

## CMOS 4-BIT MICROCONTROLLER

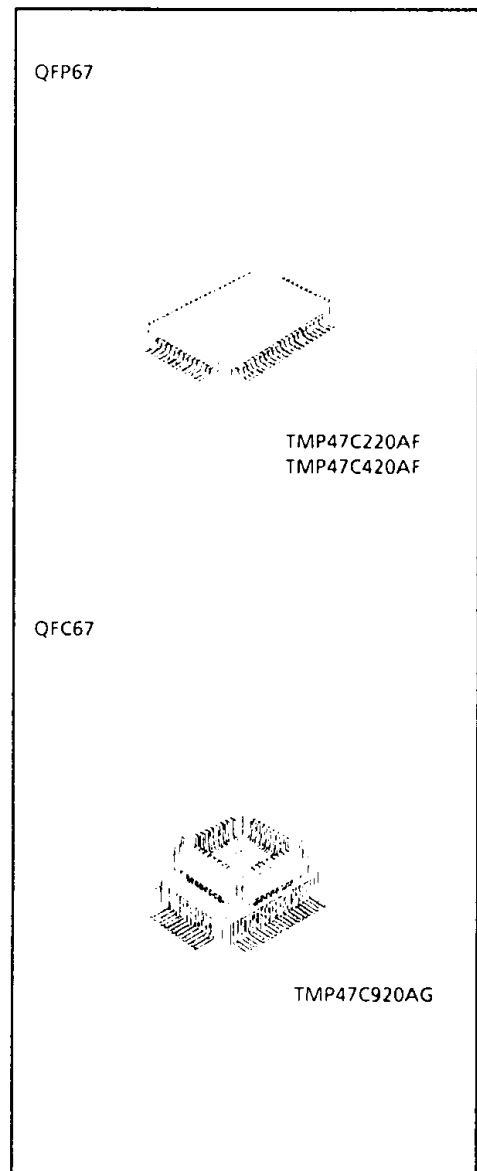
## TMP47C220AF, TMP47C420AF

The 47C220A/420A are high speed and high performance 4-bit single chip microcomputers based on the TLC5-47 CMOS series with LCD driver.

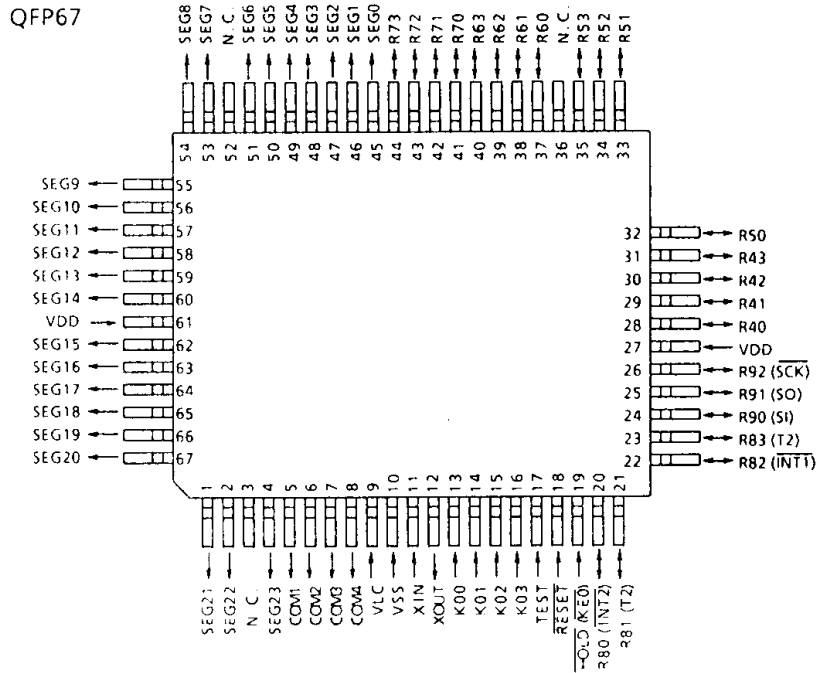
PART No.	ROM	RAM	PACKAGE	PIGGYBACK
TMP47C220AF	2048 x 8-bit	192 x 4-bit	QFP67	TMP47C920AG
TMP47C420AF	4096 x 8-bit	256 x 4-bit		

## FEATURES

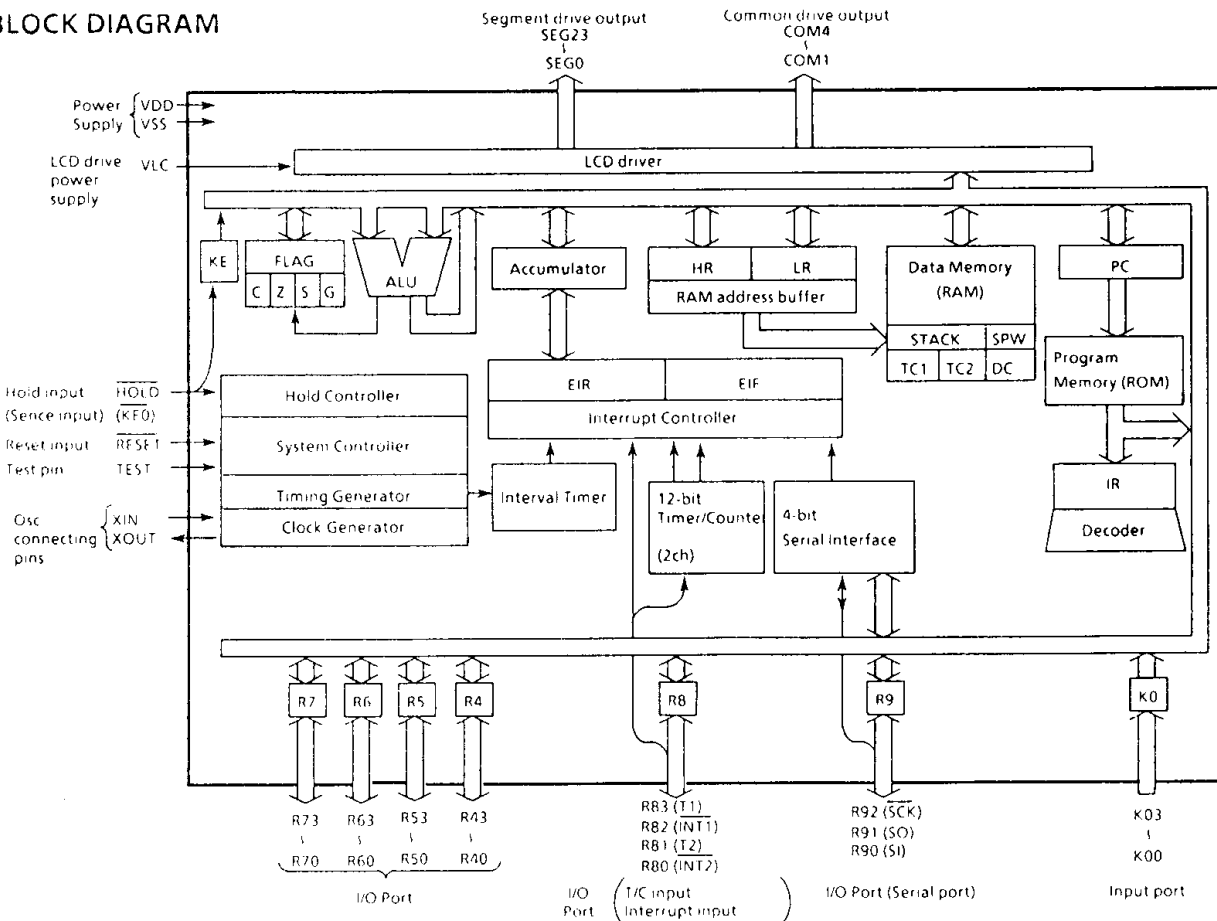
- ◆ 4-bit single chip microcomputer
- ◆ Instruction execution time : 1.9 $\mu$ s (at 4.2MHz)
- ◆ 89 basic instructions
- ◆ Table look-up instructions
- ◆ Subroutine nesting : 15 levels max.
- ◆ 6 interrupt sources (External : 2, Internal : 4)  
All sources have independent latches each, and multiple interrupt control is available.
- ◆ I/O port (28 pins)
  - Input 2 ports 5 pins
  - I/O 6 ports 23 pins
- ◆ Interval Timer
- ◆ Two 12-bit Timer/Counters  
Timer, event counter, and pulse width measurement mode
- ◆ Serial Interface with 4-bit buffer  
External/internal clock, and leading/trailing edge shift mode
- ◆ LCD driver
  - LCD direct drive is available (Max. 12-digit display at 1/4 duty LCD)
  - 1/4, 1/3, 1/2, duties or static drive are programmably selectable.
- ◆ Hold function  
Battery/Capacitor back-up
- ◆ Real Time Emulator : BM4721A + BM4723A



PIN ASSIGNMENT (TOP VIEW)



BLOCK DIAGRAM



## PIN FUNCTION

PIN NAME	Input/Output	FUNCTIONS	
K03 - K00	Input	4-bit input port	
R43 - R40	I/O	4-bit output port with latch.	
R53 - R50		When used as input port, the latch must be set to "1".	
R63 - R60		Every bit data is possible to be set, cleared and tested by the bit manipulation of the L-register indirect addressing.	
R73 - R70			
R83 (T1)	I/O (Input)	4-bit I/O port with latch.	Timer/Counter 1 external input
R82 ( $\overline{\text{INT}}1$ )		When used as input port, external interrupt input pin or timer/counter external input pin, the latch must be set to "1".	External interrupt 1 input
R81 (T2)			Timer/Counter 2 external input
R80 ( $\overline{\text{INT}}2$ )			External interrupt 2 input
R92 ( $\overline{\text{SCK}}$ )	I/O (I/O)	3-bit I/O port with latch.	Serial clock I/O
R91 (SO)	I/O (Output)	When used as input port or serial port, the latch must be set to "1".	Serial data output
R90 (SI)	I/O (Input)		Serial data input
SEG23 - SEG0	Output	LCD Segment drive output	
COM4 - COM1		LCD Common drive output	
XIN	Input	Resonator connecting pins.	
XOUT	Output	For inputting external clock. XIN is used and XOUT is opened.	
R $\overline{\text{ESET}}$	Input	Reset signal input	
H $\overline{\text{OLD}}$ (KE0)	Input (Input)	Hold request/release signal input	Sense input
TEST	Input	Test pin for out-going test. Be opened or fixed to low level.	
VDD	Power Supply	+ 5V	
VSS		0V (GND)	
VLC		LCD drive power supply	

**OPERATIONAL DESCRIPTION**

The 47C220A/420A are packaged in a 67-pin flat package instead of the 47C221A/421A's 64-pin flat package. As the function and instruction are equivalent to the 47C221A/421A, the technical data sheets for the 47C221A/421A and 47C200A/400A shall also be referred to.