

TX09 Series

32bit

Under Development

**TMPA901CMXBG**

177pin

## High-performance 32-bit RISC microcontroller with a USB host controller

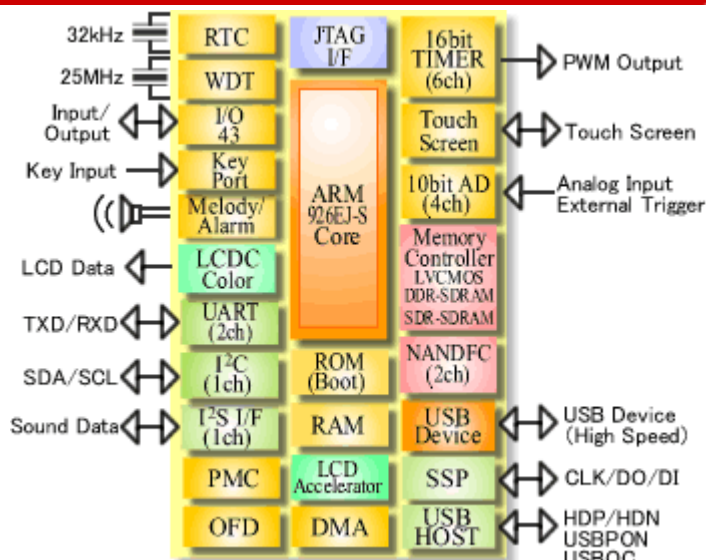
### Features

#### ● ARM926EJ-S™ CPU Core

- Operating voltage:  
Internal: 1.4 to 1.6 V I/O: 1.7 to 1.9 V, 3.0 to 3.6 V
- Minimum instruction execution time:  
5 ns (200 MHz internal, 0 to 70°C)  
6.67 ns (150 MHz internal, -20 to 85°C)
- Data cache: 16 Kbytes
- Instruction cache: 16 Kbytes
- Internal ROM: 16 Kbytes (Boot)
- Internal RAM: 32 Kbytes
- External data bus width: Up to 16 bits

#### ● On-chip Functions

- Color LCD controller (16-bit TFT/STN) : 1 channel
- LCD data process accelerator
- Memory controller
  - Static memory
  - SDR SDRAM
  - LVC MOS DDR SDRAM
- NAND Flash controller : 2 channels
- USB (High-speed) device controller : 1 channel
- USB (Full-Speed) host controller : 1 channel
- DMA controller : 8 channels
- SSP (SPI/MicroWire mode) : 1 channels
- RTC : 1 channel



- UART : 2 channels
- I2C : 1 channels
- I2S interface : 1 channels
- 10-bit AD converter : 4 channels
- 16-bit timer : 6 channels
- Touch-screen interface : 1 channel
- JTAG interface
- Power management circuit (PMIC)
- Oscillation frequency detection (OFD)

### Package Information

#### ● Pin Assignments

Package name:  
FBGA177-P-1313-0.8C4

Top View

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17
C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17
E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17
G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17
H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14	H15	H16	H17
J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16	J17
K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12	K13	K14	K15	K16	K17
L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17
M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17
N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17
P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17
R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17
T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17
U1	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11	U12	U13	U14	U15	U16	U17

● Pin Numbers and Names (1/2)

	1	2	3	4	5	6	7	8
A	A1 DVSSCOM	A2 SM3/XT2	A3 SM2/XT1	A4 PU3/NDD3/ LD3	A5 PU2/NDD2/ LD2	A6 PU1/ NDD1/LD	A7 PU0/ NDD0/LD0	A8 SE5/A5
B	B1 SP0/TCK	B2 PC2/PWE	B3 PC3/MLDA LM/PWM1 O UT	B4 PU7/NDD7/ LD7	B5 PU6/NDD6/ LD6	B6 PU5/ NDD5/LD	B7 PU4/ NDD4/LD4	B8 SF3/A11
C	C1 SP4/RTCK	C2 SP1/TMS	C3 PC4/ FSOUT/ PWM3OUT	C4 PV3/ NDCE/ LD11	C5 PV2/ NDAL/ LD10	C6 PV1/ NDMEN/ LD9	C7 PV0/ NDREN/ LD8	C8 SG0/A16
D	D1 SP5/TDO	D2 SP2/TDI	D3 PC6/ I2C0CL/ USBPON	D4 PV7/LD15	D5 PV6/ NDRB/LD1	D6 PV5/ NDCE1n/ LD13	D7 PV4/ NDCE0n/ LD12	D8 SG4/A20
E	E1 DVCC3IO	E2 SP3/TRSTn	E3 PC7/ I2C0DA/ INT9	E4 DVCC3IO	E5 DVSSCOM			
F	F1 DVCC1B	F2 DVCC3IO	F3 DVCC3IO	F4 DVCC3IO				
G	G1 DVSSCOM	G2 DVSSCOM	G3 DVSSCOM	G4 DVSSCOM				
H	H1 DVCC1A	H2 DVCC1A	H3 DVCC1A	H4 DVCC1A				
J	J1 AVCC3AD	J2 VREFH	J3 VREFL	J4 DVCC1B				
K	K1 PD4/AN4/ MX	K2 PD5/AN5/ MY	K3 AVSS3AD	K4 DVCC3IO				
L	L1 PD6/ INTACTS1)/ AN6	L2 PD7/INTB/ AN7	L3 DVCC3IO	L4 SM6/AM0				
M	M1 DVCC3IO	M2 DVCC3IO	M3 PA0/K10	M4 PA2/K12	M5 DVSSCOM	M6 AVSS3C	M7 DVCC1A	M8 DVCC3IO
N	N1 SM4/ RESETn	N2 PND/ U0TXD/ SIR0OUT	N3 PA1/K11	N4 PA3/K13	N5 DVSSCOM	N6 AVCC3C	N7 AVCC3T1	N8 AVCC3T0
P	P1 PNI/ U0RXD/ SIR0IN	P2 SM7/AM1	P3 DVCC1C	P4 DVSS1C	P5 DVSSCOM	P6 SR3/ REXT	P7 AVSS3T2	P8 AVSS3T1
R	R1 DVSSCOM	R2 SM0/X1	R3 SM1/X2	R4 DVCC1C	R5 SR4/ VSENS	R6 AVSS3T3	R7 SR1/DDM	R8 SR0/DDP
	1	2	3	4	5	6	7	8

## ● Pin Numbers and Names (2/2)

9	10	11	12	13	14	15	
A9 SE4/A4	A10 SE3/A3	A11 SE2/A2	A12 SE1/A1	A13 SE0/A0	A14 SL2/ DMCAP	A15 DVSSCOM	A
B9 SG7/A23	B10 SF2/A10	B11 SF1/A9	B12 SF0/A8	B13 SE7/A7	B14 SE6/A6	B15 SL1/ DMCGLKN	B
C9 SF7/A15	C10 SG6/A22	C11 SF6/A14	C12 SF5/A13	C13 SF4/A12	C14 SK0/ DMCSDQMD /	C15 SL0/DMCDD LKP/DMCSC	C
D9 SG3/A19	D10 SG2/A18	D11 SG5/A21	D12 SG1/A17	D13 SK4/ SMCWE <sub>n</sub>	D14 SK1/ DMCSDQMI /DMCDDMI	D15 SL6/ DMCGLKIN	D
			E12 SK5/ SMCBE1 <sub>n</sub>	E13 S <sub>J</sub> 5/ DMCBA1	E14 SE7/D15	E15 SB6/D14	E
			F12 S <sub>J</sub> 6/ DMCCKE	F13 S <sub>J</sub> 4/ DMCBA0	F14 SB5/D13	F15 SB4/D12	F
			G12 DVCCM	G13 S <sub>J</sub> 3/ DMCCAS <sub>n</sub>	G14 SB3/D11	G15 SB2/D10	G
			H12 DVCCM	H13 S <sub>J</sub> 2/ DMCRAS <sub>n</sub>	H14 SB1/D9	H15 SB0/D8	H
			J12 DVCCM	J13 S <sub>J</sub> 1/ DMCWE <sub>n</sub>	J14 SL5/ DMCDDQS1	J15 SL4/ DMCDDQS0	J
			K12 DVCC1A	K13 S <sub>J</sub> 0/ SMCCE <sub>n</sub>	K14 SA7/D7	K15 SA6/D6	K
			L12 DVCC1B	L13 SH7/ DMCCS <sub>n</sub>	L14 SA5/D6	L15 SA4/D4	L
M9 DVCC3I0	M10 SN2/ SELJTAG	M11 AVCC3H	M12 SN1/ SELDVCCM	M13 SH4/ SMCCS1 <sub>n</sub>	M14 SA3/D3	M15 SA2/D2	M
N9 PE2/K02/ LCLFP	N10 PB1/K01/ LCLAC	N11 PT2/ SP000/ I2S0DATI	N12 PT4/ UITXD/ USBPON	N13 SH3/ SMCCS0 <sub>n</sub>	N14 SA1/D1	N15 SA0/D0	N
P9 SND/SELM EMC	P10 PB0/K00/ LCLCP	P11 PT6/ UICTS <sub>n</sub> / I2S0DATO	P12 PT1/ SP0CLK/ I2S0CLK	P13 PT0/ SP0FSS/ I2S0WS	P14 PT3/SP0CI/ I2S0MCLK	P15 SH2/ SMCBE0 <sub>n</sub>	P
R9 AVSS3T0	R10 PB3/K03/ LCLLP	R11 PT7/ X1USB/ SELNAND	R12 PT5/ UIRXD/ USBDC	R13 SN7/HDM	R14 SN6/HDP	R15 DVSSCOM	R
9	10	11	12	13	14	15	

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**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.