

Microchip PIC16F630/676 Microcontroller

14-Pin Flash-Based, 8-Bit CMOS Microcontroller

High Performance RISC CPU:

- Only 35 instructions to learn
- All single cycle instructions except branches
- Operating speed:
 - DC - 20 MHz oscillator/clock input
 - DC - 200 ns instruction cycle
- Interrupt capability
- 8-level deep hardware stack
- Direct, Indirect, and Relative Addressing modes

Special Microcontroller Features:

- Internal and external oscillator options
 - Precision Internal 4 MHz oscillator factory calibrated to $\pm 1\%$
 - External Oscillator support for crystals and resonators
 - 5 μ s wake-up from SLEEP, 3.0V, typical • Power saving SLEEP mode
- Wide operating voltage range - 2.0V to 5.5V • Industrial and Extended temperature range • Low power Power-on Reset (POR)
- Power-up Timer (PWRT) and Oscillator Start-up Timer (OST)
- Brown-out Detect (BOD)
- Watchdog Timer (WDT) with independent oscillator for reliable operation • Multiplexed MCLR/Input-pin
- Interrupt-on-pin change
- Individual programmable weak pull-ups • Programmable code protection
- High Endurance FLASH/EEPROM Cell
 - 100,000 write FLASH endurance
 - 1,000,000 write EEPROM endurance
 - FLASH/Data EEPROM Retention: > 40 years

Low Power Features:

- Standby Current: - 1 nA @ 2.0V, typical
- Operating Current:
 - 8.5 μ A @ 32 kHz, 2.0V, typical
 - 100 μ A @ 1 MHz, 2.0V, typical
- Watchdog Timer Current
 - 300 nA @ 2.0V, typical
- Timer1 oscillator current:
 - 4 μ A @ 32 kHz, 2.0V, typical

Peripheral Features:

- 12 I/O pins with individual direction control
- High current sink/source for direct LED drive (20 mA)
- Analog comparator module with:
 - One analog comparator
 - Programmable on-chip comparator voltage reference (CVREF) module
 - Programmable input multiplexing from device inputs
 - Comparator output is externally accessible
- Analog-to-Digital Converter module (PIC16F676):
 - 10-bit resolution
 - Programmable 8-channel input
 - Voltage reference input
- Enhanced Timer1:
 - 16-bit timer/counter with prescaler
 - External Gate Input mode
 - Option to use OSC1 and OSC2 in LP mode as Timer1 oscillator, if IN-TOSC mode selected
- In-Circuit Serial Programming™ (ICSP™) via two pins

PIC16F630/676

14-Pin FLASH-Based 8-Bit CMOS M

Mikrokontrollerid PICmicro on RISC (Reduced Instruction Set Code) arhitektuuriga) – seega lihtsustatud ja väheste käskudega protsessorid. Käske on neil 35 ümber ja kõik käsud, peale suunamiskäskude, täidetakse ühe tsükli jooksul, mis koosneb 4-st taktist. Seega, kui taktsagedus on 20 MHz, siis tootlikus on 5 MIPs. PIC-protsessoritel ei ole eraldi IN ja OUT käske, kuna väljundseadmete registrid ja mälu on ühises mäluväljas.

PIC16F676 käsud

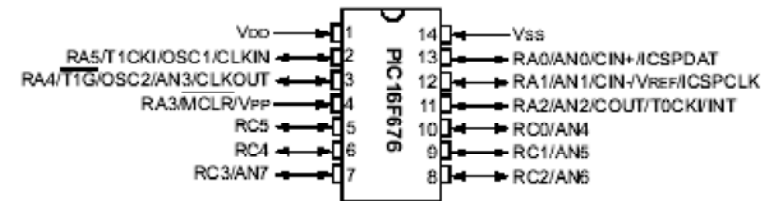
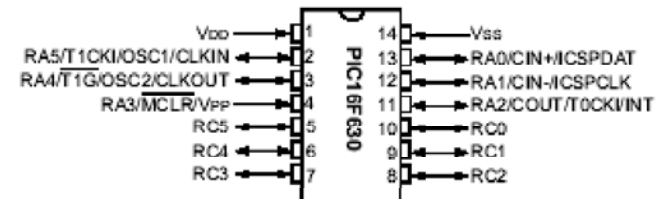
Mikrokontrolleril on ainult 35 käsku, mis on jagatud kolme ossa:

Bait-orienteeritud; Bit-orienteeritud; Suunamis- ja konstantidega käsud
Bait-orienteeritud käskudel on op-kood, registri aadress f ja d, mis määrab, kas tehtetulemus säilib üldregistris f või tööregistris w.

Bit-orienteeritud käskudel on op-kood, registri aadress f ja bit b.

Suunamis- ja konstantidega käskudel on op-kood, konstant k või aadress K, kuhu suunatakse

14-pin PDIP, SOIC, TSSOP



PIC16F684 INSTRUCTION SET

Mnemonic,	Operands	
BYTE-ORIENTED FILE REGISTER OPERATIONS		
ADDWF	f, d	Add W and f
ANDWF	f, d	AND W with f
CLRF	f –	Clear f
CLRW	f, d	Clear W
COMF	f, d	Complement f
DECF	f, d	Decrement f
DECFSZ	f, d	Decrement f, Skip if 0
INCF	f, d	Increment f
INCFSZ	f, d	Increment f, Skip if 0
IORWF	f, d	Inclusive OR W with f
MOVF	f –	Move f
MOVWF	f, d	Move W to f
NOP	f, d	No Operation
RLF	f, d	Rotate Left f through Carry
RRF	f, d	Rotate Right f through Carry
SUBWF	f, d	Subtract W from f
SWAPF	f, d	Swap nibbles in f
XORWF	f, d	Exclusive OR W with f
BIT-ORIENTED FILE REGISTER OPERATIONS		
BCF	f, b	Bit Clear f
BSF	f, b	Bit Set f
BTFSC	f, b	Bit Test f, Skip if Clear
BTFSS	f, b	Bit Test f, Skip if Set
LITERAL AND CONTROL OPERATIONS		
ADDLW	k	Add literal and W
ANDLW	k	AND literal with W
CALL	k	Call Subroutine
CLRWDT	–	Clear Watchdog Timer
GOTO	k	Go to address
IORLW	k	Inclusive OR literal with W
MOVLW	K	Move literal to W
RETFIE	–	Return from interrupt
RETLW	k	Return with literal in W
RETURN	–	Return from Subroutine
SLEEP	–	Go into Standby mode
SUBLW	k	Subtract W from literal
XORLW	k	Exclusive OR literal with W

FIGURE 13-1: GENERAL FORMAT FOR INSTRUCTIONS

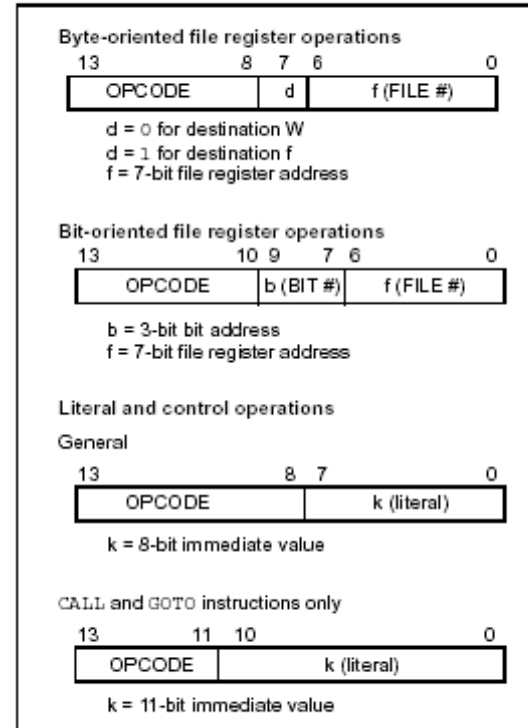


FIGURE 2-2: DATA MEMORY MAP OF THE PIC16F684

File Address		File Address	
Indirect Addr. ⁽¹⁾	00h	Indirect Addr. ⁽¹⁾	80h
TMR0	01h	OPTION_REG	81h
PCL	02h	PCL	82h
STATUS	03h	STATUS	83h
FSR	04h	FSR	84h
PORTA	05h	TRISA	85h
	06h		86h
PORTC	07h	TRISC	87h
	08h		88h
	09h		89h
PCLATH	0Ah	PCLATH	8Ah
INTCON	0Bh	INTCON	8Bh
PIR1	0Ch	PIE1	8Ch
	0Dh		8Dh
TMR1L	0Eh	PCON	8Eh
TMR1H	0Fh	OSCCON	8Fh
T1CON	10h	OSCTUNE	90h
TMR2	11h	ANSEL	91h
T2CON	12h	PR2	92h
CCPR1L	13h		93h
CCPR1H	14h		94h
CCP1CON	15h	WPUA	95h
PWM1CON	16h	IOCA	96h
ECCPAS	17h		97h
WDTCON	18h		98h
CMCON0	19h	VRCON	99h
CMCON1	1Ah	EEDAT	9Ah
	1Bh	EEADR	9Bh
	1Ch	EECON1	9Ch
	1Dh	EECON2 ⁽¹⁾	9Dh
ADRESH	1Eh	ADRESL	9Eh
ADCON0	1Fh	ADCON1	9Fh
General Purpose Registers 96 Bytes	20h	General Purpose Registers 32 Bytes	A0h
			BFh
		ACCESSES 70h-7Fh	F0h
	7Fh		FFh
BANK 0		BANK 1	