AM1808 SOM-M1 Product Change Notification
Hardware Documentation

Logic PD // Products
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Revision History

REV	EDITOR	DESCRIPTION	APPROVAL	DATE
A	JCA	-Initial release; -Released PCN 472: Pre-Production Changes	NJK	03/01/11
B	JCA	-Released PCN 474: Hardware Changes	NJK	04/11/11
C	KJH	-Released PCN 518: Hardware Changes	KJH	01/06/12
D	SO	-Throughout: Updated template and links for new support site; -Released PCN 587: Hardware Changes	BSB, JMC, NJK	05/27/14

Table of Contents

1   AM1808 SOM-M1 PCN Introduction

1.1   Purpose of Document

The purpose of this document is to provide a single repository for explaining design changes to a specific product family. The changes described in this document relate to the AM1808 SOM-M1 product family.

1.2   Identifying Your SOM

To determine whether your AM1808 SOM-M1 is affected by a PCN, locate the sticker on your System on Module (SOM) and compare the model number with the "Affected Models" table for each PCN. In some instances, a PCN may call out the "unique serial number" to better identify the affected SOM.

SOMs included in development kits may not include a model number on the sticker—for those SOMs, use the part number to identify your SOM.

The figure below shows the location of each number on the sticker.

NOTE: Logic PD's *White Paper 293: Model Number Explanation and Decoder*[1] goes into detail about these numbers and their relationship to one another.

1.3   Current Standard Model in Production

The table below lists the most current revisions of standard AM1808 SOM-M1. It also specifies the PCN that details the changes prompting the model revision.

Model Number & Rev (Part Number)	PCN Detailing Revision
SOMAM1808-10-1502QHCR-C (1024547)	PCN 587: Hardware Changes
SOMAM1808-10-1602QHIR-C (1024548)	PCN 587: Hardware Changes

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[1] http://support.logicpd.com/DesktopModules/Bring2mind/DMX/Download.aspx?portalid=0&EntryId=1378

1.4   Early Development SOMs

SOMs that are manufactured before the model is released to full production status are sometimes sent to partners and targeted customers for evaluation. This section attempts to capture a history of these pre-production builds for reference. Any products listed in the table below are not meant for production use and may not be actively supported by Logic PD.

Development Phase	Model Number & Rev (Part Number)
Alpha	1015127

2 PCN 472: Pre-Production Changes

Published: March 2011

PCN Classification:

- ☐ A - Recall
- ☒ B - Customer Action Required
- ☒ C - Product Upgrade
- ☐ D - Change of Production Line

2.1 Products Affected

This PCN describes the hardware changes that were made to the AM1808 SOM-M1 between the Pilot and Production development phases.

2.1.1 SOMs Included in Development Kits

SOM Type	Affected Model Numbers & Rev (Part Numbers)	New Model Numbers & Rev (Part Numbers)
AM1808 SOM-M1 (included in EVM)	(1015137)	(1016844)
AM1808 SOM-M1 (included in eXperimenter)	(1015232)	(1016844)

2.1.2 Standard SOMs

Affected Model Numbers & Rev (Part Numbers)	New Model Numbers & Rev (Part Numbers)
—	SOMAM1808-10-1602AHCR-A (1016962)
—	SOMAM1808-10-1502QHCR-A (1016966)
—	SOMAM1808-10-1602QHIR-A (1016970)

2.1.3 Discontinued Models

The following model numbers were published on the website, Product Brief, and in the Logic PD Price Book; however, they were never built and have been removed as available models from these publications.

Discontinued Model Numbers	Replacement Model Numbers & Rev
SOMXAM1808-10-1502AHCR-A	SOMAM1808-10-1602AHCR-A
SOMXAM1808-10-1602AHCR-A	SOMAM1808-10-1602AHCR-A
SOMXAM1808-10-1502QHCR-A	SOMAM1808-10-1502QHCR-A

2.2　Description of Change

2.2.1　TPS65070 Interrupt

The interrupt for the TI TPS65070 (U9) is now connected to net PMIC_INTn, which is tied to the AM1808's GPIO2[3] pin, U1.C8. Previously, the interrupt for the TPS65070 was connected to the AM1808 NMIn signal which is only accessible to the C674x DSP interrupt controller. GPIO2[3] was previously defined to be the BATT_HDQ signal on the SOM; BATT_HDQ is now connected to the AM1808's GPIO1[15] (uP_EPWM1_TX[0]) pin.

R160 was removed for this design change; R169 (4.7k Ohm) was added as a pull-up on the PMIC_INTn signal.

Software needs to be updated to use the new pin mapping for this interrupt. If the BATT_HDQ signal was previously used, software also needs to change the pin mapping for this functionality. These changes are not backwards compatible with previous versions of the SOM.

2.2.2　Ethernet LED Swap

ETHER_LINK_ACT_LEDn and ETHER_SPEED_LED signals swapped location on the J2 connector. ETHER_LINK_ACT_LEDn is now connected to J2.57; ETHER_SPEED_LED is now connected to J2.63.

Baseboard designs should verify the connection of these signals if LEDs are used on the Ethernet interface. There is no software impact for this change. This change is not functionally compatible with previous versions of the SOM, but is electrically equivalent.

2.2.3　LCD Enable

R167 and R168 were added as 1k Ohm pull-down resistors to uP_EMIFA_BA0 (GPIO2[8]/LCD_PANEL_PWR) and uP_SPI1_SCSn1 (GPIO2[15]/LCD_BACKLIGHT_PWR), respectively. Pulling these signals low will ensure the LCD display does not power on directly out of reset.

Software must be verified to ensure it is actively driving these signals rather than relying on the AM1808 internal pull-ups; otherwise, no software change is required. This change is backwards compatible with previous versions of the SOM.

2.2.4　INA219 Pull-ups

R114 and R115 were changed to 4.7k Ohm resistors; previously these were 1k Ohm. 1k Ohm pull-up resistors were too strong for the I2C interface of the INA219 devices and might result in the SOM functioning incorrectly.

This change requires no software updates. This change is backwards compatible with previous versions of the SOM.

2.2.5　Product ID Signal Move

The net PIDCLK has been removed from the design. Instead, uP_SPI1_ENAn has been connected directly to U21.2. Previously, this signal ran through another level shifting buffer in error. R155 has been changed to a no populate resistor because of this change.

This change requires no software updates. This change is backwards compatible with previous versions of the SOM.

2.2.6　USB Data Line Pull-down

R153 and R154 have been changed to no populate. These are pull-down resistors on the USB data lines; the AM1808 processor has internal pull-down resistors.

This change requires no software updates. This change is backwards compatible with previous versions of the SOM.

2.2.7 Clock VCC/VSS decoupling

C154 and C155 were moved to the other side of the ferrites (FB1 and FB2); these were initially on the wrong side of the ferrites to provide proper decoupling. In addition, C186, C187, FB4, and FB5 have been added to the design to separate the decoupling of the AM1808 VDDA12_PLL1 and VDDA12_PLL0 voltages.

Nets OSC_VSS and RTC_VSS have been added to the design to provide a ground connection between the system crystals and the AM1808 crystal ground pins.

This change requires no software updates. This change is backwards compatible with previous versions of the SOM.

2.2.8 uP_RESETOUTn Pull-up

R170 (4.7k Ohm) was added to uP_RESETOUTn. This signal is an open-drain output from the processor.

This change requires no software updates. This change is backwards compatible with previous versions of the SOM.

2.2.9 LCD PWM Change

LCD PWM control is now connected to ECAP2_APWM2 (uP_EPWM0_TZ[0]). J2.99 is now connected to uP_EPWM0_TZ[0] to provide this functionality. R179 (4.7k Ohm) was added to pull this signal high out of reset. uP_SPI1_SCSn0, which was previously connected to J2.99, is now connected to J3.36.

Software needs to note the pin change for PWM control if used on the LCD interface. This change is not backwards compatible with previous versions of the SOM because of the pin swap.

2.2.10 Reset on U20

Net uP_RESETOUTn_3v3 is now used to control reset on U20 (TI CDCM61001RHBT). uP_RESETOUTn_3v3 is a voltage buffered version of uP_RESETOUTn. U20 can only operate at 3.3V, so this signal needs to be voltage buffered.

This change requires no software updates. This change is backwards compatible with previous versions of the SOM.

2.2.11 SATA Clock Control

BUFF_OEn can be used to turn the output of U20 (TI CDCM61001RHBT) on and off through software. Q3 was added to the design so the control logic on BUFF_OEn would be active low.

Software will need to use BUFF_OEn to turn the SATA clock on and off depending on the use case. This change is backwards compatible with previous versions of the SOM from a SATA functionality standpoint, but is not compatible because of the software control.

2.2.12 SATA Component Change

C1-C4, C25, and C26 were changed from 0.1uF capacitors to 10nF capacitors. The 100 ohm resistor at R68 was changed to no populate because the AM1808 processor includes an internal resistor.

This change requires no software updates. This change is backwards compatible with previous versions of the SOM.

2.2.13 Buffer Control Change

The usage of BUFF_OEn on most of the buffers on the SOM has been disabled. R171 and R172 were added around U4 (TI SN74AVC4T245RGYR) to allow the buffer to always be enabled. Components U24, R161, and C179 were removed from the I2C clock going to U9. R174 was added and U7, C27, R70 were removed from the circuits around U7 to allow the MDIO interface to operate without the use of BUFF_OEn.

Software is no longer required to control BUFF_OEn to turn on the buffers on the SOM. Instead, BUFF_OEn is now used to control U20 (see Section 2.2.11). This change is backwards compatible with previous versions of the SOM.

2.2.14 Ethernet Crystal Drive Level

R176 (1.0M Ohm) and R177 (100 Ohm) were added to the Ethernet crystal circuit to allow the drive level of this crystal to be changed.

This change requires no software updates. This change is backwards compatible with previous versions of the SOM.

2.2.15 RTC Shunt Resistor

R105 has been changed to a 1.0 Ohm resistor; previously this resistor was only 0.02 Ohms. The RTC current draw is very low so a larger shunt resistor is required.

If R105 was used to measure the RTC current draw, software and hardware need to be aware of the change so the power calculation can be changed to reflect the new component value. This change is functionally backward compatible with previous versions of the SOM, but the component value change will affect measurement techniques.

2.2.16 LDO Power Supply

U24, L4, R184, C188, and C189 were added to supply 2.5V into the LDO input of the TPS65070 (U9). U24 is a step-down, switching power supply that takes the Vsys output of U9 and lowers the voltage before feeding it back to the U9 LDOs. Lowering the input to the LDOs increases the efficiency of the power supplies thereby reducing the heat generated by the power supplies.

This change requires no software updates. This change is backwards compatible with previous versions of the SOM.

2.2.17 Thermal Relief

Thermal relief vias have been added to several components on the AM1808 SOM-M1 to reduce overall operating temperatures. These thermal relief vias were not included in previous versions of the SOM.

This change requires no software updates. This change is backwards compatible with previous versions of the SOM.

2.2.18 Processor Silicon Revision

The processor silicon was changed from the pre-release version to the fully qualified version. There is no change to the performance or use of the processor with this change.

2.2.19 Model Number Change

With the release of the fully qualified processor silicon, the "X" in the model number indicating pre-release silicon has been removed.

NOTE: Because the model number string has changed, the revision letters begin again at letter "A."

2.3   Contact Information

For additional information, please post a question to the Logic PD Technical Discussion Group (TDG) forum.[2]

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[2] http://support.logicpd.com/TDGForum.aspx

3 PCN 474: Hardware Changes

Published: April 2011

PCN Classification:

- [ ] A - Recall
- [ ] B - Customer Action Required
- [X] C - Product Upgrade
- [ ] D - Change of Production Line

3.1 Products Affected

This PCN describes hardware changes that were made to the AM1808 SOM-M1 to address manufacturer part obsolescence and to improve performance. The "New Model Number & Rev" listed below indicate the first SOMs that will be manufactured with the changes described herein.

3.1.1 SOMs Included in Development Kits

SOM Type	Affected Model Numbers & Rev (Part Numbers)	New Model Numbers & Rev (Part Numbers)
AM1808 SOM-M1 (included in EVM)	(1016844)	(1017869)
AM1808 SOM-M1 (included in eXperimenter)	(1016844)	(1017869)

3.1.2 Standard SOMs

Affected Model Numbers & Rev (Part Numbers)	New Model Numbers & Rev (Part Numbers)
SOMAM1808-10-1602AHCR-A (1016962)	SOMAM1808-10-1602AHCR-B (1017941)
SOMAM1808-10-1502QHCR-A (1016966)	SOMAM1808-10-1502QHCR-B (1017945)
SOMAM1808-10-1602QHIR-A (1016970)	SOMAM1808-10-1602QHIR-B (1017950)

3.2 Description of Change

3.2.1 DDR SDRAM Change

The Micron DDR SDRAM device (U2) underwent a die shrink to migrate from 78 nm to 50 nm technology. This change has no impact on the AM1808 SOM-M1 usage. Custom software may require updating to call out the new device ID.

3.2.2 Resistor Change

Resistor R156 was changed from 470 ohm to 4.7k ohm. The original 470 ohm resistor caused too great of a pull-up on the PID_CLK and PID_SDA signals because of the dual bidirectional voltage-level translator (U21).

The PID_CLK and PID_SDA data lines should see improved performance from changing to the 4.7k ohm resistor. This change has no impact on software.

3.3   Contact Information

For additional information, please post a question to the Logic PD Technical Discussion Group (TDG) forum.[3]

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[3] http://support.logicpd.com/TDGForum.aspx

4   PCN 518: Hardware Changes

Published: January 2012

PCN Classification:

☐	A - Recall
☐	B - Customer Action Required
X	C - Product Upgrade
☐	D - Change of Production Line

4.1   Products Affected

This PCN describes hardware changes that were made to the AM1808 SOM-M1 to improve performance. The "Affected Model Numbers & Rev" listed below indicate the SOMs that will be manufactured with the changes described herein; new SOM model numbers or revisions will not accompany these changes.

4.1.1   SOMs Included in Development Kits

SOM Type	Affected Model Number & Rev (Part Number)	New Model Number & Rev (Part Number)
AM1808 SOM-M1 (included in eXperimenter)	(1017869)	—

4.1.2   Standard SOMs

Affected Model Numbers & Rev (Part Numbers)	New Model Numbers & Rev (Part Numbers)
SOMAM1808-10-1602AHCR-B (1017941)	—
SOMAM1808-10-1502QHCR-B (1017945)	—
SOMAM1808-10-1602QHIR-B (1017950)	—

4.2   Description of Change

4.2.1   Processor Silicon Change

The processor silicon used on the AM1808 SOM-M1 has been upgraded from revision 2.0 to revision 2.1. This upgraded silicon provides a fix for Advisory 2.0.20 regarding intermittent boot failure for all boot modes. Please see the Texas Instruments (TI) _AM1808 ARM Microprocessor Silicon Errata_[4] for additional information.

The new silicon also provides the following improvements to the NAND8/16 bootloader performance and functionality:

■   Enables booting from either block 0 or block 1.
■   Adds ability to enable the PLL before first page read to speed up boot time.
■   Adds various code improvements to speed up boot time.
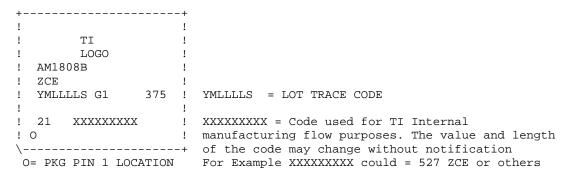■   Adds an attempt to boot from next block in case of boot error.

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[4] http://www.ti.com/product/am1808

Please see TI's *Using the AM18xx Bootloader Application Note*[5] for additional information.

Revision 2.1 silicon is a drop-in replacement and does not require any software modifications.

4.3   Identifying Upgraded AM1808 SOM-M1s

No change will be made to the orderable part number of the AM1808 SOM-M1s receiving this silicon upgrade. However, the product revision characters "21" will be added to the topside of the AM1808 processor in order to identify the SOM-M1s that have received the upgrade. An example of this can be seen below.

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+--------------------+
!                    !
!       TI           !
!       LOGO         !
!  AM1808B           !
!  ZCE               !
!  YMLLLLS G1    375 !  YMLLLLS  = LOT TRACE CODE
!                    !
!  21   XXXXXXXXX    !  XXXXXXXXX = Code used for TI Internal
! O                  !  manufacturing flow purposes. The value and length
\--------------------+  of the code may change without notification
 O= PKG PIN 1 LOCATION  For Example XXXXXXXXX could = 527 ZCE or others
```

4.3.1   Availability

As no part number change is associated with this silicon upgrade, confirming the availability of AM1808 SOM-M1s containing revision 2.1 silicon is dependent upon the supply chain and distribution channels being fully cleared of processors with revision 2.0 silicon. TI began shipping the AM1808BZCE4 processors with the upgraded silicon in mid-October 2011. Development kit AM1808 SOM-M1s with revision 2.1 silicon began shipping to TI at the end of 2011.

Based on current inventory levels, it is expected that development kits containing AM1808 SOM-M1s with revision 2.1 silicon will begin reaching customers towards the end of the first quarter in 2012, while Logic PD standard configuration AM1808 SOM-M1s with the new silicon will begin shipping during the first quarter of 2012.

4.4   Contact Information

For additional information, please post a question to the Logic PD Technical Discussion Group (TDG) forum.[6]

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[5] http://www.ti.com/product/am1808
[6] http://support.logicpd.com/TDGForum.aspx

5   PCN 587: Hardware Changes

Published: May 2014

PCN Classification:

☐ A - Recall
☐ B - Customer Action Required
☒ C - Product Upgrade
☐ D - Change of Production Line

5.1   Products Affected

This PCN describes hardware changes that were made to the AM1808 SOM-M1 to improve performance. The "New Model Number & Rev" listed below indicate the first SOMs that will be manufactured with the changes described herein.

5.1.1   SOMs Included in Development Kits

The SOMs included in both the AM1808 EVM Development Kit and AM1808 eXperimenter Kit are unaffected by the changes described within this PCN.

5.1.2   Standard SOMs

Affected Model Numbers & Rev (Part Numbers)	New Model Numbers & Rev (Part Numbers)
SOMAM1808-10-1502QHCR-B (1017945)	SOMAM1808-10-1502QHCR-C (1024547)
SOMAM1808-10-1602QHIR-B (1017950)	SOMAM1808-10-1602QHIR-C (1024548)

5.2   Description of Change

5.2.1   PCB Change

The PCB layout was updated to accommodate two active component changes.

1. The Low-Dropout (LDO) regulator U10 was changed to a new component selection.
2. An external oscillator circuit (Y7) was added to drive the processor system clock (OSCIN).

5.2.2   Real-time Clock LDO Change

The U10 power regulation IC was changed from a 200 mA-rated LDO (TPS79912YZU) with a quiescent current up to 40 uA to a 150 mA-rated LDO (TPS78101DRVR) with a quiescent current up to 1 uA to address an issue with high quiescent current on the real-time clock (RTC) circuit.

This LDO change results in lower quiescent current drain on the RTC battery, creating an approximately 3x increase in the RTC battery life when the system is in an off state.

This change has no impact on software.

5.2.3 Processor System Clock Change

An external clock oscillator Y7 was added to drive the OSCIN system clock input on the processor. This external clock implementation replaces the use of the oscillator internal to the processor, which used crystal Y2.

This clock source change addresses the erratum related to system-level ESD immunity in "Section 2.1.5" of the Texas Instruments (TI) *AM1808 ARM Microprocessor Silicon Errata*[7] (literature number SPRZ313G).

This change has no impact on software. However, software can optionally change the CLKMODE bit in the PLLCTL register to equal 1; this software change may save a small amount of additional power draw by turning off the internal processor oscillator, which is no longer used in this configuration.

5.3 Contact Information

For additional information, please post a question to the Logic PD Technical Discussion Group (TDG) forum.[8]

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[7] http://www.ti.com/product/am1808
[8] http://support.logicpd.com/TDGForum.aspx