# ❑ MN150413 / 0813

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|---|---|
| **Type** | **MN150413 / 0813** |
| **ROM (x8-bit)** | 4K/8K |
| **RAM (x4-bit)** | 256/432 |
| **Number of Instructions** | 103 |
| **Minimum Instruction Execution Time** | **At 1/4 frequency dividing 2μs (at 1.8 to 5.5V, 2MHz)**<br>**At 1/4 frequency dividing 0.94μs (at 2.7 to 5.5V, 4.24MHz)**<br>**At 1/8 frequency dividing 2μs (at 1.8 to 5.5V, 4MHz)** |
| **Interrupts** | • RESET • External (Key Interrupt is available) • Timer • Serial |
| **Timer Counter** | **Timer Counter 1 : 8-bit x 1** (Event Count)<br>Clock Source .....1/2, 1/8, 1/32, 1/128 of System Clock, XI Oscillation Clock<br>Remote Control Carrier Output<br>1/1, 1/4, 1/16, 1/64 of Time Base 8Hz Dividing Signal<br>Interrupt Source .....Overflow of Timer Counter 1<br><br>**Time Counter 2 : 8-bit x 1**<br>Clock Source.....1/1, 1/16, 1/32, 1/64 of OSC Oscillation Clock,<br>1/1, 1/16, 1/32, 1/64 of XI Oscillation Clock,<br>1/1, 1/16, 1/32, 1/64 of TCI2 Pin Input<br>Interrupt Source.....Overflow of Timer Counter 2<br>Possible cascade connection with timer counter 1<br><br>**Time Base Counter**<br>Clock Source .....1/8 of XI Oscillation Clock<br><br>**Watchdog Timer** |
| **Serial Interface** | **Serial : 8-bit x 1** (Synchronous Type)<br>Clock Source .....$\overline{SBT}$ Pin Input, System Clock |

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| **I/O Pins** | **I/O** | **16** | • Common use : 10 • Specified pull-up Resistor available : 16 (Software Programmable)<br>• SEG output selectable : 8 (Software Programmable) |
| | **Input** | **9** | • Common use : 5 • Specified pull-up Resistor available : 9 (Software Programmable) |
| | **Output** | **1** | • Common use : 1 |

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| **LCD** | 33 Segments • 2 Common • 1/2 Duty, 33 Segments • 3 Common • 1/3 Duty, 32 Segments • 4 Common • 1/4 Duty |
| **Special Ports** | Buzzer Output, Remote Control Transmission |
| **Notes** | Built-in Carrier Generator Circuit for Remote Controller |
| **Package** | QFP064-P-1414 |

**Electrical Characteristics**

**Supply Current**

| Parameter | Symbol | Condition | Limit | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| **Operating Supply Current** | IDD1 | fosc=4MHz, 1/8 dividing | | 1.0 | 3.0 | mA |
| **Supply Current at STOP** | IDD8 | fxi=32.768kHz | | 4.0 | 10 | μA |
| | IDD9 | Oscillation halt | | | 2.0 | μA |
| **Supply Current at HALT** | IDD4 | fosc=4MHz | | 0.6 | 1.2 | mA |

**(Ta= −40 to +85°C, VDD=3.0V, VSS=0V)**

## Support Tool

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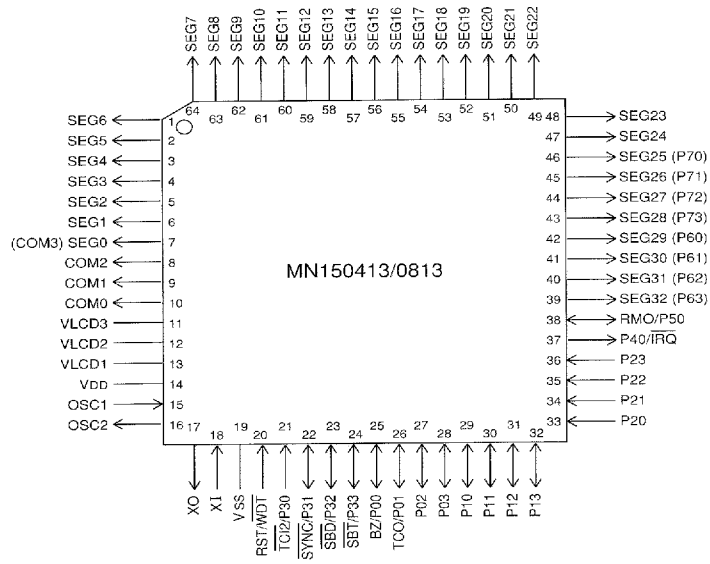
| **In-Circuit Emulator** | PX-ICE1500 + PX-PRB150413/0813 |
| **EPROM built-in Type** | Use **MN15P0813** in QFP064-P-1414 package. |

## Pin Assignment




QFP064-P-1414

※ P30 to P33 : Input only when used as the port 3.
P60 to P63, P70 to P73 : I/O when used as the port 6 or 7.