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## PIC16F84 → PIC16F84A Migration

### DEVICE MIGRATIONS

This document is intended to describe the functional differences and the electrical specification differences that are present when migrating from one device to the next. Table 1-1 shows the considerations that must be taken into account when migrating from the PIC16F84 to the PIC16F84A. Table 2 shows electrical and timing differences.

**Note:** This device has been designed to perform to the parameters of its data sheet. It has been tested to an electrical specification designed to determine its conformance with these parameters. Due to process differences in the manufacture of this device, this device may have different performance characteristics than its earlier version. These differences may cause this device to perform differently in your application than the earlier version of this device.

**Note:** The user should verify that the device oscillator starts and performs as expected. Adjusting the loading capacitor values and/or the oscillator mode may be required.

**TABLE 1: PIC16F84 → PIC16F84A FUNCTIONAL DIFFERENCES**

| No. | Module     | Differences from PIC16F84                                                                       | H/W | S/W |
|-----|------------|-------------------------------------------------------------------------------------------------|-----|-----|
| 1   | Oscillator | The PIC16F84 oscillator can run up to 10 MHz.<br>The PIC16F84A oscillator can run up to 20 MHz. | Yes | Yes |

**Legend:** H/W - Issues may exist with regard to the application circuit.  
S/W - Issues may exist with regard to the user program.

### OSCILLATOR

The PIC16F84A can use crystals up to 20 MHz, resulting in double the execution speed. No changes to the code, other than for timing concerns, are required. No changes to the configuration word are required. The crystal loading capacitors may need to be adjusted for the higher speed crystal, but verifying oscillator operation at the same speed is already recommended for the transition from the PIC16F84 to the PIC16F84A.

**TABLE 2: PIC16F84 → PIC16F84A SPECIFICATION DIFFERENCES**

| Param No.            | Symbol | Characteristic                                                                                                                             |                           | PIC16F84 |        |                    | PIC16F84A     |            |                        | Units      |
|----------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------|--------|--------------------|---------------|------------|------------------------|------------|
|                      |        |                                                                                                                                            |                           | Min      | Typ†   | Max                | Min           | Typ†       | Max                    |            |
| Core                 |        |                                                                                                                                            |                           |          |        |                    |               |            |                        |            |
|                      | FOSC   | Eternal CLKIN Frequency (HS mode)<br>Oscillator Frequency (HS mode)                                                                        |                           | DC<br>1  | —<br>— | 10<br>10           | DC<br>1       | —<br>—     | <b>20</b><br><b>20</b> | MHz<br>MHz |
| D001                 | VDD    | Supply Voltage (XT, RC, LP modes)                                                                                                          |                           | 4.0      | —      | 6.0                | 4.0           | —          | <b>5.5</b>             | V          |
| D001A                | VDD    | Supply Voltage (HS mode)                                                                                                                   |                           | 4.5      | —      | 6.0                | 4.5           | —          | <b>5.5</b>             | V          |
| 30                   | TmCL   | MCLR pulse width (low)                                                                                                                     |                           | 1        | —      | —                  | <b>2</b>      | —          | —                      | μS         |
| <b>D004A</b>         | SVDD   | VDD rise rate to ensure internal Power-on Reset signal (PWRT disabled)                                                                     |                           | N/A      | N/A    | N/A                | <b>TBD</b>    | —          | —                      | V/mS       |
| D010A                | IDD    | Supply current during FLASH programming (Fosc = 4.0 MHz, VDD = 5.5V)                                                                       |                           | —        | 7.3    | 10                 | —             | <b>3.0</b> | 10                     | mA         |
| D013                 | IDD    | Supply Current HS mode (VDD = 5.5V)                                                                                                        | PIC16F84 (Fosc = 10 MHz)  | —        | 5      | 10                 |               |            |                        | mA         |
|                      |        |                                                                                                                                            | PIC16F84A (Fosc = 20 MHz) |          |        |                    | —             | <b>10</b>  | <b>20</b>              | mA         |
| <b>D021</b>          | IPD    | Power-down current (VDD = 4.0V, WDT disabled)                                                                                              | Commercial                | —        | 1.0    | 14                 |               |            |                        | μA         |
| <b>D021A</b>         |        |                                                                                                                                            | Industrial                | —        | 1.0    | 16                 | —             | 1.0        | <b>3.0</b>             | μA         |
| <b>D022</b>          | ΔIWDT  | Module Differential Current Watchdog Timer                                                                                                 | Commercial                | N/A      | N/A    | N/A                | —             | <b>6.0</b> | <b>20</b>              | μA         |
|                      |        |                                                                                                                                            | Extended                  | N/A      | N/A    | N/A                | —             | —          | <b>25</b>              | μA         |
| D040                 | VIH    | Input High Voltage I/O Ports with TTL buffer (4.5V<VDD<5.5V) <sup>(1)</sup><br>(VDD = Entire Range) <sup>(1)</sup><br>with Schmitt Trigger |                           | 2.4      | —      | VDD                | <b>2.0</b>    | —          | VDD                    | V          |
| 0.48VDD              |        |                                                                                                                                            |                           | —        | VDD    | <b>0.25VDD+0.8</b> | —             | VDD        | V                      |            |
| 0.45VDD              |        |                                                                                                                                            |                           | —        | VDD    | <b>0.8VDD</b>      | —             | VDD        | V                      |            |
| D042                 |        | MCLR, RA4/T0CKI OSC1 (RC mode)                                                                                                             |                           | 0.85VDD  | —      | VDD                | <b>0.8VDD</b> | —          | <b>VDD</b>             | V          |
| D043                 |        | OSC1 (XT, HS and LP modes)<br>OSC1 (RC mode)                                                                                               |                           | 0.7VDD   | —      | VDD                | 0.7VDD        | —          | VDD                    | V          |
| D043A                | N/A    |                                                                                                                                            |                           | N/A      | N/A    | <b>0.9VDD</b>      | —             | VDD        | V                      |            |
| D050                 | VHYS   | Hysteresis of Schmitt Trigger inputs                                                                                                       |                           | TBD      | —      | —                  | —             | <b>0.1</b> | —                      | V          |
| EEPROM Data Memory   |        |                                                                                                                                            |                           |          |        |                    |               |            |                        |            |
| D121                 | VDRW   | VDD for read/write                                                                                                                         |                           | VMIN     | —      | 6.0                | VMIN          | —          | <b>5.5</b>             | V          |
| D122                 | TDEW   | Erase/Write Cycle Time                                                                                                                     |                           | —        | 10     | 20                 | —             | <b>4</b>   | <b>8</b>               | mS         |
| FLASH Program Memory |        |                                                                                                                                            |                           |          |        |                    |               |            |                        |            |
| D131                 | VPR    | VDD for read                                                                                                                               |                           | VMIN     | —      | 6.0                | VMIN          | —          | <b>5.5</b>             | V          |
| D133                 | TDEW   | Erase/Write Cycle Time                                                                                                                     |                           | —        | 10     | —                  | —             | <b>4</b>   | <b>8</b>               | mS         |

† Data in "Typ" column is at 5V, 25°C unless otherwise stated. These parameters are for design guidance only and are not tested.

**Note 1:** The user may choose the better of the two specifications.

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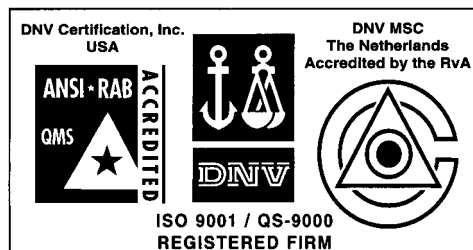
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08/01/01