

CMOS single-chip 8-bit microcontrollers

80C652/83C652

DESCRIPTION

The P80C652/83C652 Single-Chip 8-Bit Microcontroller is manufactured in an advanced CMOS process and is a derivative of the 80C51 microcontroller family. The 80C652/83C652 has the same instruction set as the 80C51. Three versions of the derivative exist:

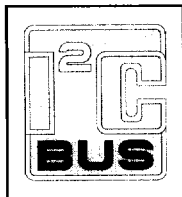
83C652 — 8k bytes mask programmable ROM

80C652 — ROMless version

87C652 — EPROM version (described in a separate chapter)

This device provides architectural enhancements that make it applicable in a variety of applications for general control systems. The 8XC652 contains a non-volatile 8k × 8 read-only program memory, a volatile 256 × 8 read/write data memory, four 8-bit I/O ports, two 16-bit timer/event counters (identical to the timers of the 80C51), a multi-source, two-priority-level, nested interrupt structure, an I²C interface, UART and on-chip oscillator and timing circuits. For systems that require extra capability, the 8XC652 can be expanded using standard TTL compatible memories and logic.

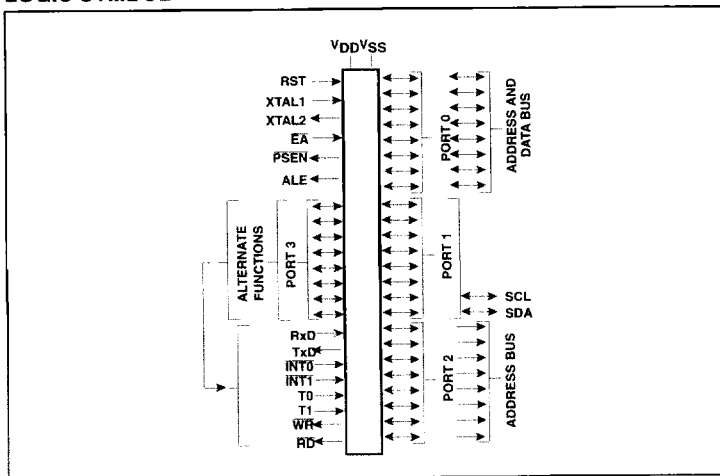
The device also functions as an arithmetic processor having facilities for both binary and BCD arithmetic plus bit-handling capabilities. The instruction set consists of over 100 instructions: 49 one-byte, 45 two-byte and 17 three-byte. With a 16(24)MHz crystal, 58% of the instructions are executed in 0.75(0.5)µs and 40% in 1.5(1)µs. Multiply and divide instructions require 3(2)µs.



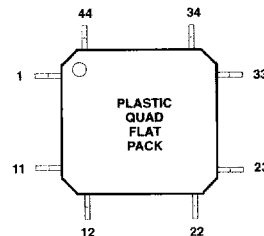
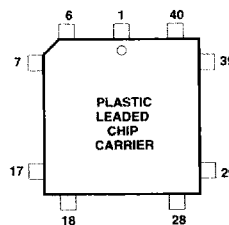
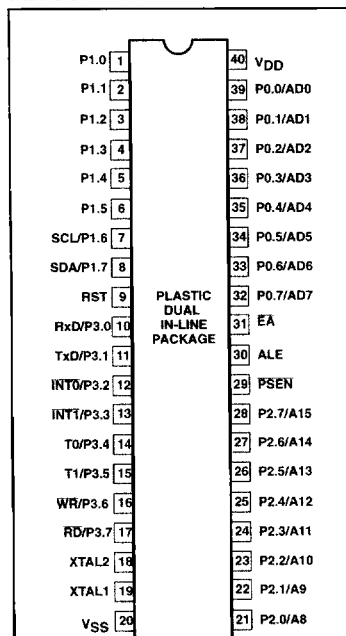
FEATURES

- 80C51 central processing unit
- 8k × 8 ROM expandable externally to 64k bytes
- 256 × 8 RAM, expandable externally to 64k bytes
- Two standard 16-bit timer/counters
- Four 8-bit I/O ports
- I²C-bus serial I/O port with byte oriented master and slave functions
- Full-duplex UART facilities
- Power control modes
 - Idle mode
 - Power-down mode
- ROM code protection
- Extended frequency range: 3.5 to 24 MHz
 - 0 to +70°C
 - 40 to +85°C
 - 40 to +125°C
- Three operating ambient temperature ranges:

LOGIC SYMBOL



PIN CONFIGURATIONS



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PLASTIC LEADED CHIP CARRIER
PIN FUNCTIONS

Pin	Function	Pin	Function
1	NC*	23	NC*
2	P1.0	24	P2.0/A8
3	P1.1	25	P2.1/A9
4	P1.2	26	P2.2/A10
5	P1.3	27	P2.3/A11
6	P1.4	28	P2.4/A12
7	P1.5	29	P2.5/A13
8	P1.6/SCL	30	P2.6/A14
9	P1.7/SDA	31	P2.7/A15
10	RST	32	PSEN
11	P3.0/RxD	33	ALE
12	NC*	34	NC*
13	P3.1/TxD	35	EA
14	P3.2/INT0	36	P0.7/AD7
15	P3.3/INT1	37	P0.6/AD6
16	P3.4/T0	38	P0.5/AD5
17	P3.5/T1	39	P0.4/AD4
18	P3.6/WR	40	P0.3/AD3
19	P3.7/RD	41	P0.2/AD2
20	XTAL2	42	P0.1/AD1
21	XTAL1	43	P0.0/AD0
22	VSS	44	VDD

*DO NOT CONNECT

PLASTIC QUAD FLAT PACK
PIN FUNCTIONS

Pin	Function	Pin	Function
1	P1.5	23	P2.5/A13
2	P1.6/SCL	24	P2.6/A14
3	P1.7/SDA	25	P2.7/A15
4	RST	26	PSEN
5	P3.0/RxD	27	ALE
6	VSS1	28	VSS2
7	P3.1/TxD	29	EA/Vpp
8	P3.2/INT0	30	P0.7/AD7
9	P3.3/INT1	31	P0.6/AD6
10	P3.4/T0	32	P0.5/AD5
11	P3.5/T1	33	P0.4/AD4
12	P3.6/WR	34	P0.3/AD3
13	P3.7/RD	35	P0.2/AD2
14	XTAL2	36	P0.1/AD1
15	XTAL1	37	P0.0/AD0
16	VSS1	38	VDD
17	NC*	39	VSS3
18	P2.0/A8	40	P1.0
19	P2.1/A9	41	P1.1
20	P2.2/A10	42	P1.2
21	P2.3/A11	43	P1.3
22	P2.4/A12	44	P1.4

*DO NOT CONNECT

NOTES TO QFP ONLY:

1. Due to EMC improvements, all VSS pins (6, 16, 28, 39) must be connected to VSS on the 80C652/83C652.

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ORDER INFORMATION

PHILIPS PART ORDER NUMBER PART MARKING			PHILIPS NORTH AMERICA PART ORDER NUMBER			TEMPERATURE RANGE (°C) AND PACKAGE	FREQ MHz ^{1,2}
ROMless	ROM ³	Drawing Number	ROMless	ROM	EPROM ²		
P80C652EBP	P83C652EBP/xxx	SOT129-1	P80C652EBPN	P83C652EBPN	S87C652-4N40	0 to +70, Plastic Dual In-line Package	16
P80C652EBA	P83C652EBA/xxx	SOT187-2	P80C652EBAA	P83C652EBAA	S87C652-4A44	0 to +70, Plastic Leaded Chip Carrier	16
P80C652EBB	P83C652EBB/xxx	SOT307-2	P80C652EBBB	P83C652EBBB	S87C652-4B44	0 to +70, Plastic Quad Flat Pack	16
P80C652EFP	P83C652EFP/xxx	SOT129-1	P80C652EFPN	P83C652EFPN	S87C652-5N40	-40 to +85, Plastic Dual In-line Package	16
P80C652EFA	P83C652EFA/xxx	SOT187-2	P80C652EFAA	P83C652EFAA	S87C652-5A44	-40 to +85, Plastic Leaded Chip Carrier	16
P80C652EFB	P83C652EFB/xxx	SOT307-2	P80C652EFBB	P83C652EFBB	S87C652-5B44	-40 to +85, Plastic Quad Flat Pack	16
P80C652EHP	P83C652EHP/xxx	SOT129-1	P80C652EHPN	P83C652EHPN		-40 to +125, Plastic Dual In-line Package	16
P80C652EHA	P83C652EHA/xxx	SOT187-2	P80C652EHAA	P83C652EHAA		-40 to +125, Plastic Leaded Chip Carrier	16
P80C652EHB	P83C652EHB/xxx	SOT307-2	P80C652EHBB	P83C652EHBB		-40 to +125, Plastic Quad Flat Pack	16
P80C652IBP	P83C652IBP/xxx	SOT129-1	P80C652IBPN	P83C652IBPN		0 to +70, Plastic Dual In-line Package	24
P80C652IBA	P83C652IBA/xxx	SOT187-2	P80C652IBAA	P83C652IBAA		0 to +70, Plastic Leaded Chip Carrier	24
P80C652IBB	P83C652IBB/xxx	SOT307-2	P80C652IBBB	P83C652IBBB		0 to +70, Plastic Quad Flat Pack	24
P80C652IFP	P83C652IFP/xxx	SOT129-1	P80C652IFPN	P83C652IFPN		-40 to +85, Plastic Dual In-line Package	24
P80C652IFA	P83C652IFA/xxx	SOT187-2	P80C652IFAA	P83C652IFAA		-40 to +85, Plastic Leaded Chip Carrier	24
P80C652IFB	P83C652IFB/xxx	SOT307-2	P80C652IFBB	P83C652IFBB		-40 to +85, Plastic Quad Flat Pack	24

NOTES:

- 80C652 and 83C652 frequency range is 3.5MHz–16MHz or 3.5MHz–24MHz.
- For specification of the EPROM version, see the 87C652 data sheet.
- xxx denotes the ROM code number.

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BLOCK DIAGRAM

