

## RC38312A200

FemtoClock3 Family Custom Configuration

### General Description

This document details the custom configuration that is programmed into the one time programmable (OTP) memory of the RC38312A200. Please refer to the device datasheet for further information about the device.

### Configuration List

| Configuration Name | Configuration Index |
|--------------------|---------------------|
| spi_4wire          | config_0            |
| spi_3wire          | config_1            |
| i2c_no_eeprom      | config_2            |
| i2c_with_eeprom    | config_3            |

### Output Frequency Overview

| Config Index | OUT0 | OUT1 | OUT2 | OUT3 | OUT4 | OUT5 |
|--------------|------|------|------|------|------|------|
| config_0     | -    | -    | -    | -    | -    | -    |
| config_1     | -    | -    | -    | -    | -    | -    |
| config_2     | -    | -    | -    | -    | -    | -    |
| config_3     | -    | -    | -    | -    | -    | -    |

  

| Config Index | OUT6 | OUT7 | OUT8 | OUT9 | OUT10 | OUT11 |
|--------------|------|------|------|------|-------|-------|
| config_0     | -    | -    | -    | -    | -     | -     |
| config_1     | -    | -    | -    | -    | -     | -     |
| config_2     | -    | -    | -    | -    | -     | -     |
| config_3     | -    | -    | -    | -    | -     | -     |

Note: Frequencies shown in parentheses indicates that the output is in disabled state by default.

### Configuration Selection Overview: Static Multi Config

| Config Slot | Config Selection 1 | Config Selection 0 | Config Index |
|-------------|--------------------|--------------------|--------------|
| slot_0      | GPIO1 Low          | GPIO0 Low          | config_0     |
| slot_1      | GPIO1 Low          | GPIO0 High         | config_1     |
| slot_2      | GPIO1 High         | GPIO0 Low          | config_2     |
| slot_3      | GPIO1 High         | GPIO0 High         | config_3     |

## Serial Interface Configuration

| Config Index | Serial Port Configuration                             |
|--------------|---|
| config_0     | 4-wire SPI (2-byte address)                           |
| config_1     | 3-wire SPI (2-byte address)                           |
| config_2     | I2C (2-byte address), 7-bit address: 0 0 0 1 A2 A1 A0 |
| config_3     | I2C (2-byte address), 7-bit address: 0 0 0 1 A2 A1 A0 |

## I2C Address Selection Bits

| Config Index | I2C Address Bit A2 | I2C Address Bit A1 | I2C Address Bit A0 |
|--------------|--------------------|--------------------|--------------------|
| config_0     | N/A                | N/A                | N/A                |
| config_1     | N/A                | N/A                | N/A                |
| config_2     | 0                  | SDO (PIN E7)       | nCS (PIN D5)       |
| config_3     | 0                  | SDO (PIN E7)       | nCS (PIN D5)       |

## GPIO Startup Configuration

| Pin Number | GPIO  | Function Description |
|------------|-------|----------------------|
| F8         | GPIO0 | CONFIG_SEL0          |
| E8         | GPIO1 | CONFIG_SEL1          |
| D8         | GPIO2 | EEPROM_ADDR0         |
| D7         | GPIO3 | EEPROM_ADDR1         |
| D6         | GPIO4 | EEPROM_ADDR2         |

## VDD Pins

| Property  | Value |
|-----------|-------|
| VDD_VCO   | 1.8V  |
| VDDXO_DCD | 1.8V  |
| VDD_FAN   | 1.8V  |
| VDD_REP   | 1.8V  |
| VDD_DIG   | 1.8V  |
| VDD_CLK   | 1.8V  |
| VDD_FOD0  | 1.8V  |
| VDD_FOD1  | 1.8V  |
| VDD_FOD2  | 1.8V  |
| VDDO0     | 1.8V  |
| VDDO1     | 1.8V  |
| VDDO2     | 1.8V  |
| VDDO3     | 1.8V  |
| VDDO4     | 1.8V  |
| VDDO5     | 1.8V  |
| VDDO6     | 1.8V  |
| VDDO7     | 1.8V  |
| VDDO8     | 1.8V  |
| VDDO9     | 1.8V  |
| VDDO10    | 1.8V  |
| VDDO11    | 1.8V  |

## spi\_4wire (config\_0) General Overview

| Property             | Value                       |
|----------------------|-----------------------------|
| Serial Interface     | 4-wire SPI (2-byte address) |
| Operation Mode DPLL0 | Synthesizer                 |
| Operation Mode DPLL1 | Synthesizer                 |
| Operation Mode DPLL2 | Synthesizer                 |
| External EEPROM Load | Disabled                    |
| XIN                  | 68                          |
| Crystal CL           | 8.24pF                      |
| VCO Frequency        | 9.8304GHz                   |
| CLKIN0               | DISABLED                    |
| CLKIN1               | DISABLED                    |
| CLKIN2               | DISABLED                    |
| CLKIN3               | DISABLED                    |
| APLL Loop BW         | ~707.0569kHz                |
| DPLL0 Lock BW        | ~63.7413Hz                  |
| DPLL0 Acquire BW     | N/A                         |
| DPLL1 Lock BW        | ~63.7413Hz                  |
| DPLL1 Acquire BW     | N/A                         |
| DPLL2 Lock BW        | ~63.7413Hz                  |
| DPLL2 Acquire BW     | N/A                         |

Note: This dash code has TOP.GLOBAL.DEVICE\_CNFG.i2c\_addr\_sel set to 0x3, meaning that bit 0 of the I2C address comes from pin nCS and bit 1 from pin SDO.

The nCS and SDO pins have an internal pull up. Example: If both nCS and SDO are left floating, the resulting I2C address will be 0x0B at device power up.

## spi\_4wire (config\_0) GPIO Settings

| Pin Number | GPIO  | Function Description                                  | Internal PU | Internal PD | Output Drive Strength              |
|------------|-------|---|-------------|-------------|------------------------------------|
| F8         | GPIO0 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| E8         | GPIO1 | APLL lock (from frequency-based lock detect) (output) | Enable      | Disable     | Open drain Output mode. Fast mode. |
| D8         | GPIO2 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| D7         | GPIO3 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| D6         | GPIO4 | General purpose input (input)                         | Enable      | Disable     | N/A                                |

## spi\_4wire (config\_0) Output Overview

| Output | IOD Mux Selection                         | Frequency | Status   | Output Type         | Output Boost |
|--------|---|-----------|----------|---------------------|--------------|
| OUT0   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT1   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT2   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT3   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT4   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT5   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT6   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT7   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT8   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT9   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT10  | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT11  | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |

Note: All VDDOs need to ramp before or at the same time as other cores power rails.

## spi\_3wire (config\_1) General Overview

| Property             | Value                       |
|----------------------|-----------------------------|
| Serial Interface     | 3-wire SPI (2-byte address) |
| Operation Mode DPLL0 | Synthesizer                 |
| Operation Mode DPLL1 | Synthesizer                 |
| Operation Mode DPLL2 | Synthesizer                 |
| External EEPROM Load | Disabled                    |
| XIN                  | 68                          |
| Crystal CL           | 8.24pF                      |
| VCO Frequency        | 9.8304GHz                   |
| CLKIN0               | DISABLED                    |
| CLKIN1               | DISABLED                    |
| CLKIN2               | DISABLED                    |
| CLKIN3               | DISABLED                    |
| APLL Loop BW         | ~707.0569kHz                |
| DPLL0 Lock BW        | ~63.7413Hz                  |
| DPLL0 Acquire BW     | N/A                         |
| DPLL1 Lock BW        | ~63.7413Hz                  |
| DPLL1 Acquire BW     | N/A                         |
| DPLL2 Lock BW        | ~63.7413Hz                  |
| DPLL2 Acquire BW     | N/A                         |

Note: This dash code has TOP.GLOBAL.DEVICE\_CNFG.i2c\_addr\_sel set to 0x3, meaning that bit 0 of the I2C address comes from pin nCS and bit 1 from pin SDO.

The nCS and SDO pins have an internal pull up. Example: If both nCS and SDO are left floating, the resulting I2C address will be 0x0B at device power up.

## spi\_3wire (config\_1) GPIO Settings

| Pin Number | GPIO  | Function Description                                  | Internal PU | Internal PD | Output Drive Strength              |
|------------|-------|---|-------------|-------------|------------------------------------|
| F8         | GPIO0 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| E8         | GPIO1 | APLL lock (from frequency-based lock detect) (output) | Enable      | Disable     | Open drain Output mode. Fast mode. |
| D8         | GPIO2 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| D7         | GPIO3 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| D6         | GPIO4 | General purpose input (input)                         | Enable      | Disable     | N/A                                |

## spi\_3wire (config\_1) Output Overview

| Output | IOD Mux Selection                         | Frequency | Status   | Output Type         | Output Boost |
|--------|---|-----------|----------|---------------------|--------------|
| OUT0   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT1   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT2   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT3   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT4   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT5   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT6   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT7   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT8   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT9   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT10  | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT11  | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |

Note: All VDDOs need to ramp before or at the same time as other cores power rails.

## i2c\_no\_eeprom (config\_2) General Overview

| Property             | Value   |
|----------------------|---|
| Serial Interface     | I2C (2-byte address), 7-bit address: 0 0 0 1 A2 A1 A0 |
| Operation Mode DPLL0 | Synthesizer   |
| Operation Mode DPLL1 | Synthesizer   |
| Operation Mode DPLL2 | Synthesizer   |
| External EEPROM Load | Disabled  |
| XIN                  | 68  |
| Crystal CL           | 8.24pF  |
| VCO Frequency        | 9.8304GHz   |
| CLKIN0               | DISABLED  |
| CLKIN1               | DISABLED  |
| CLKIN2               | DISABLED  |
| CLKIN3               | DISABLED  |
| APLL Loop BW         | ~707.0569kHz  |
| DPLL0 Lock BW        | ~63.7413Hz  |
| DPLL0 Acquire BW     | N/A   |
| DPLL1 Lock BW        | ~63.7413Hz  |
| DPLL1 Acquire BW     | N/A   |
| DPLL2 Lock BW        | ~63.7413Hz  |
| DPLL2 Acquire BW     | N/A   |

Note: This dash code has TOP.GLOBAL.DEVICE\_CNFG.i2c\_addr\_sel set to 0x3, meaning that bit 0 of the I2C address comes from pin nCS and bit 1 from pin SDO.

The nCS and SDO pins have an internal pull up. Example: If both nCS and SDO are left floating, the resulting I2C address will be 0x0B at device power up.

## i2c\_no\_eeprom (config\_2) GPIO Settings

| Pin Number | GPIO  | Function Description                                  | Internal PU | Internal PD | Output Drive Strength              |
|------------|-------|---|-------------|-------------|------------------------------------|
| F8         | GPIO0 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| E8         | GPIO1 | APLL lock (from frequency-based lock detect) (output) | Enable      | Disable     | Open drain Output mode. Fast mode. |
| D8         | GPIO2 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| D7         | GPIO3 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| D6         | GPIO4 | General purpose input (input)                         | Enable      | Disable     | N/A                                |

## i2c\_no\_eeprom (config\_2) Output Overview

| Output | IOD Mux Selection                         | Frequency | Status   | Output Type         | Output Boost |
|--------|---|-----------|----------|---------------------|--------------|
| OUT0   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT1   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT2   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT3   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT4   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT5   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT6   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT7   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT8   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT9   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT10  | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT11  | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |

Note: All VDDOs need to ramp before or at the same time as other cores power rails.

## i2c\_with\_eeprom (config\_3) General Overview

| Property             | Value   |
|----------------------|---|
| Serial Interface     | I2C (2-byte address), 7-bit address: 0 0 0 1 A2 A1 A0 |
| Operation Mode DPLL0 | Synthesizer   |
| Operation Mode DPLL1 | Synthesizer   |
| Operation Mode DPLL2 | Synthesizer   |
| External EEPROM Load | Enabled   |
| XIN                  | 68  |
| Crystal CL           | 8.24pF  |
| VCO Frequency        | 9.8304GHz   |
| CLKIN0               | DISABLED  |
| CLKIN1               | DISABLED  |
| CLKIN2               | DISABLED  |
| CLKIN3               | DISABLED  |
| APLL Loop BW         | ~707.0569kHz  |
| DPLL0 Lock BW        | ~63.7413Hz  |
| DPLL0 Acquire BW     | N/A   |
| DPLL1 Lock BW        | ~63.7413Hz  |
| DPLL1 Acquire BW     | N/A   |
| DPLL2 Lock BW        | ~63.7413Hz  |
| DPLL2 Acquire BW     | N/A   |

Note: This dash code has TOP.GLOBAL.DEVICE\_CNFG.i2c\_addr\_sel set to 0x3, meaning that bit 0 of the I2C address comes from pin nCS and bit 1 from pin SDO.

The nCS and SDO pins have an internal pull up. Example: If both nCS and SDO are left floating, the resulting I2C address will be 0x0B at device power up.

## i2c\_with\_eeprom (config\_3) GPIO Settings

| Pin Number | GPIO  | Function Description                                  | Internal PU | Internal PD | Output Drive Strength              |
|------------|-------|---|-------------|-------------|------------------------------------|
| F8         | GPIO0 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| E8         | GPIO1 | APLL lock (from frequency-based lock detect) (output) | Enable      | Disable     | Open drain Output mode. Fast mode. |
| D8         | GPIO2 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| D7         | GPIO3 | General purpose input (input)                         | Enable      | Disable     | N/A                                |
| D6         | GPIO4 | General purpose input (input)                         | Enable      | Disable     | N/A                                |

## i2c\_with\_eeprom (config\_3) Output Overview

| Output | IOD Mux Selection                         | Frequency | Status   | Output Type         | Output Boost |
|--------|---|-----------|----------|---------------------|--------------|
| OUT0   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT1   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT2   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT3   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT4   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT5   | VCO/N                                     | -         | disabled | powered down (hi-z) | -            |
| OUT6   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT7   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT8   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT9   | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT10  | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |
| OUT11  | Static high (Minimal power)<br>[Reserved] | -         | disabled | powered down (hi-z) | -            |

Note: All VDDOs need to ramp before or at the same time as other cores power rails.

## i2c\_with\_eeprom (config\_3) External EEPROM Settings

| Property              | Value            |
|-----------------------|------------------|
| Part Number           | R1EX24064ASA     |
| Address Size          | 2-byte address   |
| I2C Speed             | 400kHz           |
| Length                | 8KB              |
| EEPROM Load Pins      | GPIO0, GPIO1     |
| 7-bit Address         | 1 0 1 0 A2 A1 A0 |
| EEPROM Address Bit A2 | GPIO4 (PIN D6)   |
| EEPROM Address Bit A1 | GPIO3 (PIN D7)   |
| EEPROM Address Bit A0 | GPIO2 (PIN D8)   |

## Ordering Info

| Part Number        | Carrier Type  |
|--------------------|---------------|
| RC38312A200GBB#BC0 | Tray          |
| RC38312A200GBB#HC0 | Tape and Reel |

Notes:

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(Rev.1.0 Mar 2020)

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