LC6523C,6523H,6526C,6526H C-MOS LSI

CIRCUIT DRAWING No.1016

SINGLE-CHIP 4-BIT MICROCOMPUTER FOR SMALL-SCALE CONTROL-ORIENTED APPLICATIONS

3047A

The LC6523C/H, LC6526C/H belong to our single-chip 4-bit microcomputer LC6500 series fabricated using CMOS process technology and are suited for use in small-scale control-oriented application. Their basic architecture and instruction set are the same. Application areas include audio equipment (deck, player, etc.), office equipment, communications equipment, car equipment, home applications as well as circuit so far formed with standard logics and applications where the number of controls is small.

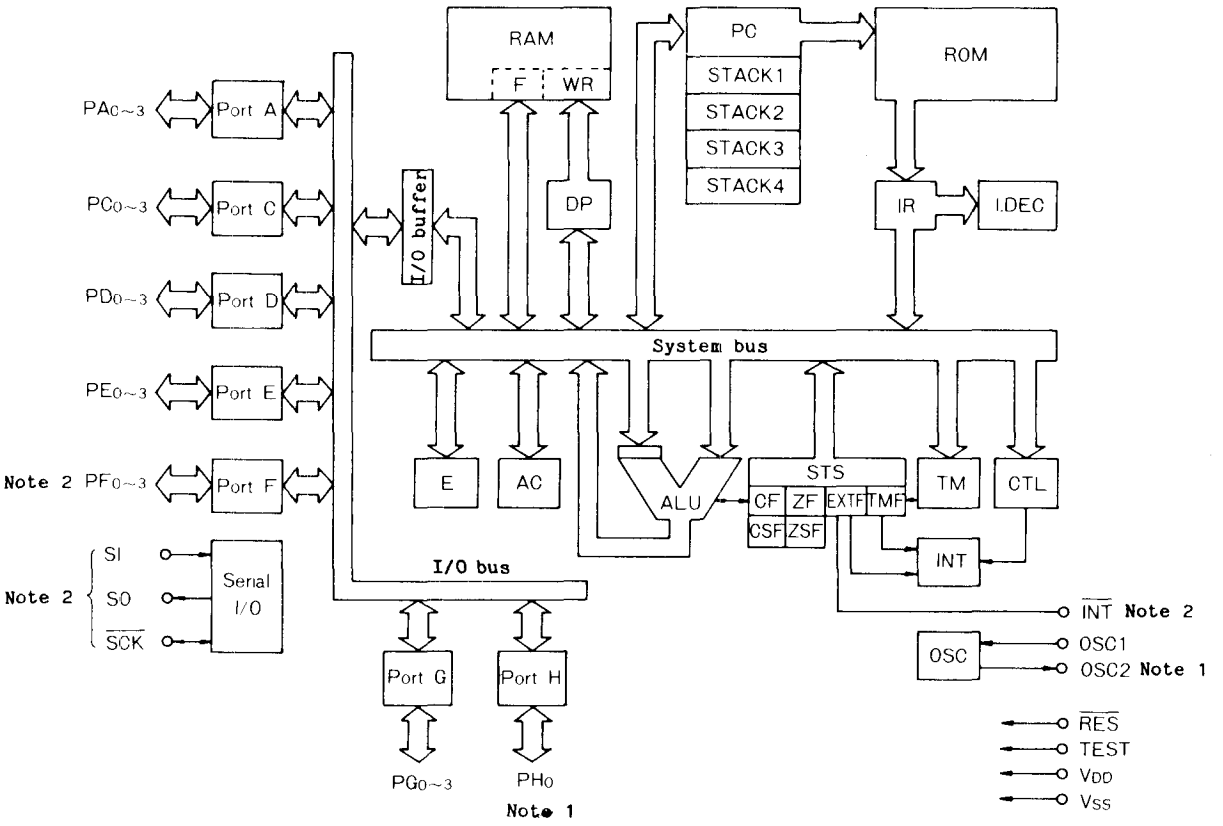
Features

- CMOS technology for low-power operation
- ROM/RAM
  LC6523C/H ROM: 2K x 8 bits, RAM: 128 x 4 bits
  LC6526C/H ROM: 1K x 8 bits, RAM: 64 x 4 bits
- Instruction set: 79 instructions common to the LC6500 series
- Wide operating voltage range from 3.0V to 6.0V (C version)
- Instruction cycle time of 0.95usec. (H version)
- On-chip serial I/O port
- Flexible I/O ports
  - Number of ports: 7 ports /25 pins max.
  - All ports: Input/output common
    Input/output voltage 15V max. (open drain type)
    Output current 20mA max. (sink current)
  - Option selectable for your intended system
    (A) Open drain output, pull-up resistor: Single-bit select for all ports
    (B) Output level at the reset mode: 4-bit select of H/L level for port C/D
- Interrupt function
  Vectored interrupt by timer overflow (instruction-testable)
  Vectored interrupt by $\overline{INT}$ pin or completion of transmit/receive at serial I/O port (instruction-testable)
- Stack level: 4 levels
- Timer: 4-bit prescaler + 8 bit programmable timer
- Clock oscillation option selectable for your intended system
  - Oscillator option: 1-pin C oscillation (with R), 1-pin external clock input, 2-pin CR oscillation (C version)
    2-pin ceramic filter oscillation (C version and H version)
  - Predivider option: No predivider, 1/3 predivider, 1/4 predivider (C version)
- Consecutive output of rectangular wave (cycle being 64 times the cycle time)

	Item	LC6523C	LC6523H	LC6526C	LC6526H
Memory	ROM	2048 x 8 bits	2048 x 8 bits	1024 x 8 bits	1024 x 8 bits
	RAM	128 x 4 bits	128 x 4 bits	64 x 4 bits	64 x 4 bits
Instruction	Instruction set	79	79	79	79
	Table read	With	With	With	With
On-chip function	Interrupt	External 1, Internal 1	External 1, Internal 1	External 1, Internal 1	External 1, Internal 1
	Timer	4-bit prescaler + 8-bit timer	4-bit prescaler + 8-bit timer	4-bit prescaler + 8-bit timer	4-bit prescaler + 8-bit timer
	Stack level	4	4	4	4
	Standby function	Standby available by HALT instruction	Standby available by HALT instruction	Standby available by HALT instruction	Standby available by HALT instruction
Input/output port	Number of ports	I/O 25 max.	I/O 25 max.	I/O 25 max.	I/O 25 max.
	Serial port	4-bit I/O	4-bit I/O	4-bit I/O	4-bit I/O
	I/O voltage	15V max.	15V max.	15V max.	15V max.
	Output current	10mA typ. 20mA max.	10mA typ. 20mA max.	10mA typ. 20mA max.	10mA typ. 20mA max.
	I/O circuit configuration	Open drain (N channel) or pull-up resistor-provided output selectable bit by bit.			
	Output level at reset mode	"H" or "L" level selectable port by port (port C, D only)			
	Rectangular wave output	Available	Available	Available	Available
Characteristic	Minimum cycle time	2.85μs(V_{DD}≧4V) 7.6μs (V_{DD}≧3V)	0.95μs	2.85μs(V_{DD}≧4V) 7.6μs (V_{DD}≧3V)	0.95μs
	Supply voltage	3 to 6V	4.5 to 6V	3 to 6V	4.5 to 6V
	Current dissipation	2.5mA typ.	4mA typ.	2.5mA typ.	4mA typ.
Oscillation	Resonator	CR(600kHz typ) Ceramic (400k, 800k, 4MHz)	Ceramic 4MHz	CR(600kHz typ) Ceramic (400k, 800k, 4MHz)	Ceramic 4MHz
	Predivider option	1/1, 1/3, 1/4	1/1	1/1, 1/3, 1/4	1/1
Other	Package	DIP30 shrink type	DIP30 shrink type	DIP30 shrink type	DIP30 shrink type

Note) Information on the resonator and oscillation circuit constants will be presented as soon as the recommended circuit is determined.

SYSTEM BLOCK DIAGRAM



Note 1. The OSC2 pin and PH_0 pin are common to each other, but are mutually exclusive. Either pin is user-selectable.

Note 2. The SI, SO, $\overline{SCK}$, and $\overline{INT}$ pins are common to the PF_0 to PF_3 pins respectively.

RAM	: Data memory	PC	: Program counter
F	: Flag	INT	: Interrupt control
WR	: Working register	IR	: Instruction register
AC	: Accumulator	I. DEC	: Instruction decoder
ALU	: Arithmetic and logic unit	CF, CSF	: Carry flag Carry save flag
DP	: Data pointer	ZF, ZSF	: Zero flag Zero save flag
E	: E register	EXTF	: External interrupt request flag
CTL	: Control register	TMF	: Internal interrupt request flag
OSC	: Oscillator		
TM	: Timer		
STS	: Status register		
ROM	: Program memory		

◎LC6514B	102				1014	High-Performance Type	4K	256×4	8	5	1.0	High voltage	10	FLT direct drivable (with pull-down resistance)
◎LC6510C	99	DIP	42S	3025B	1012	High-Performance Type	4K	256×4	8	5	1.0	5	2	
◎LC6515B	103	QIP	48	3052A	1015	High-Performance Type	4K	256×4	8	5	1.0	High voltage	10	FLT direct drivable (with pull-down resistance), with watch backup
◎LC6511C	100				1013	High-Performance Type	4K	256×4	8	5	1.0	5	2	With watch backup
◎LC6523C	104	DIP	30S	3047A	1016	Economy Type	2K	128×4	4	3	1.5	15	20	With serial port
◎LC6523H	104	DIP	30S	3047A	1016	Economy Type	2K	128×4	4	0.95	1.5	15	20	With serial port
◎LC6526C	104	DIP	30S	3047A	1016	Economy Type	1K	64×4	4	3	1.5	15	20	With serial port
◎LC6526H	104	DIP	30S	3047A	1016	Economy Type	1K	64×4	4	0.95	1.5	15	20	With serial port

●4 BITS, SINGLE CHIP [with LCD driver] (C-MOS INTEGRATED CIRCUIT)

Type Number	Page	Case			Circuit Drawing No.	Applications	ROM (Bytes)	RAM (Bits)	Stack	Cycle Time (μs)	IDD (mA)	Port		Remarks
		Package	Pins	Package No.								Max. Voltage (V)	Max. Current (mA)	
LC5700N	90	Chip (QIP64)		3026B	1004		1.39K×14	84×4	8	420	3μA	-	-	LCD direct drivable (98 segments)
◎LC5732	91	Chip (QIP64)		3026B 3057	1006		2K×8	48×4	1	122	3μA	-	-	LCD direct drivable (81 segments)
LC5850	95	Chip (QIP64)		3026B	1009	With LCD Dirver Low-Voltage Opration	1K×15	64×4	4	244, 122	4μA	-	-	LCD direct drivable (75 segments) low-current dissipation, 20 I/O pins
◎LC5851	96	Chip (QIP64)		3026B 3057	1010	Very Low Current	1K×15	64×4	4	40	10μA	-	-	Pseudo serial output, LCD direct driable(75 segments)
LC5800	94	Chip (QIP80)		3044B	1005		2K×16	152×4	8	244, 122	3μA	-	-	LCD direct drivable (126 segments), low-current dissipation, 20 I/O pins
※LC5812	92	Chip (QIP80)		3044B	1007		2K×16	152×4	8	40	10μA	-	-	LCD direct drivable (126segments)
※LC5813C	93	Chip (QIP64)		3026B	1008		2K×16	152×4	8	40	500μA	-	-	Serial I/O, LCD direct drivable (48 segments)

●8 BITS, SINGLE CHIP (N-MOS INTEGRATED CIRCUIT)

Type Number	Page	Case			Circuit Drawing No.	Applications	ROM (Bytes)	RAM (Bits)	Stacks	Cycle Time (μs)	IDD (mA)	Port		Remarks
		Package	Pins	Package No.								Max. Voltage (V)	Max. Current (mA)	
◎LM8854	89	DIP	64S	–	–	-	4K	256×8	16	1	60	15	20	
※LM8804	89	DIP	42S	3025B	–	-	4K	256×8	16	1	60	15	20	

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