Release Notes

Version 3.0.0 Public Release

- Add full support for Eddystone packet types
- Fix an EMBC02 bug whereby occasional +7g spikes were observed
- Misc BMA222E configuration changes for improved EMBC02 performance and power consumption
- Accept *EM6819F6B300* or _EM6819F6*B300* as MCU definition. Fixes the build broken by a Ride7 IDE update.
- Fix #145, a bug whereby negative temperatures were reported incorrectly

Version 2.8.0 Public Release

- Add support for the EMBC02 with BMA222E accelerometer.
- Add support for the EMBC03 with EM4325 (for temperature sensor).
- Add license header and EMUS copyright to all custom source. Add Source License pdf to distribution root.
- Fix #130, Program/Update scripts crash when log file is empty.
- Fix #133. Reduce delay between Power-On Self Test (POST) cycles from 50ms to 10ms and exclude AltBeacon advertisements from POST.
- Fix #134, prohibit locking the beacon in OFF state.
- Fix #135. Create separate projects for EMBC01, 02, and 03.
- Fix #136, Disable button pull-up during current test. Also put 9301 in sleep mode instead of idle.
- Fix #140. Use correct flags per iBeacon spec.

- Tiny/Low cost support is dropped beginning with release 2.8.0. References to Tiny/Low cost still exist in the code but there is no project file and the code does not build in Tiny/Low cost configuration.

Version 2.7 Public Release

This release supports the COiN product. Tiny and LowCost support remains in this release, but it was not tested.

- Rotates beacon type each wake-up cycle to provide separation between advertisement packets as required by the Bluetooth standard.
- Implements AltBeacon packets for planned production of COiN devices for CES.

Known issues

- The Tiny resets when battery level drop below ~1.3V
- The program*beacon and update*beacon script displays the deviceAddress values without leading "0x" on the console and in the log file.

Version 2.6 Public Release

- Fixes #124 Always advertise 9301 autocal result during POST.
- Fixes #125 Add production test for 6819/9301 sleep current
- Fixes #118, Tiny/LC battery voltage is incorrect
- Fixes #121, shortening Parameter Dictionary by ~ 50%.
- Fixes #38 (re-opened) long button-press at wake-up behavior
- Fixes #89 Clean-up TODO issues in firmware (opened #119 as a result)
- Fixes #117 Temperature Offset default now zero
- Fixes #113 Tiny Beacon Packet Data Errors (opened #118 as separate matter)
- Fixes #109, Create TemperatureOffset Parameter
- Fixes #110, Use OpenSensor Parameter to Specify Both Sensor AND Event Counter
- Fix MISO setup. A small percentage of coincells did not advertise during POST prior to fix.
- Fix an error affecting any platform with di07.

Version 2.5 Public Release

Support for COiN/Tiny/LowCost with the same code base, same feature set. Programming utilities integrated into the SDK. Programming utilities UI simplified.

- program_beacon [options] <firmware.hex> <parameters.csv>
- update_beacon [options] <firmware.hex> <parameters.csv>

- update_beacon [options] <firmware.hex>
- update_beacon [options] <parameters.csv>
- For a complete description, see ../util/usage.md or usage.pdf

COiN Schematic and mechanical drawings updated

Numerous minor fixes and enhancements:

- Add FET control for EM9301 power (#75)
- Go into a permanent (until battery is replaced) low power state if the 9301 passes self test but fails calibration. (#99)
- Add the Proximity beacon state machine. (#97)
- Bug fix - update the power field in id data packet dynamically (#103)
- Battery linearization (#84)
- Remove temperature from default advertisement. Replace with modelID. Temperature is optionally selectable as open sensor field number 4. (#87)
- Apply random 0..10ms jitter to advertising interval (#82)
- Sample temperature, battery, and lux (if present) every 4th advertising cycle
- Change the beacon name to use a 5-digit value derived from minor ID (#79)
- Support for energy harvesting apps. Skip POST. Other enhancements when button is pressed at powerup. (#38)
- Bug fix - eliminate extra button count at startup (#9)
- Improved button debounce (#24)
- The default state machine for Tiny/LC is simple on/off.
- Whenever the platform has a light sensor, the default openSensor field is the lux value.

Version 2.4 Public Release

Changes in this public release (includes all work listed in previous releases):

- Enhancement #78: Remove Customization Scripts From Project
- Enhancement #77: Set default UUID to 699EBC80-E1F3-11E3-9A0F-0CF3EE3BC012
- Enhancement #69: Eliminate HCI "disable RF periodic autocal" when only sensor OR id data is transmitted
- Enhancement #68: Improve Temp Measurement Stability
- Bug fix #67: Measure Battery Before self-test
- Bug fix #66: Revise RF Cal Self-Test Limits
- Bug fix #65: Long press only works correctly when beacon is on.
- Bug fix #64: Error in 6819 distribution file irqmsk.h - ClrPending*IRQ*SlpCnt() macro.
- Enhancement #61: Temperature-Compensate the 8KHhz RC Clock
- Documentation Fix #58: Release Notes Incorrectly Define GASP_SCK Sense
- Enhancement #57: Default Parameters (related to #39)
- Enhancement #54: Min Advertising Interval 100ms
- Enhancement #50: Do not beacon below 2.5V (EM6818) or 0.9V (EM6819)
- Enhancement #40: Obtain Device Parameters from Row 62. Default device address and advertising parameters are written to write-once memory at the factory.
- Enhancement #39: Multiple State Machine, Chosen by Parameterization. The customization script can specifiy the advertisement modes. 1) sensor data only 2) iddata only 3) both 4) coin standard state machine (default)
- Enhancement #35: New Button Behavior. Coin standard and Coin custom state machines implemented per published Fact Sheets.
- Enhancement #31: Beacon Interval set on 100ms increments. The customization script requires the beacon interval to be specificed on 100ms boundaries, with 100ms minimum.
- Enhancement #30: Deterministic Time Base, 1ms increments, full 24 bits.
- Bug fix #25: Button Press Shortens Advertising Interval

Version 2.3 Public Release

- Directory structures are reorganized (see README.txt file).
- All code that uses iBeacon technology has been moved to the ID Data library, iddata.a. The public release includes only a "dummy" library however. See README.txt for additional information.
- Convert the Lux field in the emBeacon packet to a "generic" sensor field (#28)
- By default the RF Auto-calibration values are displayed in the generic sensor field (#48)
- If GASP_SCK is held **high** at start up, the Beacon enters the Fault state with both LEDs illuminated. This permits a current measurement that

can verify both (or one or neither are working) (#49). *Note: this was incorectly stated as "low at startup" rather than high in the actual 2.3.0 release.*
- Beacon will not operate if the battery voltage falls below 2.5V (or 0.9V if the EM6819 has a built-in DC-DC converter) (#50)
- Display firmware version number instead of button count in initial advertising burst, reverting to button count once normal beaconing starts (#51)
- Device parameters are displayed during the customization process when the -v (--verbose) flag is set (see util/CUSTOMIZATIOIN.md) (#41)
- The -r (--run) option is selected by default during device customization. Use the --norun option if you do not want this behavior (#47)

Known Firmware issues with this release:

- Developers: The RIDE7 support files from the C816-RKit **must** be updated using the following download: http://www.emdeveloper.com/downloads/6819/EM6819F6-B300_Ride7Template.zip
- Test mode is difficult to enter. It requires using the adapter and tag-connect cable with the SCK and VDD pins jumpered while inserting the battery. But the tag-connect cable and battery interfere with each other.
- Button press/release briefly cuts short the time between advertisements. Sleep timer is NOT restored after button interrupt. This is only evident using a sniffer.

Version 2.2.1 (Internal use only)

Changes in this release:

- ~1 second default beacon interval
- "Locally assigned" device address, e.g. `0x0EF3EE000001`
- Activate power level in ID Data packet. Table lookup based on 9301 version and output power setting.
- Remove test modes (#44)
- ID Data/emBeacon selectable via CSV file (#27)
- ID Data and emBeacon during powerup regardless of CSV file setting
- 10 Advertisements upon battery insertion (#42)

Version 2.2 (Public release that was withdrawn)

Changes since the last public release: * Set ID Data measured power field based on 9301 die rev and nominal power. * Use locally-assigned instead of universally-assigned device addresses. * Beacon interval set to ~1 second for di10 (about 10% longer for di07). * Set power to minimum during 1 second initial advertising burst during POST. * Includes all changes noted for the previous 5 internal releases.

Version 2.1.5 (Internal use only)

Changes in this release: * Sleeps until button pressed when not advertising. * Adds battery insertion-time GPIO tests. * Uses SEL for signaling RF Activity for quicker system shut down. * Speeds up SPI transactions. * EM9301 identification and configuration fully handled at run-time.

Version 2.1.4 (Internal use only)

Resolves the following issues * Param clean up (some eliminated, some moved to compile-time config) (#21) * Non-interactive mode for production programming environments (#15)

Version 2.1.3 (Internal use only)

Resolves the following issues * Optionally put modulator cal value in Lux field (#19) * Add 2 to modulator (RF) cal value on di10 (#18) * Use the full 16-bits for em9301 die identification (#17) * Use lower 3 digits of Minor ID for "friendly id" (#16) * CustomizeBeacon script hangs if not device connected to programmer (#13) * Creation of Custom Programming Log File (#11)

Version 2.1.2 (Internal use only)

Resolves the following issues * Start-up Tests and Failure Mode (#14) * Lux Scaling (#12)

Version 2.1.1 (Internal use only)

Resolves the following issues * missing LED flash on first button press (#10) * customization script fails when param block is at start of .rodata (#8) * swaps red/green LED (#7) * battery scaling for 6818 (#6) * Packet count no longer continues to rise when beaconing is OFF. * First cut at a Serial Number logger (#11).

Version 2.1.0

Initial release for Coincell support. Tiny and LowCost Beacons are not supported by this release. Changes since last release: 1. Slight improvement to low-power sleep current 2. Eliminated 9301 sleep-mode which was superfluous because the 9301 is powered down between advertisements.

Version 2.0.3 (Internal use only)

The BTN cycles thru the beacon modes. LEDs flash to indicate the mode. The startup LED is ~2.5secs. All the rest are ~250ms.

``` Powerup: Normal --> Grn + Red Test mode --> Red only

Normal modes: Grn --> On Red --> Off 2 Grn = Stay On (Press and hold until 2 green flashes)

Test modes: Button pushes cause the unit to cycle thru test modes. Sleep --> GPIO --> CW --> Rx --> Tx --> Sleep. Red/Grn LEDs alternate on successive button pushes. Grn + Red together = Sleep mode

Debugger: Normal with Debugger attached --> Red only. The Grn LED is not controlled by FW when debugger is attached. Any Grn flashes indicate debugger activity.```

## Version 2.0.2 (Internal use only)

- Scripts directory replaced by util directory which now also packages the programming utility, EM6819_pgm.exe.
- Bug fixed in the customize_beacon.rb script that caused it to sometimes fail to properly run the programming utility. Full API-level html docs now provided for this script in the /doc/utilities folder.
- Evolutionary refinements to the firmware configurability.

## Version 2.0.1 (Internal use only)

Features * Beacon is programmed with 'reasonable' defaults. Configurable by CSV file with scripts. * Default beacon interval is 2.5 secs * Normal modes: - Beacon starts in ON mode. Button toggles beaconing on/off. - Press and hold button >3 beacon intervals --> Beaconing stays ON until battery is removed. * Test modes: - Press and hold button while inserting battery --> Beacon enters test mode. (See note below) - Initial mode is SLEEP - Subsequent button presses cycle through test modes. - Modes are SLEEP --> GPIO tests --> CW --> RX --> Rapid Tx --> SLEEP - Sleep, CW, and Rapid Tx are implemented in v2.0.1. GPIO and Rx are not. - See note re: CW below.

## Version 1.0

Lightweight Bluetooth Smart (tm) reference design of emBeacon and ID Data firmware for EM Microelectronic's Low-Cost Beacon and Tiny beacon platforms featuring the EM9301 radio and EM6819 CoolRisc host MCU. The firmware eliminates the overhead of a full Bluetooth stack utilizing only the EM9301's Host Controller Interface layer commands.
```