O FORMATO HEX

```
:020000040000FA
:0800000003178600850183123D
:02400E00183D5B
:00000001FF
:0000000TLL
```

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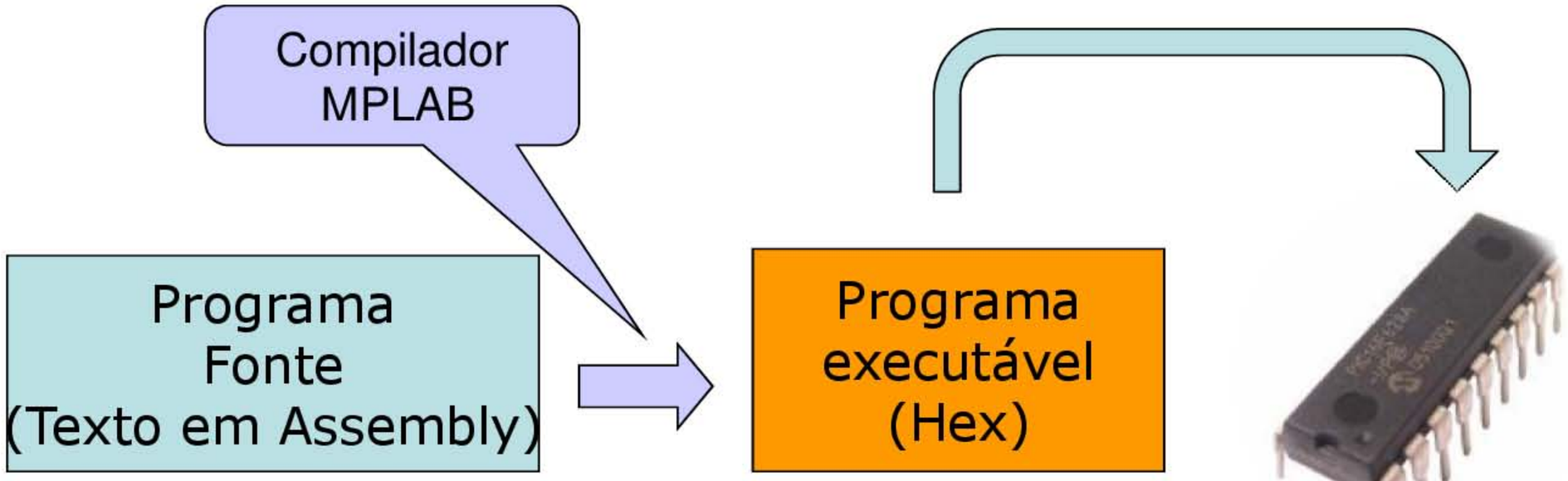
Montagem




```
include "P16F628a.inc"
__config    0x3D18

org     0x000       ;endereço da flashrom
bcf     STATUS,RP1
bsf     STATUS,RP0  ;muda para BANK 1
movlw   0x00
movwf   TRISB
bcf     STATUS,RP1
bcf     STATUS,RP0  ;muda para BANK 0
movlw   0x55        ;0101.0101
movwf   PORTB
end
```

```
:020000040000FA
:0800000003178600850183123D
:02400E00183D5B
:00000001FF
```

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Processo

```
:020000040000FA
:0800000003178600850183123D
:02400E00183D5B
:00000001FF
```

Formato Intel

www.aliexpress.com

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A partir do HEX

- O formato HEX proposto pela INTEL® e usado até os dias de hoje, é conforme o gráfico seguinte:

```
:020000040000FA
:0800000003178600850183123D
:02400E00183D5B
:00000001FF
```

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HEX

Inicia com 3AH

Dados úteis

O qual, podemos enxergar melhor colorindo:

```
:02000004 0000 FA
:08000000 03178600 85018312 3D
:02400E00 183D5B
:00000001 FF
```

Bytes úteis

Endereço de gravação

04 - início
01 – fim
00 – Dados úteis

Checksum

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Interpretando o CHKSUM

- Considere uma linha:

:02400E00183D5B

- Onde o CHKSUM é **5B.** Como chegar a ele ?
- Somamos todos os Bytes:

02 + 40 + 0E + 00 + 18 + 3D =

2 + 64 + 14 + 0 + 24 + 61 = 165

165 = 1010.0101

Em C1 = 0101.1010

Em C2 = 0101.1011 = 5B !

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Extraindo os dados

```
:020000040000FA
:0800000003178600850183123D
:02400E00183D5B
:00000001FF
```

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Analisando uma linha

```
:02000004000FA
:0800000003178600850183123D
:02400E00183D5B
:00000001FF
```

Este é o programa !

0317860085018312183D

0317 8600 8501 8312 183D

1703 0086 0185 1283 3D18

Formato
MSB ..... LSB

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Detalhando

1703 = 0101111000000011

14 bits

E eliminamos os dois bits extras (14 e 15) ficando com:

0101111000000011

01.0111.0000.0011

Formato de comando

que equivale a:

bsf 3,6 = bsf STATUS,RP1

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CÓDIGOS DE COMANDO DO PIC 16F628A

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Operações de registros orientados a Byte

Mnemônico	Operando	Descrição	Ciclos	MSB			LSB	Flags
ADDWF	f,d	Add W and f	1	00	0111	dfff	ffff	C,DC,Z
ANDWF	f,d	AND W with f	1	00	0101	dfff	ffff	Z
CLRF	f-	Clear f	1	00	0001	lfff	ffff	Z
CLRW	f,d	Clear W	1	00	0001	0xxx	xxxx	Z
COMF	f,d	Complement f	1	00	1001	dfff	ffff	Z
DECF	f,d	Decrement f	1	00	0011	dfff	ffff	Z
DECFSZ	f,d	Decrement f, Skip if 0	1	00	1011	dfff	ffff	
INCF	f,d	Increment f	1	00	1010	dfff	ffff	Z
INCFSZ	f,d	Increment f, Skip if 0	1	00	1111	dfff	ffff	
IORWF	f,d	Inclusive OR W with f	1	00	0100	dfff	ffff	Z
MOVF	f -	Move f	1	00	1000	dfff	ffff	Z
MOVWF	f,d	Move W to f	1	00	0000	lfff	ffff	
NOP	f,d	No Operation	1	00	0000	0xx0	0000	
RLF	f,d	Rotate Left f through Carry	1	00	1101	dfff	ffff	C
RRF	f,d	Rotate Right f through Carry	1	00	1100	dfff	ffff	C
SUBWF	f,d	Subtract W from f	1	00	0010	dfff	ffff	C,DC,Z
SWAPF	f,d	Swap nibbles in f	1	00	1110	dfff	ffff	
XORWF	f,d	Exclusive OR W with f	1	00	0110	dfff	ffff	Z

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Operações de registros orientados a bit

Mnemônico	Operando	Descrição	Ciclos	MSB			LSB	Flags
BCF	f,d	Bit Clear f	1	01	00bb	bfff	ffff	
BSF	f,d	Bit Set f	1	01	01bb	bfff	ffff	
BTFSC	f,d	Bit Test f, Skip if Clear	1	01	10bb	bfff	ffff	
BTFSS	f,d	Bit Test f, Skip if Set	1	01	11bb	bfff	ffff	

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Operações literais e de controle

Mnemônico	Operando	Descrição	Ciclos	MSB			LSB	Flags
ADDLW	k	Add literal and W	1	11	111x	kkkk	kkkk	C,DC,Z
ANDLW	k	AND literal with W	1	11	1001	kkkk	kkkk	Z
CALL	k	Call subroutine	2	10	0kkk	kkkk	kkkk	
CLRWDT	-	Clear Watchdog Timer	1	00	0000	0110	0100	TO,PD
GOTO	k	Go to address	2	10	1kkk	kkkk	kkkk	
IORLW	k	Inclusive OR literal with W	1	11	1000	kkkk	kkkk	Z
MOVLW	k	Move literal to W	1	11	00xx	kkkk	kkkk	
RETFIE	-	Return from interrupt	2	00	0000	0000	1001	
RETLW	k	Return with literal in W	2	11	01xx	kkkk	kkkk	
RETURN	-	Return from Subroutine	2	00	0000	0000	1000	
SLEEP	-	Go into Standby mode	1	00	0000	0110	0011	TO,PD
SUBLW	k	Subtract W from literal	1	11	110x	kkkk	kkkk	C,DC,Z
XORLW	k	Exclusive OR literal with W	1	11	1010	kkkk	kkkk	Z

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