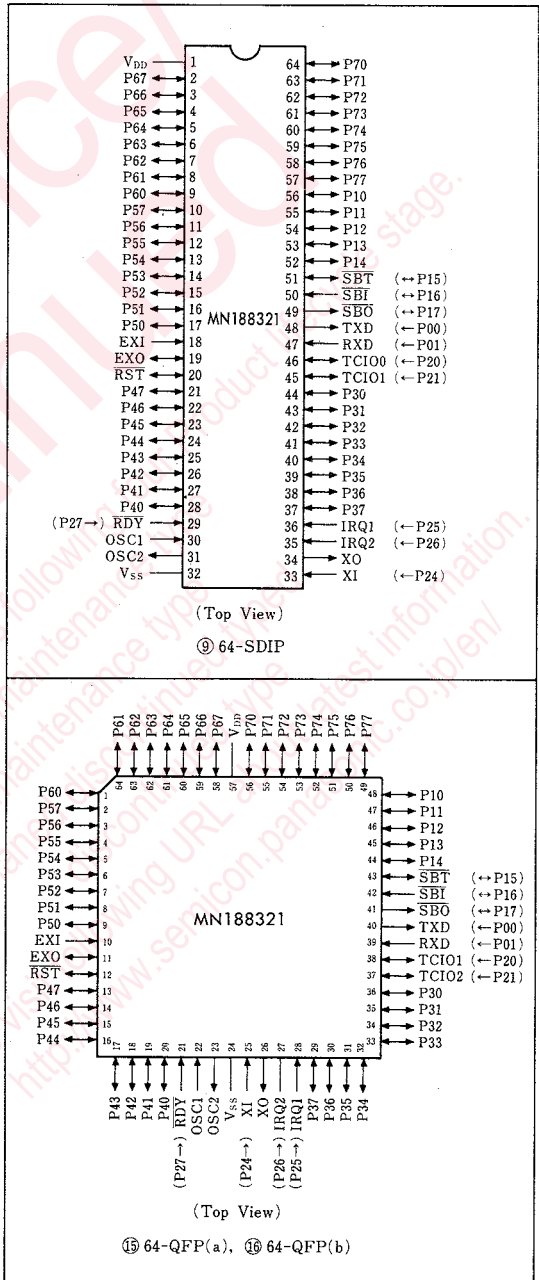# 8-Bit 1-Chip Microcomputers

MN188321

■ Outline

 The MN188321 has the same functions as those of the MN18881,except that capacities of the built–in ROM and RAM of the MN18881 are increased.

■ Features

- ROM capacity:32,768 × 8bits
- RAM capacity:448 × 8bits
  (data area and stack area)
- Interrupt:External interrupt 2
  Timer interrupt 3
  Serial interrupt 2
  Abnormal run detect interrupt 1
- Timer/counter:16-bit programmable timer × 4
  Timer function
  Event count function
  Baud rate generator
  16-bit binary counter × 1
  Time base function
  Watchdog function
- Serial interface:8-bit sync.type
  1 channel
  Start condition addable
  8-bit start–stop sync.type
  1 channel
- ROM,RAM external extension:
  Both ROM and RAM extendible up
  to 64 KB
- I/O pins:Memory mapped I/O system
  8 for per-bit direction control I/O port
  (3 of them combined with serial interface)
  40 for per-byte direction control I/O port
  8 for input port(various function combined)
- Package:64-QFP/64-SDIP
- Piggyback:EP188321

■ Pin Configuration

(Top View)
⑨ 64-SDIP

(Top View)
⑮ 64-QFP(a), ⑯ 64-QFP(b)

■ Pin Descriptions

Symbol	Pin	I/O	Description
V_{DD}	Power supply	——	Connect +5V.
V_{SS}	Power supply	——	Connect 0V(GND).
OSC1	Oscillation input	I	High-speed system clock oscillation input pin
OSC2	Oscillation output	O	High-speed system clock oscillation output pin
XI/IRQ0/P24	Oscillation input	I	Low-speed system clock oscillation input pin. Also available as an IRQ0(interrupt) input pin or an input port.
XO	Oscillation output	O	Low-speed system clock oscillation output pin.
$\overline{RST}$	Reset	I	Pin to reset the microcomputer
EXI EXO	Operation mode selector	I O	Pins to set the extension mode. System clock S2 is outputted from EXO.
TXD (P00)	UART data send	O (I)	Start-stop sync. serial interface(UART) serial data output pin. Also available as an input port.
RXD (P01)	UART data receive	I	Start-stop sync. serial interface(UART) serial data input pin. Also available as an input port.
$\overline{SBT}$ (P15)	Sync. serial clock I/O	I/O	Sync. serial interface clock I/O pin. Also available as an I/O port.
$\overline{SBI}$ (P16)	Sync. serial data input	I (I/O)	Sync. serial interface data input pin. Also available as an I/O port.
$\overline{SBO}$ (P17)	Sync. serial data output	I (I/O)	Sync. serial interface data output pin. Also available as an I/O port.
TCIO0~1 (P20~P21)	Timer/event counter I/O	I/O (I)	Timer/event counter I/O pins. Also available as input ports.
IRQ1~2 (P25~P26)	External interrupt input	I	External interrupt input pins and always in an input state. Also available as input ports.
P10~P17	I/O	I/O	General purpose I/O pins. Input/output can be specified for each bit.
P30~P37 P40~P47 P50~P57 P60~P67 P70~P77	I/O	I/O	General purpose I/O pins. Input/output can be specified for each port, with 8 bits in one.

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