
  - SPI controller : 1 ch
- LCD controller
  - Monochrome, 4, 16 and 64 gray levels, 256/4096 color for STN
  - 4096/65536/262144/16777216 color for TFT
  - PIP (Picture-In-Picture Display)
  - H/W Rotation function
- SDRAM controller: 1 channel
- Key-on wakeup (Interrupt key input)

- 10-bit A/D converter: 6 channels
- Touch screen interface
- Melody/alarm generator
- 56 interrupts
- DMAC function: 6 channels
- Input/output ports: 136 pins
- MLC-NAND Flash interface
  - Available to connect directly with NAND flash
  - Supports SLC type and MLC type
  - Data Bus: 8/16-bit; Page Size: 512/2048 Bytes
  - Built-in Rees Solomon calculation circuits
- MAC unit
  - 32 x 32 + 64-bit, 64 - 32 x 32-bit, 32 x 32 - 64-bit
- Operating voltage:
  - Internal (Core) 1.4V to 1.6V,
  - External (I/O) 3.0V to 3.6V
- Package
  - 228 pin FBGA: P-FBGA228-1515-0.80A5
  - QFP176 under planning

Diagram

TMP92CZ26AXBG

PLL	RAM 288 KB	RTC
WDT	MAC	Timer (8 ch x 8-bit 2 ch x 16-bit)
I/O Ports (136)	CPU 900/H1 (80 MHz)	Touch Screen
Alarm		ADC (6 ch x 10-bit)
Key Port	MMU	CS/Wait (4 ch)
SIO	SDRAMC	DMAC
I2C	MLC NANDFC	USB I/F
I2S	Power Controller	16M TFT LCDC
SPI		

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Software IPs

Software IP	Product Code	MCU Series	Peripheral
TCP/IP Stack	SWIP-N100	32-Bit	Ether Controller
HTTP Server	SWIP-N110	32-Bit	-
JPEG (Decode)	SWIP-G100	32-Bit	LCD Controller
USB1.1(Device)	SWIP-N201	16/32-Bit	USB Controller
FAT File System	SWIP-F100	32-Bit	Storage Driver
IrDA Protocol Stack	SWIP-N300	16-Bit	IrDA Transceiver
Voice Memo	SWIP-V200	8-Bit	D/A or PWM
Voice Compression	SWIP-V100	8-Bit	D/A or PWM
Voice Memo	SWIP-V201	16-Bit	D/A or PWM
Voice Compression	SWIP-V101	16-Bit	D/A or PWM
Security Authentication	SWIP-S100	8-Bit	-
CF Card Driver	SWIP-F220	16/32-Bit	-
SD Card Driver	SWIP-F230	16/32-Bit	Serial Controller
Graphical Interface	SWIP-G200	32-Bit	LCD Controller
Graphic Library	SWIP-G300	16/32-Bit	LCD Controller
Hand Writing Recognition	SWIP-I100	32-Bit	LCD/Touch Panel

Development Tool Support

TMP92CZ26   **Target Board**

EI_PODDATA
EI_SYNCLK
EI_PODREQ
EI_REFCLK
EI_TRGIN
EI_COMRESET
EO_MCUDATA
EO_MCUREQ
EO_TRGOUT

DSU Probe

New Type Emulation POD

Emulator/ Controller (Model 15/20)

PC

Model 15   BM1040R0A
POD   BM92CZ26XB0A-M15
IDE   SW96MN0-ZCC
C-Compiler   SW96CN0-ZCC

A number of reference and demo boards are also available
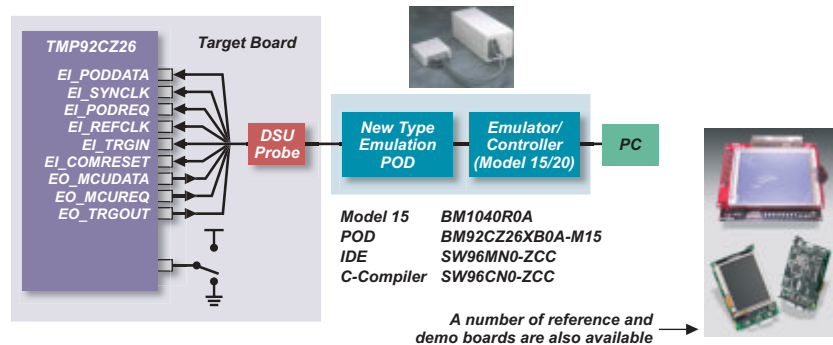
Product Line-up

	TMP92CH21	TMP92CA25	TMP92CF29	TMP92CZ26
MAC	-	-	32 x 32 + 64	32 x 32 + 64
LCD-CTRL	16 Gray/Color 640*480	W/B 640*480	Gray/Color 640*480	Gray/Color 640*480
10-bit A/DC	4 ch	4 ch	5 ch	5 ch
ROM size	8 KB(Boot)	-	8 KB(Boot)	8 KB(Boot)
RAM size	16 KB	10 KB	144 KB	288 KB
DRAM-CTRL	SDRAM Program execute	SDRAM Program execute	SDRAM Program execute	SDRAM Program execute
UART/SIO	2 ch	-	-	-
SIO/IrDA1.0	1 ch	1 ch	1 ch	1 ch
SBI/I^{2}C BUS	-	1 ch	1 ch	1 ch
SPI	-	1 ch	1 ch	1 ch
MMU	512 MBmax	512 MBmax	3.1 GBmax	3.1 GBmax
Min Instruction CLK (internal)	50 nS 20 MHz/3.0V	50 nS 20 MHz/3.0V	16.6 nS 80 MHz/1.4V	16.6 nS 80 MHz/1.4V
8-bit Timer	4 ch	4 ch	8 ch	8 ch
16-bit Timer	1 ch	1 ch	2 ch	2 ch
USB-CTRL	USB 1.1	-	USB 1.1	USB 1.1
NANDF CTRL	2 ch	2 ch	2 ch (MLC)	2 ch (MLC)
Package	144-pin LQFP	144-pin LQFP	176-pin LQFP	228-pin FBGA

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