

Title of Notification:	PCF8523 External Real Time Battery Backed Clock non-Functional on some platforms					
Type of Notification:	Errata, Design Change			Updated:	11 Dec 2015	
Affected Areas:	NXP PCF8523 Real Time Clock Calendar					
Original Notification Date:	07 Apr 2015			Supersedes:	PCN-20150001-01	
SHIP Version Required	v5.0.201 or later			Superseded by:		
Scope:	Power <input type="checkbox"/>	BOM <input checked="" type="checkbox"/>	Design <input checked="" type="checkbox"/>	PCB <input checked="" type="checkbox"/>	Mechanical <input type="checkbox"/>	Software <input checked="" type="checkbox"/>
Serious Internal Issue Number(s):	242, 243, 244, 245, 246, 247, 248, 249					

Summary:

On affected products, the external Real Time Clock Calendar chip PCF8523 on power-up/down may become non-communicative and unreadable. In laboratory testing this behavior has been observed on numerous units with/without the backup battery present and in power up/down and warm-reboot situations.

This issue has been resolved via production-level (aka "blue wire") fixes and subsequent design fixes; SHIP Firmware v5.0.201 and later will automatically recognize boards without this fix and disable the RTCC and enable it when available.

Affected Products*:

Family	LCD Option(s)	Variant(s)	Version(s)	PCB Revision(s)	Serial Number(s)
SIM115	All	A01, A02	v2.0	PCB-000019-02	All within Version + PCB Revision scope
SIM231	All	A02, A02	v2.0	PCB-000020-02	All within Version + PCB Revision scope
SIM535	All	A01, A02	v2.1	PCB-000018-03	All within Version + PCB Revision scope
			v2.2	PCB-000018-04	All within Version + PCB Revision scope

*See Identifying Affected Products (below) for more information.

Production-level Fixed Products

Family	LCD Option(s)	Variant(s)	Version(s)	PCB Revision(s)	Serial Number(s)
SIM115	All	A01, A02	v2.1	PCB-000019-02	All within Version + PCB Revision scope
SIM231	All	A02, A02	v2.1	PCB-000020-02	All within Version + PCB Revision scope
SIM535	All	A01, A02	v2.3	PCB-000018-04	All within Version + PCB Revision scope

Design-level Fixed Products

Family	LCD Option(s)	Variant(s)	Version(s)	PCB Revision(s)	Serial Number(s)
SIM115	All	A01, A02	v2.2*	PCB-000019-03*	All within Version + PCB Revision scope
SIM231	All	A02, A02	v2.2*	PCB-000020-03*	All within Version + PCB Revision scope
SIM535	All	A01, A02	v2.4*	PCB-000018-05*	All within Version + PCB Revision scope

*and all later versions and revisions

Detail/Root Cause

Since the initial design of the affected products, NXP has added guidelines to their data sheet requiring a slower than 0.7uS fall time to the power supply V_{CC} in order to ensure the battery switch-over detection system works correctly. The affected SIMs have power supply fall times (and rise times) faster than this rate, and therefore the new NXP guidelines explain issues related to power-off with battery installed but do not explain the power-up and no-battery issues which appear similar in nature. However, *Serious* lab tests of previously affected units with the circuit change recommended by NXP (adding an RC circuit in-line with V_{CC} to ensure power supply rise/fall times slower than 0.7uS) have indicated that all observed issues (power up/down and warm reboot issues with and without installed backup battery) seem to have been corrected by this change. *Serious* continues to work with NXP on this issue to ensure the

complete root cause is understood and that the implemented change addresses all issues. Regardless, the circuit change is required to ensure correct battery backup switchover on power down as per the NXP guidelines and must be implemented.

Workarounds and Software Implications

There is no workaround to this issue on the affected products; the external PCF8523 Real Time Clock Calendar should not be used on the affected products. *Serious* firmware (including SHIPEngine, SHIPTug) starting with v5.0.201 will recognize the affected products and will not attempt to utilize the chip on those versions.

Resolution

Production-level (aka “blue wire”) fixes were applied to interim versions preceding design fix releases; see the chart above for specific version/revisions. All final design fix versions include the RC circuit to the V_{CC} input of the PCF8523 per NXP guidelines to ensure the chip sees a slower than 0.7uS power supply fall time.

Plans

No future actions are anticipated with respect to this issue.

Changelog

PCN Revision	Release Date	Changes
01	07 Apr 2015	Initial
02	11 Dec 2015	Shows supersedes -01 Added Serious internal reference numbers Added <i>Production-level Fixed Products</i> and <i>Design-level Fixed Products</i> tables Added <i>Resolution</i> Revised <i>Plans</i>

Identifying Affected Products:

Affected products can be identified in the following ways:

- PCB silk screen with product and version number
- PCB silk screen of PCB revision
- Through the product serial number, which encodes the product identification and version, and can be accessed:
 - at runtime by OEM custom software as described in the product's Technical Reference Manual (TRM),
 - at runtime in SHIP GUIs,
 - using SHIPTide, and,
 - from an attached controller using the SHIPBridge protocol.
- The Manufacturing ID (MID) 2D matrix barcode on all SIMs can be submitted to Serious for determination

For Further Information

Contact your local [Serious manufacturers' representative](#) or [Contact Serious](#).

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