FemtoClock 3 Wireless/FemtoClock 4

FC3W 100BGA Device Upgrade to FC4 100BGA Device

Introduction

This application note explains the minor differences between the FemtoClock™3 Wireless (FC3W) 100BGA family of devices and the FemtoClock 4 (FC4) 100BGA family of devices and provides the customer with details to upgrade the device. This document does not apply to the 144BGA family of devices. The devices referenced herein are the FC3W devices RC38312/RC38112 and the FC4 devices RC32412/RC38412.

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1. Overview

Customers using the FC3W devices RC38312/RC38112 can upgrade to the FC4 devices RC32412/RC38412 for improved performance. The 100BGA FC3W and FC4 devices share similar pins. The differences are listed in section 2.

2. FC3W vs FC4 Pin Mappings

The pin mappings for the 100-pin BGA FC3W and FC4 devices are shown in Figure 1. The main differences are highlighted in red squares and also described in Table 1.

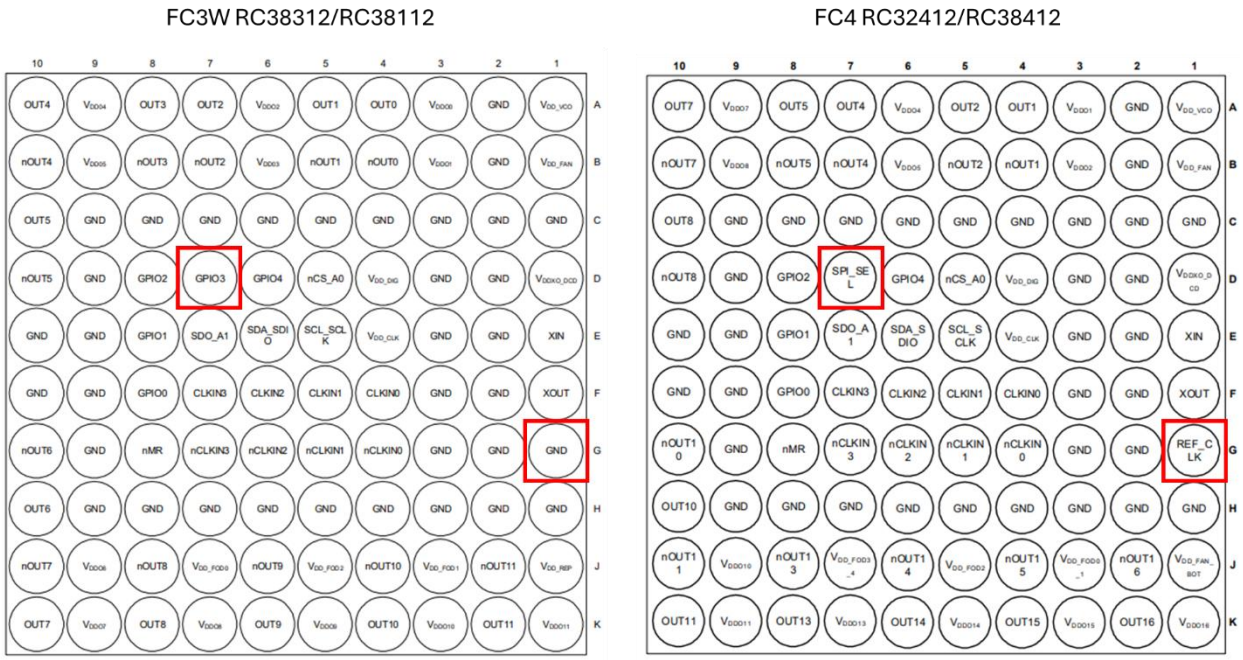


Figure 1. FC3W vs FC4 Pin Mappings

Table 1. Pin Differences for FC3W and FC4 100BGA Devices

FC3W (100BGA)	FC4 (100BGA)
GND	REF_IN (XO)
GPIO3	SPI_nI2C_SEL

2.1 Major Differences

1. A ground connection meant for FC3W will translate to a disabled REF_IN for the FC4 device. This means an XO is not possible at REF_IN. If the XIN/XOUT pins are used in FC4, the REF_IN pin can be disabled. An XO on XIN for FC4 will work, even though the XO on REF_IN is preferred.
2. The GPIO3 pin can be translated to the serial port selection pin. If the GPIO3 pin is not used on the board, the new serial port selection functionality can be used.

2.2 Other Differences

1. The specific outputs do not line up numerically. **Example**: OUT4 is at a different location. However, an output remains an output. **Example**: OUT4 becomes OUT7.
2. The specific output rails do not line up numerically. **Example**: VDDO4 is at a different location. However, an output rail remains an output rail. **Example**: VDDO4 becomes VDDO7.
3. Power rails: VDD_REP in FC3W is a 1.8V rail for the FOD digital blocks. VDD_FAN_BOT in FC4 is a 1.8V rail for the internal buffering to the IODs for OUT13–OUT16.

4. Power Rails: nMR in FC3W is powered by the VDD_FOD0 which is a 1.8V rail. In FC4, nMR is powered by VDD_DIG which supports 1.8V, 2.5V, or 3.3V.

2.3 Similarities

1. The size of the FC3 and FC4 devices are identical.
2. The same XTAL on XIN/XOUT work for both devices.
3. The digicap register setting for the internal XTAL loading is similar on both devices. FC4 can support the same 8pF–12pF range as the FC3W devices. The settings for each C_L are not ideal, but the calculation in RICBox is accurate and design recommends offsetting XOUT > XIN for the programmable capacitors. The fixed capacitors are not changed. The programmable capacitors are listed below:
   a. For an 8.0pF load, XOUT = 6.72pF and XIN = 0.48pF.
   b. For a 10.0pF load, XOUT = 7.20pF and XIN = 2.40pF.
   c. For a 12.0pF load, XOUT = 6.24pF and XIN = 0.00pF.

3. Power Implications

The power consumed may be slightly different when transferring from the FC3W device to the FC4 device. The power rail totals should be similar between the devices such that the customer does not need to resize the LDO regulator. A difference of up to 20mA should be considered fine for the LDO.

4. Revision History

Revision	Date	Description
1.01	Oct 23, 2026	Added comment regarding nMR power to section 2.2
1.00	Apr 7, 2026	Initial release.

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