

PIC16(L)F15354/55 Family Silicon Errata and Data Sheet Clarifications

The PIC16(L)F15354/55 family devices that you have received conform functionally to the current Device Data Sheet (DS40001853E), 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)F15354/55 silicon.

Note: This document summarizes all silicon errata issues from all revisions of silicon, previous as well as current. Only the issues indicated in the last column of [Table 2](#) apply to the current silicon revision (**A4**).

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® X IDE and Microchip's programmers, debuggers, and emulation tools, which are available at the Microchip corporate website (www.microchip.com).

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

1. Using the appropriate interface, connect the device to the hardware debugger.
2. Open an MPLAB X IDE project.
3. Configure the MPLAB X IDE project for the appropriate device and hardware debugger.
4. 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.

Note: If you are unable to extract the silicon revision level, please contact your local Microchip sales office for assistance.

The DEVREV values for the various PIC16(L)F15354/55 silicon revisions are shown in [Table 1](#).

TABLE 1: SILICON DEVREV VALUES

Part Number	Device ID ⁽¹⁾	Revision ID for Silicon Revision ⁽²⁾		
		A2	A3	A4
PIC16F15354	30ACh	2002h	2003h	2004h
PIC16LF15354	30ADh	2002h	2003h	2004h
PIC16F15355	30AEh	2002h	2003h	2004h
PIC16LF15355	30AFh	2002h	2003h	2004h

Note 1: The Device IDs (DEVID and DEVREV) are located at addresses 8006h and 8005h, respectively. They are shown in hexadecimal in the format "DEVID DEVREV".

2: Refer to the "PIC16(L)F153XX Memory Programming Specification" (DS40001838) for detailed information on Device and Revision IDs for your specific device.

TABLE 2: SILICON ISSUE SUMMARY

Module	Feature	Item Number	Issue Summary	Affected Revisions ⁽¹⁾		
				A2	A3	A4
Analog-to-Digital Converter (ADC)	ADC Positive Voltage Reference	1.1	Using FVR as the positive voltage reference to the ADC can cause missing codes in the conversion result.	X	X	X
Development Support	Data Breakpoints	2.1	Data breakpoints are not available on Banks 32 through 63.	X		
Windowed Watchdog Timer (WWDT)	Watchdog Timer Clock Source	3.1	WWDT does not work with SOSC as the clock source.	X		
Electrical Specifications	Minimum VDD Specification for LF Devices	4.1	VDDMIN specifications are changed for LF devices only.	X	X	X
	Fixed Voltage Reference (FVR) Accuracy	4.2	FVR output tolerance may be higher than specified at temperatures below -20°C.	X	X	X
	ADC Offset Error	4.3	ADC Offset Error specification changed.	X	X	X
TMR0	Clock Source	5.1	TMRH register does not increment when the clock source is Fosc/4 and the T0ASYNC bit is cleared.	X	X	X

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 (**A4**).

1. Module: Analog-to-Digital Converter (ADC)

1.1 ADC Positive Voltage Reference

Using the FVR as the positive voltage reference to the ADC can cause an increase in missing codes.

Work around

1. Increase the bit conversion time, known as TAD, to 8 μ s.
2. Use VDD as the positive voltage reference to the ADC.

Affected Silicon Revisions

A2	A3	A4					
X	X	X					

2. Module: Development Support

2.1 Data Breakpoints

Data breakpoints are not available on Banks 32 through 63. Any breakpoints that are placed in Banks 32 through 63 will fail to be recognized.

Work around

None.

Affected Silicon Revisions

A2	A3	A4					
X							

3. Module: Windowed Watchdog Timer (WWDT)

3.1 WWDT Clock Source Selection

When the WDTCS <2:0> bits of the WDTCON1 register are set to 'b010', selecting the Secondary Oscillator SOSC 32 kHz as the clock source, the WWDT does not operate.

Work around

Use the LFINTOSC or MFINTOSC clock sources for the WWDT.

Affected Silicon Revisions

A2	A3	A4					
X							

4. Module: Electrical Specifications

4.1 Minimum VDD Specifications for LF Devices

VDDMIN at -40°C to +25°C = 2.3V. (See [Table 37-1](#) at the bottom of the page for reference.)

Work around

None.

Affected Silicon Revisions

A2	A3	A4					
X	X	X					

4.2 Fixed Voltage Reference (FVR) Accuracy

At temperatures below -20°C, the output voltage for the FVR may be greater than the levels specified in the data sheet. This will apply to all three gain amplifier settings (1X, 2X, 4X). The affected parameter numbers found in the data sheet are: FVR01 (1X gain setting), FVR02 (2X gain setting), and FVR03 (4X gain setting).

Work around

None.

Affected Silicon Revisions

A2	A3	A4					
X	X	X					

TABLE 37-1: SUPPLY VOLTAGE

PIC16LF15354/15355			Standard Operating Conditions (Unless Otherwise Stated)				
Param. No.	Sym.	Characteristic	Min.	Typ.†	Max.	Units	Conditions
D002	VDD		1.8	—	3.6	V	FOSC ≤ 16 MHz, +25°C ≤ TA ≤ +125°C
			2.3	—	3.6	V	FOSC ≤ 16 MHz, -40°C ≤ TA ≤ +25°C
			2.5	—	3.6	V	FOSC > 16 MHz

4.3 ADC Offset Error

The table containing the Offset Error specification (AD04:EOFF) for the Analog-to-Digital Converter is modified. The updated value for Offset Error specification is +/- 3.0 LSB.

Work around

None.

Affected Silicon Revisions

A2	A3	A4					
X	X	X					

5. Module: TMR0

5.1 Clock Source

Clocking Timer0, in 16-bit mode, with $F_{osc}/4$, and clearing the T0ASYNC bit in T0CON1 register may cause the High-Byte register, TMRH, to not increment. This issue is only valid when $F_{osc}/4$ is used as the clock source.

Work around

When using $F_{osc}/4$ as the Timer0 clock, set the T0ASYNC bit in T0CON1 register to '1'.

Affected Silicon Revisions

A2	A3	A4					
X	X	X					

Data Sheet Clarifications

The following typographic corrections and clarifications are to be noted for the latest version of the device data sheet (DS40001853E):

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

None.

APPENDIX A: DOCUMENT REVISION HISTORY

Rev K Document (07/2024)

Added Module 5.1 (TMR0).

Rev J Document (10/2023)

Updated data sheet revision letter.

Rev H Document (11/2021)

Added silicon revision A4.

Rev G Document (03/2021)

Updated Table 2 and 37-1 and Section 4.1 Minimum VDD Specification. Other minor corrections.

Data Sheet Clarifications:

Added Module 2: Electrical Specifications.

Rev F Document (11/2020)

Added Table 37-1; Updated Sections 4.1 and 4.3.

Rev E Document (09/2020)

Added Silicon Revision A3; Other minor corrections.

Rev D Document (03/2018)

Data Sheet Clarifications: Added Module 1: Analog-to-Digital Converter. Other minor corrections.

Rev C Document (08/2017)

Added Module 4: Electrical Specifications

Data Sheet Clarifications:

Added Modules 1 and 2. Other minor corrections.

Rev B Document (01/2017)

Removed Module 1: Oscillators. Added Module 3: Windowed Watchdog Timer (WWDT). Other minor corrections.

Rev A Document (10/2016)

Initial release of this document.

Note the following details of the code protection feature on Microchip products:

- Microchip products meet the specifications contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is secure when used in the intended manner, within operating specifications, and under normal conditions.
- Microchip values and aggressively protects its intellectual property rights. Attempts to breach the code protection features of Microchip product is strictly prohibited and may violate the Digital Millennium Copyright Act.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of its code. Code protection does not mean that we are guaranteeing the product is "unbreakable" Code protection is constantly evolving. Microchip is committed to continuously improving the code protection features of our products.

This publication and the information herein may be used only with Microchip products, including to design, test, and integrate Microchip products with your application. Use of this information in any other manner violates these terms. Information regarding device applications 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. Contact your local Microchip sales office for additional support or, obtain additional support at <https://www.microchip.com/en-us/support/design-help/client-support-services>.

THIS INFORMATION IS PROVIDED BY MICROCHIP "AS IS". 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 ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTIES RELATED TO ITS CONDITION, QUALITY, OR PERFORMANCE.

IN NO EVENT WILL MICROCHIP BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL, OR CONSEQUENTIAL LOSS, DAMAGE, COST, OR EXPENSE OF ANY KIND WHATSOEVER RELATED TO THE INFORMATION OR ITS USE, HOWEVER CAUSED, EVEN IF MICROCHIP HAS BEEN ADVISED OF THE POSSIBILITY OR THE DAMAGES ARE FORESEEABLE. TO THE FULLEST EXTENT ALLOWED BY LAW, MICROCHIP'S TOTAL LIABILITY ON ALL CLAIMS IN ANY WAY RELATED TO THE INFORMATION OR ITS USE WILL NOT EXCEED THE AMOUNT OF FEES, IF ANY, THAT YOU HAVE PAID DIRECTLY TO MICROCHIP FOR THE INFORMATION.

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 unless otherwise stated.

For information regarding Microchip's Quality Management Systems, please visit www.microchip.com/quality.

Trademarks

The Microchip name and logo, the Microchip logo, Adaptec, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, CryptoMemory, CryptoRF, dsPIC, flexPWR, HELDO, IGLOO, JukeBlox, KeeLoq, Klear, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricon, SyncServer, Tachyon, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

AgileSwitch, ClockWorks, The Embedded Control Solutions Company, EtherSynch, Flashtec, Hyper Speed Control, HyperLight Load, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, TimeCesium, TimeHub, TimePictra, TimeProvider, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, Augmented Switching, BlueSky, BodyCom, Clockstudio, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, Espresso T1S, EtherGREEN, EyeOpen, GridTime, IdealBridge, iGAT, In-Circuit Serial Programming, ICSP, INICnet, Intelligent Parallelizing, IntelliMOS, Inter-Chip Connectivity, JitterBlocker, Knob-on-Display, MarginLink, maxCrypto, maxView, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, mSiC, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICKit, PICtail, Power MOS IV, Power MOS 7, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, RTAX, RTG4, SAM-ICE, Serial Quad I/O, simpleMAP, SimpliPHY, SmartBuffer, SmartHLS, SMART-I.S., storClad, SQL, SuperSwitcher, SuperSwitcher II, Switchtec, SynchroPHY, Total Endurance, Trusted Time, TSHARC, Turing, USBCheck, VariSense, VectorBlox, VeriPHY, ViewSpan, WiperLock, XpressConnect, 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.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks 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.

© 2016-2023, Microchip Technology Incorporated and its subsidiaries.

All Rights Reserved.

ISBN: 978-1-6683-4788-1

Worldwide Sales and Service

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>
Web Address:
www.microchip.com

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: 630-285-0071
Fax: 630-285-0075

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

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453
Tel: 317-536-2380

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608
Tel: 951-273-7800

Raleigh, NC
Tel: 919-844-7510

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110
Tel: 408-436-4270

Canada - Toronto
Tel: 905-695-1980
Fax: 905-695-2078

ASIA/PACIFIC

Australia - Sydney
Tel: 61-2-9868-6733

China - Beijing
Tel: 86-10-8569-7000

China - Chengdu
Tel: 86-28-8665-5511

China - Chongqing
Tel: 86-23-8980-9588

China - Dongguan
Tel: 86-769-8702-9880

China - Guangzhou
Tel: 86-20-8755-8029

China - Hangzhou
Tel: 86-571-8792-8115

China - Hong Kong SAR
Tel: 852-2943-5100

China - Nanjing
Tel: 86-25-8473-2460

China - Qingdao
Tel: 86-532-8502-7355

China - Shanghai
Tel: 86-21-3326-8000

China - Shenyang
Tel: 86-24-2334-2829

China - Shenzhen
Tel: 86-755-8864-2200

China - Suzhou
Tel: 86-186-6233-1526

China - Wuhan
Tel: 86-27-5980-5300

China - Xian
Tel: 86-29-8833-7252

China - Xiamen
Tel: 86-592-2388138

China - Zhuhai
Tel: 86-756-3210040

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444

India - New Delhi
Tel: 91-11-4160-8631

India - Pune
Tel: 91-20-4121-0141

Japan - Osaka
Tel: 81-6-6152-7160

Japan - Tokyo
Tel: 81-3-6880-3770

Korea - Daegu
Tel: 82-53-744-4301

Korea - Seoul
Tel: 82-2-554-7200

Malaysia - Kuala Lumpur
Tel: 60-3-7651-7906

Malaysia - Penang
Tel: 60-4-227-8870

Philippines - Manila
Tel: 63-2-634-9065

Singapore
Tel: 65-6334-8870

Taiwan - Hsin Chu
Tel: 886-3-577-8366

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

Taiwan - Taipei
Tel: 886-2-2508-8600

Thailand - Bangkok
Tel: 66-2-694-1351

Vietnam - Ho Chi Minh
Tel: 84-28-5448-2100

EUROPE

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

Denmark - Copenhagen
Tel: 45-4485-5910
Fax: 45-4485-2829

Finland - Espoo
Tel: 358-9-4520-820

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

Germany - Garching
Tel: 49-8931-9700

Germany - Haan
Tel: 49-2129-3766400

Germany - Heilbronn
Tel: 49-7131-72400

Germany - Karlsruhe
Tel: 49-721-625370

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

Germany - Rosenheim
Tel: 49-8031-354-560

Israel - Hod Hasharon
Tel: 972-9-775-5100

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

Italy - Padova
Tel: 39-049-7625286

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

Norway - Trondheim
Tel: 47-7288-4388

Poland - Warsaw
Tel: 48-22-3325737

Romania - Bucharest
Tel: 40-21-407-87-50

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

Sweden - Gothenberg
Tel: 46-31-704-60-40

Sweden - Stockholm
Tel: 46-8-5090-4654

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