Intel® StrongARM® SA-1100 Evaluation Platform

Specification Update

December 1999

Notice: The Intel® StrongARM® SA-1100 evaluation platform may contain design defects or errors known as errata. Characterized errata that may cause the board's behavior to deviate from published specifications are documented in this specification update.

Order Number: 278246-005

Contents

Revision History

Date	Version	Description
01/22/99	001	This is the new Specification Update document. It contains all identified errata published prior to this date.
04/16/99	002	Under Errata, added touch screen panel problem for Intel® StrongARM® SA-1100 evaluation platforms with serial numbers 750 through 798. Under Documentation Changes, changed the name of the *Porting the Windows* CE Operating System to StrongARM™ SA-1100 Based Platforms Application Note* to *Porting the Windows* CE Operating System to the Intel® StrongARM® SA-1100 Evaluation Platform;* changed wording in Table 2 for the middle row, steps 3, 5, and 6; changed the description in the middle row for Benefits/Drawbacks; in the *StrongARM** SA-1100 Microprocessor Evaluation Platform User's Guide*, changed wording in Table 1-2 for the S14 row, initial Setting (Default); changed wording in Table 2-1 for the S14 row, Setting.
10/12/99	003	Under Documentation Change, add information on Adjusting Display Brightness and add information on where evaluators can obtain sample programs. Under Specification Changes, add information on the G-stepping of the SA-1100 microprocessor.
12/2/99	004	Under Documentation Change and Specification change, change the type of component for U46 to a UCB1300.
12/16/99	005	Under Documentation Change and Specification change, change the type of component for capacitors C203, C204, C205, and C206 to a C0805 1000pF, 50V (10%), X7R capacitor, part number PN-08052R102K9BB2.

Preface

As of July, 1996, Intel's Computing Enhancement Group has consolidated available historical device and documentation errata into this new document type called the Specification Update. We have endeavored to include all documented errata in the consolidation process, however, we make no representations or warranties concerning the completeness of the Specification Update.

This document is an update to the specifications contained in the Affected Documents/Related Documents table below. This document is a compilation of device and documentation errata, specification clarifications and changes. It is intended for hardware system manufacturers and software developers of applications, operating systems, or tools.

Information types defined in Nomenclature are consolidated into the specification update and are no longer published in other documents.

This document may also contain information that was not previously published.

Affected Documents/Related Documents

Title	Order
Porting the Windows* CE Operating System to StrongARM™ SA-1100 Based Platforms	278229-001
StrongARM® SA-1100 Microprocessor Evaluation Platform User's Guide	278172-001
Intel Corporation StrongARM® SA-1100 Evaluation Platform Schematics	Not Available. <Footnote 1>

<Footnote 1> Available only from the Intel web site.

Nomenclature

Errata are design defects or errors. These may cause the published (component, board, system) behavior to deviate from published specifications. Hardware and software designed to be used with any component, board, and system must consider all errata documented.

Specification Changes are modifications to the current published specifications. These changes will be incorporated in any new release of the specification.

Specification Clarifications describe a specification in greater detail or further highlight a specification's impact to a complex design situation. These clarifications will be incorporated in any new release of the specification.

Documentation Changes include typos, errors, or omissions from the current published specifications. These will be incorporated in any new release of the specification.

Note: Errata remain in the specification update throughout the product's lifecycle, or until a particular stepping is no longer commercially available. Under these circumstances, errata removed from the specification update are archived and available upon request. Specification changes, specification clarifications and documentation changes are removed from the specification update when the appropriate changes are made to the appropriate product specification or user documentation such as datasheets and developer manuals.

Summary Table of Changes

The following table indicates the errata, specification changes, specification clarifications, or documentation changes which apply to the Intel® StrongARM® SA-1100 evaluation platform (SA-1100 evaluation platform), order number DE-1S110-OA. Intel may fix some of the errata in a future stepping of the evaluation platform, and account for the other outstanding issues through documentation or specification changes as noted. This table uses the following notations:

Codes Used in Summary Table

Stepping

X:	Errata exists in the stepping indicated. Specification Change or Clarification that applies to this stepping.
(No mark) or (Blank box):	This erratum is fixed in listed stepping or specification change does not apply to listed stepping.

Page

(Page):	Page location of item in this document.

Status

Doc:	Document change or update will be implemented.
Fix:	This erratum is intended to be fixed in a future step of the component.
Fixed:	This erratum has been previously fixed.
NoFix:	There are no plans to fix this erratum.
Eval:	Plans to fix this erratum are under evaluation.

Row

|	Change bar to left of table row indicates this erratum is either new or modified from the previous version of the document.

Errata

No.	Steppings			Page	Status	ERRATA
	E	G	#			
1	X	X		11	Fix	PCMCIA Ejector Mechanism Problem
2	X	X		13	Fix	Touch Screen Panel Problem

Specification Changes

No.	Steppings		Page	Status	SPECIFICATION CHANGES
	E	G			
1		X	14	Fix	Upgrade to G-Stepping of the SA-1100 Microprocessor
2		X	14	Fix	Core Voltage Raised to Support G-Stepping Upgrade
3		X	14	Fix	Angel* Upgraded to Version 1.20.4
4		X	14	Fix	U46 changed to a UCB1300
5		X	14	Fix	C203, C204, C205, and C206 changed to a 1000pF Capacitor

Specification Clarifications

No.	Steppings			Page	Status	SPECIFICATION CLARIFICATIONS
	#	#	#			
1				15		None

Documentation Changes

No.	Document Revision	Page	Status	DOCUMENTATION CHANGES
1	278229-001	16	Doc	Porting the Windows* CE Operating System to StrongARM™ SA-1100 Based Platforms Application Note: Title
2	278229-001	16	Doc	Loading an Image of Windows CE to the Hardware Platform: Section 3.0
3	278229-001	16	Doc	Downloading the Image to the Hardware Platform: Table 2.
4	278172-001	18	Doc	Minislide Switch Descriptions: Table 1-2.
5	278172-001	19	Doc	Default Minislide Switch Settings: Table 2-1.
6	278172-001	20	Doc	Adjusting Display Brightness: Section 2.4
7	278172-001	20	Doc	Sample Programs: Section 3.3
8	1100DevBrdSch.pdf	20	Doc	Schematic Flow Codecs: Sheet 27
9	1100DevBrdSch.pdf	20	Doc	Schematic Codec Capacitors: Sheet 27

Identification Information

Markings

This document contains errata for the SA-1100 evaluation platform. The board's revision that is affected by this errata can be identified as order number DE-1S110-OA. The serial numbers affected by the touch screen panel problem are 750 through and including 798. The SA-1100 evaluation platforms that support and contain the G-stepping of the SA-1100 microprocessor are labeled with a sticker marked: FADES1100EF.

Errata

1. PCMCIA Ejector Mechanism Problem

Problem: The PCMCIA ejector mechanism can short to a via on the board of the SA-1100 evaluation platform when a PCMCIA card is installed.

Implication: The SA-1100 evaluation platform will not work properly and could become damaged if a PCMCIA card is installed.

Workaround: Use the following procedure to insulate the via's on the board of the SA-1100 evaluation platform:

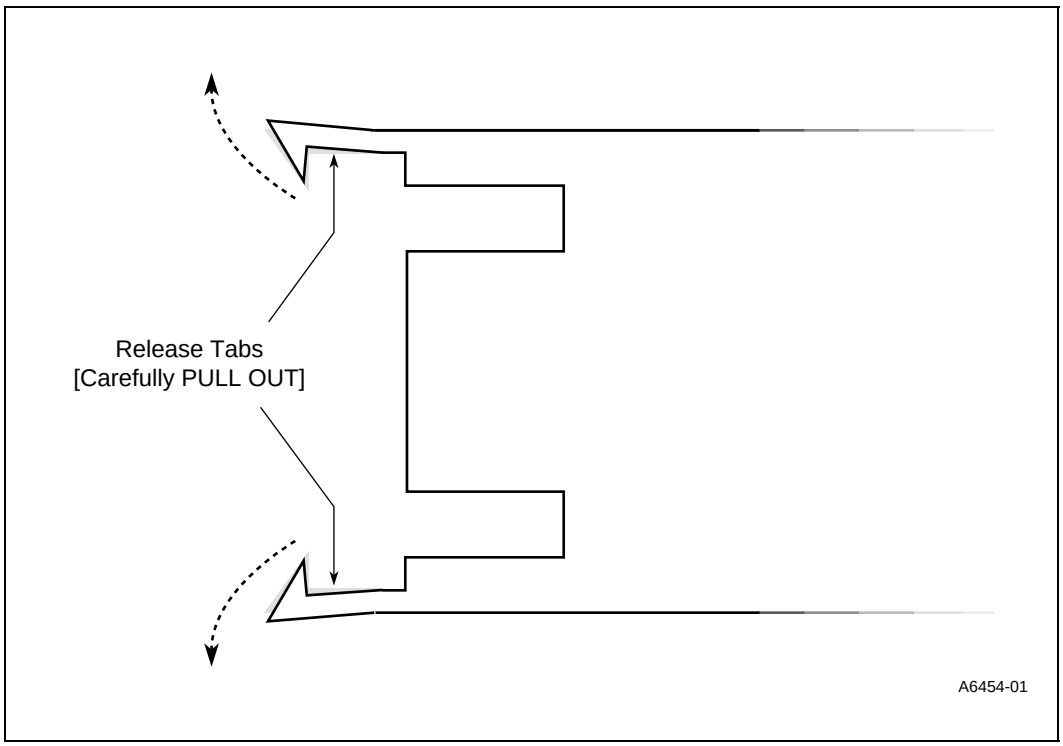
Note: Observe antistatic precautions while working on this module. When removing cables, handle all wires simultaneously to prevent damage.

1. Power down the SA-1100 evaluation platform.
2. Remove the following cables from the SA-1100 evaluation platform:

- J27–LCD cable (side 2, back-left corner)
- J3–Touch screen cable (side 1, back center)
- J6–Backlight inverter cable (side 1, back-right corner)
- J25, J26–Keyboard cable (side 1, front-center) note unused pins on pins 1, 2, 3, of J25 and on pins 15, 16, 17 of J26

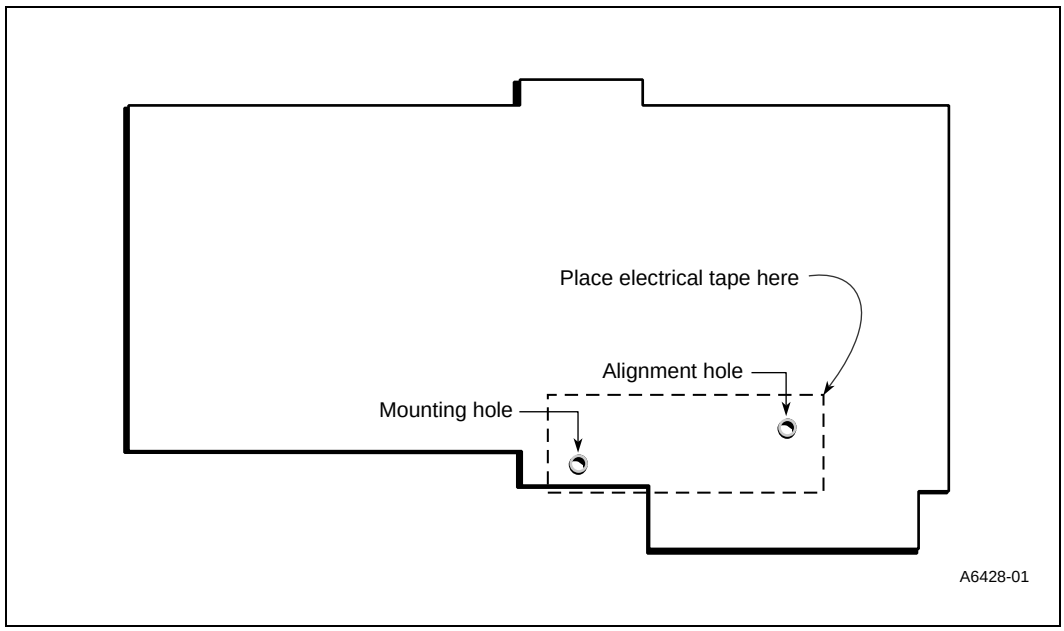
3. Remove the six screws from the SA-1100 evaluation platform that attach it to the base.
4. Remove the two screws attaching the PCMCIA ejector mechanism from the SA-1100 evaluation platform (nuts are located on side two).
5. Place a small flat tipped screwdriver under the black locking tabs, which are located just above the "41" of "TP 41." Gently pull the tabs out by twisting the screw driver (see Figure 1) while rocking and pulling the ejector mechanism towards the right-hand edge of the board. Be careful to lift the ejector over C17.

Figure 1. Ejector Mechanism



6. Place a piece of electrical tape approximately one-half inch wide by one inch in length on the top side of the SA-1100 evaluation platform covering the mounting hole and the alignment hole for the ejector mechanism. This prevents the ejector mechanism from shorting to the via's when a PCMCIA card is installed. See Figure 2 for tape location.

Figure 2. Mounting and Alignment Holes on the Evaluation Platform



7. Installation is the reverse of removal.

Status: Fix.

2. Touch Screen Panel Problem

Problem: For SA-1100 evaluation platforms with serial numbers 750 through and including 798, the touch screen panel may be screwed down too tight.

Implication: The touch screen panel will not function.

Workaround: Use the following procedure to loosen the touch screen panel screws:

1. Power down and disconnect all power from the SA-1100 evaluation board.
2. Loosen the screws that hold on the touch screen panel by approximately 1/2 turn.
3. Reconnect power and power up the SA-1100 evaluation board and verify that the touch screen panel functions properly.
4. If the touch screen panel still does not function at all, repeat steps 1 through 3 up to two more times.

Warning: Do not loosen the touch screen panel by more than 2 turns as the touch screen panel may fall off.

Status: Fix.

Specification Changes

1. Upgrade to G-Stepping of the SA-1100 Microprocessor

Issue: The SA-1100 microprocessor has been upgraded to the G-stepping of the 190 MHz SA-1100 microprocessor.

Affected Docs: None.

Status: Fix.

2. Core Voltage Raised to Support G-Stepping Upgrade

Issue: To insure the reliable operation of the G-stepping of the 190 MHz SA-1100 microprocessor running at 206 MHZ, the core voltage was increased from 1.5 V to 1.75 V. The core voltage was increased by changing R237 from a 5.6 K Ohm, 1% resistor to a 11.0 K Ohm, 1% resistor.

Affected Docs: None.

Status: Fix.

3. Angel* Upgraded to Version 1.20.4

Issue: Angel* was upgraded to Version 1.20.4 for the G-stepping of the SA-1100 microprocessor.

Affected Docs: None.

Status: Fix.

4. U46 changed to a UCB1300

Issue: U46 has been changed from a UCB1200 to a UCB1300. Intel has provided an update to the SA-1100 Evaluation Platform Windows CE Driver Kit to compensate for touch screen behavior differences encountered with the UCB1300 component. Customers providing touch screen driver support on other operating systems may need to consult with the UCB1300 manufacturer if problems are found.

Affected Docs: Schematics

5. C203, C204, C205, and C206 changed to a 1000pF Capacitor

Issue: Capacitors C203 through C206 are changed from a 4700pF capacitor to a C0805, 1000pF, 50V (10%), X7R capacitor (part number 08052R102K9BB2). This improves the SA-1100 touch-screen functionality.

Affected Docs: Schematics

Status: Fix

Note: The changes listed in Item 5 (above) are reflected only in this specification update and are not reflected in the *Intel Corporation StrongARM® SA-1100 Evaluation Platform Schematics* (1100DevBrdSch.pdf).

Specification Clarifications

None

Documentation Changes

1. Porting the Windows* CE Operating System to StrongARM™ SA-1100 Based Platforms Application Note: Title

Changed the name of the *Porting the Windows* CE Operating System to StrongARM™ SA-1100 Based Platforms Application Note* (order number 278246-001) to *Porting the Windows* CE Operating System to the Intel® StrongARM® SA-1100 Evaluation Platform*.

2. Loading an Image of Windows CE to the Hardware Platform: Section 3.0

Section 3.0 contains the following note:

Note: The easiest of the three methods listed in Table 2 is loading the NK.NBO image for the Windows CE operating system from the PCMCIA Intel compatible linear flash card.

3. Downloading the Image to the Hardware Platform: Table 2.

Reordered the rows so that the easiest method is listed first. Removed the footnote and modified some of the steps in the table. Changed the description for Benefits/Drawbacks.

Table 2 Downloading the Image to the Hardware Platform (Sheet 1 of 2)

Action	Description	Benefits/Drawbacks
Load the NK.NBO image for the Windows CE operating system from the PCMCIA Intel compatible linear flash card	1. For the SA-1100 evaluation platform, verify that Angel 1.02 or later is installed. For information on upgrading Angel, refer to the *SA-1100 Microprocessor Firmware User's Guide.* 2. Transfer the image for the Windows CE operating system to the PCMCIA flash card by using the File to Flash utility. This utility is provided by Intel and is also available on the Intel Flash web site. 3. Run the loaded program to copy the image from the flash to the DRAM (first 4 MB at 0xD000 0000 and second 4 MB at 0xD800 0000 for the SA-1100 evaluation platform), set the SA-1100 in the supervisor mode and jump to the location of the image of the Windows CE operating system (0xD000 1000 for SA-1100 evaluation platform). The 0x1000 offset is required because the actual executable code starts from that offset. This program is available from Intel for the SA-1100 evaluation platform.	Benefit: This is the easiest method for downloading the image.

Table 2 Downloading the Image to the Hardware Platform (Sheet 2 of 2)

Action	Description	Benefits/Drawbacks

Load the NK.NB image(s) for the Windows CE operating system over the serial port	1. For the SA-1100 evaluation platform, verify that Angel 1.05 or later is installed[a]. For information on upgrading Angel, refer to the *SA-1100 Microprocessor Firmware User's Guide*.
	2. Set the ROMsize parameter in the config.bib file to the physical size of each memory bank. Note: The SA-1100 evaluation platform has 16MB in banks of 4 MB factory installed.
	3. Modify the file fwbrut.s by adding the following code immediately after the line to flush the caches:
	`;disable clock switching`
	`mcr p15, 0, r0, c15, c2, 2`
	
	`mov r0, #0xC8000000`
	`add r1, r0, #0x40000`
	`mov sp, #0xD8000000`
	`2 ldmia r0!, {r2-r9}`
	`stmia sp!, {r2-r9}`
	`cmp r0, r1`
	`bne %b2`
	4. Rebuild the Windows CE image using blddemo. The MAKEIMG application will make the proper number of NK.NB images determined by the size of the image and the value of ROMsize parameter. MAKEIMG displays the size of the image as the value Total ROM Size. Note: For a standard SA-1100 evaluation platform and many Windows CE projects, two 4MB files will be created called NK.NB0 and NK.NB1.
	5. Run the ARM debugger on your host machine and establish a connection with the Angel Debug Monitor.
	6. Run the get file command (FILE menu) to load and get NK.NB0 at address 0xD000 0000 and then if NK.NB1 was created, load NK.NB1 at 0xC8000000 onto the target.
	7. Set the PSR (status register from the VIEW-REGISTERS-CURRENT Option) to 0xD3 after both images are loaded. This sets the SA-1100 in supervisor mode and displays the following bit mnemonics: %nzcvIFt_SVC32
	8. Set the PC (program counter from the VIEW-REGISTERS-CURRENT option) to 0xD0001000.
	9. Enter GO (or F5) to execute the image. This results in an error message in the ARM debugger on your host machine. The error message can be ignored because the Windows CE operating system overwrites the Angel debug monitor making it useless.
		Drawback: Takes too long (approximately 15 minutes) to download each image. Also, care must be taken when sharing the serial port between the Angel debug monitor and Windows CE, since they require incompatible serial port settings.

Porting the boot loader to the hardware platform	A sample bootloader is available for the ODO reference platform in the %_WINCEROOT%\Platform\Odo\Bootload directory. The image NK.Bin can be downloaded via a serial, parallel or Ethernet port from the %_FLATRELEASEDIR% directory. See the on-line manual for more information.	Drawback: The bootloader is not ported for the SA-1100 evaluation platform and hence this method of downloading the image is not supported.

a. If you are running Angel 1.02, you may skip step 3. However, if you skip step 3 you must load the file NK.NB1 at 0xD8000000 instead of at 0xC8000000, as described in step 6.

4. Minislide Switch Descriptions: Table 1-2.

Changed the Initial Settings (Default) value in row S14.

Table 1-2. Minislide Switch Descriptions

Switch	Function	DOT	NO DOT	Schematic[a] Page Number	Initial Setting (Default)
S1	Determines which mode the SA-1100 LCD controller is configured for.	Color	Mono	26	Dot
S2	ON/OFF control for LCD backlight.	OFF	ON	26	No dot
S3	tsclk_byp mode control.	VDDX	GND	3	No dot
S4 through S6	Varies frequency into txtal. txtal can be driven from a pulse generator connected to J17 (load of 0.0 V to 1.0 V, 50 ohms impedance).	Standard	External Input	3	S4 no dot S5 dot S6 dot
S7	Power on/off switch as marked on platform.	—	—	30	Left position
S8 through S10	Varies frequency into pxtal. pxtal can be driven from a pulse generator connected to J17 (load of 0.0 V to 1.0 V, 50 ohms impedance).	Standard	External Input	3	S8 no dot S9 dot S10 dot
S11	SA-1100 nCS2 signal for either SRAM component enables or chip select for external Boot ROM (pin 7 of J28).	SRAM	External Boot ROM	20	Dot
S12	Selects whether GPIO signals are used for PCMCIA signals or by SA-1100 to drive 16-bit LCD panel.	LCD	PCMCIA	18	No dot
S13	SA-1100 bit width access to Flash memory.	32 bits	16 bits	15	Dot
S14	Selects either SRAM or DRAM to communicate with data bus.	SRAM	DRAM	9	No dot
S15	SA-1100 bit width access to Boot ROM.	32 bits	16 bits	13	Dot
S16	Reset switch for SA-1100 evaluation platform.	Off	On	30	No dot
S17	Simulates a Vdd (+5 V) fault.	Fault	No Fault	31	No dot
S18	Simulates a battery fault.	Fault	No Fault	31	No dot
S19	Simulates an external switch that asserts a signal when the user presses the switch.	Active	Not Active	24	Dot
S20	Simulates a sensor that reports when the system lid (on a portable device) is open or closed.	Open	Closed	24	Dot
S21	Controls gpio[1] state.	gpio[1] High	gpio[1] Low	24	Dot
S22	Controls gpio[0] state.	gpio[0] High	gpio[0] Low	24	Dot

a. Schematics are provided in the kit in PDF format.

5. Default Minislide Switch Settings: Table 2-1.

Changed the Settings value in row S14.

Table 2-1. Default Minislide Switch Settings

Switch	Setting	Selection
S1	DOT	Color LCD installed
S2	NO DOT	LCD backlight turned on
S3	NO DOT	tstclk_byp = 0 (inactive)
S4	NO DOT	ext_tx connected to sw_ext_tx
S5	DOT	Use 32.768-kHz crystal
S6	DOT	Use 32.768-kHz crystal
S7	—	Power switch in left position
S8	NO DOT	ext_px connected to sw_ext_px
S9	DOT	Use 3.6864-MHz crystal
S10	DOT	Use 3.6864-MHz crystal
S11	DOT	nCS2 addresses SRAM
S12	NO DOT	PCMCIA signals driven back to gpio[7:2]
S13	DOT	32-bit wide Flash
S14	NO DOT	SRAM (for DRAM, default should be NO DOT)
S15	DOT	32-bit wide ROM
S16	NO DOT	Entire evaluation platform held in reset (to run, slide to DOT)
S17	NO DOT	batt_fault = 0
S18	NO DOT	Vdd_fault = 0
S19	DOT	kbc_xsw floating
S20	DOT	LID_CLOSED# = 1
S21	DOT	gpio[1] = 1
S22	DOT	gpio[0] = 1

6. Adjusting Display Brightness: Section 2.4

Please correct the following in the SA-1100 Microprocessor Evaluation Board User's Guide (278172-001):

2.4 Installation Procedure, Step 3 should read:

3. Set all trim pots to their middle positions except for trim pot R3. R3 should be set to a 1/3 position.

Note: The Kyocera LCD panel that ships with the SA-1100 evaluation board is not tolerant of the higher V_{EE} voltages that the R3 trimpot can generate. When the V_{EE} is too high for the RS trimpot to handle, the Kyocera panel is overdriven and turns dark in response. Turning R3 fully counter clock-wise for a few seconds and then slowly turning it clock-wise will restore the LCD panel display.

7. Sample Programs: Section 3.3

Sample demonstration and diagnostic programs are available from the SA-1100 Software Library section of the *Developer.Intel. com* website. The previous documentation on the SA-1100 evaluation platform suggested that these software programs were provided in the SA-1100 evaluation platform kit on floppy diskette. The availability of these software programs is only from the website.

The diagnostic files available include Bounce, Kbin and cterm.

8. Schematic Flow Codecs: Sheet 27

U46 has been changed to a UCB1300.

9. Schematic Codec Capacitors: Sheet 27

Capacitors C203, C204, C205, and C206 in location 4C on sheet 27 have been changed from a 4700pF part to a 1000pF, 50V (10%) part.

Note: The changes listed in Item 9 (above) are reflected only in this specification update and are not reflected in the *Intel Corporation StrongARM® SA-1100 Evaluation Platform Schematics* (1100DevBrdSch.pdf).

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