

T-90-60

T-49-01

April 1986
Edition 3.0

4-Bit Microcontrollers and Peripherals

Table 1: FUJITSU 4-BIT MCU FAMILY

Process/ Series	ROM Size [bits]	RAM Size [bits]	Device Number	Package ¹	Device Number	Package
NMOS MB 8840 Series	2K x 8	128 x 4	MB 8841HM/-PSH	DIP-42P-M01/M02	MB 8845HM	FPT-48P-M02
	2K x 8	128 x 4	MB 8842M/-PSH	DIP-28P-M02/M03	MB 8846M	FPT-48P-M02
	1K x 8	64 x 4	MB 8843M/-PSH	DIP-42P-M01/M02	MB 8847M	FPT-48P-M02
	1K x 8	64 x 4	MB 8844M/-PSH	DIP-28P-M02/M03	MB 8848M	FPT-48P-M02
CMOS MB 8850/H MB 8850B Series	2K x 8	128 x 4	MB 8851M/-PSH	DIP-42P-M01/M02	MB 8855M	FPT-48P-M02
	2K x 8	128 x 4	MB 8852M/-PSH	DIP-28P-M02/M03	MB 8856M	FPT-48P-M02
	1K x 8	64 x 4	MB 8854M/-PSH	DIP-28P-M02/M03	MB 8858M	FPT-48P-M02
	2K x 8	128 x 4	MB 8851AM/-PSH	DIP-42P-M01/M02	MB 8855AM	FPT-48P-M02
	2K x 8	128 x 4	MB 8852AM/-PSH	DIP-28P-M02/M03	MB 8856AM	FPT-48P-M02
	1K x 8	64 x 4	MB 8854AM/-PSH	DIP-28P-M02/M03	MB 8858AM	FPT-48P-M02
	2K x 8	128 x 4	MB 8851LM/-PSH	DIP-42P-M01/M02	MB 8855LM	FPT-48P-M02
	2K x 8	128 x 4	MB 8852LM/-PSH	DIP-28P-M02/M03	MB 8856LM	FPT-48P-M02
	1K x 8	64 x 4	MB 8854LM/-PSH	DIP-28P-M02/M03	MB 8858LM	FPT-48P-M02
	2K x 8	128 x 4	MB 8851HM/-PSH	DIP-42P-M01/M02	MB 8855HM	FPT-48P-M02
2K x 8	128 x 4	MB 8851B-P ³	DIP-42P-M01	MB 8855B-P ³	FPT-48P-M02	
CMOS MB 88200/H MB 88200B Series	512 x 8	16 x 4	MB 88201-P	DIP-16P-M02	MB 88201-PF	FPT-16P-M03
	1K x 8	32 x 4	MB 88202-P	DIP-16P-M02	MB 88202-PF	FPT-16P-M03
	512 x 8	16 x 4	MB 88201A-P	DIP-16P-M02	MB 88201A-PF	FPT-16P-M03
	1K x 8	32 x 4	MB 88202A-P	DIP-16P-M02	MB 88202A-PF	FPT-16P-M03
	512 x 8	16 x 4	MB 88201H-P	DIP-16P-M02	MB 88201H-PF	FPT-16P-M03
1K x 8	32 x 4	MB 88202H-P	DIP-16P-M02	MB 88202H-PF	FPT-16P-M03	
1K x 8	32 x 4	*MB 88205B-P ³	DIP-28P-M02	-	-	
CMOS MB 88210 Series	1K x 8	32 x 4	MB 88211-P ⁴	DIP-20P-M02	-	-
NMOS MB 88400/H Series	4K x 8	192 x 4	MB 88401-P/-PSH	DIP-42P-M01/M02	MB 88401-PF	FPT-48P-M02
	4K x 8	256 x 4	MB 88401H-P/-PSH	DIP-42P-M01/M02	MB 88401H-PF	FPT-48P-M02
	2K x 8	256 x 4	MB 88403H-P/-PSH	DIP-42P-M01/M02	MB 88403H-PF	FPT-48P-M02
NMOS MB 88410/H Series	4K x 8	192 x 4	MB 88411-P/-PSH ⁴	DIP-42P-M01/M02	MB 88411-PF ⁴	FPT-48P-M02
	2K x 8	192 x 4	MB 88413-P/-PSH ⁴	DIP-42P-M01/M02	MB 88413-PF ⁴	FPT-48P-M02
	4K x 8	256 x 4	MB 88411H-P/-PSH ⁴	DIP-42P-M01/M02	MB 88411H-PF ⁴	FPT-48P-M02
	2K x 8	256 x 4	MB 88413H-P/-PSH ⁴	DIP-42P-M01/M02	MB 88413H-PF ⁴	FPT-48P-M02
NMOS MB 88420/H Series	4K x 8	192 x 4	MB 88421-PSH ⁵	DIP-64P-M01	-	-
	3K x 8	192 x 4	MB 88422-PSH ⁵	DIP-64P-M01	-	-
	2K x 8	128 x 4	MB 88423-PSH ⁵	DIP-64P-M01	-	-
	4K x 8	256 x 4	MB 88421H-PSH ⁵	DIP-64P-M01	-	-



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Maximum Input Only Ports	Maximum Output Only Ports	Maximum I/O Ports	Maximum Control Ports	Supply Voltage	Typical Power Dissipation [mW]	Number of Instructions	Minimum Instruction Cycle Time [μs]	Maximum Clock Frequency ² [MHz]	Process/ Series
4	12	16	5	5.0 ± 10%	350	70	2.0	3.0	NMOS MB 8840 Series
4	8	11	2	5.0 ± 10%	300	69	3.0	2.0	
4	12	16	5	5.0 ± 10%	300	70	3.0	2.0	
4	8	11	2	5.0 ± 10%	300	69	3.0	2.0	
4	12	16	5	5.0 ± 10%	10 at 1MHz	70	3.0	2.0	
4	8	11	2	5.0 ± 10%	10 at 1MHz	69	3.0	2.0	
4	8	11	2	5.0 ± 10%	10 at 1MHz	69	3.0	2.0	
4	12	16	5	3.5 to 6.0	10 at 1MHz	70	3.0	2.0	CMOS MB 8850/H MB 8850B Series
4	8	11	2	3.5 to 6.0	10 at 1MHz	69	3.0	2.0	
4	8	11	2	3.5 to 6.0	10 at 1MHz	69	3.0	2.0	
4	12	16	5	2.5 to 4.0	1.8 at 0.5MHz	70	7.5	0.8	
4	8	11	2	2.5 to 4.0	1.8 at 0.5MHz	69	7.5	0.8	
4	8	11	2	2.5 to 4.0	1.8 at 0.5MHz	69	7.5	0.8	
4	12	16	5	5.0 ± 10%	15 at 2MHz	70	1.5	4.0	
4	12	16	5	5.0 ± 10%	10 at 1MHz	70	2.0	3.0	
0	0	12	0	5.0 ± 10%	5 at 1MHz	37	3.0	2.0	CMOS MB 88200/H MB 88200B Series
0	0	12	0	5.0 ± 10%	5 at 1MHz	38	3.0	2.0	
0	0	12	0	3.5 to 6.0	5 at 1MHz	37	3.0	2.0	
0	0	12	0	3.5 to 6.0	5 at 1MHz	38	3.0	2.0	
0	0	12	0	5.0 ± 10%	15 at 3MHz	37	1.5	4.0	
0	0	12	0	5.0 ± 10%	15 at 3MHz	38	1.5	4.0	
0	16	7	0	5.0 ± 10%	15 at 1MHz	39	3.0	2.0	CMOS MB 88210 Series
0	0	10	0	5.0 ± 10%	10 at 4MHz	39	3.0	4.0 with prescaler	
4	12	15	5	5.0 ± 10%	365	75	2.86	2.0	NMOS MB 88400/H Series
4	12	16	5	5.0 ± 10%	425	76	1.5	4.0	
4	12	16	5	5.0 ± 10%	425	76	1.5	4.0	
4	12	12	5	5.0 ± 10%	384	74	2.86	2.0	NMOS MB 88410/H Series
4	12	12	5	5.0 ± 10%	384	74	2.86	2.0	
4	12	12	5	5.0 ± 10%	440	75	1.5	4.0	
4	12	12	5	5.0 ± 10%	440	75	1.5	4.0	
4	8	40	5	5.0 ± 10%	415	79	2.86	2.0	NMOS MB 88420/H Series
4	8	40	5	5.0 ± 10%	415	79	2.86	2.0	
4	8	40	5	5.0 ± 10%	415	79	2.86	2.0	
4	8	40	5	5.0 ± 10%	415	80	1.5	4.0	
4	8	40	5	5.0 ± 10%	415	80	1.5	4.0	

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Table 1: (Continued)

Process/ Series	ROM Size [bits]	RAM Size [bits]	Device Number	Package ¹	Device Number	Package
CMOS MB 88500/H Series	4K x 8	192 x 4	MB 88501-P/-PSH	DIP-42P-M01/M02	MB 88501-PF	FPT-48P-M02
	4K x 8	256 x 4	MB 88505-P/-PSH	DIP-42P-M01/M02	MB 88505-PF	FPT-48P-M02
	2K x 8	256 x 4	MB 88507-P/-PSH	DIP-42P-M01/M02	MB 88507-PF	FPT-48P-M02
	4K x 8	192 x 4	MB 88501A-P/-PSH	DIP-42P-M01/M02	MB 88501A-PF	FPT-48P-M02
	4K x 8	256 x 4	MB 88505A-P/-PSH	DIP-42P-M01/M02	MB 88505A-PF	FPT-48P-M02
	4K x 8	256 x 4	MB 88501H-P/-PSH	DIP-42P-M01/M02	MB 88501H-PF	FPT-48P-M02
CMOS MB 88510 MB 88510B Series	2K x 8	256 x 4	*MB 88511-P/-PSH ⁴	DIP-42P-M01/M02	*MB 88511-PF ⁴	FPT-48P-M02
	2K x 8	192 x 4	*MB 88513-P/-PSH ⁴	DIP-42P-M01/M02	*MB 88513-PF ⁴	FPT-48P-M02
	6K x 8	256 x 4	MB 88514B-PSH ³⁴⁵	DIP-64P-M01	—	—
	8K x 8	256 x 4	MB 88515B-PSH ³⁴⁵	DIP-64P-M01	—	—
	4K x 8	256 x 4	MB 88516B-PSH ³⁴	DIP-64P-M01	—	—
	4K x 8	256 x 4	MB 88517B-P ³⁴	DIP-42P-M01	—	—
CMOS MB 88520 MB 88520B Series	4K x 8	256 x 4	MB 88521-PSH ⁵	DIP-64P-M01	MB 88521-PF ⁵	FPT-64P-M01
	4K x 8	256 x 4	*MB 88522-PSH ⁵	DIP-64P-M01	—	—
	2K x 8	256 x 4	MB 88523-PSH ⁵	DIP-64P-M01	MB 88523-PF ⁵	FPT-64P-M01
	4K x 8	256 x 4	MB 88525-PSH ⁵	DIP-64P-M01	—	—
	4K x 8	256 x 4	MB 88525B-PSH ³⁵	DIP-64P-M01	MB 88525B-PF ³⁵	FPT-64P-M01
CMOS MB 88530 Series	2K x 8	128 x 4	MB 88535-P/-PSH ⁶	DIP-42P-M01/M02	MB 88535-PF ⁶	FPT-48P-M02
	2K x 8	128 x 4	MB 88536-P/-PSH ⁶	DIP-42P-M01/M02	MB 88536-PF ⁶	FPT-48P-M02
CMOS MB 88540 Series	4K x 8	256 x 4	—	—	MB 88541-PF ⁷	FPT-70P-M01
	4K x 8	256 x 4	—	—	*MB 88543-PF ⁷	FPT-80P-M01
	4K x 8	256 x 4	—	—	*MB 88544-PF ⁷	FPT-80P-M01
	4K x 8	256 x 4	—	—	*MB 88545-PF ⁷	FPT-80P-M01
	4K x 8	256 x 4	—	—	*MB 88546-PF ⁷	FPT-80P-M01
CMOS MB 88550/H Series	8K x 8	256 x 4	—	—	MB 88551-PF ⁴⁵	FPT-80P-M01
	6K x 8	256 x 4	—	—	MB 88552-PF ⁴⁵	FPT-80P-M01
	8K x 8	256 x 4	—	—	MB 88551H-PF ⁴⁵	FPT-80P-M01
	6K x 8	256 x 4	—	—	MB 88552H-PF ⁴⁵	FPT-80P-M01
CMOS MB 88560 Series	3K x 8	192 x 4	—	—	MB 88561-PF ^{47B}	FPT-80P-M01
	4K x 8	256 x 4	—	—	*MB 88562-PF ^{34B}	FPT-80P-M01

- Notes: 1. 28- and 42-pin DIP packages may be specified with standard 100 mil pin spacing [M or -P suffix as shown], or small-outline 70 mil pin spacing [-PSH suffix]. The 64-pin DIP is available in small-outline 70 mil pin spacing only [-PSH suffix].
2. When the on-chip prescaler is connected, the maximum external clock frequency can be doubled. A 4.194 MHz crystal can be used for MB 884XX or MB 885XX devices. (except MB 88530 series)
3. On-chip VFD driver port 4. On-chip A/D converter 5. Multiple I/O ports 6. On-chip D/A converter
7. On-chip LCD driver 8. On-chip PLL * Under development



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Maximum Input Only Ports	Maximum Output Only Ports	Maximum I/O Ports	Maximum Control Ports	Supply Voltage	Typical Power Dissipation [mW]	Number of Instructions	Minimum Instruction Cycle Time [μs]	Maximum Clock Frequency ² [MHz]	Process/ Series
4	12	15	5	5.0 ± 10%	10 at 1MHz	75	2.86	2.0	
4	12	15	5	5.0 ± 10%	10 at 1MHz	75	2.0	3.0	
4	12	15	5	5.0 ± 10%	10 at 1MHz	75	2.0	3.0	
4	12	15	5	3.5 to 6.0	10 at 1MHz	75	2.86	2.0	CMOS MB 88500/H Series
4	12	15	5	3.5 to 6.0	10 at 1MHz	75	2.86	2.0	
4	12	15	5	5.0 ± 10%	20 at 2MHz	76	1.5	4.0	
4	12	15	5	5.0 ± 10%	20 at 2MHz	76	1.5	4.0	
4	12	15	5	5.0 ± 10%	20 at 2MHz	76	1.5	4.0	
4	12	15	5	5.0 ± 10%	20 at 2MHz	76	1.5	4.0	
0	0	34	5	5.0 ± 10%	15 at 1MHz	79	2.0	3.0	CMOS MB 88510 MB 88510B Series
0	0	34	5	5.0 ± 10%	15 at 1MHz	79	2.0	3.0	
0	25	29	5	5.0 ± 10%	15 at 1MHz	81	2.0	3.0	
0	25	29	5	5.0 ± 10%	15 at 1MHz	81	2.0	3.0	
0	17	26	5	5.0 ± 10%	15 at 1MHz	81	2.0	3.0	
0	15	19	5	5.0 ± 10%	15 at 1MHz	81	2.0	3.0	
4	8	40	5	5.0 ± 10%	10 at 1MHz	80	2.0	3.0	CMOS MB 88520 MB 88520B Series
4	8	40	5	5.0 ± 10%	TBD	80	2.0	3.0	
4	8	40	5	5.0 ± 10%	10 at 1MHz	80	2.0	3.0	
4	8	40	5	5.0 ± 10%	10 at 1MHz	80	2.0	3.0	
4	8	40	5	5.0 ± 10%	10 at 1MHz	80	2.0	3.0	
4	32	16	5	5.0 ± 10%	10 at 1MHz	79	2.0	3.0	
4	8	17	5	5.0 ± 10%	10 at 1MHz	70	3.0	2.0	CMOS MB 88530 Series
4	8	15	5	5.0 ± 10%	10 at 1MHz	70	3.0	2.0	
4	4	16	5	5.0 ± 10%	10 at 1MHz	75	2.86	2.0	CMOS MB 88540 Series
4	4	16	5	5.0 ± 10%	10 at 1MHz	76	2.0	3.0	
4	4	24	5	5.0 ± 10%	10 at 1MHz	80	2.0	3.0	
4	4	16	5	5.0 ± 10%	10 at 1MHz	76	2.0	3.0	
4	4	24	5	5.0 ± 10%	10 at 1MHz	80	2.0	3.0	
0	0	68	5	5.0 ± 10%	15 at 1MHz	82	2.0	3.0	CMOS MB 88550/H Series
0	0	68	5	5.0 ± 10%	15 at 1MHz	82	2.0	3.0	
0	0	68	5	5.0 ± 10%	25 at 2MHz	82	1.5	4.0	
0	0	68	5	5.0 ± 10%	25 at 2MHz	82	1.5	4.0	
4	4	11	2	5.0 ± 10%	85 at 4.5MHz	70	6.67	4.5	CMOS MB 88560 Series
4	4	11	2	5.0 ± 10%	TBD	71	6.67	4.5	



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Table 2: FEATURES OPTIONS AVAILABLE ON THE FUJITSU 4-BIT MCU FAMILY

Device Number	Process	ROM Size [bits]	RAM Size [bits]	Package	Ambient Temperature Range [°C]	Serial Port Output Latch	Serial Buffer	Nesting Levels
MB 8841HM/-PSH	NMOS	2K x 8	128 x 4	DIP	-30 to +70	option	4	4
MB 8842M/-PSH	NMOS	2K x 8	128 x 4	DIP	-30 to +70	no	4	4
MB 8843M/-PSH	NMOS	1K x 8	64 x 4	DIP	-30 to +70	option	4	4
MB 8844M/-PSH	NMOS	1K x 8	64 x 4	DIP	-30 to +70	no	4	4
MB 8845HM	NMOS	2K x 8	128 x 4	FPT	-30 to +70	option	4	4
MB 8846M	NMOS	2K x 8	128 x 4	FPT	-30 to +70	no	4	4
MB 8847M	NMOS	1K x 8	64 x 4	FPT	-30 to +70	option	4	4
MB 8848M	NMOS	1K x 8	64 x 4	FPT	-30 to +70	no	4	4
MB 8851M/-PSH	CMOS	2K x 8	128 x 4	DIP	-40 to +85	option	4	4
MB 8851AM/-PSH	CMOS	2K x 8	128 x 4	DIP	-30 to +70	option	4	4
MB 8851B-P	CMOS	2K x 8	128 x 4	DIP	-30 to +70	option	4	4
MB 8851HM/-PSH	CMOS	2K x 8	128 x 4	DIP	-40 to +85	option	4	4
MB 8851LM/-PSH	CMOS	2K x 8	128 x 4	DIP	-30 to +70	option	4	4
MB 8852M/-PSH	CMOS	2K x 8	128 x 4	DIP	-40 to +85	no	4	4
MB 8852AM/-PSH	CMOS	2K x 8	128 x 4	DIP	-30 to +70	no	4	4
MB 8852LM/-PSH	CMOS	2K x 8	128 x 4	DIP	-30 to +70	no	4	4
MB 8854M/-PSH	CMOS	1K x 8	64 x 4	DIP	-40 to +85	no	4	4
MB 8854AM/-PSH	CMOS	1K x 8	64 x 4	DIP	-30 to +70	no	4	4
MB 8854LM/-PSH	CMOS	1K x 8	64 x 4	DIP	-30 to +70	no	4	4
MB 8855M	CMOS	2K x 8	128 x 4	FPT	-40 to +85	option	4	4
MB 8855AM	CMOS	2K x 8	128 x 4	FPT	-30 to +70	option	4	4
MB 8855B-P	CMOS	2K x 8	128 x 4	FPT	-30 to +70	option	4	4
MB 8855HM	CMOS	2K x 8	128 x 4	FPT	-40 to +85	option	4	4
MB 8855LM	CMOS	2K x 8	128 x 4	FPT	-30 to +70	option	4	4
MB 8856M	CMOS	2K x 8	128 x 4	FPT	-40 to +85	no	4	4
MB 8856AM	CMOS	2K x 8	128 x 4	FPT	-30 to +70	no	4	4
MB 8856LM	CMOS	2K x 8	128 x 4	FPT	-30 to +70	no	4	4
MB 8858M	CMOS	1K x 8	64 x 4	FPT	-40 to +85	no	4	4
MB 8858AM	CMOS	1K x 8	64 x 4	FPT	-30 to +70	no	4	4
MB 8858LM	CMOS	1K x 8	64 x 4	FPT	-30 to +70	no	4	4



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Output Port Options ¹	PLA Output Port ² [bits]	Optional On-chip Prescaler	On-chip Clock Generator	Features	Device Number
5	4/8	yes	yes	High speed	MB 8841HM/-PSH
3	4/8	yes	yes	Standard	MB 8842M/-PSH
4	4/8	yes	yes	Standard	MB 8843M/-PSH
3	4/8	yes	yes	Standard	MB 8844M/-PSH
5	4/8	yes	yes	High speed	MB 8845HM
3	4/8	yes	yes	Standard	MB 8846M
4	4/8	yes	yes	Standard	MB 8847M
3	4/8	yes	yes	Standard	MB 8848M
2	4/8	yes	yes	Standard	MB 8851M/-PSH
2	4/8	yes	yes	Wide voltage range	MB 8851AM/-PSH
2	4/8	yes	yes	VFD driver port [8 seg. x 8 digits], high speed	MB 8851B-P
4	4/8	yes	yes	High speed	MB 8851HM/-PSH
2	4/8	yes	yes	Low voltage	MB 8851LM/-PSH
2	4/8	yes	yes	Standard	MB 8852M/-PSH
2	4/8	yes	yes	Wide voltage range	MB 8852AM/-PSH
2	4/8	yes	yes	Low voltage	MB 8852LM/-PSH
2	4/8	yes	yes	Standard	MB 8854M/-PSH
2	4/8	yes	yes	Wide voltage range	MB 8854AM/-PSH
2	4/8	yes	yes	Low voltage	MB 8854LM/-PSH
2	4/8	yes	yes	Standard	MB 8855M
2	4/8	yes	yes	Wide voltage range	MB 8855AM
2	4/8	yes	yes	VFD driver port [8 seg. x 8 digits], high speed	MB 8855B-P
4	4/8	yes	yes	High speed	MB 8855HM
2	4/8	yes	yes	Low voltage	MB 8855LM
2	4/8	yes	yes	Standard	MB 8856M
2	4/8	yes	yes	Standard	MB 8856AM
2	4/8	yes	yes	Standard	MB 8856LM
2	4/8	yes	yes	Standard	MB 8858M
2	4/8	yes	yes	Wide voltage range	MB 8858AM
2	4/8	yes	yes	Low voltage	MB 8858LM



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Table 2: (Continued)

Device Number	Process	ROM Size [bits]	RAM Size [bits]	Package	Ambient Temperature Range [°C]	Serial Port Output Latch	Serial Buffer	Nesting Levels
MB 88201-P	CMOS	512 x 8	16 x 4	DIP	-40 to +85	-	-	2
MB 88201-PF	CMOS	512 x 8	16 x 4	FPT	-40 to +85	-	-	2
MB 88201A-P	CMOS	512 x 8	16 x 4	DIP	-30 to +70	-	-	2
MB 88201A-PF	CMOS	512 x 8	16 x 4	FPT	-30 to +70	-	-	2
MB 88201H-P	CMOS	512 x 8	16 x 4	DIP	-40 to +85	-	-	2
MB 88201H-PF	CMOS	512 x 8	16 x 4	FPT	-40 to +85	-	-	2
MB 88202-P	CMOS	1K x 8	32 x 4	DIP	-40 to +85	-	-	4
MB 88202-PF	CMOS	1K x 8	32 x 4	FPT	-40 to +85	-	-	4
MB 88202A-P	CMOS	1K x 8	32 x 4	DIP	-30 to +70	-	-	4
MB 88202A-PF	CMOS	1K x 8	32 x 4	FPT	-30 to +70	-	-	4
MB 88202H-P	CMOS	1K x 8	32 x 4	DIP	-40 to +85	-	-	4
MB 88202H-PF	CMOS	1K x 8	32 x 4	FPT	-40 to +85	-	-	4
*MB 88205B-P	CMOS	1K x 8	32 x 4	DIP	-40 to +85	-	-	4
MB 88211-P	CMOS	1K x 8	32 x 4	DIP	0 to +70	-	-	4
MB 88401-P/-PSH	NMOS	4K x 8	192 x 4	DIP	-30 to +70	yes	4	8
MB 88401-PF	NMOS	4K x 8	192 x 4	FPT	-30 to +70	yes	4	8
MB 88401H-P/-PSH	NMOS	4K x 8	256 x 4	DIP	-30 to +70	yes	4	8
MB 88401H-PF	NMOS	4K x 8	256 x 4	FPT	-30 to +70	yes	4	8
MB 88403H-P/-PSH	NMOS	2K x 8	256 x 4	DIP	-30 to +70	yes	4	8
MB 88403H-PF	NMOS	2K x 8	256 x 4	FPT	-30 to +70	yes	4	8
MB 88411-P/-PSH	NMOS	4K x 8	192 x 4	DIP	-30 to +70	yes	4	8
MB 88411-PF	NMOS	4K x 8	192 x 4	FPT	-30 to +70	yes	4	8
MB 88411H-P/-PSH	NMOS	4K x 8	256 x 4	DIP	-30 to +70	yes	4	8
MB 88411H-PF	NMOS	4K x 8	256 x 4	FPT	-30 to +70	yes	4	8
MB 88413-P/-PSH	NMOS	2K x 8	192 x 4	DIP	-30 to +70	yes	4	8
MB 88413-PF	NMOS	2K x 8	192 x 4	FPT	-30 to +70	yes	4	8
MB 88413H-P/-PSH	NMOS	2K x 8	256 x 4	DIP	-30 to +70	yes	4	8
MB 88413H-PF	NMOS	2K x 8	256 x 4	FPT	-30 to +70	yes	4	8
MB 88421-PSH	NMOS	4K x 8	192 x 4	DIP	-30 to +70	yes	4	8
MB 88421H-PSH	NMOS	4K x 8	256 x 4	DIP	-30 to +70	yes	4	8
MB 88422-PSH	NMOS	3K x 8	192 x 4	DIP	-30 to +70	yes	4	8
MB 88423-PSH	NMOS	2K x 8	128 x 4	DIP	-30 to +70	yes	4	8



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Output Port Options ¹	PLA Output Port ² [bits]	Optional On-chip Prescaler	On-chip Clock Generator	Features	Device Number
4	—	yes	yes	Low cost	MB 88201-P
4	—	yes	yes	Low cost	MB 88201-PF
4	—	yes	yes	Wide voltage range	MB 88201A-P
4	—	yes	yes	Wide voltage range	MB 88201A-PF
4	—	yes	yes	High speed	MB 88201H-P
4	—	yes	yes	High speed	MB 88201H-PF
4	—	yes	yes	Low cost	MB 88202-P
4	—	yes	yes	Low cost	MB 88202-PF
4	—	yes	yes	Wide voltage range	MB 88202A-P
4	—	yes	yes	Wide voltage range	MB 88202A-PF
4	—	yes	yes	High speed	MB 88202H-P
4	—	yes	yes	High speed	MB 88202H-PF
3	—	yes	yes	Low cost, VFD driver port [8 seg. x 8 digits]	*MB 88205B-P
3	—	yes (fixed)	yes	Low cost, A/D converter [8 bits x 1 channel]	MB 88211-P
3	4/8	yes	yes	Standard	MB 88401-P/-PSH
2	4/8	yes	yes	Standard	MB 88401-PF
4	4/8	yes	yes	High speed	MB 88401H-P/-PSH
4	4/8	yes	yes	High speed	MB 88401H-PF
4	4/8	yes	yes	High speed, ROM 2K version	MB 88403H-P/-PSH
4	4/8	yes	yes	High speed, ROM 2K version	MB 88403H-PF
3	4/8	yes	yes	On-chip A/D converter [8 bits x 7 channels]	MB 88411-P/-PSH
2	4/8	yes	yes	On-chip A/D converter [8 bits x 7 channels]	MB 88411-PF
4	4/8	yes	yes	On-chip A/D converter [8 bits x 7 channels], high speed	MB 88411H-P/-PSH
4	4/8	yes	yes	On-chip A/D converter [8 bits x 7 channels], high speed	MB 88411H-PF
3	4/8	yes	yes	On-chip A/D converter [8 bits x 7 channels], ROM 2K version	MB 88413-P/-PSH
2	4/8	yes	yes	On-chip A/D converter [8 bits x 7 channels], ROM 2K version	MB 88413-PF
4	4/8	yes	yes	On-chip A/D converter [8 bits x 7 channels], high speed, ROM 2K version	MB 88413H-P/-PSH
4	4/8	yes	yes	On-chip A/D converter [8 bits x 7 channels], high speed, ROM 2K version	MB 88413H-PF
3	4	yes	yes	Multiple I/O ports [57 I/O ports]	MB 88421-PSH
5	4	yes	yes	Multiple I/O ports [57 I/O ports], high-speed	MB 88421H-PSH
3	4	yes	yes	Multiple I/O ports [57 I/O ports], ROM 3K version	MB 88422-PSH
3	4	yes	yes	Multiple I/O ports [57 I/O ports], ROM 2K version	MB 88423-PSH

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Table 2: (Continued)

Device Number	Process	ROM Size [bits]	RAM Size [bits]	Package	Ambient Temperature Range [°C]	Serial Port Output Latch	Serial Buffer	Nesting Levels
MB 88501-P/-PSH	CMOS	4K x 8	192 x 4	DIP	-40 to +85	yes	4	8
MB 88501-PF	CMOS	4K x 8	192 x 4	FPT	-40 to +85	yes	4	8
MB 88501A-P/-PSH	CMOS	4K x 8	192 x 4	DIP	-30 to +70	yes	4	8
MB 88501A-PF	CMOS	4K x 8	192 x 4	FPT	-30 to +70	yes	4	8
MB 88501H-P/-PSH	CMOS	4K x 8	256 x 4	DIP	-40 to +85	yes	4	8
MB 88501H-PF	CMOS	4K x 8	256 x 4	FPT	-40 to +85	yes	4	8
MB 88503H-P/-PSH	CMOS	2K x 8	256 x 4	DIP	-40 to +85	yes	4	8
MB 88503H-PF	CMOS	2K x 8	256 x 4	FPT	-40 to +85	yes	4	8
MB 88505-P/-PSH	CMOS	4K x 8	256 x 4	DIP	-40 to +85	yes	4/8	8
MB 88505-PF	CMOS	4K x 8	256 x 4	FPT	-40 to +85	yes	4/8	8
MB 88505A-P/-PSH	CMOS	4K x 8	256 x 4	DIP	-30 to +70	yes	4/8	8
MB 88505A-PF	CMOS	4K x 8	256 x 4	FPT	-30 to +70	yes	4/8	8
MB 88505H-P/-PSH	CMOS	4K x 8	256 x 4	DIP	-40 to +85	yes	4/8	8
MB 88505H-PF	CMOS	4K x 8	256 x 4	FPT	-40 to +85	yes	4/8	8
MB 88507-P/-PSH	CMOS	2K x 8	256 x 4	DIP	-40 to +85	yes	4/8	8
MB 88507-PF	CMOS	2K x 8	256 x 4	FPT	-40 to +85	yes	4/8	8
*MB 88511-P/-PSH	CMOS	4K x 8	256 x 4	DIP	-40 to +85	yes	4/8	8
*MB 88511-PF	CMOS	4K x 8	256 x 4	FPT	-40 to +85	yes	4/8	8
*MB 88513-P/-PSH	CMOS	2K x 8	192 x 4	DIP	-40 to +85	yes	4/8	8
*MB 88513-PF	CMOS	2K x 8	192 x 4	FPT	-40 to +85	yes	4/8	8
MB 88514B-PSH	CMOS	6K x 8	256 x 4	DIP	-40 to +85	yes	4/8	8
MB 88515B-PSH	CMOS	8K x 8	256 x 4	DIP	-40 to +85	yes	4/8	8
MB 88516B-PSH	CMOS	4K x 8	256 x 4	DIP	-40 to +85	yes	4/8	8
MB 88517B-P	CMOS	4K x 8	256 x 4	DIP	-40 to +85	yes	4/8	8
MB 88521-PSH	CMOS	4K x 8	256 x 4	DIP	-30 to +70	yes	4	8
MB 88521-PF	CMOS	4K x 8	256 x 4	FPT	-30 to +70	yes	4	8



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Output Port Options ¹	PLA Output Port ² [bits]	Optional On-chip Prescaler	On-chip Clock Generator	Features	Device Number
2	4/8	yes	yes	Standard	MB 88501-P/-PSH
2	4/8	yes	yes	Standard	MB 88501-PF
2	4/8	yes	yes	Wide voltage range	MB 88501A-P/-PSH
2	4/8	yes	yes	Wide voltage range	MB 88501A-PF
4	4/8	yes	yes	High speed	MB 88501H-P/-PSH
4	4/8	yes	yes	High speed	MB 88501H-PF
4	4/8	yes	yes	High speed, ROM 2K version	MB 88503H-P/-PSH
4	4/8	yes	yes	High speed, ROM 2K version	MB 88503H-PF
2	4	yes	yes	Serial buffer 4/8 bits	MB 88505-P/-PSH
2	4	yes	yes	Serial buffer 4/8 bits	MB 88505-PF
2	4	yes	yes	Serial buffer 4/8 bits, wide voltage range	MB 88505A-P/-PSH
2	4	yes	yes	Serial buffer 4/8 bits, wide voltage range	MB 88505A-PF
2	4	yes	yes	High speed, serial buffer 4/8 bits	MB 88505H-P/-PSH
2	4	yes	yes	High speed, serial buffer 4/8 bits	MB 88505H-PF
2	4	yes	yes	High speed, ROM 2K version	MB 88507-P/-PSH
2	4	yes	yes	High speed, ROM 2K version	MB 88507-PF
4	—	yes	yes	On-chip A/D converter [8 bits x 4 channels]	*MB 88511-P/-PSH
4	—	yes	yes	On-chip A/D converter [8 bits x 4 channels]	*MB 88511-PF
4	—	yes	yes	On-chip A/D converter [8 bits x 4 channels], ROM 2K version	*MB 88513-P/-PSH
4	—	yes	yes	On-chip A/D converter [8 bits x 4 channels], ROM 2K version	*MB 88513-PF
4	—	yes	yes	On-chip A/D converter [8 bits x 8 channels], multiple I/O ports [54 I/O ports], VFD driver port [18 seg. x 7 digits], ROM 6K version	MB 88514B-PSH
4	—	yes	yes	On-chip A/D converter [8 bits x 8 channels], multiple I/O ports [54 I/O ports], VFD driver port [18 seg. x 7 digits], ROM 8K version	MB 88515B-PSH
4	—	yes	yes	On-chip A/D converter [8 bits x 8 channels], VFD driver port [10 seg. x 7 digits]	MB 88516B-PSH
4	—	yes	yes	On-chip A/D converter [8 bits x 4 channels], VFD driver port [8 seg. x 6 digits]	MB 88517B-P
3	—	yes	yes	Multiple I/O ports [57 I/O ports]	MB 88521-PSH
2	—	yes	yes	Multiple I/O ports [57 I/O ports]	MB 88521-PF

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Table 2: (Continued)

Device Number	Process	ROM Size [bits]	RAM Size [bits]	Package	Ambient Temperature Range [°C]	Serial Port Output Latch	Serial Buffer	Nesting Levels
*MB 88522-PSH	CMOS	4K x 8	256 x 4	DIP	-30 to +70	yes	4	8
MB 88523-PSH	CMOS	2K x 8	256 x 4	DIP	-30 to +70	yes	4	8
MB 88523-PF	CMOS	2K x 8	256 x 4	FPT	-30 to +70	yes	4	8
MB 88525-PSH	CMOS	4K x 8	256 x 4	DIP	-30 to +70	yes	4/8	8
MB 88525B-PSH	CMOS	4K x 8	256 x 4	DIP	-30 to +70	yes	4/8	8
MB 88525B-PF	CMOS	4K x 8	256 x 4	FPT	-30 to +70	yes	4/8	8
MB 88535-P/-PSH ³	CMOS	2K x 8	128 x 4	DIP	-30 to +70	option	4	4
MB 88535-PF ³	CMOS	2K x 8	128 x 4	FPT	-30 to +70	option	4	4
MB 88536-P/-PSH ³	CMOS	2K x 8	128 x 4	DIP	-30 to +70	option	4	4
MB 88536-PF ³	CMOS	2K x 8	128 x 4	FPT	-30 to +70	option	4	4
MB 88541-PF	CMOS	4K x 8	256 x 4	FPT	-40 to +85	yes	4	8
*MB 88543-PF	CMOS	4K x 8	256 x 4	FPT	-40 to +85	yes	4/8	8
*MB 88544-PF	CMOS	4K x 8	256 x 4	FPT	-40 to +85	yes	4/8	8
*MB 88545-PF	CMOS	4K x 8	256 x 4	FPT	-40 to +85	yes	4/8	8
*MB 88546-PF	CMOS	4K x 8	256 x 4	FPT	-40 to +85	yes	4/8	8



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Output Port Options ¹	PLA Output Port ² [bits]	Optional On-chip Prescaler	On-chip Clock Generator	Features	Device Number
TBD	—	yes	yes	Multiple I/O ports [57 I/O ports], square wave output	*MB 88522-PSH
3	—	yes	yes	Multiple I/O ports [57 I/O ports], ROM 2K version	MB 88523-PSH
3	—	yes	yes	Multiple I/O ports [57 I/O ports], ROM 2K version	MB 88523-PF
3	—	yes	yes	Multiple I/O ports [57 I/O ports], serial buffer 4/8 bits	MB 88525-PSH
2	—	yes	yes	Multiple I/O ports [57 I/O ports], VFD driver port [8 seg. x 16 digits]	MB 88525B-PSH
2	—	yes	yes	Multiple I/O ports [57 I/O ports], VFD driver port [8 seg. x 16 digits]	MB 88525B-PF
2	—	yes	yes	On-chip D/A converter [6 bits x 3 channels]	MB 88535-P/-PSH ³
2	—	yes	yes	On-chip D/A converter [6 bits x 3 channels]	MB 88535-PF ³
2	—	yes	yes	On-chip D/A converter [6 bits x 3 channels, 13 bits x 1 channel]	MB 88536-P/-PSH ³
2	—	yes	yes	On-chip D/A converter [6 bits x 3 channels, 13 bits x 1 channel]	MB 88536-PF ³
2	—	yes	yes	On-chip LCD driver [24 segment output and 4 common output, programmable duty: static, 1/2, 1/3, and 1/4]	MB 88541-PF
2	—	yes	yes	On-chip LCD driver [32 segment output and 4 common output, programmable duty: static, 1/2, 1/3, and 1/4], serial buffer 4/8 bit	*MB 88543-PF
2	—	yes	yes	On-chip LCD driver [24 segment output and 4 common output, programmable duty: static, 1/2, 1/3, and 1/4] serial buffer 4/8 bit	*MB 88544-PF
2	—	yes	yes	On-chip LCD driver [32 segment output and 4 common output, programmable duty: static, 1/2, 1/3, and 1/4], two clock, serial buffer 4/8 bit	*MB 88545-PF
2	—	yes	yes	On-chip LCD driver [24 segment output and 4 common output, programmable duty: static, 1/2, 1/3, and 1/4], two clock, serial buffer 4/8 bit	*MB 88546-PF

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Table 2: (Continued)

Device Number	Process	ROM Size [bits]	RAM Size [bits]	Package	Ambient Temperature Range [°C]	Serial Port Output Latch	Serial Buffer	Nesting Levels
MB 88551-PF	CMOS	8K x 8	256 x 4	FPT	-30 to +70	yes	4/8	8
MB 88551H-PF	CMOS	8K x 8	256 x 4	FPT	-30 to +70	yes	4/8	8
MB 88552-PF	CMOS	6K x 8	256 x 4	FPT	-30 to +70	yes	4/8	8
MB 88552H-PF	CMOS	6K x 8	256 x 4	FPT	-30 to +70	yes	4/8	8
MB 88561-PF	CMOS	3K x 8	192 x 4	FPT	-40 to +85	yes	—	4
*MB 88562-PF	CMOS	4K x 8	256 x 4	FPT	-40 to +85	yes	—	4

Notes:

1. Standard pull-up, high-current pull-up, standard open-drain, high-current open-drain, middle-current open-drain, high-voltage open-drain, and 12V-interface open-drain output port configurations are available on certain devices.
 2. "4" means dual 4-bit parallel output, "8" means 8-bit parallel output. Either option is available.
 3. MB 8850 series device.
- * Under development.



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Output Port Options ¹	PLA Output Port ² [bits]	Optional On-chip Prescaler	On-chip Clock Generator	Features	Device Number
3	—	yes	yes	On-chip A/D converter [5 bits x 4 channels], programmable pulse generator [9 bits x 1], multiple I/O ports [68 I/O ports]	MB 88551-PF
3	—	yes	yes	On-chip A/D converter [5 bits x 4 channels], programmable pulse generator [9 bits x 1], multiple I/O ports [68 I/O ports], high speed	MB 88551H-PF
3	—	yes	yes	On-chip A/D converter [5 bits x 4 channels], programmable pulse generator [9 bits x 1], multiple I/O ports [68 I/O ports]	MB 88552-PF
3	—	yes	yes	On-chip A/D converter [5 bits x 4 channels], programmable pulse generator [9 bits x 1], Multiple I/O ports [68 I/O ports], high speed	MB 88552H-PF
2	—	—	yes	On-chip LCD driver [26 segment output and 2 common output, 1/2 duty], PLL, A/D converter [6 bits x 3 channels]	MB 88561-PF
2	—	—	yes	On-chip VFD driver [39 segment output], PLL, A/D converter [6 bits x 3 channels]	*MB 88562-PF

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