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## Power-up Time Acceleration



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### Overview

ON Semiconductor RF chip have typical start-up times from sleep to oscillator and references running are in the order of 3 ms (this value depends on the specific crystal used). This time can vary with temperature and be in rare cases over 10 ms. The start-up time is not specified and not controlled. For synchronous applications this is not desirable. Therefore we are presenting two easy ways to reduce and control the start-up time to a constant value.

This document applies to the devices AX5051, AX5151, AX5031, AX5131 and AX50424.

### APPLICATION NOTE

#### Power-up Acceleration

##### Implementation 1

Connect a digital output pin PIO directly from a micro-controller to the VREG pin of the RF device. The default setting of PIO should be Hi-Z.

After powering up the RF device PIO has to be set from Hi-Z to 1 and back to Hi-Z. This will induce a voltage kick to VREG and helps the device to power up in minimum time.

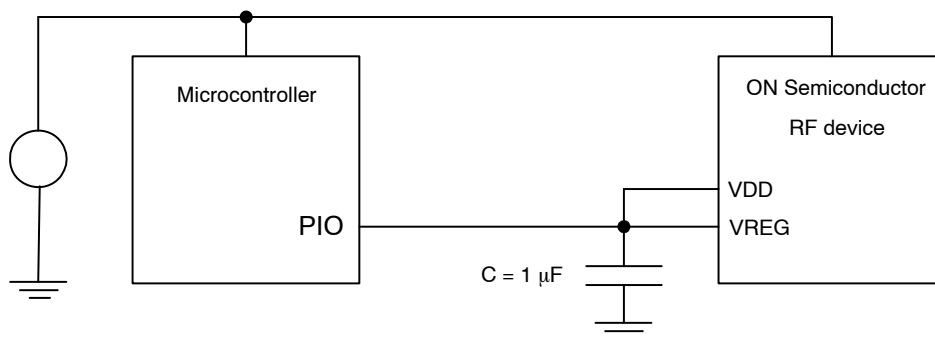


Figure 1. Implementation 1

Powering up references and oscillators should now be done as follows (see Note):

1. Set PWRMODE to STANDBY (register value 0x05)
2. Set PIO to output 1
3. Wait at least 200 µs
4. Set PIO back to Hi-Z

NOTE: Refer to the product specific Programming Manual for details on power up sequences, see <http://www.onsemi.com>

##### Implementation 2

This implementation uses a GPIO pin from the RF device itself, so no extra pin from a micro-controller or any other external device is required.

Choose a GPIO pin (SYSCLK or IRQ) and connect it via a capacitor  $C_2$  to the VREG pin. The pin numbers of the GPIO pins that can be used for each of ON Semiconductor RF device are shown in Table 1.

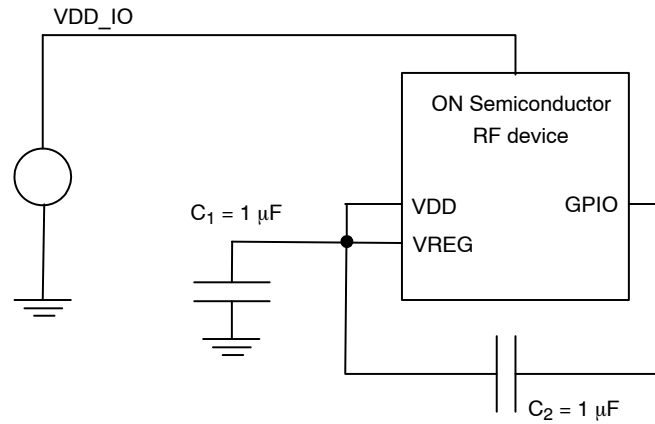


Figure 2. Implementation 2

Powering up references and oscillators should now be done as follows (see Note):


1. Set GPIO pin to output 0 (registers PINCFG1 and PINCFG2)
2. Set PWRMODE register to STANDBY (register value 0x05)
3. Set GPIO pin to output 1
4. Wait at least 30 µs
5. Set GPIO pin back to 0

Note, that  $C_2$  should be approximately the same size as  $C_1$ . If the capacitors are chosen greater than 1 µF, the minimum wait time in step 3 will be longer.

NOTE: Refer to the product specific Programming Manual for details on power up sequences and GPIO pin configuration, see <http://www.onsemi.com>

Table 1. GPIO PIN NUMBERS

Device	IRQ	SYSCLK
AX5051	19	13
AX5151	20	14
AX5031	14	7
AX5131	16	10
AX50424	19	13

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