❑ MN1021617

Type	MN1021617	
ROM (x8-bit)	128 K	
RAM (x8-bit)	4 K	
Package	LQFP128-P-1818C *Lead-free, FLGA165-C-1111 *Lead-free	
Minimum Instruction Execution Time	With main clock operated	50 ns (at 3.0 V to 3.6 V, 40 MHz) 100 ns (at 2.0 V to 3.6 V, 20 MHz)
Interrupts	• $\overline{\text{RST}}$ pin • Watchdog • NMI pin • Timer counter 4 to 15 • Timer counter 16, 17, 21 • Timer counter 16 to 20 compare capture A • Timer counter 16 to 20 compare capture B • Timer counter 21 capture A • Timer counter 21 capture B • Timer counter 21 capture D • Timer counter 21 compare E • Timer counter 21 compare F • ATC ch.0 to 3 transfer finish • External 0 to 7 • Serial ch.0 to 3 transmission • Serial ch.0 to 3 reception • $\overline{\text{KI}}$ pin (OR) • A/D conversion finish	

Timer Counter

Timer counter 0 : 8-bit × 1 (prescalers)
Clock source ····· 1/2 of system clock frequency; timer counter 1 output

Timer counter 1 : 8-bit × 1 (prescalers)
Clock source ····· 1/2 of system clock frequency; timer counter 0 output

Timer counter 2 : 8-bit × 1 (UART baud rate generator)
Clock source ····· 1/2 of system clock frequency; timer counter 0 output

Timer counter 3 : 8-bit × 1 (UART baud rate generator)
Clock source ····· 1/2 of system clock frequency; timer counter 0 output; external clock input

Timer counter 4 : 8-bit × 1 (timer output, A/D conversion start up)
Clock source ····· 1/2 of system clock frequency; timer counter 0 output; timer counter 1 output
Interrupt source ····· underflow of timer counter 4

Timer counter 5, 9 : 8-bit × 1 (UART baud rate generator)
Clock source ····· 1/2 of system clock frequency; timer counter 0 output; timer counter 1 output
Interrupt source ····· underflow of timer counter 5, 9

Timer counter 6, 10, 11 : 8-bit × 1 (timer output)
Clock source ····· 1/2 of system clock frequency; external clock input; timer counter 0 output
Interrupt source ····· underflow of timer counter 6, 10, 11

Timer counter 7 : 8-bit × 1 (timer output)
Clock source ····· 1/2 of system clock frequency; external clock input; timer counter 0 output
Interrupt source ····· underflow of timer counter 7

Timer counter 8 : 8-bit × 1 (timer output)
Clock source ····· 1/2 of system clock frequency; external clock input; timer counter 0 output; timer counter 1 output
Interrupt source ····· underflow of timer counter 8

Timer counter 12 : 8-bit × 1 (timer output)
Clock source ····· 1/2 of system clock frequency; external clock input with edge; timer counter 0 output; timer counter 1 output
Interrupt source ····· underflow of timer counter 12

Timer counter 13 : 8-bit × 1 (timer output)
Clock source ····· 1/2 of system clock frequency; timer counter 0 output; timer counter 1 output
Interrupt source ····· underflow of timer counter 13

Timer counter 14 : 8-bit × 1 (timer output)
Clock source ····· 1/2 of system clock frequency; external clock input with edge; timer counter 0 output
Interrupt source ····· underflow of timer counter 14

Timer Counter (Continue)

Timer counter 15 : 8-bit × 1 (timer output)
- Clock source ····· 1/2 of system clock frequency; external clock input with edge; timer counter 0 output
- Interrupt source ····· underflow of timer counter 15

(Connectable) timer counter 0 to 3, 4 to 7, 8 to 11, 12 to 15

Timer counter 16, 17 : 16-bit × 1
(timer output, event count, input capture, output compare, PWM output, 2-phase encorder input)
- Clock source ····· 1/2 of system clock frequency; external clock input (with edge, timer counter 17 only); timer counter 0 output; timer counter 1 output (timer counter 16 only)
- Interrupt source ····· coincidence with compare capture A or at capture; coincidence with compare capture B or at capture; underflow of timer counter 16, 17

Timer counter 18 : 16-bit × 1
(timer output, event count, input capture, output compare, PWM output, 2-phase encorder input)
- Clock source ····· 1/2 of system clock frequency; external clock input; timer counter 0 output; timer counter 1 output
- Interrupt source ····· coincidence with compare capture A or at capture; coincidence with compare capture B or at capture; underflow of timer counter 18, 19, 20

Timer counter 19, 20 : 16-bit × 1
(timer output, event count, input capture, output compare, PWM output, 2-phase encorder input)
- Clock source ····· 1/2 of system clock; timer counter 0 output; timer counter 1 output
- Interrupt source ····· coincidence with compare capture A or at capture; coincidence with compare capture B or at capture; underflow of timer counter 18, 19, 20

Timer counter 21 : 24-bit × 1 (servo control)
- Clock source ····· 1/2 of system clock frequency; timer counter 1 output
- Interrupt source ····· when capturing to capture A; when capturing to capture B; when capturing to capture D; when coinciding to compare E; when coinciding to compare F

Serial Interface

Serial 0, 1 : 8-bit × 1 (transfer direction of MSB / LSB selectable, transmission / reception of 7, 8-bit length)
- Clock source ····· 1/8 of timer counter 2 frequency; 1/8, 1/2 of timer counter 5 frequency; external clock

Serial 2, 3 : 8-bit × 1 (transfer direction of MSB / LSB selectable, transmission / reception of 7, 8-bit length)
- Clock source ····· 1/8 of timer counter 3 frequency; 1/8, 1/2 of timer counter 9 frequency; external clock

UART × 4 (common use with serial 0 to 3)

I^2C × 2 (common use with serial 1, 3; single master)

I/O Pins	**I/O**	100	• Common use : 56 (address data separate 8-bit mode) • Common use : 73 (address data multiplex 8-bit Mode)
	Input	8	• Common use : 8

A/D Inputs 10-bit × 12-ch. (maximum input is 16) (with S/H)

PWM 16-bit × 5-ch. (timer counter 16 to 20)

ICR 16-bit × 5-ch., 24-bit × 1-ch. (timer counter 16 to 21)

OCR 16-bit × 5-ch., 24-bit × 1-ch. (timer counter 16 to 21)

Notes Address / data multiplex bus Interface, address / data separate bus interface, 8-bit / 16-bit bus width selectable

See the next page for electrical characteristics, pin assignment and support tool.

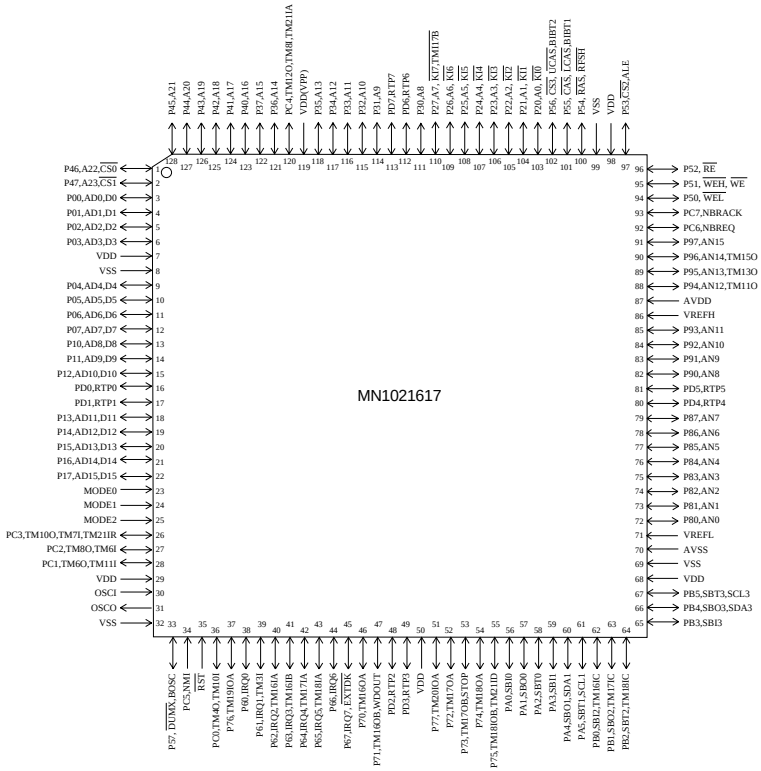
Electrical Characteristics

Supply current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDDopr	VI = VDD or VSS, output open f = 40 MHz , VDD = 3.3 V			50	mA
Supply current at STOP	IDDS	Pin with pull-up resistor is open all other input pins and Hi-Z state input/output pins are simultaneously applied VDD or VSS level f = 40 MHz , VDD = 3.3 V, output open			50	µA
Supply current at HALT	IDDH				25	mA

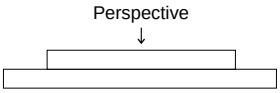
(Ta = –20°C to +70°C , VDD = AVDD = 3.3 V , VSS = AVSS = 0 V)

Pin Assignment



LQFP128-P-1818C *Lead-free

Pin Assignment (Continue)



13	12	11	10	9	8	7	6	5	4	3	2	1	
N.D.	N.D.	PB5,SBT3, SCL3	AVDD	P81,AN1	P83,AN3	P87,AN7	AVDD	P94,AN12, TM11O	AVDD	P50,/WEL	N.D.	N.D.	N
N.D.	N.D.	PB3,SBI3	VSS	VREFL	P85,AN5	PD5,RTP5	P93,AN11	P96,AN14, TM15O	PC6,NBREQ	P52,/RE	N.D.	N.D.	M
VSS	PB2,SBT2, TM18IC	PB1,SBO2, TM17IC	PB4,SBO3, SDA3	P80,AN0	P84,AN4	AVSS	P91,AN9	P95,AN13, TM13O	PC7, NBRACK	P51,/WEH, /WE	VDD	P54,/RAS, /RFSH	L
PB0,SBI2, TM16IC	PA4,SBO1, SDA1	PA5,SBT1, SCL1	VDD	AVSS	P86,AN6	P90,AN8	P92,AN10	P97,AN15	VSS	P53,/CS2, ALE	P56,/CS3, /UCAS, BIBT2	VDD	K
PA1,SBO0	PA3,SBI1	PA0,SBI0	PA2,SBT0	AVSS	P82,AN2	PD4,RTP4	VREFH	P55,/CAS, /LCAS, BIBT1	VPP	P20,A0,/KI0	P21,A1,/KI1	P23,A3,/KI3	J
P75, TM18IOB, TM21ID	P73, TM17OB, STOP	P77, TM20IOA	P72, TM17OA	P74, TM18OA	N.D.	N.D.	N.D.	P22,A2,/KI2	P26,A6,/KI6	P24,A4,/KI4	P27,A7,/KI7, TMI17B	P25,A5,/KI5	H
P71, TM16OB, WDOUT	PD3,RTP3	VDD	VDD	PD2,RTP2	N.D.	N.D.	N.D.	P30,A8	PD7,RTP7	VPP	P31,A9	PD6,RTP6	G
P65,IRQ5,TM 18IA	P67,IRQ7,/EX TDK	P66,IRQ6	P70,TM16OA	P64,IRQ4, TM17IA	N.D.	N.D.	N.D.	P34,A12	P32,A10	P33,A11	P35,A13	PC4,TM12O, TM8I, TM21IA	F
P63,IRQ3, TM16IB	P61,IRQ1, TM3I	P62,IRQ2, TM16IA	VDD	P60,IRQ0	MODE0	PD0,RTP0	P05,AD5,D5	P03,AD3,D3	P36,A14	VPP	P41,A17	P37,A15	E
VSS	P76, TM19IOA	PC0,TM4O, TM10I	VDD	PC2,TM8O, TM6I	P15,AD13, D13	P13,AD11, D11	P11,AD9,D9	VSS	P01,AD1,D1	P42,A18	P40,A16	VDD	D
/RST	P57,/DUMX, BOSC	PC5,NMI	OSCO	MODE2	P14,AD12, D12	VSS	P07,AD7,D7	VSS	P47,A23, /CS1	P44,A20	P45,A21	P43,A19	C
N.D.	N.D.	VSS	PC1,TM6O, TM11I	PC3,TM10O, TM7I, TM21IR	P16,AD14, D14	PD1,RTP1	P10,AD8,D8	VDD	P02,AD2,D2	P46,A22, /CS0	N.D.	N.D.	B
N.D.	N.D.	OSCI	VSS	MODE1	P17,AD15,D1 5	P12,AD10, D10	P06,AD6,D6	P04,AD4,D4	VDD	P00,AD0,D0	N.D.		A

FLGA165-C-1111 *Lead-free

The MN102F1617 is manufactured and sold under license agreement with BULL CP8 Inc. Note that MN102F1617 cannot be used as the IC card.

* A1 has no electrode (pin).
* N.D. (not defined) has an electrode (pin) but not guaranteed for N.C. (not connected). Pay sufficient attention so as not to cause shorting with any other wiring on the user board.
* VPP, VDD, VSS, AVDD and AVSS has multiple electrodes (pins). Electrodes having the same name are shorted internally.

Support Tool

In-circuit Emulator	PX-ICE102H1617-LQFP128-P-1818C	Not applicable to FLGA165-C-1111.
	Minimum instruction execution time	57.1 ns (at 35 MHz)
Flash Memory Built-in Type	Type	MN102F1617
	ROM (× 8-bit)	128 K
	RAM (× 8-bit)	4 K
	Minimum instruction execution time	62.5 ns (at 3.0 V to 3.6 V, 32 MHz) 83.3 ns (at 2.7 V to 3.6 V, 24 MHz)
	Package	LQFP128-P-1818C *Lead-free, FLGA165-C-1111 *Lead-free

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