

MN101D01C / D / E / F / G

Type		MN101D01C / D / E / F / G
ROM (x8-bit)		48K / 64K / 80K / 96K / 128K
RAM (x8-bit)		1536 / 2048 / 2304 / 2560 / 3072
Minimum Instruction Execution Time	With Main Clock operated	0.1397 μs (at 4.0 to 5.5V, 14.32MHz) 0.1128 μs (at 4.0 to 5.5V, 17.73MHz)
	When Sub-clock operated	143 μs (at 2.7 to 5.5V fixed to 14.32MHz internal division) 122 μs (at 2.7 to 5.5V, 32.768MHz)
Interrupts	• RESET • Runaway • External 0, 1, 2, 3, 4/key input (P50 to 54) • Timer 0 • Timer 1 • Timer 2 • Timer 3 • Timer 4 • Timer 6 • Capstan FG • Control • HSW • Cylinder FG • VSYNC • Continuous Synchronous Output • OSD • XDS • Serial 0 • Serial 1 • Serial 2 • A/D (common with PWM 14 reference frequency)	
Timer Counter	Timer Counter 0: 16-bit x 1 (Timer Output, Clock Function [max. 2 s]) Clock Source.....1/2, 1/4, 1/8, 1/16 of System Clock, 1/512 of XI Oscillation Clock or OSC Oscillation Clock Interrupt Source.....Overflow of Timer Counter 0	
	Timer Counter 1: 16-bit x 1 (Timer Output, linear Timer Counter Function) Clock Source.....1/2, 1/4, 1/8, 1/16, CTL Signal of System Clock Interrupt Source.....Overflow of Timer Counter 1	
	Timer Counter 2: 16-bit x 1 (Timer Output, Input Capture (DCTL Specified Edge), Duty Judgment of DCTL Signal) Clock Source.....1/2, 1/4, 1/8, 1/12, 1/16, 1/24 of System Clock Interrupt Source.....Overflow of Timer Counter 2, Input of DCTL Specified Edge, Underflow of Timer 2 Shift Register 4-bit Counter, Coincidence of Timer 2 Shift Register with Timer 2 Shift Register Compare Register	
	Timer Counter 3: 16-bit x 1 (Timer Output, Detection of Serial Indexing, Generation of Remote Control Output Carrier Frequency) Clock Source.....1/2, 1/4, 1/8, 1/16 of System Clock Interrupt Source.....Overflow of Timer Counter 3	
	Timer Counter 4: 16-bit x 1 (Timer Output, Event Count (P15 Input), Generation of Serial Transmission Clock) Clock Source.....1/8, 1/16 of System Clock, External Clock Input Interrupt Source.....Overflow of Timer Counter 4, Coincidence of Timer Counter 4 with OCR4	
	Timer Counter 5: 17-bit x 1 (Watchdog, Stable Oscillation Waiting Function) Clock Source.....System Clock Watchdog Interrupt Source....1/2 ¹³ , 1/2 ¹⁵ of Timer Counter 5 Clear by Stable Oscillation...After 256 Counts by Timer Counter 5 (2 ¹⁸ Counts of OSC Oscillation Clock)	
Serial Interface	Timer Counter 6: 16-bit x 1 (Clock Function [max. 2 s]) Clock Source.....1/512 of OSC Oscillation Clock, XI Oscillation Clock, 1/4, 1/8, 1/64, 1/128 of System Clock Interrupt Source.....1/2 ¹³ , 1/2 ¹⁴ , 1/2 ¹⁵ , Overflow of Timer Counter 6	
	Serial 0: 8-bit x 1 (Synchronous Type/Start-stop Synchronous Type) (Transfer Direction of MSB/LSB Selectable) Synchronous Type Clock Source...1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256 of System Clock, 2-division timer 4 output, $\overline{\text{SBT0}}$ pin input Clock for UART8-division of Above Clock, 2-division Timer 4 Output, $\overline{\text{SBT0}}$ Pin Input	
	Serial 1: 8-bit x 1 (Synchronous Type/Remote Control Transmission/Simple Remote Control Receive) (Transfer Direction of MSB/LSB Selectable, Start Condition Function) Clock Source.....1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256 of System Clock, 2-division Timer 4 Output, $\overline{\text{SBT1}}$ Pin Input Remote Control Clock....2-division Timer Output	
	Serial 2: 8-bit x 1 (Sync/I²C) (Master Transmission/Reception, Slave Transmission/Reception) Clock Source.....1/72, 1/80, 1/84, 1/96, 1/102, 1/112, 1/128, 1/144, 1/160, 1/168, 1/192, 1/224, 1/256, 1/320, SCK Pin Input of System Clock	

OSD			Accommodation with Menu or Super Impose Display Applicable Broadcasting System: NTSC, PAL, PAL-M, PAL-N Screen Configuration : 24 Characters x 2n Rows (n=1 to 6) Character Type : Max. 512 Character Types (Variable) Character Size : 12x18 Dots Enlarged Characters : Each x 2, x 3 or x 4 Settings in Horizontal and Vertical Character Interpolation : None Background Color : 8 Gradations Settable (Settable in The Row Unit at Menu Display) Background Intensity : 8 Gradations Settable in The Row Unit Character Color : White Character Intensity : 8 Gradations Settable in The Row Unit Frame Function : 1-Dot frame in 4 or 8 Directions Frame Intensity : 4 Gradations Settable in The Row Unit Box Shade Function : Settable in The Character Unit (Only at Composite Output with 128 Character Types or More) Blinking : None (Covered by Software) Inverted Character : Settable in The Character Unit Halftone : Settable in The Row Unit in 2 Intensity Gradations (Setting in The Row Unit) Input : Composite Video Signal Input (Output Level: 1 Vpp/2 Vpp) Clamp Method : Sync Chip Clamp, Clamp Level in 4 Levels Output : Composite Video Output : Digital Output (6 pins) : 8 Character and Background Colors Each Settable at Digital Output. Measure Against Image Fluctuation : Built-in AFC Circuit Sync Signal Detection Function : Detection Functions for Horizontal and Vertical Sync Signals (Integral System) With Horizontal Sync Signal Interpolation Function
XDS			Built-in U.S. Closed Caption Data Slicer (Optional 2 Line Data can be Extracted.)
ROM Correction			Correcting Address Designation: Up to 2 Addresses Possible Correction Method: Correction Program Being Saved in Internal RAM
I/O Pins	I/O	73	• Common use: 73 ports 0, 1, 2, 4, 5, 6, 7, A, B, by-bit
	Input	4	• Common use: 4
A/D			8-bit x 12ch (Without S/H)
PWM			13-bit x 2ch (at Repetition Cycle 572μs, 14.32MHz), 10-bit x 2ch (at Repetition Cycle 71.5μs, 14.32MHz), 14-bit x 1ch (at Repetition Cycle 1144μs, 14.32MHz)
ICR			18-bit x 6ch
OCR			16-bit x 7ch, 8-bit x 1ch
Special Ports			Buzzer Output, 3-State Output (PTO) VLP Pin, Synchronous Output: 7, 3-State Synchronous Output: 4, Remote Control Receive, CTL Amp, Built-in FG Amp, Output of 1/2 OSC Oscillation Clock (2Vpp), Output of 1/4 OSC Oscillation Clock (1 Vpp)
Notes			VISS/VASS Detection Function
Package			QFP-100-P-1818

Electrical Characteristics

Supply Current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating Supply Current	IDD1	14.32MHz operation without load		30	60	mA
	IDD2	14.32MHz oscillation SLOW operation without load		2	5	mA
	IDD3	Stop of 14.32MHz oscillation 32kHz oscillation operation without load		0.1	1.0	mA
Supply Current at STOP	IDSP	Stop of oscillation without load			20	μA
Supply Current at HALT	IDHT0	14.32MHz oscillation without load		5	15	mA
	IDHT1	Stop of 14.32MHz oscillation 32kHz oscillation operation without load		5	20	μA

(Ta=25±2°C, VDD=5.0V, VSS=0V)

A/D Converter Performance

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Conversion Relative Error	ΔNLad				±3	LSB
A/D Conversion Time	Tad	fosc = 14.32Mhz		8		μs
Analog Input Voltage			0.5		4.5	V

(Ta = 25±2°C, VDD=5.0V, VSS=0V)

Support Tool

In-Circuit Emulator

PX-ICE1880-2 + PX-PRB67508

EPROM built-in Type

Use MN101DP01G [ES (Engineering available)].

Pin Assignment

