Product Change Notification

Product Change Notification Number: QC103001 **Notification Date:** August 3, 2010

Title: ATMXT224 Firmware Revision Change from V1.6 to V2.0

Product Identification:
ATMXT224-CU
ATMXT224-CCU
ATMXT224-MAH

Reason for Change:

☒ Design	☐ Processing	☐ Logistics
☐ Manufacturing Location	☒ Quality/Reliability	☐ Material

Change Description:
As part of the continuous improvement process for the mXT224 touchscreen driver IC, a number of performance and functional enhancements were identified. These enhancements provide system benefits to customers and shall be implemented by transitioning the existing V1.6 firmware to V2.0 production release.

The enhancements in V2.0 are generally backwards compatible with V1.6 with the exceptions noted in Attachment 1

Atmel recommends the implementation of V2.0 as it shall result in improved features & functions for customers.

The functional objects which are improved by the transition to V2.0 are summarized in the enclosed Attachment 1.

Identification Method to Distinguish Change:
Marking of device:

Current marking ATMXT224-CU: QS473	**New marking ATMXT224-CU:** QS505
ATMEL	ATMEL
MXT224	MXT224
CU-1R6	CU-2R0
LOTCODE	LOTCODE
Current marking ATMXT224-CCU: QS474	**New marking ATMXT224-CCU:** QS506
ATMEL	ATMEL
MXT224	MXT224
CCU-1R6	CCU-2R0
LOTCODE	LOTCODE
Current marking ATMXT224-MAH: QS475	**New marking ATMXT224-MAH:** QS507
ATMEL	ATMEL
MXT224	MXT224
MAH-1R6	MAH-2R0
LOTCODE	LOTCODE

Qualification Data: ☐ available ☐ will be available in WW___ ☒ not applicable
Samples: ☒ Please contact your Atmel Sales representative.

Quantifiable Impact on Quality & Reliability:
Please refer to Attachment 1 for a summary of the improvements.

Proposed First Ship Date*: October 28, 2010

**The Proposed First Ship Date is the forecasted date that a customer may expect to receive changed product. This is determined by the estimated date of inventory depletion on the PCN issue date. This may be affected by fluctuations in supply and demand. Consequently, although customers should be prepared to receive changed product on this date, Atmel will continue to ship pre-changed product until a time in which inventory has been depleted. This may result in pre-changed product being shipped to customers after this forecasted date.*

Atmel Contact: pcnadm@atmel.com

Atmel will deem this change accepted unless specific conditions of acceptance are provided in writing within 30 days from the date of this notice. All correspondence must be sent to the Atmel Contact e-mail address listed above.

Attachment 1

Overview

This document provides a summary of the improvements related to mXT224 (ATMXT224) firmware release 2.0. Issues associated with the interface driver are also included.

Summary: Improvement & Fixes in Version 2.0

NEW FEATURES	Summary	System Impact	Backwards Compatible with V1.6?
1	Added 'stuck-low-CHG' recovery logic for ESD recovery	None	Yes
2	Palm recovery algorithm added to T8 object	None - new controls that if are unused will cause the system to behave as before	Yes – if driver was written correctly to zero unused fields
3	Improved touchscreen position filtering for smoother tracking of touches	None	Yes
4	T44 Message counter object added for improved message throughput	None - the object can be ignored and system used as before	Yes
5	Improved Multitouch tracking when many touches are on the screen	None	Yes
6	Release update feature added	None - disabled by default	Yes – if previously reserved bit-field was zeroed
7	Grip suppression now has UNGRIP status field to indicate that a touch was previously suppressed	Status bit was previously reserved and can safely be ignored if not required and system will behave as before	Yes – if previously reserved bit-field was ignored/masked.
8	Two-touch Gesture processor object removed	Cannot now use 2-touch gestures	No
9	New Touchscreen TCHHYST feature added	None - No compatibility issues if unused/written to zero then system will behave as previously	Yes – if driver written correctly to zero unused fields
CORRECTIONS/ FIXES	**Summary**	**System Impact**	
10	Corrected an issue in the Single-touch gesture processing when NUMGEST was set less than 4	Gesture processing now behaves properly when NUMGEST is set less than 4	Yes
11	Corrected an issue with the FLICKEN control bit, Flicks can now be properly disabled and FLICKTHR ignored	Taps will function correctly when Flicks are disabled using the FLICKEN bit	Yes
12	Corrected an area calculation error in the Grip/Face suppression object	Touch area is now calculated correctly when being applied to SZTHR1, SHPTHR2 and SHPTHR1	Yes – but SZTHR1, SHPTHR1 and SHPTHR2 settings might need to be re-assessed although unlikely.
13	Corrected an AKS issue on the Key Array object when a DI setting of 0 or 1 is used	AKS behaves properly when transitioning between keys in the key array with a DI setting of 0 or 1	Yes

14	Corrected a rare position calculation mistake when small-flat touches are detected	Position will now be more accurate in the case of a small-flat touch	Yes
15	Frequency hopping issue corrected where dynamically changing a FREQ setting to 255 could cause a bad frequency to be generated	Now works as intended	Yes
16	TCHAMPLITUDE calculation improved to avoid wrapping issue	TCHAMPLITUDE will now saturate at 255 instead of wrapping	Yes
17	Fixed issue where a suppressed touchscreen touch that comes into the active region can force the entire touchscreen to detect	SUPEXTTO can now be used with non-locking grip suppression	Yes
18	Corrected an issue where the touchscreen TCHAUTOCAL will now wait this period after previously being off before calibrating the sensor	The touchscreen TCHAUTOCAL feature now behaves correctly when enabled when a touch is already present on the screen. Behaviour is now the same as on the key array.	Yes
19	Added recovery logic for a rare event where the stored NVM checksum gets corrupted	If a CRC error is detected it will be flagged as CFGERR and sending a backup command will correct the error	Yes
20	Small fix to correct a timing window where a calibration command could be lost when settings are being changed	A calibration command will always be properly processed even when settings are being changed	Yes
21	Corrected an issue where a config error condition would not be detected (origin + size > 255)	Touch object Origin and size configuration errors will always be detected	Yes
22	Corrected frequency hopping frequency selection issue	The currently used frequency will always be the intended one	Yes
23	X line slew rate calibration value is now used properly	X line negative edge slew rate will be correct for front-end sink/source limits	Yes
24	Now enables all 14 Y integrators to prevent instability on products where not all Y lines are enabled	Increase in AIdd depending on configuration.	Yes
25	Corrected an issue where grip face suppression MAXTCHS feature will not behave properly with a DI setting of 0 or 1	The feature will now work as intended when the DI setting is less than 2	Yes
26	Corrected an issue with the gripface suppression where SZTHR2 could not behave correctly if configured to be less than 1/16th of the screen area	May result in a small behavioural change to settings outside the typical setting of SZTHR2	Yes – but SZTHR2 may need to be re-assessed if previously used outside the typical range specified in the datasheet (i.e. ~15-20)
27	Ensured that the noise level calculations was corrected based on which sensor channels were enabled	No real impact except will ensure more robust operation when settings are being dynamically changed or not all Y lines are used.	Yes
28	Corrected a noise suppression message issue where erroneous messages may be generated during frequency hopping, these could only be seen if the host attempted to read at a specific and unlikely time	Erroneous noise suppression messages will not be generated regardless of when host reads messages	Yes
29	Corrected a noise suppression message issue where a status message could not be guaranteed when returning to frequency 0 or exiting from FHERR state	The frequency-change messages now behave correctly	Yes

30	Corrected an issue with the noise suppression object where changing a setting that cause a configuration check will cause the stored noise level to be reset	The noise level will behave correctly even when settings are being dynamically changed	Yes
31	Corrected an issue where the sensor channels could be drifted too fast when frequency hopping	The channels will now always drift correctly when frequency hopping	Yes
32	Fixed an issue where dynamically changing settings could cause a touchscreen release event to get delayed several seconds	System behaviour will be more robust when changing settings dynamically	Yes
33	Corrected an issue where the self test object would report the wrong Y line as being the source of a pin fault test failure	Pin fault test failures will now correctly identify the shorted Y line	Yes
34	Corrected an issue in the touch tracking logic where touches in the clip region could appear to move onto the screen	Touches in the clip region can now not appear back on the screen until really brought out of the clip region	Yes
35	Corrected an issue in the touch tracking logic where touches could appear to swap over	Touches will be less likely to swap over number when the multiple fingers move in unusual ways	Yes
36	Corrected a minor use of the jumplimit control in the tracking logic	The jumplimit is now correctly applied to all tracking logic	Yes
37	Corrected an issue in the noise suppression where too many acquisitions could be performed in one cycle, with the possibility of causing a watchdog reset	The maximum possible cycle time has been reduced and should now never approach the watchdog timer limit	Yes
38	Corrected an issue where the anti-touch recalibration logic could use erroneous data if not all X lines are used	Behaviour before may have been unpredictable with certain settings	Yes
BEHAVIOURAL CHANGES	**Summary**	**System Impact**	
39	Reportall command now clears the CMD field after processing it instead of before	Host can now poll CMD field to know when the command really has been processed although unlikely that they would. Otherwise no impact	Yes
40	Diagnostic debug command now cleared after is has been processed instead of before	Host can now poll the command field to know when the command really has been processed - this allows the host to be certain the requested data is valid. Otherwise no impact	Yes
41	Chargetime setting is now internally soft limited to 2.5us (register setting of 10)	Chip can now not be run outside spec but if was being used outside spec then noise suppression frequency settings may need re-evaluating	Yes – as long as chip was previously being run within the datasheet specifications
42	Gain setting is now internally soft limited to 3	Chip can now not be run outside of spec but if it was being used outside spec the threshold settings may need re-evaluating	Yes – as long as chip was previously being run within the datasheet specifications
43	Gain Calibration feature will now only attempt to calibrate using gains 0, 1, 2 and 3.	CTE mode diagnostic data may contain different recommended values	Yes
44	Address pointer wrapping feature has been updated to ignore the CRC byte if CRC mode is not used	If the wrapping feature is used in non-CRC mode then fewer bytes should be read	No – if wrapping feature was used in 1.6.AB to read multiple

			messages in one transfer then this must be adjusted.
45	Hawkeye Debug data SPI timing has been changed to reduce the DEBUG_CLK low time	This will increase DEBUG_CLK frequency. DEBUG_CLK frequency is fairly low so this should not have an effect on H/W SPI receivers.	Yes
46	Message ordering will be reset after inactivity	Message ordering will be more predictable	Yes
47	If >5 touches are put down at the same time the touch numbering will be more predictable	Touches can now not be apparently lost due to the NUMTOUCHES setting being less than 10	Yes
48	The TCHAUTOCAL behaviour of the touchscreen has been updated so that any moving touch will reset the counter of all detected touches	The behaviour has changed so that in order to trigger a recalibration all touches must be stationary	Yes – TCHAUTOCAL behavior has changed subtly to make it more useful.
49	The CHG line behaviour and message deletion system has been updated to only consider a message read after the first byte after the reportID has been buffered ready for sending. This change is to ensure that the updated wrapping mode does not cause issues to hosts that are unaware of it, and so that the CHG line behaviour is more predictable.	If the host is actively checking the CHG line status during message reading the time of checking may need updating	No - if the host actively checks the CHG line DURING the I2C read of the message then this check may need adjusting.
50	Changing the Noise Suppression FREQ[] fields will now not cause an automatic calibration	If the GCAF noise suppression mode is in use and the host is dynamically changing the FREQ settings then the host should send a calibrate command after changing these settings	Yes
51	The decision as to when the chip is really in the FHERR state has been improved so that the noise suppression object can better handle multiple interfering noise frequencies	The noise suppression object will generate the FHERR condition only when it actually is unable to find a clear frequency	Yes
52	Updated the TCHAUTOCAL behaviour of the T9 Multitouchscreen; now the TCHAUTOCAL counter for all touchscreen touches will get reset when a new touch enters detection	This will make the TCHAUTOCAL a more robust feature	Yes – TCHAUTOCAL behavior has changed subtly to make it more useful.
53	Updated the default behaviours of the gesture timeouts in the Single-touch gesture processor object. Settings of zero will now default to 75 (300ms)	Settings of zero will now behave differently, previously a zero setting may have caused undesirable behaviour	No – if settings of zero were previously used for these controls then the behavior may have changed.