The PIC16(L)F1454/1455/1459 family devices that you have received conform functionally to the current Device Data Sheet (DS40001639B), except for the anomalies described in this document.

The silicon issues discussed in the following pages are for silicon revisions with the Device and Revision IDs listed in Table 1. The silicon issues are summarized in Table 2.

The errata described in this document will be addressed in future revisions of the PIC16(L)F1454/1455/1459 silicon.

For example, to identify the silicon revision level using MPLAB IDE in conjunction with a hardware debugger:

1. Using the appropriate interface, connect the device to the hardware debugger.
2. Open an MPLAB IDE project.
3. Configure the MPLAB IDE project for the appropriate device and hardware debugger.
4. Based on the version of MPLAB IDE you are using, do one of the following:
   a) For MPLAB IDE 8, select Programmer > Reconnect.
   b) For MPLAB X IDE, select Window > Dashboard and click the Refresh Debug Tool Status icon ( ).
5. Depending on the development tool used, the part number and Device Revision ID value appear in the Output window.

The DEVREV values for the various PIC16(L)F1454/1455/1459 silicon revisions are shown in Table 1.

Data Sheet clarifications and corrections start on page 5, following the discussion of silicon issues.

The silicon revision level can be identified using the current version of MPLAB® IDE and Microchip’s programmers, debuggers, and emulation tools, which are available at the Microchip corporate web site (www.microchip.com).

### TABLE 1: SILICON DEVREV VALUES

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Device ID&lt;sup&gt;(1)&lt;/sup&gt;</th>
<th>Silicon Revision ID&lt;sup&gt;(2)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A2 A5 A6</td>
<td></td>
</tr>
<tr>
<td>PIC16F1454</td>
<td>3020h</td>
<td>— 1005h 1006h</td>
</tr>
<tr>
<td>PIC16LF1454</td>
<td>3024h</td>
<td>— 1005h 1006h</td>
</tr>
<tr>
<td>PIC16F1455</td>
<td>3021h 1003h 1005h 1006h</td>
<td></td>
</tr>
<tr>
<td>PIC16LF1455</td>
<td>3025h 1003h 1005h 1006h</td>
<td></td>
</tr>
<tr>
<td>PIC16F1459</td>
<td>3023h 1003h 1005h 1006h</td>
<td></td>
</tr>
<tr>
<td>PIC16LF1459</td>
<td>3027h 1003h 1005h 1006h</td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> The Device ID is located in the configuration memory at address 8006h.

<sup>2</sup> Refer to the "PIC16(L)F145X Memory Programming Specification" (DS41620) for detailed information on Device and Revision IDs for your specific device.
### TABLE 2: SILICON ISSUE SUMMARY

<table>
<thead>
<tr>
<th>Module</th>
<th>Feature</th>
<th>Item Number</th>
<th>Issue Summary</th>
<th>Affected Revisions&lt;sup&gt;(1)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscillator</td>
<td>HFINTOSC Ready/Stable bit</td>
<td>1.1</td>
<td>Bits remained set to ‘1’ after initial trigger.</td>
<td>X</td>
</tr>
<tr>
<td>Oscillator</td>
<td>Oscillator Start-up Timer (OST) bit</td>
<td>1.2</td>
<td>OST bit remains set.</td>
<td>X X</td>
</tr>
<tr>
<td>Fixed Voltage Reference (FVR)</td>
<td>Gain Amplifier Output</td>
<td>2.1</td>
<td>Use of FVR module can cause device Reset.</td>
<td>X</td>
</tr>
<tr>
<td>Program Flash Memory (PFM)</td>
<td>PFM Self-Write</td>
<td>3.1</td>
<td>PFM self-write will not work depending on clock selection.</td>
<td>X</td>
</tr>
<tr>
<td>CPU</td>
<td>BRA/BRW</td>
<td>4.1</td>
<td>An interrupt during the execution of a BRA or BRW instruction can return an incorrect PC value.</td>
<td>X X</td>
</tr>
<tr>
<td>USB</td>
<td>Dual Port RAM</td>
<td>5.1</td>
<td>Data located within the Dual Port RAM region may become corrupted.</td>
<td>X X X</td>
</tr>
</tbody>
</table>

**Note 1:** Only those issues indicated in the last column apply to the current silicon revision.
Silicon Errata Issues

Note: This document summarizes all silicon errata issues from all revisions of silicon, previous as well as current. Only the issues indicated by the shaded column in the following tables apply to the current silicon revision (A6).

1. Module: Oscillator

1.1 OSCSTAT bits: HFIOFR and HFIOFS

When HFINTOSC is selected, the HFIOFR and HFIOFS bits will become set when the oscillator becomes ready and stable. Once these bits are set they become “stuck”, indicating that HFINTOSC is always ready and stable. If the HFINTOSC is disabled, the bits fail to be cleared.

Work around
None.

Affected Silicon Revisions

<table>
<thead>
<tr>
<th></th>
<th>A2</th>
<th>A5</th>
<th>A6</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.2 Oscillator Start-up Timer (OST) bit

During the Two-Speed Start-up sequence, the OST is enabled to count 1024 clock cycles. After the count is reached, the OSTS bit is set, and the system clock is held low until the next falling edge of the external crystal (LP, XT or HS mode), before switching to the external clock source.

When an external oscillator is configured as primary clock and Fail-Safe Clock mode is enabled (FCMEN = 1), any of the following conditions will result in the Oscillator Start-up Timer (OST) failing to restart:

- MCCLR Reset
- Wake from Sleep
- Clock change from INTOSC to Primary Clock

This anomaly will manifest itself as a clock failure condition for external oscillators which take longer than the clock failure time-out period to start.

Work around
None.

Affected Silicon Revisions

<table>
<thead>
<tr>
<th></th>
<th>A2</th>
<th>A5</th>
<th>A6</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Module: Fixed Voltage Reference (FVR)

2.1 Gain Amplifier Output

When using the FVR module, if the gain amplifier outputs are set via the CDAFVR or ADFVR bits in FVRCON while the module is disabled (FVREN = 0), the internal oscillator frequency may shift, the device current consumption can increase, and a Brown-out Reset may occur.

Work around
Set the FVREN bit of FVRCON to enable the module prior to adjusting the amplifier output selections with the CDAFVR and ADFVR bits. If switching from the 4x output setting to the 1x output setting, select the 2x output setting as an intermediary step. Always set the amplifier output selections to off (’00’) before disabling the FVR module.

Affected Silicon Revisions

<table>
<thead>
<tr>
<th></th>
<th>A2</th>
<th>A5</th>
<th>A6</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Module: Program Flash Memory (PFM)

3.1 PFM Self Write

Writes to the PFM will not execute if the device’s clock source is HS or ECH, or if the internal oscillator is at either 8 MHz or 16 MHz. The DFM is unaffected.

Work around
To write to the PFM, the clock source must have one of the following settings: internal oscillator set to 4 MHz or lower, ECM, ECL, XT, External RC, LP or T1OSC.

Affected Silicon Revisions

<table>
<thead>
<tr>
<th></th>
<th>A2</th>
<th>A5</th>
<th>A6</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Module: CPU

4.1 BRA/BRW

If a BRA or BRW instruction is executed concurrently with an interrupt event, the ISR routine can restore the PC to an incorrect value.

Work around
Use the GOTO instruction rather than the BRA or BRW instruction.

Affected Silicon Revisions

<table>
<thead>
<tr>
<th></th>
<th>A2</th>
<th>A5</th>
<th>A6</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Module: USB

5.1 Dual Port RAM

When powering-up the device, selecting a USB Ping-Pong Buffer configuration (PPB<1:0> = 01, 10, or 11) and then enabling the USB module (USBEN = 1), the data located within the Dual Port RAM region may be corrupted.

Work around

Avoid writing to the Dual Port RAM region until after the USB module has been initialized.

Affected Silicon Revisions

<table>
<thead>
<tr>
<th>A2</th>
<th>A5</th>
<th>A6</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Data Sheet Clarifications

The following typographic corrections and clarifications are to be noted for the latest version of the device data sheet (DS40001639B):

Note: Corrections are shown in **bold**. Where possible, the original bold text formatting has been removed for clarity.

1. Module: Master Synchronous Serial Port (MSSP)

   A note box should be inserted in column 2 (right side of page) in Section 22.1 Master SSP (MSSP) Module Overview. The note should read:

   **Note:** The ANSELx bits default to the Analog mode after Reset. To use the MSSP pins for digital communications, the corresponding ANSEL bits must be initialized to ‘0’ by user software.
APPENDIX A: DOCUMENT
REVISION HISTORY

Rev A Document (08/2012)
Initial release of this document.

Rev B Document (08/2012)
Corrected Device ID and Silicon Revision ID in Table 1.
Removed incorrect errata module.

Rev C Document (12/2012)
Added PIC16(L)F1454 devices; Added Silicon Revision A5; Updated Table 1 and Table 2.

Added Module 4, CPU.

Rev E Document (10/2013)
Added Silicon Revision A6; Other minor corrections.

Rev F Document (09/2014)
Added Module 5: USB.
Data Sheet Clarifications: Replaced Module 1: Electrical Specifications with Module 1: MSSP.
Note the following details of the code protection feature on Microchip devices:

• Microchip products meet the specification contained in their particular Microchip Data Sheet.

• Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.

• There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip’s Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.

• Microchip is willing to work with the customer who is concerned about the integrity of their code.

• Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as “unbreakable.”

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip’s code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer’s risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights.

Trademarks

The Microchip name and logo, the Microchip logo, dsPIC, FlashFlex, flexPWR, JukeBlox, KEELOG, KEELOG logo, Kleer, LANCheck, MediaLB, MOST, MOST logo, MPLAB, OptoLyzer, PIC, PICSTART, PIC18 logo, RightTouch, SpyNIC, SST, SST Logo, SuperFlash and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

The Embedded Control Solutions Company and mTouch are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Analog-for-the-Digital Age, BodyCom, chipKIT, chipKIT logo, CodeGuard, dsPICDEM, dsPICDEM.net, ECAN, In-Circuit Serial Programming, ICSP, Inter-Chip Connectivity, KleerNet, KleerNet logo, MiWi, MPASM, MFIF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, RightTouch logo, REAL ICE, SQI, Serial Quad I/O, Total Endurance, TSHARC, USBCheck, Varisense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2012-2014, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN: 978-1-63276-610-6

Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company’s quality system processes and procedures are for its PIC® MCUs and dsPIC® DSCs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip’s quality system for the design and manufacture of development systems is ISO 9001:2000 certified.
## Microchip Technology Inc.

### AMERICAS

**Corporate Office**
- 2355 West Chandler Blvd.
- Chandler, AZ 85224-6199
- Tel: 480-792-7200
- Fax: 480-792-7277

**Technical Support:**
- [http://www.microchip.com/support](http://www.microchip.com/support)

**Web Address:**
- [www.microchip.com](http://www.microchip.com)

**Americas Sales Offices**

- **Atlanta**
  - DULUTH, GA
  - Tel: 678-957-9614
  - Fax: 678-957-1455

- **Austin, TX**
  - Tel: 512-257-3370

- **Boston**
  - Westborough, MA
  - Tel: 774-760-0087
  - Fax: 774-760-0088

- **Chicago**
  - Itasca, IL
  - Tel: 86-2-9868-6733
  - Fax: 86-2-9868-6755

- **Dallas**
  - Addison, TX
  - Tel: 972-818-7423
  - Fax: 972-818-2924

- **Detroit**
  - Novi, MI
  - Tel: 774-760-0087
  - Fax: 774-760-0088

- **Houston, TX**
  - Tel: 281-894-5983

- **Indianapolis**
  - Noblesville, IN
  - Tel: 317-773-8323
  - Fax: 317-773-5453

- **Los Angeles**
  - Mission Viejo, CA
  - Tel: 949-462-9523
  - Fax: 949-462-9608

- **New York, NY**
  - Tel: 631-435-6000

- **San Jose, CA**
  - Tel: 408-735-9110

- **Canada - Toronto**
  - Tel: 905-673-0699
  - Fax: 905-673-6509

### ASIA/PACIFIC

**Asia Pacific Office**

- Suites 3707-14, 37th Floor
- Tower 6, The Gateway
- Harbour City, Kowloon
- Hong Kong
  - Tel: 852-2943-5100
  - Fax: 852-2401-3431

**Australia - Sydney**
- Tel: 61-2-9868-6733
  - Fax: 61-2-9868-6755

**China - Beijing**
- Tel: 86-10-8569-7000
  - Fax: 86-10-8528-2104

**China - Chengdu**
- Tel: 86-28-8665-5511
  - Fax: 86-28-8665-7889

**China - Chongqing**
- Tel: 86-23-8980-9588
  - Fax: 86-23-8980-9500

**China - Hangzhou**
- Tel: 86-571-8792-8115
  - Fax: 86-571-8792-8116

**China - Hong Kong SAR**
- Tel: 852-2943-5100
  - Fax: 852-2401-3431

**China - Nanjing**
- Tel: 86-25-8473-2460
  - Fax: 86-25-8473-2470

**China - Qingdao**
- Tel: 86-532-8502-7355
  - Fax: 86-532-8502-7205

**China - Shanghai**
- Tel: 86-21-5407-5533
  - Fax: 86-21-5407-5066

**China - Shenyang**
- Tel: 86-24-2334-2829
  - Fax: 86-24-2334-2393

**China - Shenzhen**
- Tel: 86-755-8864-2200
  - Fax: 86-755-8203-1760

**China - Wuhan**
- Tel: 86-27-5980-5300
  - Fax: 86-27-5980-5118

**China - Xian**
- Tel: 86-29-8833-7252
  - Fax: 86-29-8833-7256

**China - Xiamen**
- Tel: 86-592-2388138
  - Fax: 86-592-2388130

**China - Zhuhai**
- Tel: 86-756-3210040
  - Fax: 86-756-3210049

### ASIA/PACIFIC

**India - Bangalore**
- Tel: 91-80-3090-4444
  - Fax: 91-80-3090-4123

**India - New Delhi**
- Tel: 91-11-4160-8631
  - Fax: 91-11-4160-8632

**India - Pune**
- Tel: 91-20-3019-1500
  - Fax: 91-20-3019-1500

**Japan - Osaka**
- Tel: 81-6-6152-7160
  - Fax: 81-6-6152-9310

**Japan - Tokyo**
- Tel: 81-3-6880-3770
  - Fax: 81-3-6880-3771

**Korea - Daegu**
- Tel: 82-53-744-4301
  - Fax: 82-53-744-4302

**Korea - Seoul**
- Tel: 82-2-554-7200
  - Fax: 82-2-558-5932 or 82-2-558-5934

**Malaysia - Kuala Lumpur**
- Tel: 60-3-6201-9857
  - Fax: 60-3-6201-9859

**Malaysia - Penang**
- Tel: 60-4-227-8870
  - Fax: 60-4-227-4068

**Philippines - Manila**
- Tel: 63-2-634-9065
  - Fax: 63-2-634-9069

**Singapore**
- Tel: 65-6334-8870
  - Fax: 65-6334-8850

**Taiwan - Hsin Chu**
- Tel: 886-3-5778-366
  - Fax: 886-3-5770-955

**Taiwan - Kaohsiung**
- Tel: 886-7-213-7830

**Taiwan - Taipei**
- Tel: 886-2-2508-8600
  - Fax: 886-2-2508-0102

**Thailand - Bangkok**
- Tel: 66-2-694-1351
  - Fax: 66-2-694-1350

### EUROPE

**Austria - Wels**
- Tel: 43-7242-2244-39
  - Fax: 43-7242-2244-393

**Denmark - Copenhagen**
- Tel: 45-4450-2828
  - Fax: 45-4485-2829

**France - Paris**
- Tel: 33-1-69-53-63-20
  - Fax: 33-1-69-30-90-79

**Germany - Dusseldorf**
- Tel: 49-2129-3766400

**Germany - Munich**
- Tel: 49-89-627-144-0
  - Fax: 49-89-627-144-44

**Germany - Pforzheim**
- Tel: 49-7231-424750

**Italy - Milan**
- Tel: 39-0331-742611
  - Fax: 39-0331-466781

**Italy - Venice**
- Tel: 39-049-7625286

**Netherlands - Drunen**
- Tel: 31-416-690399
  - Fax: 31-416-690340

**Poland - Warsaw**
- Tel: 48-22-3325737

**Spain - Madrid**
- Tel: 34-91-708-08-90
  - Fax: 34-91-708-08-91

**Sweden - Stockholm**
- Tel: 46-8-5090-4654
  - Fax: 44-118-921-5820

**UK - Wokingham**
- Tel: 44-118-921-5800
  - Fax: 44-118-921-5820

---

**Worldwide Sales and Service**

**03/25/14**