



# TMP19A31CYFG

**32-bit high-functionality and high-performance microcontroller  
based on TX19A/H1 core suitable for amusement equipment and office equipment**

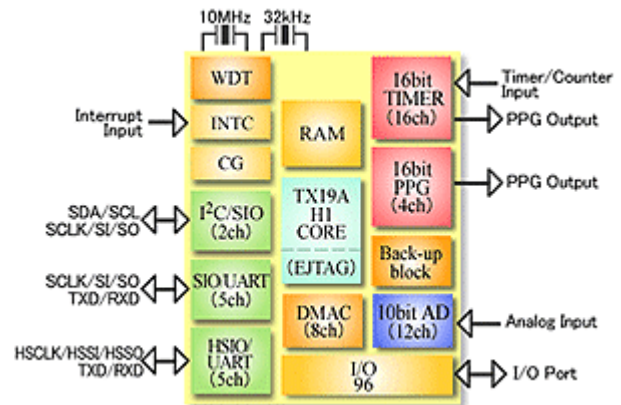
## Features

### TX19A/H1 CPU Core

- ▶ Operating voltage:  
2.7 V to 3.6 V
- ▶ Maximum Operating frequency :  
80 MHz (10 MHz × 8 by PLL )

### Built-in Functions

- ▶ 10-bit AD converter : 12 channels
- ▶ DMA controller : 8 channels
- ▶ 16-bit timer : 16 channels
- ▶ 16-bit PPG output : 4 channels
- ▶ SIO/UART : 5 channels
- ▶ HSIO/UART : 5 channels
- ▶ I<sup>2</sup>C/SIO : 2 channels
- ▶ Multiplex /separate bus selectable
- ▶ Back-up block



### Memory Size

Part number	ROM	RAM
TMP19A31CYFG	ROMless	256 Kbytes



## Pin Numbers and Names

Pin No	Pin Name	Pin No	Pin Name
1	AVCC3	45	DVCC3
2	P900, SDA1, TBCOUT	46	DVSS
3	P901, SCL1, TBCOUT	47	D0, AD0
4	P902, SCK1, TBCOUT	48	D1, AD1
5	P903, INT9, TBCOUT	49	D2, AD2
6	P904, HTXD2, TBAIN0	50	D3, AD3
7	P905, HRXD2, TBAIN0	51	D4, AD4
8	P906, HSCLK2, TBAIN1, <del>HCTS2</del>	52	D5, AD5
9	P907, INTA, TBAIN1	53	D6, AD6
10	P908, HTXD3, TD0OUT0	54	D7, AD7
11	P909, HRXD3, TD0OUT1	55	D8, AD8
12	P910, HSCLK3, TD1OUT0, <del>HCTS3</del>	56	D9, AD9
13	P911, INTB, TD1OUT1, <del>DACK4</del>	57	D10, AD10
14	P912, HTXD4, TD2OUT0	58	D11, AD11
15	P913, HRXD4, TD2OUT1	59	D12, AD12
16	P914, HSCLK4, TD3OUT0, <del>HCTS4</del>	60	D13, AD13
17	P915, INTO, TD3OUT1, <del>DREQ4</del>	61	D14, AD14
18	A23, P415	62	D15, AD15
19	A22, P414	63	P100, D16, AD16
20	A21, P413	64	P101, D17, AD17
21	DVCC3	65	P102, D18, AD18
22	DVSS	66	P103, D19, AD19
23	A20, P412	67	DVCC3
24	A19, P411	68	DVSS
25	A18, P410	69	P104, D20, AD20
26	A17, P409	70	P105, D21, AD21
27	A16, P408	71	P106, D22, AD22
28	A15, P407	72	P107, D23, AD23
29	A14, P406	73	P108, D24, AD24
30	A13, P405	74	P109, D25, AD25
31	A12, P404	75	P110, D26, AD26
32	A11, P403	76	P111, D27, AD27
33	A10, P402	77	P112, D28, AD28
34	A9, P401	78	P113, D29, AD29
35	A8, P400	79	P114, D30, AD30
36	A7, P307	80	P115, D31, AD31
37	A6, P306	81	DVSS
38	A5, P305	82	P600, INT0, TBBIN0
39	A4, P304	83	P601, <del>ALARM</del> , TBBIN1
40	A3, P303	84	P602, INT1, TBCIN0
41	A2, P302	85	P603, TBCIN1
42	A1, P301	86	P604, INT2, TBCIN0
43	A0, P300	87	P605, TBCIN1, BUSMD
44	TEST1	88	P606, ENDIAN

Pin No	Pin Name	Pin No	Pin Name
89	X1	133	BVCC3
90	CVSS	134	XT1
91	X2	135	XT2
92	TEST4	136	BUPM0
93	NMI	137	TEST3
94	WDTOUT	138	TEST2
95	RD	139	P800, TXD3, TB00OUT
96	WRLL	140	P801, RXD3, TB10OUT
97	WRLH	141	P802, SCLK3, TB20OUT, CTS3
98	P203, WRHL	142	P803, TB30OUT
99	P204, WRHH	143	P804, TXD4, TB40OUT
100	P205, WAIT, RDY	144	P805, RXD4, TB50OUT
101	P206, R/W	145	P806, SCLK4, TB60OUT, CTS4
102	P207, ALE	146	P807, TB70OUT
103	P208, CS0	147	P808, HTXD0, TB80OUT
104	P209, CS1	148	P809, HRXD0, TB90OUT
105	CS2	149	P810, HSCLK0, TBAOUT, HCTS4
106	P211, CS3	150	P811, INT7, TB00OUT
107	P212, CS4, ADTRG	151	P812, HTXD1, TB7IN0
108	P213, INTD, CS5	152	P813, HRXD1, TB8IN0
109	P214, INTE, BUSRQ	153	P814, HSCLK1, TB7IN1, HCTS1
110	P215, INTF, BUSAK	154	P815, INT8, TB8IN1
111	DVCC3	155	DVCC3
112	DVSS	156	DVSS
113	REGVCC3	157	EJE
114	REGVSS	158	TCK
115	P700, TXD0, TB0IN0	159	TMS
116	P701, RXD0, TB1IN0	160	TDO
117	P702, SCLK0, TB0IN1, CTS0	161	TDI
118	P703, INT3, TB1IN1	162	TRST
119	P704, TXD1, TB2IN0	163	P500, AIN0
120	P705, RXD1, TB3IN0	164	P501, AIN1
121	P706, SCLK1, TB2IN1, CTS1	165	P502, AIN2
122	P707, INT4, TB3IN1	166	P503, AIN3
123	P708, SDA0, TB4IN0	167	P504, AIN4
124	P709, SCL0, TB4IN1	168	P505, AIN5
125	P710, SCK0, SCOUT	169	P506, AIN6
126	P711, INT5, DACI0	170	P507, AIN7
127	P712, TXD2, TB5IN0	171	P508, AIN8
128	P713, RXD2, TB6IN0	172	P509, AIN9
129	P714, SCLK2, TB5IN1, CTS2	173	P510, AIN10
130	P715, INT6, TB6IN1, DREQ0	174	P511, AIN11
131	RESET	175	AVSS
132	BW0	176	VREFH

## Development Systems

### Software Products

Toshiba Integrated Development Environment	C Compiler	SW1ACN0-ZCC: 1 license SW1ACN3-ZCC: 10 licenses
	Integrated Development Environment	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses The emulator comes with a single-seat download license.
Real-Time OS (μITRON 4.0)		SW1ARN5-ZCC: Object code can be freely copied. SW1ARNF-ZCC: Object code can be freely copied and comes with source code.

### Hardware Products Emulator

On-Chip Debug Emulator	HW19DG100AG
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\* As to hardware products, additional accessories are also needed.

» For further information about Toshiba microcomputers and Toshiba microcomputer development systems, please visit <http://www.semicon.toshiba.co.jp/eng/product/micro/index.html>

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