[SPRLL-2227] TC26 | UI changes with no screen touch operations (Ghost touches). Needs to be in Glove and Finger mode.

Created: 2023-Sep-15 10:58 AM - Updated: 2024-Jun-03 2:56 PM - Resolved: 2024-May-28 6:23 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Touch Panel
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Low
Reporter:	Celestino Alem	**Assignee:**	Folorunsho Atanda
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

% Complete:	0
Application Type (Environment):	Non-Prod
Approvals:	
Assignee (Display Name):	Folorunsho Atanda
BR_ID:	No_BR_ID
Case Category:	Not Sure Yet
Client:	REFLEXIS
Client Reported:	No
Cluster Management Emergency:	No
Corrective Action:	Copper tape was added to adhere the TPM flex to the display shield, insuring consistent grounding. To further bolster the copper tape, black acetate tape was placed over the copper tape to ensure long term adhesion. Customer units were in staging, and screened for this issue.
Critical Action Required:	No
Critical Information:	No
Currently Implementing:	RTM
Customer Facing:	Yes
DND Enabled?:	No
Date of First Response:	2023-11-01 11:12:24.665
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, …

	• Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4 • Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …
Developer Release Note:	Internal notes: For Customer: <Background> <Resolution>
Development:	
Development Code Analysis Required?:	No
Development Code Fix Required?:	No
Discipline:	Electrical Engineering
Documentation Approved:	No
EDD Approved:	No
EDD Link:	http:///
EST Description:	Impacted Product : Impacted Number of device : Business Impact% : Urgency : Describe the Issue: Action taken: Bagfile Link: Other logs Link:
Holding the release:	Yes
Hotfix:	Not Requested
Instance Shutdown Time:	0 (Midnight)
Issue Age:	584
Jaspersoft Role:	USER
LastComment:	Thanks for providing that information, moving to closed. Author: Celestino Alem
Owner:	QA
PDD Approved:	No
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-3528
Priority (ENC):	9: Unassigned
Project Type:	New
R&D justification:	Yes
RFLX Client Ticket Language:	English
RIOT Health:	On Track
ReOpen Reason:	Not working as expected
Release Tracker Requirements Ready:	To Do
Reporter (Display Name):	Celestino Alem

Reporter's Discipline:	System Test
Reproduction Steps:	Can not reproduce.
Resolution Date:	2023-11-01 11:12:24.665
Revision:	a
Root Cause Details:	Customer experienced ghost touches/false touches 1. Poor grounding caused reference voltages to be incorrect. 2. Ground pad on display flex did not properly ground pin 41of display flex to the shield. Insufficient grounding was due to poor bonding of conductive adhesive on ground pad.
Root Cause Level 2:	Flexes
Root Cause Level 3:	Touch Panel
Root Cause Level 4:	USI
SPR Reference #:	~~SPR-50287~~
SSO Enabled?:	No
Sales Priority:	Low - 14D
Scrub Result:	Not Set
Secondary Status:	1. Analysis Required
Smart Checklist Progress:	0/0
Source:	ECRT-Electrical
Status Sub-Type:	Please Specify
Support Reported:	NO
Synopsis:	TC26 | UI changes with no screen touch operations (Ghost touches). Needs to be in Glove and Finger mode.
Test Plan Approved:	No
Test Plan Link:	http:///
Time in Status:	3_*:*_1_*:*_18570_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_22145110841
UI/UX Design:	Status Unknown
UX Design Approved:	No
UX Design Link:	http:///
Zebra Priority:	0 - UnScrubbed
[CHART] Date of First Response:	2023-11-01 11:12:24.665
[CHART] Time in Status:	3_*:*_1_*:*_18570_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_22145110841

Description

1. Improve touch panel validation process to include all possible touch panel modes.
2. For any grounding pads that use conductive adhesive, ensure adhesive application force is feasible for use case.

Attachments

TBOLT-20536 - Touch Panel Modes

Thunderbolt WLAN:

The Device shall provide a mechanism to switch between the following modes of touchscreen operation:

- Finger
- Glove and Finger.

Thunderbolt WWAN:

- Stylus and Finger (Screen Protector OFF)
- Glove and Finger (Screen Protector OFF)
- Stylus and Finger (Screen Protector ON)

- Glove and Finger (Screen Protector ON)
- Finger Only

image-2024-05-28-18-22-55-785.png (53 kB)

Links

LessonsLearned

is learned from	[~~SPR-50287~~]	TC26 | UI changes with no screen touch operations (Ghost touches). Needs to be in Glove and Finger mode.	Closed

Mention

mentions	[EE-4223]	TP User Scenario Verification: Different Gestures and Touch Modes (Suspend to Resume)	Active
mentions	[EE-8491]	TP User Scenario Verification: Multi Touch Performance of Different Use Case Scenarios	Active
is mentioned by	[~~SPRLL-2228~~]	TC26 | UI changes with no screen touch operations (Ghost touches). Needs to be in Glove and Finger mode.	Closed
is mentioned by	[~~SPRLL-2284~~]	TC26 | UI changes with no screen touch operations (Ghost touches). Needs to be in Glove and Finger mode.	Closed

Comments

Folorunsho Atanda added a comment - 2023-Nov-01 12:12 PM

Hello Michael Verdecanna ,

What are the requirements for this ticket? Is there a specific person I can contact to discuss it further?

Folorunsho Atanda added a comment - 2023-Nov-06 3:37 PM

Hello Rohan Chopra,

I heard you were the lead Electrical Engineer on the TC26 project. I'll temporarily reassign this task to you. Please review the SPRLL and suggest a team member you think is best suited to handle this case.

Folorunsho Atanda added a comment - 2023-Nov-28 11:34 AM

Michael Vangi is going to get back to EE team to see if there is anything EE can do to help with this issue. As of now it seems like it is more of a manufacturing/mechanical issue.

Michael Vangi added a comment - 2024-May-28 1:17 PM

Hi Folorunsho Atanda ,

We can resolve this SPRLL if we make sure when we test touch panels, we test all applicable modes, finger, glove, finger +glove, etc.

Thanks,

Folorunsho Atanda added a comment - 2024-May-28 6:23 PM

Hello Michael Vangi ,

The PRD states the available touch panel modes, which the engineer and EE lab make sure to test.

Attached is a snippet of the Thunderbolt PRD Touch Panel Mode section

TBOLT-20536 - Touch Panel Modes

Thunderbolt WLAN:

The Device shall provide a mechanism to switch between the following modes of touchscreen operation:

- Finger
- Glove and Finger.

Thunderbolt WWAN:

- Stylus and Finger (Screen Protector OFF)
- Glove and Finger (Screen Protector OFF)
- Stylus and Finger (Screen Protector ON)

- Glove and Finger (Screen Protector ON)
- Finger Only

There are also a suite of test cases stating this: EE-4223, EE-8491, and others

Celestino Alem added a comment - 2024-May-29 8:50 AM

Thanks for providing that information, moving to closed.

History

Jira System made changes - 2023-Sep-15 10:58 AM		
Link		This issue is learned from SPR-50287
Jira System made changes - 2023-Sep-15 10:58 AM		
Source		ECRT-Electrical
Reporter	Jira System	Celestino Alem
Polarion System made changes - 2023-Sep-17 11:30 AM		
Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-3528

Rohan Chopra made changes - 2023-Sep-19 3:07 PM		
Component/s		Touch Panel
Michael Vangi made changes - 2023-Oct-06 11:35 AM		
Link		This issue is mentioned by SPRLL-2228
Michael Verdecanna made changes - 2023-Nov-01 1:57 PM		
Assignee	Michael Verdecanna	Folorunsho Atanda
Folorunsho Atanda made changes - 2023-Nov-06 3:38 PM		
Assignee	Folorunsho Atanda	Rohan Chopra
Celestino Alem made changes - 2023-Dec-11 3:18 PM		
Link		This issue is mentioned by SPRLL-2284
Folorunsho Atanda made changes - 2024-May-28 6:22 PM		
Attachment		image-2024-05-28-18-22-55-785.png
Folorunsho Atanda made changes - 2024-May-28 6:23 PM		
Assignee	Rohan Chopra	Folorunsho Atanda
Status	To Do	In Progress
Folorunsho Atanda made changes - 2024-May-28 6:23 PM		
Resolution		Work Complete
Status	In Progress	Resolved
Celestino Alem made changes - 2024-May-29 8:50 AM		
Status	Resolved	Closed
Folorunsho Atanda made changes - 2024-Jun-03 2:56 PM		
Link		This issue mentions EE-8491
Folorunsho Atanda made changes - 2024-Jun-03 2:56 PM		
Link		This issue mentions EE-4223

[SPRLL-1815] When putting holes in a cover glass, avoid irregular shapes. In any shape, corner radii should be maximized. Irregular shapes and corners add internal stress to the glass resulting in higher variation in glass fragility.

Created: 2022-May-23 11:36 AM - Updated: 2023-Nov-14 12:12 PM - Resolved: 2022-Aug-23 5:19 PM

Status:	Resolved
Project:	SPR Lessons Learned
Component/s:	Touch Panel
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Low
Reporter:	Mark Lamont	**Assignee:**	Dennis Suk Noh
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

Approvals:	
Assignee (Display Name):	Dennis Suk Noh
BR_ID:	No_BR_ID
Backlog Priority:	2,000
Client Reported:	No
Cluster Management Emergency:	No
Corrective Action:	The receiver opening was changed to a oval shape.
Critical Action Required:	No
Critical Information:	No
Currently Implementing:	RTM
DND Enabled?:	No
Date of First Response:	2022-05-23 11:17:31.607
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, … • Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4 • Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …
Developer Release Note:	Internal notes: For Customer:

	<Background> <Resolution>
Development:	
Development Code Analysis Required?:	No
Development Code Fix Required?:	No
Discipline:	Mechanical Engineering
Holding the release:	Yes
Hotfix:	Not Requested
Impacted Products:	Jaws_WL
Instance Shutdown Time:	0 (Midnight)
Issue Age:	1,064
Jaspersoft Role:	USER
LL Type - Primary:	Design - Advanced
LastComment:	Can this Jira LL be closed at this point? Author: Amir Weiss
Owned By:	Reflexis Support
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-3096
Priority (ENC):	9: Unassigned
RFLX Client Ticket Language:	English
ReOpen Reason:	Not working as expected
Reporter (Display Name):	Mark Lamont
Reporter's Discipline:	System Test
Reproducibility:	none
Resolution Date:	2022-05-23 11:17:31.607
Root Cause Details:	The shape of the receiver opening resulted in higher stress within the glass that caused frequent touch panel cracking.
SPR Reference #:	none
SSO Enabled?:	No
Sales Priority:	Low - 14D
Scrub Result:	Not Set
Secondary Status:	1. Analysis Required
Status Sub-Type:	Please Specify
Support Reported:	NO
Target:	Jaws
Time in Status:	3_*:*_1_*:*_7969217790_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_113348
[CHART] Date of First Response:	2022-05-23 11:17:31.607
[CHART] Time in Status:	3_*:*_1_*:*_7969217790_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_113348

Description

The original Jaws receiver opening in the touch panel was a trapezoidal shape which resulted in high stress within the glass due to the sharper upper corners. The internal high stress resulted in frequent touch panel cracks.

Links

Defect

defect	[~~ME-11190~~]	[JAWS_WLAN_DV1_QTP] DUT TP broken on top area	Closed

Comments

Mark Lamont added a comment - 2022-May-23 11:42 AM

Hi Dennis, Hi Dream,

Please add to the touch panel design best practices and design checklist items regarding openings in the touch panel for acoustics (receiver, mics, speakers). We want to try and make sure that all transitions are made a smooth as possible (largest radii allowable).

Thank you

Mark

Dennis Suk Noh added a comment - 2022-May-23 12:17 PM

Hi Mark and Dream,

Please help to review updated design check list and reference document and let me know if you have any comments to be updated.

- Design Check List has been updated.

https://zebra.sharepoint.com/:x:/r/sites/mengMERP/_layouts/15/Doc.aspx?sourcedoc=%7BB5FBF33E-AC4E-4AEA-98A3-64AD204DBF1E%7D&file=Touch%20and%20Display%20Design%20Check%20List_Product%20Name_Rev02.xlsx&action=default&mobileredirect=true

Rule 3 : Receiver, Mics, Speakers Cut out opening should have smooth as possible(largest radius like race track design).

- Reference Document has been updated.

https://zebra.sharepoint.com/:p:/r/sites/mengMERP/_layouts/15/Doc.aspx?sourcedoc=%7BD7766E26-A92B-4121-9654-469419A720DC%7D&file=Cover%20Glass%20-%20TP%20lens%20glass%20through%20hole%20design.pptx&action=edit&mobileredirect=true&cid=679f0bcf-eaee-4b9f-aba1-7f21d31c1d83

I will discuss with Bo to update this best practice on the system.

Best regards,

Dennis

Dennis Suk Noh added a comment - 2022-Aug-23 5:19 PM

Hi Mark and Dream,

Please help to review updated design check list and reference document and let me know if you have any comments to be updated.

- Design Check List has been updated.

https://zebra.sharepoint.com/:x:/r/sites/mengMERP/_layouts/15/Doc.aspx?sourcedoc=%7BB5FBF33E-AC4E-4AEA-98A3-64AD204DBF1E%7D&file=Touch%20and%20Display%20Design%20Check%20List_Product%20Name_Rev02.xlsx&action=default&mobileredirect=true

Rule 3 : Receiver, Mics, Speakers Cut out opening should have smooth as possible(largest radius like race track design).

- Reference Document has been updated.

https://zebra.sharepoint.com/:p:/r/sites/mengMERP/_layouts/15/Doc.aspx?sourcedoc=%7BD7766E26-A92B-4121-9654-469419A720DC%7D&file=Cover%20Glass%20-%20TP%20lens%20glass%20through%20hole%20design.pptx&action=edit&mobileredirect=true&cid=679f0bcf-eaee-4b9f-aba1-7f21d31c1d83

I will discuss with Bo to update this best practice on the system.

Best regards,

Dennis

Amir Weiss added a comment - 2023-Nov-14 12:12 PM

Can this Jira LL be closed at this point?

History

Mark Lamont made changes - 2022-May-23 11:38 AM		
Link		This issue defect ME-11190
Mark Lamont made changes - 2022-May-23 11:38 AM		
Assignee		Mark Lamont
Status	To Do	In Progress
Mark Lamont made changes - 2022-May-23 11:38 AM		
Assignee	Mark Lamont	Dennis Suk Noh
Polarion System made changes - 2022-May-24 11:30 AM		
Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-3096
Dennis Suk Noh made changes - 2022-Aug-23 5:19 PM		
Resolution		Work Complete

Status	In Progress	Resolved

[SPRLL-1744] TC75x screen jumping/phantom ghosting seen only on 4GB units.

Created: 2022-Apr-04 8:51 AM - Updated: 2024-Nov-15 2:33 AM - Resolved: 2022-Jun-04 3:53 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Touch Panel
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Low
Reporter:	Khazi-Syed Taheer Ahmed	**Assignee:**	Marija Gajic-Mancic
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

Approvals:	
Assignee (Display Name):	Marija Gajic-Mancic
BR_ID:	No_BR_ID
Backlog Priority:	2,000
Client:	REFLEXIS
Client Reported:	No
Cluster Management Emergency:	No
Corrective Action:	Use the hotfix patch archived below. https://zebra.sharepoint.com/:f:/s/mengEMC-ECRT/EpVxwTb30lJOoors-9ToFFgBIHzHnr4EEn3t8VUcphCrOQ?e=OlkPnt
Critical Action Required:	No
Critical Information:	No
Currently Implementing:	RTM
DND Enabled?:	No
Date of First Response:	2022-05-23 18:24:24.024
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, … • Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4 • Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …
Developer Release Note:	Internal notes: For Customer:

	<Background> <Resolution>
Development:	
Development Code Analysis Required?:	No
Development Code Fix Required?:	No
Discipline:	Electrical Engineering
Holding the release:	Yes
Hotfix:	Not Requested
Instance Shutdown Time:	0 (Midnight)
Issue Age:	1,113
Jaspersoft Role:	USER
LastComment:	Hi Chung Keung Poon Yes, this SPRLL can be closed. I will ask Reporter to close it, I can not close it. Hi Khazi-Syed Taheer Ahmed Please check the comments above and Close this Jira. The Jira is duplicate. Thanks. CC Michael Vangi , Celestino Alem , Tong-Hsiao Chang Author: Marija Gajic-Mancic
Owned By:	Reflexis Support
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-3020
Priority (ENC):	9: Unassigned
RFLX Client Ticket Language:	English
ReOpen Reason:	Not working as expected
Reporter (Display Name):	Khazi-Syed Taheer Ahmed
Reporter's Discipline:	System Test
Reproducibility:	none
Resolution Date:	2022-05-23 18:24:24.024
Root Cause Details:	Touch Panel
Root Cause Level 2:	Firmware
Root Cause Level 3:	Touch Panel
SPR Reference #:	~~SPR-44489~~
SSO Enabled?:	No
Sales Priority:	Low - 14D
Scrub Result:	Not Set
Secondary Status:	1. Analysis Required
Source:	ECRT-Software
Status Sub-Type:	Please Specify
Support Reported:	NO
Synopsis:	TC75x screen jumping/phantom ghosting seen only on 4GB units.

Time in Status:	3_*:*_1_*:*_1024116781_*|*_5_*:*_1_*:*_16748913733_*|*_6_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_4271591394
[CHART] Date of First Response:	2022-05-23 18:24:24.024
[CHART] Time in Status:	3_*:*_1_*:*_1024116781_*|*_5_*:*_1_*:*_16748913733_*|*_6_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_4271591394

Description

ECRT has identified the following lessons learned:

EE should define a threshold for a change in noise and if a new display passes this threshold, we should consider modifying the touch configuration.

Links

LessonsLearned

is learned from	[~~SPR-44489~~]	TC75x screen jumping/phantom ghosting seen only on 4GB units.	Closed

Mention

mentions	[~~SPRLL-1592~~]	TC77 Is experiencing Ghost Like touches on the screen even though no physical contact is made on the device's touch Screen.	Closed

Comments

Marija Gajic-Mancic added a comment - 2022-May-23 7:24 PM

Hi Tong-Hsiao Chang

Do you know who was lead EE on TC75x?

I need EE from TC75x program to review this SPRLL and advise what was missed in the development/test process to cause this issue and what should we be doing to improve our processes in the future.

From SPR it looks like there was a display change, and a new Tianma display was having some noise and ghost touch issues on the units with 4GB memory configurations which were not identified.

Please advise who should be looing into this one.

Thanks.

Marija Gajic-Mancic added a comment - 2022-Jun-04 3:52 PM

Hi Khazi-Syed Taheer Ahmed

This SPRLL is duplicate to the ~~SPRLL-1592~~.

We will investigate if anything is missing in the Display/TP test when the new display is introduced.

I am checking with the verification team the EE Library for Display and TP.

Please close the duplicate Jira.

Thanks.

CC Michael Vangi , Celestino Alem , Tong-Hsiao Chang

Marija Gajic-Mancic added a comment - 2022-Jun-04 3:53 PM

Duplicate to the ~~SPRLL-1592~~

Chung Keung Poon added a comment - 2022-Dec-13 2:27 PM

Hi Marija Gajic-Mancic , I noticed this SPRLL has been in resolved state for a while. Can this be closed? Thank you.

Marija Gajic-Mancic added a comment - 2022-Dec-13 2:33 PM

Hi Chung Keung Poon

Yes, this SPRLL can be closed. I will ask Reporter to close it, I can not close it.

Hi Khazi-Syed Taheer Ahmed

Please check the comments above and Close this Jira. The Jira is duplicate. Thanks.

CC Michael Vangi , Celestino Alem , Tong-Hsiao Chang

History

Michael Verdecanna made changes - 2022-Apr-04 9:10 AM		
Assignee	Michael Verdecanna	Marija Gajic-Mancic
Polarion System made changes - 2022-Apr-04 5:32 PM		
Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-3020
Marija Gajic-Mancic made changes - 2022-May-23 7:24 PM		
Status	To Do	In Progress
Marija Gajic-Mancic made changes - 2022-Jun-04 3:52 PM		
Link		This issue mentions SPRLL-1592
Marija Gajic-Mancic made changes - 2022-Jun-04 3:53 PM		
Resolution		Work Complete
Status	In Progress	Resolved
Marija Gajic-Mancic made changes - 2022-Jun-12 12:38 PM		
Component/s		Touch Panel
Khazi-Syed Taheer Ahmed made changes - 2022-Dec-15 11:21 AM		
Status	Resolved	Closed
JIRA Administrator made changes - 2024-Jul-17 2:46 PM		
SPR Reference #	44489 [https://spr.zebra.com/ViewSPR.aspx?sprID=+44489]	SPR-44489
Jira System made changes - 2024-Nov-15 2:33 AM		
Link		This issue is learned from SPR-44489

[SPRLL-1592] TC77 Is experiencing Ghost Like touches on the screen even though no physical contact is made on the device's touch Screen.

Created: 2022-Jan-06 7:11 AM - Updated: 2024-Nov-15 2:34 AM - Resolved: 2023-Dec-04 3:24 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Touch Panel
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Low
Reporter:	Khazi-Syed Taheer Ahmed	**Assignee:**	Tong-Hsiao Chang
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

% Complete:	0
Approvals:	
Assignee (Display Name):	Tong-Hsiao Chang
BR_ID:	No_BR_ID
Backlog Priority:	2,000
Client:	REFLEXIS
Client Reported:	No
Cluster Management Emergency:	No
Corrective Action:	Touch panel config was modified to suppress the additional noise. The changes were provided by PDA.
Critical Action Required:	No
Critical Information:	No
Currently Implementing:	RTM
DND Enabled?:	No
Date of First Response:	2022-06-04 14:11:45.867
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, … • Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4 • Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …

Developer Release Note:	Internal notes: For Customer: <Background> <Resolution>
Development:	
Development Code Analysis Required?:	No
Development Code Fix Required?:	No
Discipline:	Electrical Engineering
Hotfix:	Not Requested
Instance Shutdown Time:	0 (Midnight)
Issue Age:	1,201
Jaspersoft Role:	USER
LastComment:	CS and RS have been updated in the test suite by Chenglin Zheng and the new test procedure has been used on TC77 by Tong-Hsiao Chang. Resolving this since the test suite has been updated and the test procedure has been used. Author: Folorunsho Atanda
Owned By:	Reflexis Support
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-3097
Priority (ENC):	9: Unassigned
RFLX Client Ticket Language:	English
ReOpen Reason:	Not working as expected
Reporter (Display Name):	Khazi-Syed Taheer Ahmed
Reporter's Discipline:	System Test
Reproducibility:	Reproducible
Reproduction Steps:	At least 20 Devices have experienced Ghost Like touches on the screen even though no physical contact is made on the device's Touch Screen. 20 Devices have seen the issue in the Field. After battery is removed for 2 days for shipping to be Troubleshot by SE, Issue can not be replicated. Build Number: 01-30-04.00-OG-U15-C84-P06 Video Of issue attached RX Logs attached Devices are enrolled into SOTI As DO Agent 14.4.4 build 1051 with plugin 1.18.2.100
Resolution Date:	2022-06-04 14:11:45.867
Root Cause Details:	Touch Panel
Root Cause Level 2:	Firmware
Root Cause Level 3:	Touch Panel
SPR Reference #:	~~SPR-44031~~
SSO Enabled?:	No
Sales Priority:	Low - 14D
Scrub Result:	Not Set

Secondary Status:	1. Analysis Required
Source:	ECRT-Software
Status Sub-Type:	Please Specify
Support Reported:	NO
Synopsis:	TC77 Is experiencing Ghost Like touches on the screen even though no physical contact is made on the device's touch Screen. .
Time in Status:	3_*:*_1_*:*_47351548082_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_12898851336
[CHART] Date of First Response:	2022-06-04 14:11:45.867
[CHART] Time in Status:	3_*:*_1_*:*_47351548082_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_12898851336

Description

ECRT has identified the following lessons learned:

Whenever a new display is added, we should qualify how much noise it generates and determine whether we actually suppress it. We should qualify for the noise any time a change is added to the display.

Links

LessonsLearned

is learned from	[~~SPR-44031~~]	TC77 Is experiencing Ghost Like touches on the screen even though no physical contact is made on the device's touch Screen. .	Closed

Mention

mentions	[EE-4224]	Desense by Conducted Susceptibility (CS)	Active
mentions	[EE-4225]	Capacitive TP Desense by Radiated Susceptibility (RS)	Active
is mentioned by	[~~SPRLL-1739~~]	TC20 Batteries are swelling as the devices are kept in the cradle for too long.	Resolved
is mentioned by	[~~SPRLL-1744~~]	TC75x screen jumping/phantom ghosting seen only on 4GB units.	Closed

Comments

Marija Gajic-Mancic added a comment - 2022-Jun-04 3:11 PM

Hi Michael Vangi and Celestino Alem

Can you please provide more information regarding ~~SPR-44031~~?

After checking the SPR I am not sure what was the HW change to the display that contributed to the ghost touches.

The TC77 has been released for some time now. Do you know if Wistron changed the display and did not perform regression TP test?

We do have the the whole suite of TP test in the EE Library and glove and other modes should have been tested prior to release.

We have tests for all the asks in this SPRLL and I do not see any gaps in the EE development process regarding this SPRLL.

Any information would be very helpful to find the proper owner in EE team.

Thanks.

CC Tong-Hsiao Chang , Juliano Rodrigues Brianeze Giovanni Colella

Marija Gajic-Mancic added a comment - 2023-Jan-17 12:13 PM

HI Tong-Hsiao Chang

Can you please review this SPRLL and provide next steps.

I could not figure this out back in Jun.

Please work with ECRT Michael Vangi and Celestino Alem on resolution and closure.

If someone else in EE team is more familiar with TC77 please reassign to them

This issue was create 1 year ago, we need resolution asap if this is real EE issue.

Thanks.

CC Chung Keung Poon

Tong-Hsiao Chang added a comment - 2023-Feb-07 3:29 PM

Hi Michael Vangi & Celestino Alem ,

Sorry, I was not aware this jiar is still open. I see in the SPR video, the ghost touches happened in the stand alone mode without any cable attached or in cradle. Do you know what touch mode they are in, finger only? or glove? And do you know what changes PDA did to fix this?

In EE we have to pass the CS 10V/m test, which is with noise injected into the DC charging cable. That is pretty severe one already. We could not do radiated immunity on touch panel since it is general done in a closed chamber. We can't get in to watch it. I don't know if we can ask to have camera overhanging to watch for ghost touch. I can check with regulatory team to see if it is doable.

Thank you,

Tony

cc: Chung Keung Poon Michael Robustelli

Michael Vangi added a comment - 2023-Feb-07 3:36 PM

Hi Tong-Hsiao Chang ,

This lessons learned was generated by the ECRT software team, as it was a software SPR.

Please interface with Edward Etheridge and Mohitosh Mondal who worked on this SPR for questions.

Thanks,

Tong-Hsiao Chang added a comment - 2023-Feb-08 9:21 AM

Hi Edward Etheridge and Mohitosh Mondal ,

Can you provide more detail on this USPS touch panel ghost touch issue and how PDA was able to fix it. We like to see from EE side if there is anything we can prevent this from happening? Here are some of the key parameters I like to find out.

1. touch panel mode selected in USPS devices, finger only, finger + stylus or finger + glove?
2. With multiple USPS device having ghost touch in standalone mode (not in cradle, nor cable tethering), does it happen only when someone was holding the device or it happened even when device left on table?
3. Were the affected device reported from the same USPS location?
4. Lastly, were there any machineries (convey belt, larger fan etc.) nearby when the ghost touch appeared?
5. Do you have any detail on what kind of change PDA made to get rid of the ghost touches? Did we provide a custom version of TP config file for USPS?

Thank you,

cc Chung Keung Poon Marija Gajic-Mancic

Tony

Mohitosh Mondal added a comment - 2023-Feb-08 10:02 AM

Hi Tong-Hsiao Chang,

1. Touch Panel Mode was Glove and Finger
2. Issue was hard to reproduce, internally we did issue while in cradle and in field it was reported while in hand
3. No info available if it was specific location or multiple location
4. No machinery but was found it was easier to reproduce when a key or metal object was rubbing on edges of the device frame along the screen, (simulating scenario where keys in pocket could be against the device)
5. It was a custom touch config for glove and finger touch mode reference here: https://gerrit.zebra.com/c/ZEUS/Common/kernel/msm-4.4/+/299501
    1. USPS only took CPG LG build so yes it was custom for them

Hope that helps.

Thanks

Tong-Hsiao Chang added a comment - 2023-Feb-08 4:59 PM

Hi Chenglin Zheng ,

We should modify the TP CS & RS (EE-4224 and EE-4225) test steps to make sure that we test them under the worst case TP settings, which would have been Finger+glove and Finger+Stylus modes. Currently, we only test devices in finger only mode. As of the RS test we need to set device in worst case settings and have setup with Wysor to view the screen from a remote PC wirelessly. This way we can monitor the screen while test in the closed RF chamber. There are few addition settings in device to make it easy to detect ghost touches.

1. make sure device development options is turned on and both USB & Wireless debuggings are enabled from Setting->system-> developer options.
2. Turns on both Show taps and Pointer locations in Development in Setting ~~> System~~> developer options.
3. Connecting remote PC and device to the same Wi-Fi router and setup Vysor for Wireless connect and connecting to Android device being tested.
4. Launch an application like paint which would draw dot or line in case ghost touch happen to make it easy to spot.

Thank you,

Tony

Chenglin Zheng added a comment - 2023-Feb-14 4:56 PM

Hi Tong-Hsiao Chang,

Done, see EE-4224 and EE-4225. FYI, I only mentioned glove mode for RS as there is no human being can go into chamber physically, please read through, and let me know.

Regards,

Lin

Tong-Hsiao Chang added a comment - 2023-Mar-14 5:34 PM

Wait on Nazare TC73/TC78 Post rev B to test TP CS & RS in glove mode in outside test lab.

Tong-Hsiao Chang added a comment - 2023-Dec-04 3:16 PM

Hi Marija Gajic-Mancic, Folorunsho Atanda,

I don't know how many customers are setting their TC77 devices in "Finger + Glove" mode all times, but it is the worst condition for potential "Ghost" touches. In the past, EE tested touch CS in "Finger+water" mode, which is easier to pass as I can see. And the RS test was never done since it has to be checked inside the closed RF chamber. We have since changed these 2 items in EE test library to 1. test only in "Finger + Glove" mode, and 2. use remote Android application like Vysor to do remote desktop to watch the UUT display for any "ghost" touch during test. I have gotten TC78 tested using the new procedure, since we must certain NG TC77 would not have the same failure. And guess what we passed CS in finger mode originally, but we failed in DV matrix test in "finger + glove" mode. PDA has since updated Touch FW to improve the noise performance. And that's what we released in July 2023. The lesson here is that every product should test CS and RS in the worst "finger + glove" mode from now on.

Thank you,

Tony

Folorunsho Atanda added a comment - 2023-Dec-04 3:24 PM

CS and RS have been updated in the test suite by Chenglin Zheng and the new test procedure has been used on TC77 by Tong-Hsiao Chang.

Resolving this since the test suite has been updated and the test procedure has been used.

History

Michael Verdecanna made changes - 2022-Jan-06 9:58 PM

Assignee	Michael Verdecanna	Marija Gajic-Mancic

Marija Gajic-Mancic made changes - 2022-Jun-04 3:11 PM

Status	To Do	In Progress

Marija Gajic-Mancic made changes - 2022-Jun-04 3:52 PM

Link		This issue is mentioned by SPRLL-1744

Marija Gajic-Mancic made changes - 2022-Jun-04 3:56 PM

Component/s		Touch Panel

Polarion System made changes - 2022-Jun-05 5:30 AM

Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-3097

Marija Gajic-Mancic made changes - 2023-Jan-17 12:10 PM

Assignee	Marija Gajic-Mancic	Tong-Hsiao Chang

Tong-Hsiao Chang made changes - 2023-Feb-08 4:59 PM

Link		This issue mentions EE-4225

Tong-Hsiao Chang made changes - 2023-Feb-08 4:59 PM

Link		This issue mentions EE-4224

Folorunsho Atanda made changes - 2023-Dec-04 3:24 PM

Resolution		Work Complete
Status	In Progress	Resolved

Khazi-Syed Taheer Ahmed made changes - 2023-Dec-11 3:54 PM

Status	Resolved	Closed
Khazi-Syed Taheer Ahmed made changes - 2023-Dec-11 3:55 PM		
Link		This issue is mentioned by SPRLL-1739
JIRA Administrator made changes - 2024-Jul-17 2:47 PM		
SPR Reference #	44031 [https://spr.zebra.com/ViewSPR.aspx?sprID=+44031]	SPR-44031
Jira System made changes - 2024-Nov-15 2:34 AM		
Link		This issue is learned from SPR-44031

[SPRLL-1561] VC83-10 - TP not working during warm boots at temperatures less than -10C

Created: 2021-Nov-16 3:32 PM - Updated: 2024-Jun-21 4:49 PM - Resolved: 2024-Jun-21 4:48 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Touch Panel
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Low
Reporter:	Juliano Rodrigues Brianeze	**Assignee:**	Juliano Rodrigues Brianeze
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

% Complete:	0
Approvals:	
Assignee (Display Name):	Juliano Rodrigues Brianeze
BR_ID:	No_BR_ID
Backlog Priority:	2,000
Client:	REFLEXIS
Client Reported:	No
Cluster Management Emergency:	No
Corrective Action:	* Pinout for both Semtech and TI RTP controllers are the same, except for the reset pin in the first, which becomes A1 in the second, for I2C address setting. We thought that addressing this pin change should be enough to use TSC2007. *Need to ensure RTP controller is* {*}reset in a system reboot.{*} * *Change test case EE-4084 to include TP and change labeling (as EE-5713 and EE-5664).* * Didn't expect the EOL notification for Semtech RTP controller, just after gerbering out DV HW. *Should have a better monitoring of the life cycle of main EE components we* *use in our designs.*
Critical Action Required:	No
Critical Information:	No
Currently Implementing:	RTM
DND Enabled?:	No
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, … • Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4

	• Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …
Developer Release Note:	Internal notes: For Customer: <Background> <Resolution>
Development:	
Development Code Analysis Required?:	No
Development Code Fix Required?:	No
Discipline:	Electrical Engineering
Hotfix:	Not Requested
Impacted Products:	Optimus10_FRZ
Instance Shutdown Time:	0 (Midnight)
Issue Age:	1,252
Jaspersoft Role:	USER
LastComment:	All corrective actions were implemented. Author: Juliano Rodrigues Brianeze
Owned By:	Reflexis Support
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2871
Priority (ENC):	9: Unassigned
RFLX Client Ticket Language:	English
ReOpen Reason:	Not working as expected
Reporter (Display Name):	Juliano Rodrigues Brianeze
Reporter's Discipline:	System Test
Reproducibility:	Reproducible
SSO Enabled?:	No
Sales Priority:	Low - 14D
Scrub Result:	Not Set
Secondary Status:	1. Analysis Required
Status Sub-Type:	Please Specify
Support Reported:	NO
Target:	Optimus
Time in Status:	3_*:*_1_*:*_81388262484_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_519861846
[CHART] Time in Status:	3_*:*_1_*:*_81388262484_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_519861846

Description

Lessons learned from issue ~~EE-15286~~, also listed in ~~EE-13329~~.

A readout on the issue ~~EE-15286~~ was given to senior EE management, where we listed some related lessons learned:

https://zebra.sharepoint.com/sites/EMC-PgMgmt/VC80-8/Shared%20Documents/Forms/Table%20of%20Content%20View.aspx?id=%2Fsites%2FEMC%2DPgMgmt%2FVC80%2D8%2FShared%20Documents%2F04%2E%20Electrical%2FTerminal%2FProject%20workflow%20documentation%2FReadout%20TP%20issue%20reboot%20at%20cold&viewid=ba6bd08e%2D7798%2D4920%2D9189%2D38d7cc2e6046

PM organized VC83-10 lessons learned from all disciplines for a review with FMs on Nov 16:

https://zebra.sharepoint.com/:p:/r/sites/EMC-PgMgmt/VC80-8/_layouts/15/Doc.aspx?sourcedoc=%7BB5BEB122-6756-410C-8A19-9DCCBFF8CFF7%7D&file=VC83-10%20lessons%20learned_v0.pptx&wdLOR=cE9597D9B-38DE-4D6F-ADE2-1F05FF8F6161&action=edit&mobileredirect=true

Links

Mention

mentions	[~~EE-13329~~]	EE Lessons Learned Review	Closed
mentions	[~~DE-4~~]	As a research engineer, I would like to be able to collaborate with my research colleagues on the same project on our different machines and share code, environments and dependencies so we don't spend lots of time recreating the environment needed to run	Closed
mentions	[EE-4084]	System Power Management: HW Reset (Coldboot) Over Temperature Verification	Active
mentions	[~~EE-15286~~]	[SD660][A11][Optimus_10]The touch panel is not functioning after soft reset/hard reset when device in -30C chamber for 2hr.	Closed

Comments

Juliano Rodrigues Brianeze added a comment - 2021-Nov-22 3:57 PM

Hello Chenglin Zheng,

We also have this SPRLL from VC83-10. Can you please help us to update EE-4084 accordingly?

Thank you,

Juliano

Juliano Rodrigues Brianeze added a comment - 2022-Mar-29 11:12 AM

Test EE-4084 was updated accordingly:

- Included TP verification.
- Added missing Component labels.

Juliano Rodrigues Brianeze added a comment - 2024-Jun-21 4:48 PM

All corrective actions were implemented.

History

Juliano Rodrigues Brianeze made changes - 2021-Nov-16 3:32 PM

Link	This issue mentions DE-4

Juliano Rodrigues Brianeze made changes - 2021-Nov-16 3:32 PM

Link	This issue mentions EE-13329

Juliano Rodrigues Brianeze made changes - 2021-Nov-16 3:32 PM

Link	This issue mentions EE-15286

Juliano Rodrigues Brianeze made changes - 2021-Nov-16 3:33 PM		
Summary	VC83-10 - TP not working during warm boots at temperatures less than -10C	VC83-10 - TP not working during warm boots at temperatures less than -10C
Juliano Rodrigues Brianeze made changes - 2021-Nov-16 3:35 PM		
Link	This issue mentions DE-4	
Juliano Rodrigues Brianeze made changes - 2021-Nov-16 3:40 PM		
Corrective Action	* Pinout for both Semtech and TI RTP controllers are the same, except for the reset pin in the first, which becomes A1 in the second, for I2C address setting. We thought that addressing this pin change should be enough to use TSC2007. *Need to ensure RTP controller is* {*}reset in a system reboot.{*} * *Change test case EE-4084 to include TP and change labeling.* * Didn't expect the EOL notification for Semtech RTP controller, just after gerbering out DV HW. *Should have a better monitoring of the life cycle of main EE components we* {*}use in our designs.{*}{*}{*}	* Pinout for both Semtech and TI RTP controllers are the same, except for the reset pin in the first, which becomes A1 in the second, for I2C address setting. We thought that addressing this pin change should be enough to use TSC2007. *Need to ensure RTP controller is* {*}reset in a system reboot.{*} * *Change test case EE-4084 to include TP and change labeling.* * Didn't expect the EOL notification for Semtech RTP controller, just after gerbering out DV HW. *Should have a better monitoring of the life cycle of main EE components we* {*}use in our designs.{*}
Juliano Rodrigues Brianeze made changes - 2021-Nov-16 3:40 PM		
Link		This issue mentions DE-4
Juliano Rodrigues Brianeze made changes - 2021-Nov-16 3:40 PM		
Corrective Action	* Pinout for both Semtech and TI RTP controllers are the same, except for the reset pin in the first, which becomes A1 in the second, for I2C address setting. We thought that addressing this pin change should be enough to use TSC2007. *Need to ensure RTP controller is* {*}reset in a system reboot.{*} * *Change test case EE-4084 to include TP and change labeling.* * Didn't expect the EOL notification for Semtech RTP controller, just after gerbering out DV HW. *Should have a better monitoring of the life cycle of main EE components we* {*}use in our designs.{*}	* Pinout for both Semtech and TI RTP controllers are the same, except for the reset pin in the first, which becomes A1 in the second, for I2C address setting. We thought that addressing this pin change should be enough to use TSC2007. *Need to ensure RTP controller is* {*}reset in a system reboot.{*} * *Change test case EE-4084 to include TP and change labeling.* * Didn't expect the EOL notification for Semtech RTP controller, just after gerbering out DV HW. *Should have a better monitoring of the life cycle of main EE components we* *use in our designs.*
Juliano Rodrigues Brianeze made changes - 2021-Nov-16 4:19 PM		
Corrective Action	* Pinout for both Semtech and TI RTP controllers are the same, except for the reset pin in the first, which becomes A1 in the second, for I2C address setting. We thought that addressing this pin change should be enough to use TSC2007. *Need to ensure RTP controller is* {*}reset in a system reboot.{*} * *Change test case EE-4084 to include TP and change labeling.* * Didn't expect the EOL notification for Semtech RTP controller, just after gerbering out DV HW. *Should have a better monitoring of the life cycle of main EE components we* *use in our designs.*	* Pinout for both Semtech and TI RTP controllers are the same, except for the reset pin in the first, which becomes A1 in the second, for I2C address setting. We thought that addressing this pin change should be enough to use TSC2007. *Need to ensure RTP controller is* {*}reset in a system reboot.{*} * *Change test case EE-4084 to include TP and change labeling (as EE-5713 and EE-5664).* * Didn't expect the EOL notification for Semtech RTP controller, just after gerbering out DV HW. *Should have a better monitoring of the life cycle of main EE components we* *use in our designs.*
Polarion System made changes - 2021-Nov-17 11:30 AM		

Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2871
Juliano Rodrigues Brianeze made changes - 2021-Nov-22 3:56 PM		
Assignee		Juliano Rodrigues Brianeze
Juliano Rodrigues Brianeze made changes - 2021-Nov-22 3:57 PM		
Link		This issue mentions EE-4084
Juliano Rodrigues Brianeze made changes - 2021-Nov-22 3:57 PM		
Status	To Do	In Progress
Juliano Rodrigues Brianeze made changes - 2021-Dec-08 5:28 PM		
Impacted Products		Optimus10_FRZ
Target		Optimus
Juliano Rodrigues Brianeze made changes - 2024-Jun-20 2:08 PM		
Discipline		Electrical Engineering
Juliano Rodrigues Brianeze made changes - 2024-Jun-21 4:48 PM		
Resolution		Work Complete
Status	In Progress	Resolved
Juliano Rodrigues Brianeze made changes - 2024-Jun-21 4:49 PM		
Status	Resolved	Closed

[SPRLL-1430] L10 tablet running Android Oreo does not work with Glove mode.

Created: 2021-May-05 10:06 AM - Updated: 2024-Nov-15 2:35 AM - Resolved: 2021-Aug-10 4:42 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Touch Panel
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Low
Reporter:	Darren Kropp	**Assignee:**	Marija Gajic-Mancic
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

% Complete:	0
Approvals:	
Assignee (Display Name):	Marija Gajic-Mancic
BR_ID:	No_BR_ID
Backlog Priority:	2,000
Corrective Action:	None
Critical Action Required:	No
Critical Information:	No
Date of First Response:	2021-05-13 21:42:23.721
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, … • Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4 • Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …
Developer Release Note:	Internal notes: For Customer: <Background> <Resolution>
Development:	
Discipline:	Electrical Engineering
Instance Shutdown Time:	0 (Midnight)
Issue Age:	1,447

Jaspersoft Role:	USER
LastComment:	Hi Marija Gajic-Mancic, One more LL for everyone in the future on this experience. Glove and Stylus are in the same category for PCAP touch panel. For the case of L10 , the difference is the imprint size, particularly for small signal strength. It's ok to be a small imprint on large signal, like finger or finger with latex glove. But for leather or thick cotton glove, imprint size is set for better noise rejection. The additional Lesson learn is that in case there is issue see with glove mode, user should switch to stylus mode seeking better touch experience. cc: Steven Cox, Timothy Zelinski, Darren Kropp Thank you, Tony Author: Tong-Hsiao Chang
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2741
Priority (ENC):	9: Unassigned
Reporter (Display Name):	Darren Kropp
Reporter's Discipline:	System Test
Reproducibility:	Reproducible
Reproduction Steps:	Device Settings > Display > Advanced > Touch panel Mode > Glove and Finger Mode. Try touching the screen with a glove on.
Resolution Date:	2021-05-13 21:42:23.721
Root Cause Details:	Touch Panel
Root Cause Level 2:	Touch Panel
Root Cause Level 3:	Touch Panel
Root Cause Level 4:	Pegatron
SPR Reference #:	~~SPR-41820~~
Scrub Result:	Not Set
Source:	ECRT-Electrical
Status Sub-Type:	Please Specify
Synopsis:	L10 tablet running Android Oreo does not work with Glove mode.
Time in Status:	3_*:*_1_*:*_96944859_*|*_5_*:*_1_*:*_1102300275_*|*_6_*:*_1_*:*_0_*| *_10000_*:*_1_*:*_8307625098
[CHART] Date of First Response:	2021-05-13 21:42:23.721
[CHART] Time in Status:	3_*:*_1_*:*_96944859_*|*_5_*:*_1_*:*_1102300275_*|*_6_*:*_1_*:*_0_*| *_10000_*:*_1_*:*_8307625098

Description

ECRT has identified the following lessons learned:

Choose a more flexible touch controller in terms of tweaking and upgrading firmware for custom gloves

Attachments

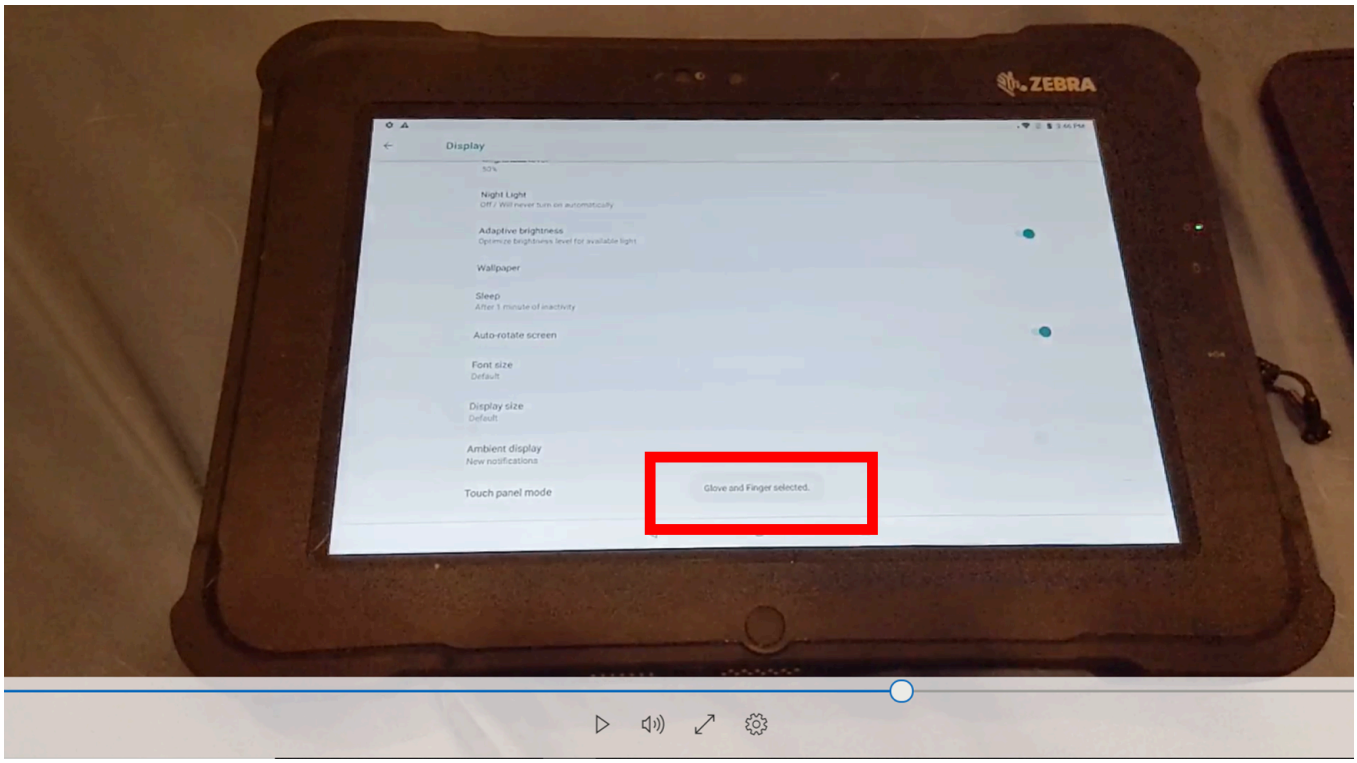
Gloves.PNG (523 kB)

PXL_20210108_212832906.jpg (3.37 MB)

PXL_20210108_212832906.jpg (3.37 MB)

PXL_20210108_212838753.jpg (3.14 MB)

PXL_20210108_212838753.jpg (3.14 MB)



Picture1.png (1.62 MB)

Links

LessonsLearned

is learned from [~~SPR-41820~~] L10 tablet running Android Oreo does not work with Glove mode. Closed

Comments

Timothy Zelinski added a comment - 2021-May-13 10:42 PM

Hi Tony,

Can you look at this real quick and let me know what (if any) process improvement is required?

Thanks,

Tim

Tong-Hsiao Chang added a comment - 2021-Jul-30 12:52 PM

HI Darren Kropp,

Do you have more information on this issue in Oreo? Also, do you know what type of glove was used? L10 TP was tuned and tested with one specific glove. It won't work with super heavy working gloves.

Thank you,

cc: Timothy Zelinski

Tony

Michael Vangi added a comment - 2021-Aug-02 1:31 PM

Hi Tong-Hsiao Chang,

I have attached some pictures of the gloves that seen the issue during testing in the SPR. We don't know specifically what gloves were used for the customer.
If the pictures aren't attached, here is a sharing link:
https://zebra-my.sharepoint.com/:f:/g/personal/mv6961_zebra_com1/EsDwgVmwZidBrrsgI9w1ytUBF3MNZlvJJ01tUwrgwYrTnA?e=Ex767P

Additionally, Steven Cox worked on this SPR and would probably be able to give you more information.

Thanks,

Tong-Hsiao Chang added a comment - 2021-Aug-02 6:01 PM

Hi Michael Vangi & Steven Cox,

Judging from the pictures, the brown gloves looks thick compare to the Wells Lamont leather glove we used. The other key is that the finger under the glove has to be wrap tightly to the glove without airgap, otherwise it won't work. That goes with any touch panel. Lastly, there is a delay when switches between finger and glove. The TP needs to detect and adapt to different mode. That was added to give better water and false touch rejection.

Has anyone tried on L10 Windows to see if it works any different?

cc: Timothy Zelinski

Thank you,

Tony

Tong-Hsiao Chang added a comment - 2021-Aug-05 10:48 PM

HI Michael Vangi & Steven Cox,

I just look at the video inside the SPR, one thing I don't understand was that in the ET51 TP mode selection pop-up page which showed 3 radio button for finger only, finger + stylus, and finger+glove respectively. But in L10, the pop-up showed three icons, which I had never seen before. And this Oreo 8.1 here. Has anyone check to see if TP actually went to the correct mode? Plus in the SPR histor, no one has reported TP FW version number. Actually, if anyone has selected either finger+glove or finger +stylus, the glove would have worked.

Thank you,

cc: Timothy Zelinski

Tony

Michael Vangi added a comment - 2021-Aug-06 8:28 AM

Hi Tong-Hsiao Chang,

I double checked the video, and the user **did** select glove+finger mode and demonstrated it **did not work**.

Thanks,

Tong-Hsiao Chang added a comment - 2021-Aug-06 5:05 PM

Hi Michael Vangi,
'

But the applet or the mode selection pop-up from L10 looked different from the ET5x, is there any reason why? I am so used the one on ET5x and that's how it looks on my L10 devices. Apparently UI showed mode changed, but has anyone confirmed that touch firmware did change mode perhaps via adb command? Also, has anyone tried glove in finger+stylus mode? Glove works in either mode. The other test is to see if after mode change, restart the system (reboot) to see if it makes any difference. Lastly, has anyone checked the TP FW version through setup -> about phone -> SW components?

cc: Timothy Zelinski

Thank you,

Tony

Steven Cox added a comment - 2021-Aug-09 6:35 AM

Tong-Hsiao Chang Tony,

One of the customers in APAC used thick cotton gloves in 'glove mode', which worked poorly in both Android and Windows versions of the L10.

The UI for the L10 is a bit different than the other SD660 platforms, and I think that's part of the problem: the touch controller chosen for the L10 is quite a bit different than what we've chosen for any other Zebra device.

The main purpose of this LL is to ensure that we capture the fact that we need to ensure that our ODM's are choosing a touch controller that affords flexibility in a variety of gloves for capacitive touch screens. That's it.

We shouldn't spend any more time trying to debug the issue in this LL. We know that there are limitations to the EETI controller on the L10's, we just need to ensure that the next versions on tablets afford more flexibility. That's the purpose of this LL.

Tong-Hsiao Chang added a comment - 2021-Aug-09 3:44 PM

Hi Steven Cox,

First, the title of this LL should not be “L10 tablet running Android Oreo does not work with Glove mode”. It gives a wrong annotation and the video in SPR history clearly portraited a false image as “Glove” did not work at all in L10A. That needs to be corrected.

Secondly, when you said “poor” glove sensitivities in thick cotton glove, I don’t know if anyone expects cotton glove to perform better. Glove material does not matter as much, it’s the thickness that counts the most. I wonder has anyone benchmarked L10 performance against ET5x or other competitive products using the same exact glove? Or has any tried to set the mode to “finger+stylus” for comparison? Gloves works in either mode, but finger+stylus is a bit worse with external noise or with water on surface. Compare 10-inch tablet to 5-inch mobile device does not sound like a fair comparison.

Going forward, we should ask PdM and System Engineer to provide a better touch requirement in PRD. Details which should require are levels of water rejection, do we allow false touch or 100% no false touch with water, power supply noise rejection, external interference rejection, is palm heel rejection required (if it supports drawing with stylus and rest heel of palm on screen, there are iPad palm rejection gloves available on the market, does that mean iPad has poor palm heel rejection). Do we need to support glove and how thick? If controller can detect finger hovering 2 millimeter above screen, it would detect anything lower. There is no flexibility there but the maximum thickness or height. Essentially, we need PRD to specify all required features in detail before searching for a controller best suited for the design. I am not defending L10 TP controller but blaming on the controller may not be fair. We don’t know a new controller can solve the issue without creating another one. At the end of day, Projected Capacitive (PCAP) Touch technology has its merit and limitation. It’s all about trade-offs. For example, we can enhance detection or sensitivity but at the cost of poor noise or palm rejection.

cc: Timothy Zelinski

Thank you,

Tony

Steven Cox added a comment - 2021-Aug-09 4:43 PM

Hello Tong-Hsiao Chang,

I agree that the title should have been worded differently: more along the lines of "L10 tablet glove mode performance inconsistent or poor with various gloves"

Both customers and account teams compared the touch mode of the L10 vs. the ET5x, and all came away with the opinion that the ET5x was FAR SUPERIOR to the L10 with a variety of gloves, both cotton AND different leather glove types.

Most of our customers don't standardize around gloves that their employees wear: they just let their users find whatever gloves they can get. Its a shame since there are so many capacitive touch work gloves on the market that make glove mode moot.

I agree that PdM for tablets need to take into account glove mode settings for rugged environments, and then choose appropriately around that. This LL was merely a place-holder/reminder to do that in future products.

Marija Gajic-Mancic added a comment - 2021-Aug-09 5:02 PM

Tong-Hsiao Chang

HI Tony,

I wonder if enforcing few items in the EE Playbook Planning and PT phase for new product development would prevent these kinds of issues in the future?

In EE Playbook Planning we have these 2 Jira Stories:

1. **PRD Review**: This is where engineering should review the PRD with SE and PdM to make sure enough data is provided for TP performance
2. **Concept/System Review**: This is where the TP controller limitations should be identified by engineering, SE and PdM in case cost is key factor. At this point we should know if glove or stylus or water are required and what are the TP controller options (performance vs. cost). SW tuning should also be considered.

In the EE Playbook PT phase we have following item in EE Playbook:

1. **Touch/Display Preliminary Spec (kick off touch/tuning vendors)**: At this phase we should know which modes of operation we need for TP and engage with tuning vendors. They should be getting all the glove samples in case we need to tune for glove or water operation.

Once we produce the prototype we have a Test Suite for Touch Panel -> Capacitive TP in our EE Test Library and we should create a test cycle to validate TP performance and also run User Scenario tests for each mode.

From your perspective is there something we can improve in the EE Playbook, or it's more a problem that we do not have requirements locked down by PdM and SE early on in the development when the TP controller decision is made and during the concept review phase.

Any thoughts on this?

Thanks.

CC Timothy Zelinski, Steven Cox

Tong-Hsiao Chang added a comment - 2021-Aug-09 6:11 PM

HI Marija Gajic-Mancic,

L10A was not a ground up design but a refresh one where we needed an Android version of the Windows L10 in short time frame. And the design concept was to reuse as much as from Windows device, the modules, batteries, display + TP, sub-PCBs etc. To accommodate, we have to use the hybrid approach since the removable and backup batteries were both 7.6V instead of the typical 3.8V. If we had given another 7-9 months we would have started the whole design from scratch, new batteries, new display + touch and everything. The only sample of glove we were asked to test was the one in picture attached. In the end, we had to spend 4 months working with TP supplier to re-tune. The original FW from Windows was not good enough to pass Zebra tests as in EV2, especially with water rejection, ghost touches appeared in conducted susceptibility and external

interferences. Eventually, we asked supplier to split FW into 3 different modes, finger only with water rejection and palm, palm heel rejection and best cs/noise immunity, finger + glove with no water rejection but some CS/noise immunity, finger + stylus with no water rejection and limited cs/noise immunity. Apparently, this product is a special case in which we adopted sub-module design from another product. We were design to meet the same performance as the previous one.

Thank you,

Tony

Marija Gajic-Mancic added a comment - 2021-Aug-10 4:42 PM

Resolving based on comments from Steven and Tony.

CC Tong-Hsiao Chang, Steven Cox

The new product development should not have these issues that were seen in hybrid mode.

Tony did not identify missing test in EE library or step in the development process for NPI programs.

There are provisions in the EE Playbook that will make sure that PRD is reviewed, concept review is done and HW Health Check is done.

The TP is key component and types of gloves and TP modes are addressed in Concept and PT phase.

Marija Gajic-Mancic added a comment - 2021-Aug-10 4:43 PM

Darren Kropp, Michael Vangi

Please review and close this Jira.

Thanks.

CC Tong-Hsiao Chang

Tong-Hsiao Chang added a comment - 2021-Aug-11 3:31 PM

Hi Marija Gajic-Mancic,

One more LL for everyone in the future on this experience. Glove and Stylus are in the same category for PCAP touch panel. For the case of L10 , the difference is the imprint size, particularly for small signal strength. It's ok to be a small imprint on large signal, like finger or finger with latex glove. But for leather or thick cotton glove, imprint size is set for better noise rejection. The additional Lesson learn is that in case there is issue see with glove mode, user should switch to stylus mode seeking better touch experience.

cc: Steven Cox, Timothy Zelinski, Darren Kropp

Thank you,

Tony

History

Michael Verdecanna made changes - 2021-May-05 11:45 AM

Assignee	Michael Verdecanna	Marija Gajic-Mancic

Polarion System made changes - 2021-May-05 7:09 PM

Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2741

Timothy Zelinski made changes - 2021-May-13 10:42 PM

Assignee	Marija Gajic-Mancic	Tong-Hsiao Chang
Tong-Hsiao Chang made changes - 2021-Jul-30 12:51 PM		
Attachment		Gloves.PNG
Michael Vangi made changes - 2021-Aug-02 1:25 PM		
Attachment		PXL_20210108_212838753.jpg
Michael Vangi made changes - 2021-Aug-02 1:25 PM		
Attachment		PXL_20210108_212832906.jpg
Michael Vangi made changes - 2021-Aug-02 1:29 PM		
Attachment		PXL_20210108_212832906.jpg
Attachment		PXL_20210108_212838753.jpg
Michael Vangi made changes - 2021-Aug-06 8:29 AM		
Attachment		Picture1.png
Marija Gajic-Mancic made changes - 2021-Aug-09 1:46 PM		
Assignee	Tong-Hsiao Chang	Marija Gajic-Mancic
Status	To Do	In Progress
Marija Gajic-Mancic made changes - 2021-Aug-10 4:42 PM		
Resolution		Work Complete
Status	In Progress	Resolved
Darren Kropp made changes - 2021-Aug-23 10:54 AM		
Status	Resolved	Closed
Marija Gajic-Mancic made changes - 2022-Jun-12 12:45 PM		
Component/s		Touch Panel
JIRA Administrator made changes - 2024-Jul-17 2:48 PM		
SPR Reference #	41820 [https://spr.zebra.com/ViewSPR.aspx?sprID=+41820]	SPR-41820
Jira System made changes - 2024-Nov-15 2:35 AM		
Link		This issue is learned from SPR-41820

[SPRLL-1401] Gauntlet Lessons Learned

Created: 2021-Mar-22 12:15 PM - Updated: 2023-Dec-15 11:13 AM - Resolved: 2023-Dec-05 2:05 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Touch Panel
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Low
Reporter:	Doug Perry	**Assignee:**	Chung Keung Poon
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

% Complete:	0
Approvals:	
Assignee (Display Name):	Chung Keung Poon
BR_ID:	No_BR_ID
Backlog Priority:	2,000
Corrective Action:	# Improved use case definitions for hot swap # Improved HVP/GPIO checks in playbook to cover this case. HVP/GPIO checks added to health check. # EE/ST touchpanel test updated to add requirement for speed of finger press (only needed for products with mode auto-switching)
Critical Action Required:	No
Critical Information:	No
Date of First Response:	2021-04-21 10:33:54.992
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, … • Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4 • Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …
Developer Release Note:	Internal notes: For Customer: <Background> <Resolution>
Development:	
Discipline:	Electrical Engineering

Instance Shutdown Time:	0 (Midnight)
Issue Age:	1,491
Jaspersoft Role:	USER
LastComment:	Closed per the activity described. Author: Doug Perry
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2712
Priority (ENC):	9: Unassigned
Process Category:	Lessons_Learned
Reporter (Display Name):	Doug Perry
Reporter's Discipline:	System Test
Reproducibility:	Reproducible
Resolution Date:	2021-04-21 10:33:54.992
Root Cause Details:	1. Gauntlet hotswap use cases during design stage did not adequately cover all configurations (specifically different states of terminal when battery is removed e.g. transferring file) 2. Gauntlet GPIO configuration inherited from Arkon. Arkon served as PT for Gauntlet but features and test plan were limited to needs for Google CTS (trigger function not enabled). Transition from Arkon to Gauntlet did not highlight this gap. Testing in Gauntlet EV phase occurred after DV GO because of schedule pull-in. 3. Gauntlet auto-switching function between glove and finger modes created a dependency on speed of finger press, which was not adequately covered as part of test procedure
Scrub Result:	Not Set
Status Sub-Type:	Please Specify
Target:	Gauntlet
Time in Status:	3_*:*_1_*:*_85373344377_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_42228
[CHART] Date of First Response:	2021-04-21 10:33:54.992
[CHART] Time in Status:	3_*:*_1_*:*_85373344377_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_42228

Description

1. Gauntlet hotswap performance did not meet performance rqmts across all use cases
2. Gauntlet GPIO for trigger function not wake-up capable
3. Gauntlet touchpanel double-tap performance issue

Attachments

Gambit PT lessons learned.pptx (76 kB)

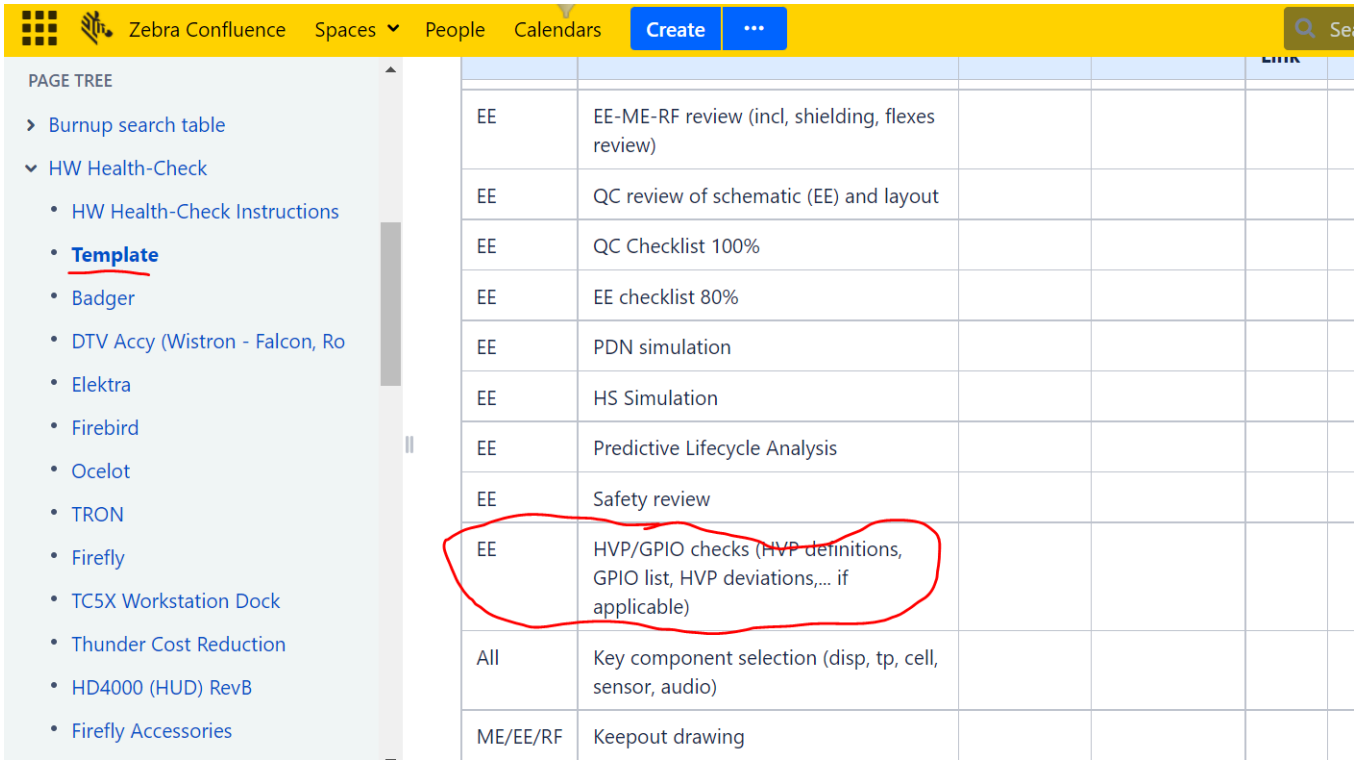
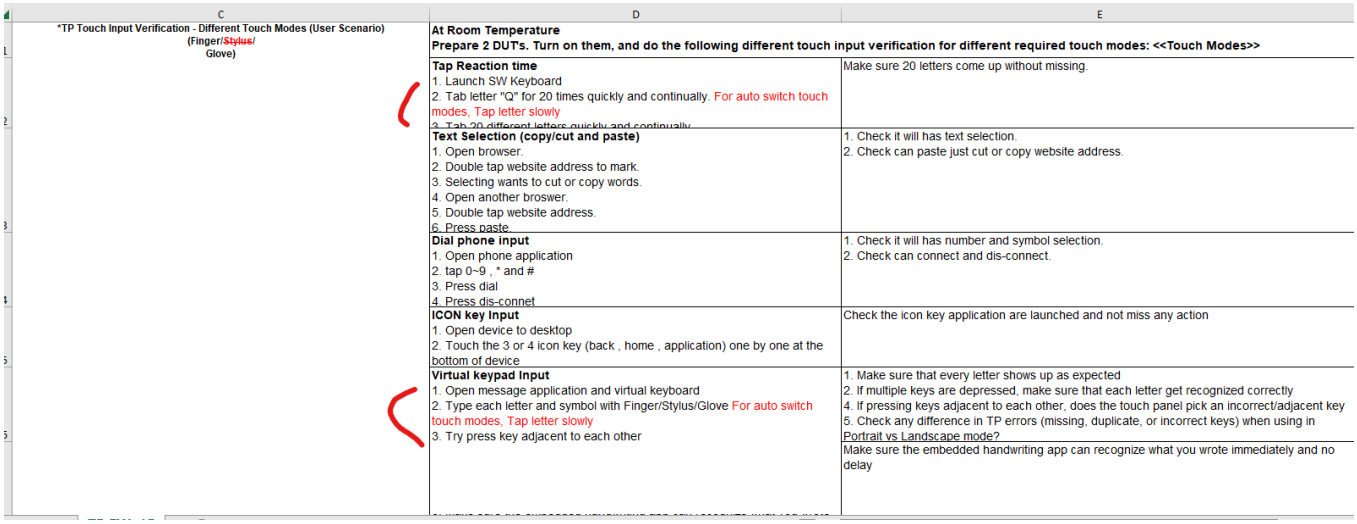


image-2021-11-09-15-35-18-196.png (142 kB)



screenshot-user scenario TP change.png (72 kB)

Links

Mention

mentions	[EE-8492]	TP User Scenario Verification: Touch Input Verification of Different Use Case Scenarios	Active

Comments

Doug Perry added a comment - 2021-Mar-31 1:20 PM

Link to review presentation 3/31 here:

https://zebra.sharepoint.com/:p:/r/sites/Gambit/Shared%20Documents/Zebra%20Only/01.%20Program%20Management/Lessons%20Learned/Gambit%20PT%20lessons%20learned.pptx?d=w82355bebb2334ee88196af9d991b0406&csf=1&web=1&e=z4VSYu

Summarizing the identified lessons learned:

- Improved use case definitions for hot swap. Dimitri (owner), with SE, 4/30
- HVP/GPIO checks in playbook updated to highlight this case. HVP/GPIO checks added to health check. Dimitri 4/30
- EE/ST touchpanel test updated to add requirement for speed of finger press (only needed for products with mode auto-switching). ST complete already. EE Dimitri 4/30.

Marija Gajic-Mancic added a comment - 2021-Apr-21 11:33 AM

Hi Doug Perry

Is there a plan to assign this Jira to Dimitri to work on resolution?

Based on presentation in the link we have due date 4/30 approaching.

Please advise how to expedite resolution.

Thanks.

CC Dimitri Epassa

Doug Perry added a comment - 2021-May-10 9:11 AM

Sorry Marija I didn't realize this was not assigned. We will look to make progress on this as we are also going through PAC-IV and I would like this to be as clean as possible.

Dimitri Epassa added a comment - 2021-May-11 9:04 AM

hi Marija Gajic-Mancic Doug Perry i do not have access to the sharepoint link posted , can you help providing me access ?

Marija Gajic-Mancic added a comment - 2021-Aug-25 3:55 PM

Hi Dimitri Epassa

I attached the presentation in the SP link to the Jira. I will talk to PM to give you access to Gambit SP as well.

Can you please review Jira and attached presentation and provide updates?

Are all the action items outlined in JIra done?

Thanks.

CC Doug Perry

Marija Gajic-Mancic added a comment - 2021-Oct-01 9:55 AM

Hi Marcelo Ortolan

One of the lessons learned on Gauntlet was that the HVP and the GPIO allocation table were not sufficiently reviewed during EV phase phase and HW Health Check.

The ask is to improve HVP/GPIO checks in playbook and also to add this check into the HW Health Check Template.

The "HVP Definition (Ex., GPIO list, HVP deviations, ...if applicable)" item is already added to the EE Playbook Template, but we should consider addition of this item in the HW Health Check Template as well.

Can you please add this item into the HW Health Check Template, or advise who is the owner of the template from EE side so that we can work on this improvement.

Link to HW Health Check Template: https://confluence.zebra.com/display/HTW/Template

CC Doug Perry, Dimitri Epassa

Thanks.

Marija Gajic-Mancic added a comment - 2021-Oct-01 9:55 AM

Hi Marcelo Ortolan

One of the lessons learned on Gauntlet was that the HVP and the GPIO allocation table were not sufficiently reviewed during EV phase phase and HW Health Check.

The ask is to improve HVP/GPIO checks in playbook and also to add this check into the HW Health Check Template.

The "HVP Definition (Ex., GPIO list, HVP deviations, ...if applicable)" item is already added to the EE Playbook Template, but we should consider addition of this item in the HW Health Check Template as well.

Can you please add this item into the HW Health Check Template, or advise who is the owner of the template from EE side so that we can work on this improvement.

Link to HW Health Check Template: https://confluence.zebra.com/display/HTW/Template

CC Doug Perry, Dimitri Epassa

Thanks.

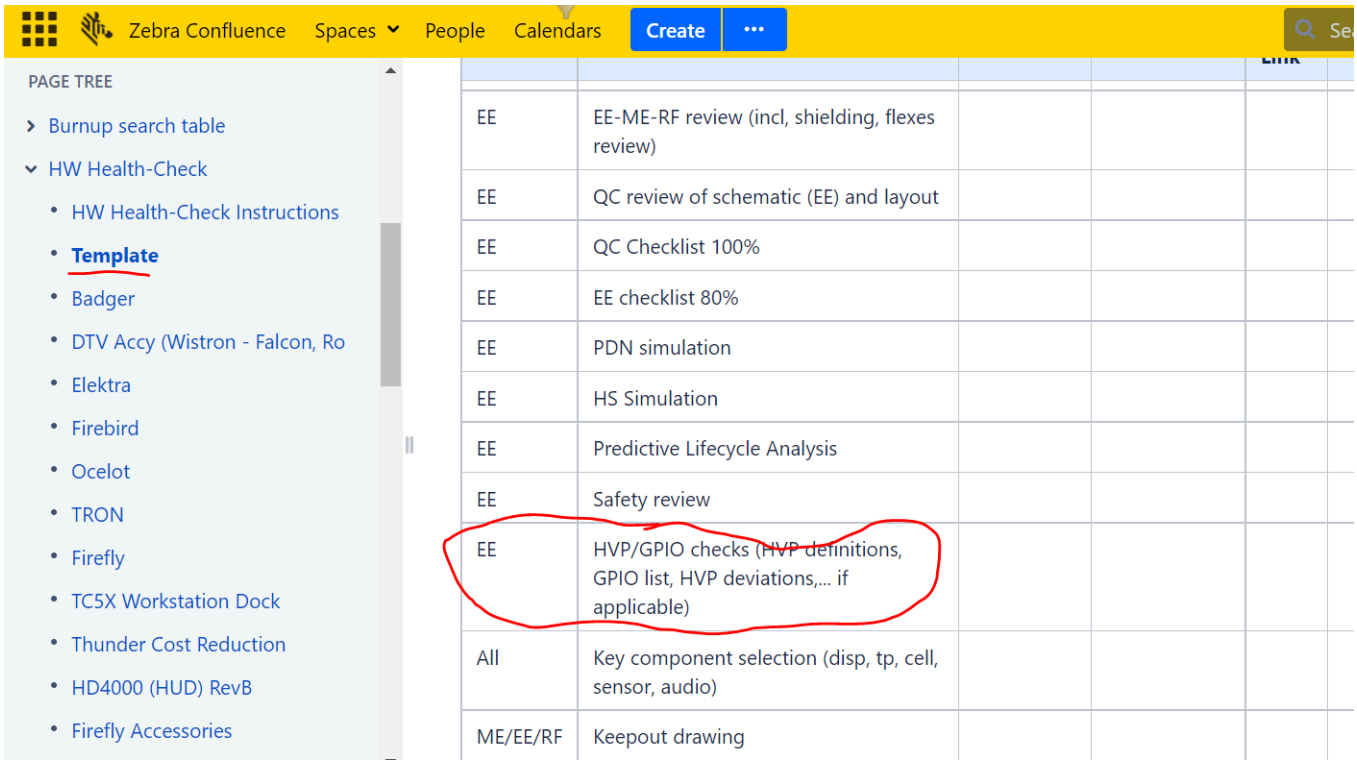
Marija Gajic-Mancic added a comment - 2021-Nov-09 3:35 PM

Doug Perry, Dimitri Epassa

The HW Health-Check Template in Confluence has been updated to add the HVP/GPIO checks as result of this LL.

Link to Health Check Template: https://confluence.zebra.com/display/HTW/Template

See snapshot:



Thanks.

Marija Gajic-Mancic added a comment - 2021-Nov-12 3:52 PM

Doug Perry, Rohan Chopra, Dimitri Epassa, Chenglin Zheng

The touch panel auto-switching (#3) LL below discussed on the call on 11/12.

(#3) Gauntlet auto-switching function between glove and finger modes created a dependency on speed of finger press, which was not adequately covered as part of test procedure

Recommendations are following:

- Need to align on the TP strategy within engineering as a first step and PdM has to agree
- We want to have the same approach on all products. Same expectations by the customers. Customers expect to be able to select TP mode.
- There will be corner cases which will be difficult to meet with single tuning file
- If we need to provide auto-switching for TP going forward we will need to create separate TP test cases for those products. We do not recommend to modify the existing test cases.
- The LL here is that we should have the same approach and user expectation for TP on all Zebra products

Next steps:

- Set up call with EE managers and stake holders to align within engineering on the strategy

Thanks.

CC Kevin Chan,

Marija Gajic-Mancic added a comment - 2022-Jun-03 3:36 PM

Hi Dimitri Epassa

Can you please provide update to this SPRLL? I think most of items are done, the only one that was still open was (3).

Please resolve this one or advise what else needs to be done.

Thanks.

CC Doug Perry

Dimitri Epassa added a comment - 2022-Jun-08 5:09 PM

hi Marija Gajic-Mancic
ok sounds like we need a call on this with manager? can we have it with Rohan Chopra?
i have some idea on this , and will just require some amendments to some items in the Touch Scenario test plan

thanks

Marija Gajic-Mancic added a comment - 2022-Jun-08 7:16 PM

Hi Dimitri Epassa

Sure, please set up call with Rohan Chopra , Chenglin Zheng and me and we can discuss the next steps.

I am including Lin since you are recommending the updates to the Touch Scenario Test Plan.

Thanks.

Chung Keung Poon added a comment - 2023-Jan-03 3:52 PM

Hi Dimitri Epassa ,

Can you please followup and update on this SPRLL?

Thanks.

Ken

Chung Keung Poon added a comment - 2023-Feb-12 6:14 PM

Hi Dimitri Epassa ,

Any update on this SPRLL?

Thanks.
Ken

Chung Keung Poon added a comment - 2023-Mar-12 9:29 PM

Hi Dimitri Epassa ,

I haven't see update from you on this SPRLL since last year. Can you look into it and followup with update?

Thank you.

Ken

Chung Keung Poon added a comment - 2023-Apr-21 3:24 PM

Hi Dimitri Epassa ,

I am not seeing any update on this assigned SPRLL, can you look into it and provide progress update? Thanks.

Ken

Dimitri Epassa added a comment - 2023-Apr-24 9:22 AM

about the user scenario test plan modification for TP attached is what i suggest Rohan Chopra Chenglin Zheng

lets find the latest revision of the spreadsheet and work on it

cc Marija Gajic-Mancic

Chenglin Zheng added a comment - 2023-Apr-26 6:52 PM

I prefer a call to move faster

Chu Pang Alex Ng [X] added a comment - 2023-Aug-02 10:30 AM

Per Quasar Concept review, we need to close this out with proper corrective action items.

James Wise , Chung Keung Poon

Chenglin Zheng added a comment - 2023-Dec-05 1:34 PM

Just talked to Dimitri Epassa, we updated EE-8492 based on this sprll.

Dimitri Epassa added a comment - 2023-Dec-05 2:05 PM

Item #3 resolved:
Since the user scenario test plan is now in SRT, as per Chenglin Zheng previous comments the changes have been made.

Resolving the issue, it can be closed
cc Chung Keung Poon Marija Gajic-Mancic Doug Perry

Chung Keung Poon added a comment - 2023-Dec-08 11:49 AM

Based on Dimitri's confirmation of corresponding update in user scenario test, I'd recommend closing this SPRLL. Thanks.

Doug Perry added a comment - 2023-Dec-15 11:13 AM

Closed per the activity described.

History

Doug Perry made changes - 2021-Mar-22 12:16 PM

Assignee	Dimitri Epassa	Doug Perry
Status	To Do	In Progress

Doug Perry made changes - 2021-Mar-22 4:20 PM

Corrective Action	# Improved use case definitions for hot swap # HVP review and checking needs to be done against a proven platform release. Add this item to the health check. Include hw/sw mapping? # EE/ST touchpanel tests updated to add requirement for speed of finger press (only needed for products with mode auto-switching)	# Improved use case definitions for hot swap # Improved HVP/GPIO checks in playbook to cover this case. HVP/GPIO checks added to health check. # EE/ST touchpanel test updated to add requirement for speed of finger press (only needed for products with mode auto-switching)
Root Cause Details	# Gauntlet hotswap use cases during design stage did not adequately cover all configurations (specifically state of terminal when battery is removed e.g. transferring file) # Gauntlet GPIO configuration inherited from Arkon (Google CTS 'rapid' project) but never tested on Arkon (Arkon considered as PT for Gauntlet). GPIO configuration review fell into	# Gauntlet hotswap use cases during design stage did not adequately cover all configurations (specifically different states of terminal when battery is removed e.g. transferring file) # Gauntlet GPIO configuration inherited from Arkon. Arkon served as PT for Gauntlet but features and test plan were limited to needs for Google CTS (trigger function not enabled).

	grey area between Arkon development and Gauntlet EV and item got missed. Testing in Gauntlet EV phase occurred after DV GO because of schedule pull-in. # Gauntlet auto-switching between glove and finger created a dependency on speed of finger press, not adequately covered as part of test procedure	Transition from Arkon to Gauntlet did not highlight this gap. Testing in Gauntlet EV phase occurred after DV GO because of schedule pull-in. # Gauntlet auto-switching function between glove and finger modes created a dependency on speed of finger press, which was not adequately covered as part of test procedure
Description	1. Gauntlet hotswap performance did not meet performance expectation 2. Gauntlet trigger GPIO not wake-up capable 3. Gauntlet touchpanel double-tap issue	1. Gauntlet hotswap performance did not meet performance rqmts across all use cases 2. Gauntlet GPIO for trigger function not wake-up capable 3. Gauntlet touchpanel double-tap performance issue
Polarion System made changes - 2021-Mar-22 7:09 PM		
Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2712
Doug Perry made changes - 2021-May-10 9:10 AM		
Assignee	Doug Perry	Dimitri Epassa
Marija Gajic-Mancic made changes - 2021-Aug-25 3:52 PM		
Attachment		Gambit PT lessons learned.pptx
Marija Gajic-Mancic made changes - 2021-Nov-09 3:35 PM		
Attachment		image-2021-11-09-15-35-18-196.png
Marija Gajic-Mancic made changes - 2022-Jun-09 1:09 PM		
Component/s		Touch Panel
Dimitri Epassa made changes - 2023-Apr-24 9:22 AM		
Attachment		screenshot-user scenario TP change.png
Chu Pang Alex Ng [X] made changes - 2023-Aug-02 10:31 AM		
Assignee	Dimitri Epassa	Chung Keung Poon
Chenglin Zheng made changes - 2023-Dec-05 1:34 PM		
Link		This issue mentions EE-8492
Dimitri Epassa made changes - 2023-Dec-05 2:05 PM		
Resolution		Work Complete
Status	In Progress	Resolved
Doug Perry made changes - 2023-Dec-15 11:13 AM		
Status	Resolved	Closed

[SPRLL-1172] Screen Protector mode Touch Signature issue

Created: 2020-Jun-01 8:58 AM - Updated: 2024-Nov-15 2:36 AM - Resolved: 2020-Oct-26 9:38 AM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Touch Panel
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Low
Reporter:	Darren Kropp	**Assignee:**	Michael Robustelli
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

Approvals:	
Assignee (Display Name):	Michael Robustelli
BR_ID:	No_BR_ID
Backlog Priority:	2,000
Corrective Action:	The touch panel configuration file had to be optimized to work with the screen protector and zebra stylus.
Critical Action Required:	No
Critical Information:	No
Date of First Response:	2020-07-13 11:46:02.437
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, … • Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4 • Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …
Developer Release Note:	Internal notes: For Customer: <Background> <Resolution>
Development:	
Discipline:	Electrical Engineering
Instance Shutdown Time:	0 (Midnight)
Issue Age:	1,785
Jaspersoft Role:	USER

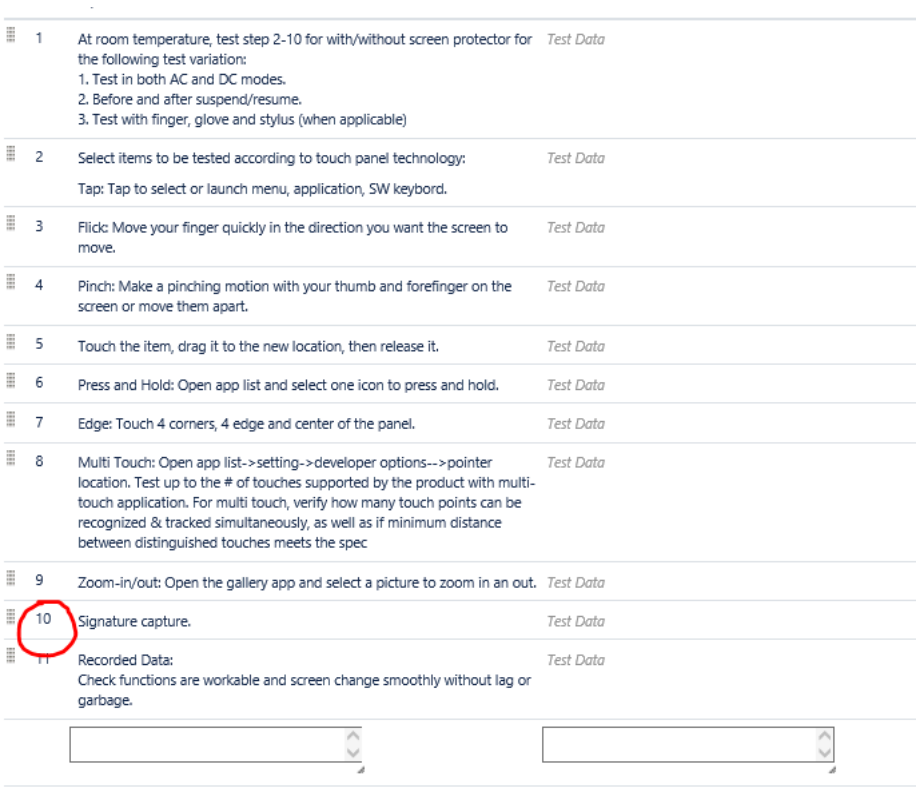
LastComment:	Closing this SPR based on addtional tests added to TP test plan for screen protectors. Author: Darren Kropp
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1152
Priority (ENC):	9: Unassigned
Reporter (Display Name):	Darren Kropp
Reporter's Discipline:	System Test
Reproducibility:	Reproducible
Reproduction Steps:	Screen Protector mode Touch Signature issue TC75x (TC75FK) OS: 01-01-49-00-NN-U19-STD LG 20 does not make any difference Software used for Testing: Hermes APP and Zebra Feature Demo TC75 OS: BSP 02.10.02 LG 13 for comparision shows better results with TS Screen Protector Part Number from Zebra Part Number SG-TC7X-SCRNTMP-01 (single) supplied by Martin Delto. He shipped two samples to Hermes for testing. The screen protector part number from the third party supplier does not matter right now. Contract Number 40135388 – we do have an issue with TC75x devices which are used by Hermes (HES). They always used screen protectors on TC75 and it worked well. Since they use the same screen protectors on TC75x, they run into problems, especially when capturing signatures. We tested already original Zebra Screen Protectors even with a more worse result. Problem has been verified by the customer and the system engineer. You will find all details and screen shots within the attached power point presentation. Hermes Touch Screen Problem.pptx
Resolution Date:	2020-07-13 11:46:02.437
Root Cause Details:	Device / SW Configuration
Root Cause Level 2:	Touch Panel
Root Cause Level 3:	Touch Panel
SPR Reference #:	~~SPR-38617~~
Scrub Result:	Not Set
Status Sub-Type:	Please Specify
Synopsis:	Screen Protector mode Touch Signature issue
Time in Status:	3_*:*_1_*:*_9060795224_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_3642415057
[CHART] Date of First Response:	2020-07-13 11:46:02.437

[CHART] Time in Status:	3_*:*_1_*:*_9060795224_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_3642415057

Description

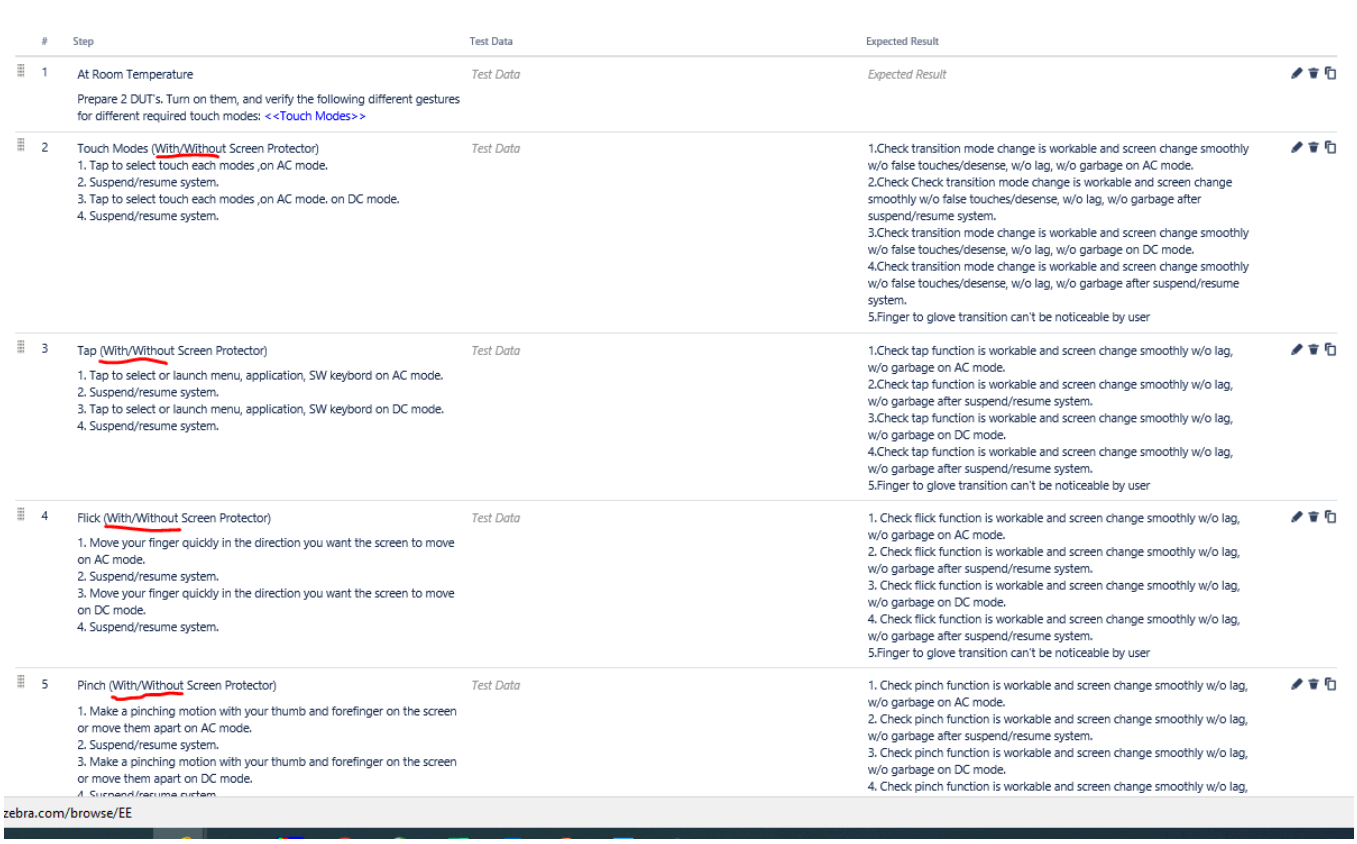
ECRT has identified the following lessons learned:This looks like a test miss. The touch panel doesn't work with the Zebra stylus and screen protector. This should've been tested at the time of release.

Attachments



1	At room temperature, test step 2-10 for with/without screen protector for the following test variation: 1. Test in both AC and DC modes. 2. Before and after suspend/resume. 3. Test with finger, glove and stylus (when applicable)	*Test Data*
2	Select items to be tested according to touch panel technology: Tap: Tap to select or launch menu, application, SW keybord.	*Test Data*
3	Flick: Move your finger quickly in the direction you want the screen to move.	*Test Data*
4	Pinch: Make a pinching motion with your thumb and forefinger on the screen or move them apart.	*Test Data*
5	Touch the item, drag it to the new location, then release it.	*Test Data*
6	Press and Hold: Open app list and select one icon to press and hold.	*Test Data*
7	Edge: Touch 4 corners, 4 edge and center of the panel.	*Test Data*
8	Multi Touch: Open app list->setting->developer options-->pointer location. Test up to the # of touches supported by the product with multi-touch application. For multi touch, verify how many touch points can be recognized & tracked simultaneously, as well as if minimum distance between distinguished touches meets the spec	*Test Data*
9	Zoom-in/out: Open the gallery app and select a picture to zoom in an out.	*Test Data*
10	Signature capture.	*Test Data*
11	Recorded Data: Check functions are workable and screen change smoothly without lag or garbage.	*Test Data*

image-2020-10-26-09-30-42-789.png (44 kB)



#	Step	Test Data	Expected Result
1	At Room Temperature Prepare 2 DUT's. Turn on them, and verify the following different gestures for different required touch modes: <<Touch Modes>>	*Test Data*	*Expected Result*
2	Touch Modes (With/Without Screen Protector) 1. Tap to select touch each modes ,on AC mode. 2. Suspend/resume system. 3. Tap to select touch each modes ,on AC mode. on DC mode. 4. Suspend/resume system.	*Test Data*	1.Check transition mode change is workable and screen change smoothly w/o false touches/desense, w/o lag, w/o garbage on AC mode. 2.Check Check transition mode change is workable and screen change smoothly w/o false touches/desense, w/o lag, w/o garbage after suspend/resume system. 3.Check transition mode change is workable and screen change smoothly w/o false touches/desense, w/o lag, w/o garbage on DC mode. 4.Check transition mode change is workable and screen change smoothly w/o false touches/desense, w/o lag, w/o garbage after suspend/resume system. 5.Finger to glove transition can't be noticeable by user
3	Tap (With/Without Screen Protector) 1. Tap to select or launch menu, application, SW keybord on AC mode. 2. Suspend/resume system. 3. Tap to select or launch menu, application, SW keybord on DC mode. 4. Suspend/resume system.	*Test Data*	1.Check tap function is workable and screen change smoothly w/o lag, w/o garbage on AC mode. 2.Check tap function is workable and screen change smoothly w/o lag, w/o garbage after suspend/resume system. 3.Check tap function is workable and screen change smoothly w/o lag, w/o garbage on DC mode. 4.Check tap function is workable and screen change smoothly w/o lag, w/o garbage after suspend/resume system. 5.Finger to glove transition can't be noticeable by user
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zebra.com/browse/EE

image-2020-10-26-09-36-54-035.png (106 kB)

Links

LessonsLearned

is learned from	[~~SPR-38617~~]	Screen Protector mode Touch Signature issue	Closed

Mention

mentions	[EE-4397]	TP Quick Sensitivity/Accuracy Check with Screen Protector	Draft
mentions	[EE-4223]	TP User Scenario Verification: Different Gestures and Touch Modes (Suspend to Resume)	Active
mentions	[EE-4229]	TP Functional Screening Test With/Without Screen Protector	Active

Comments

Marija Gajic-Mancic added a comment - 2020-Jul-13 12:46 PM

Review issue and assign owner, possibly Juliano to review if there was a test case miss and confirm that SRT covers the test case.

Marija Gajic-Mancic added a comment - 2020-Sep-29 4:05 PM

Hi Juliano Rodrigues Brianeze

Can you please review this EE SPRLL and identify the test cases from EE library that would prevent this issue from happening?

Are we missing test case on TP?

Thanks.

Juliano Rodrigues Brianeze added a comment - 2020-Sep-29 4:37 PM

Hello Marija Gajic-Mancic,

I don't think we're missing test cases for screen protector or stylus in EE Test Library.

We have test EE-4397 for a quick functional verification of screen protector, but we should run EE-4229 and all 19 User Scenario tests with bare finger, stylus and gloves, with and without screen protector, according to product PRD. It's up to EE to ensure all the applicable cases were tested.

Regards,

Juliano

CC: Chenglin Zheng

Marija Gajic-Mancic added a comment - 2020-Oct-06 4:30 PM

Hi Michael Robustelli

I am wondering if you were involved in the development and testing of the TC75x (TC75FK) product line and if you could help with this EE SPRLL?

Can you please review the ~~SPR-38617~~ and advise improvements needed in development process to prevent this type of issues in the future.

We need to review the TP test suite for the CTP User Profile tests and identify if there are gaps in test cases to validate the "signature capture" feature with and without screen protector?

Which test cases are typically used in development of the "signature capture" feature in TC7X products and also new generation (Simba)?

I am working with Juliano to figure out how to make sure tests with screen protector are not missed during development.

Any ideas on this?

If you were not involved in this one can you please who would be the best EE to help with this?

Thanks.

CC Juliano Rodrigues Brianeze, Michael Vangi, Chenglin Zheng

Juliano Rodrigues Brianeze added a comment - 2020-Oct-20 1:04 PM

Hello Chenglin Zheng,

Do you know how signature capture was tested in other programs in NY21? Was it verified by EE? I don't think we have an EE test case for that, right? Please advise about this.

Thank you,

Juliano

Rohan Chopra added a comment - 2020-Oct-20 3:10 PM

Darren Kropp : Was this done with the Zebra stylus? Also is this the tianma display or the one that was released at Rev A?

Did anyone test with Android debug (show pointer location and show touches) to see if the touch is being recognized and maybe the app is the issue here?

CC Michael Robustelli

Marija Gajic-Mancic added a comment - 2020-Oct-20 4:00 PM

Hi Rohan Chopra and Michael Robustelli

I think some of the answers can be found in the ~~SPR-38617~~.

The link is at the top of the Jira.

Looks like Zebra stylus was used.

CC Michael Vangi

Louis Milone added a comment - 2020-Oct-21 9:32 AM

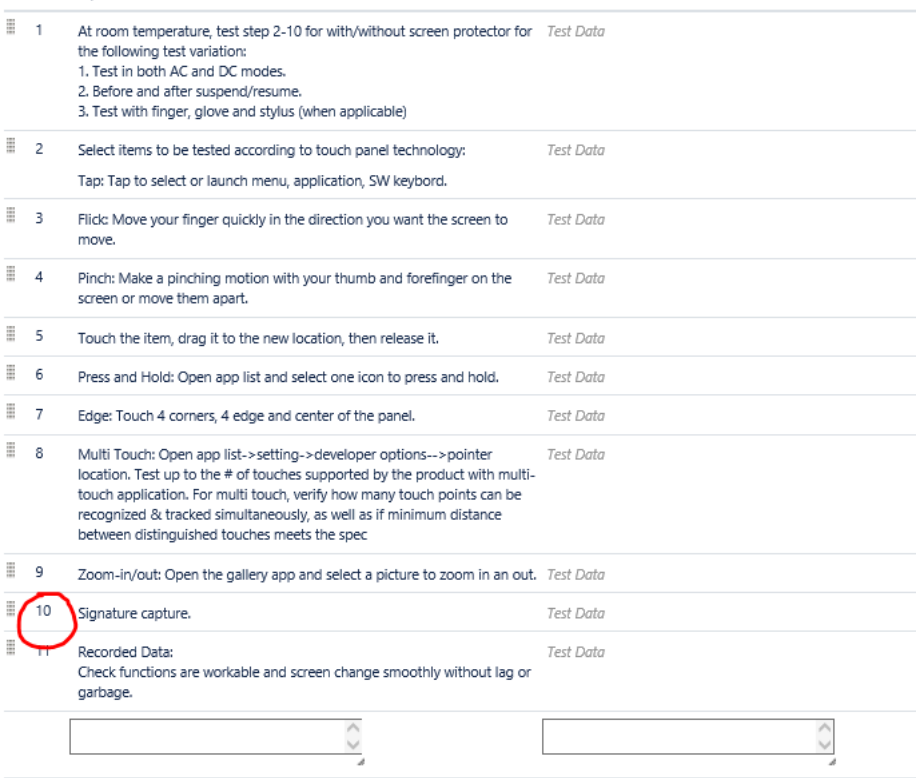
Yes, see SPR, the issue was confirmed by PDA (tuning partner) and the TP was retuned for the use case in the SPR. It was retested with at the time the existing display/TP (Innolux) and the new Display /TP (Tianma).

Marija Gajic-Mancic added a comment - 2020-Oct-26 9:36 AM

The EE Test Library is update to add Screen Protector to the 19 User Scenario test cases.

Signature Capture test is added to the Basic Function Verification With/Without Screen Protector Test EE-4229.

See test item 10



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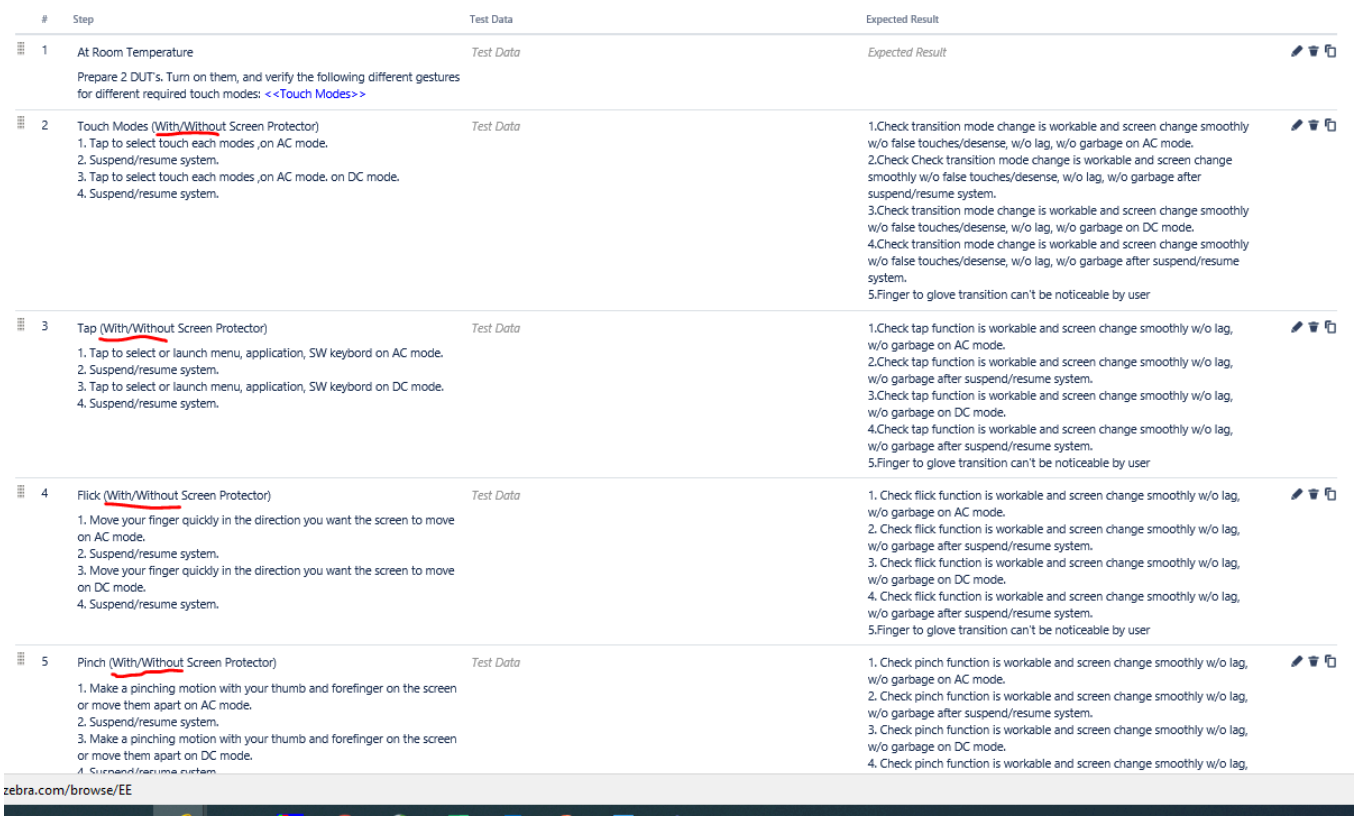
10	Signature capture.	*Test Data*
11	Recorded Data: Check functions are workable and screen change smoothly without lag or garbage.	*Test Data*

Each Test in 19 User Scenario Tests clearly states that test should be performed With/Without Screen Protector:

See example EE-4223....



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CC Chenglin Zheng , Michael Robustelli , Rohan Chopra , Michael Vangi , Juliano Rodrigues Brianeze , Louis Milone

Marija Gajic-Mancic added a comment - 2020-Oct-26 9:38 AM

Screen Protector test added for all the 19 user scenario test cases.

Signature capture is added to EE-4229.

Marija Gajic-Mancic added a comment - 2020-Oct-26 9:40 AM

Hi Darren Kropp and Michael Vangi

Please review the EE Test Library updates done to to fill in the gaps in the Screen Protector and Signature Capture test cases.

Screen protector is added for all the 19 user scenario test cases.

Signature capture is added to EE-4229.

This Jira can now be closed.

Thanks.

Darren Kropp added a comment - 2020-Nov-02 8:46 AM

Closing this SPR based on addtional tests added to TP test plan for screen protectors.

History

Polarion System made changes - 2020-Jun-01 7:05 PM

Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1152
Description	ECRT has identified the following lessons learned: This looks like a test miss. The touch panel doesn't work with the Zebra stylus and screen protector. This should've been tested at the time of release.	ECRT has identified the following lessons learned:This looks like a test miss. The touch panel doesn't work with the Zebra stylus and screen protector. This should've been tested at the time of release.
Michael Verdecanna made changes - 2020-Jun-11 10:51 PM		
Assignee	Michael Verdecanna	Marija Gajic-Mancic
Marija Gajic-Mancic made changes - 2020-Jul-13 12:45 PM		
Status	To Do	In Progress
Marija Gajic-Mancic made changes - 2020-Sep-29 4:05 PM		
Assignee	Marija Gajic-Mancic	Juliano Rodrigues Brianeze
Juliano Rodrigues Brianeze made changes - 2020-Sep-29 4:37 PM		
Link		This issue mentions EE-4397
Juliano Rodrigues Brianeze made changes - 2020-Sep-29 4:37 PM		
Link		This issue mentions EE-4229
Marija Gajic-Mancic made changes - 2020-Sep-30 4:10 PM		
Component/s		Touch Panel
Marija Gajic-Mancic made changes - 2020-Oct-06 4:30 PM		
Assignee	Juliano Rodrigues Brianeze	Michael Robustelli
Marija Gajic-Mancic made changes - 2020-Oct-26 9:30 AM		
Attachment		image-2020-10-26-09-30-42-789.png
Marija Gajic-Mancic made changes - 2020-Oct-26 9:36 AM		
Attachment		image-2020-10-26-09-36-54-035.png
Marija Gajic-Mancic made changes - 2020-Oct-26 9:36 AM		
Link		This issue mentions EE-4223
Marija Gajic-Mancic made changes - 2020-Oct-26 9:38 AM		
Resolution		Work Complete
Status	In Progress	Resolved
Darren Kropp made changes - 2020-Nov-02 8:46 AM		
Status	Resolved	Closed
Polarion System made changes - 2021-Jan-18 7:51 PM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1152	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2377
Polarion System made changes - 2021-Jan-19 1:36 AM		

Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2377	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1152
Polarion System made changes - 2021-Jan-19 7:18 AM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1152	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2377
Polarion System made changes - 2021-Jan-19 2:53 PM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2377	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1152
JIRA Administrator made changes - 2024-Jul-17 2:48 PM		
SPR Reference #	38617 [https://spr.zebra.com/ViewSPR.aspx?sprID=+38617]	SPR-38617
Jira System made changes - 2024-Nov-15 2:36 AM		
Link		This issue is learned from SPR-38617

[SPRLL-1060] TC70- has a display issue and will not respond to touch in most regions of the screen.

Created: 2020-Mar-03 10:00 AM - Updated: 2024-Nov-15 2:37 AM - Resolved: 2020-Sep-29 3:17 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Touch Panel
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Low
Reporter:	Darren Kropp	**Assignee:**	Yi Wei
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

Approvals:	
Assignee (Display Name):	Yi Wei
Backlog Priority:	2,000
Corrective Action:	Per SPR36395, recommendation is to control the DC environment. There is no way to really prevent humidity from affecting the touch panel.
Date of First Response:	2020-05-01 15:00:16.67
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, … • Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4 • Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …
Development:	
Discipline:	Electrical Engineering
Issue Age:	1,875
LastComment:	I am reluctant to close this SPR as there is no way to stop a new product team from using a SITO touch panel. Author: Darren Kropp
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1054
Priority (ENC):	9: Unassigned
Reporter (Display Name):	Darren Kropp
Reporter's Discipline:	System Test

Reproducibility:	Reproducible
Reproduction Steps:	Sample device was sent to NY TC700H-GC11ES-IN SN 18146522502087 Power on device. Touch panel will not respond
Resolution Date:	2020-05-01 15:00:16.67
Root Cause Details:	Touch Panel Environmental conditions
Root Cause Level 2:	Touch Panel
Root Cause Level 3:	Touch Panel
Root Cause Level 4:	Wistron
SPR Reference #:	~~SPR-38390~~
Scrub Result:	Not Set
Synopsis:	TC70- has a display issue and will not respond to touch in most regions of the screen. 12 failures our of 150 units for this customer
Time in Status:	3_*:*_1_*:*_13043848590_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_5115570247
[CHART] Date of First Response:	2020-05-01 15:00:16.67
[CHART] Time in Status:	3_*:*_1_*:*_13043848590_*|*_5_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_5115570247

Description

ECRT has identified the following lessons learned:We should be catious using SITO technology touch panels since the jumpers make it more susceptible to failure from moisture and ESD. DITO touch panels are more robust.

Attachments

Re: Help with SPRLL-1060

WY Wei, Yi
To Gajic-Mancic, Marija
You replied to this message on 9/29/2020 11:40 AM.

Marija,

We have already migrated to DITO long time ago.
This is old issue, didn't exist anymore.

Yi Wei, PhD
Fellow, Engineering
Enterprise Mobile Computing
ZEBRA TECHNOLOGIES CORPORATION

1 Zebra Plaza
Holtsville, NY 11742
O: +1 (631) 738-3064; M: +1 (480) 277-6697
Yi.Wei@zebra.com

Outlook, Android 5G

Response from Yi Wei.PNG (18 kB)

Links

LessonsLearned

is learned from	[~~SPR-38390~~]	TC70- has a display issue and will not respond to touch in most regions of the screen. 12 failures our of 150 units for this customer	Closed

Comments

Marija Gajic-Mancic added a comment - 2020-May-01 4:00 PM

HI Yi Wei

Can you please review this lesson learned that was identified on Pollux touch panel by ECRT and advise improvements needed in the process of TP selection, development and integration in Zebra products.

Details of the issue are outlined in ~~SPR-38390~~.

Any recommendations how to prevent these type of issues in the future?

Thanks.

Marija Gajic-Mancic added a comment - 2020-Sep-29 10:36 AM

Hi Yi Wei

Can you please review this Jira and provide your comment on what can be done going forward to prevent this type of display issue.

Thanks.

Marija Gajic-Mancic added a comment - 2020-Sep-29 2:17 PM

Comment from Yi Wei on 9/29/2020

Marija,

We have already migrated to DITO long time ago.

This is old issue, didn't exist anymore.

Yi Wei, PhD

Fellow, Engineering

Enterprise Mobile Computing

ZEBRA TECHNOLOGIES CORPORATION

Marija Gajic-Mancic added a comment - 2020-Sep-29 3:15 PM

Marija Gajic-Mancic added a comment - 2020-Sep-29 3:17 PM

Resolved based on feedback from Yi Wei.

Zebra migrated to DITO technology long time ago

Darren Kropp added a comment - 2020-Nov-02 8:44 AM

I am reluctant to close this SPR as there is no way to stop a new product team from using a SITO touch panel.

History

Polarion System made changes - 2020-Mar-03 7:04 PM		
Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1054
Description	ECRT has identified the following lessons learned: We should be catious using SITO technology touch panels since the jumpers make it more susceptible to failure from moisture and ESD. DITO touch panels are more robust.	ECRT has identified the following lessons learned:We should be catious using SITO technology touch panels since the jumpers make it more susceptible to failure from moisture and ESD. DITO touch panels are more robust.
Michael Verdecanna made changes - 2020-Mar-27 7:49 AM		
Assignee	Michael Verdecanna	Marija Gajic-Mancic
Marija Gajic-Mancic made changes - 2020-May-01 4:00 PM		
Status	To Do	In Progress
Marija Gajic-Mancic made changes - 2020-May-01 4:02 PM		
Assignee	Marija Gajic-Mancic	Yi Wei
Marija Gajic-Mancic made changes - 2020-Sep-29 3:17 PM		
Resolution		Work Complete
Status	In Progress	Resolved
Marija Gajic-Mancic made changes - 2020-Oct-05 4:34 PM		
Attachment		Response from Yi Wei.PNG
Darren Kropp made changes - 2020-Nov-02 8:44 AM		
Status	Resolved	Closed
Polarion System made changes - 2021-Jan-18 7:23 PM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1054	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1691
Polarion System made changes - 2021-Jan-19 1:35 AM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1691	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1054
Polarion System made changes - 2021-Jan-19 7:31 AM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1054	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1691
Polarion System made changes - 2021-Jan-19 2:52 PM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1691	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1054
Marija Gajic-Mancic made changes - 2022-Jun-12 12:58 PM		
Component/s		Touch Panel
JIRA Administrator made changes - 2024-Jul-17 2:51 PM		
SPR Reference #	38390 [https://spr.zebra.com/ViewSPR.aspx?sprID=+38390]	SPR-38390

Jira System made changes - 2024-Nov-15 2:37 AM	
Link	This issue is learned from SPR-38390

[SPRLL-1006] Add Display Backlight Flex & Circuitry Isolation to EE Design Checklist

Created: 2019-Dec-03 3:59 PM - Updated: 2024-Dec-03 3:29 PM - Resolved: 2019-Dec-14 12:41 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Display
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Medium
Reporter:	Timothy Zelinski	**Assignee:**	Marija Gajic-Mancic
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

Approvals:	
Assignee (Display Name):	Marija Gajic-Mancic
Date of First Response:	2019-12-14 11:41:18.85
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, … • Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4 • Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …
Development:	
Discipline:	Electrical Engineering
Impacted Products:	Ocelot_WAN_Pd, Ocelot_WAN_Slt
Issue Age:	1,966
LastComment:	Duplicate Author: Timothy Zelinski
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1000
Priority (ENC):	9: Unassigned
Process Category:	Lessons_Learned
Reporter (Display Name):	Timothy Zelinski
Reporter's Discipline:	System Test
Reproducibility:	Reproducible
Resolution Date:	2019-12-14 11:41:18.85

Scrub Result:	Not Set
Target:	Common
Time in Status:	3_*:*_1_*:*_206823_*|*_5_*:*_1_*:*_174350587_*|*_6_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_938314267
[CHART] Date of First Response:	2019-12-14 11:41:18.85
[CHART] Time in Status:	3_*:*_1_*:*_206823_*|*_5_*:*_1_*:*_174350587_*|*_6_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_938314267

Description

Per attached email, please add an EE design checklist item for checking to make sure Display backlights utilizing PWMs have the flex and any other components isolated from audio traces and transducers.

Please speak to Tong-Hsiao Chang for clarification.

Links

Duplicate

is duplicated by	[~~SPRLL-976~~]	L10A - Acoustic coupling from external LCD BL driver with PWM dimming control in the audible frequency range	Closed

Relates

relates to	[EE-20713]	SMPS Acoustic Coupling	Active

Comments

Marija Gajic-Mancic added a comment - 2019-Dec-14 12:41 PM

Hi Timothy Zelinski

The EE Checklist have been updated to add provision for audio coupling in cease eternal display backlight controller with PWM is used.

Tony already opened the ~~SPRLL-976~~ that duplicates this SPRLL.

I will close this duplicate.

Please check the EE checklist EE_Design_Checklist_Master_2019_12_13 .xlsm in Electrical Engineering SharePoint.

Thanks.

CC Tong-Hsiao Chang

Marija Gajic-Mancic added a comment - 2019-Dec-14 12:41 PM

Duplicated by ~~SPRLL-976~~.

Marija Gajic-Mancic added a comment - 2019-Dec-14 12:42 PM

Timothy Zelinski

Please close this issue. Duplicated by ~~SPRLL-976~~.

Timothy Zelinski added a comment - 2019-Dec-16 1:07 PM

Duplicate

History

Polarion System made changes - 2019-Dec-04 1:03 AM

Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1000
Description	Per attached email, please add an EE design checklist item for checking to make sure Display backlights utilizing PWMs have the flex and any other components isolated from audio traces and transducers. Please speak to Tong-Hsiao Chang for clarification.	Per attached email, please add an EE design checklist item for checking to make sure Display backlights utilizing PWMs have the flex and any other components isolated from audio traces and transducers. Please speak to Tong-Hsiao Chang for clarification.
Marija Gajic-Mancic made changes - 2019-Dec-14 12:37 PM		
Link		This issue is duplicated by SPRLL-976
Marija Gajic-Mancic made changes - 2019-Dec-14 12:38 PM		
Status	To Do	In Progress
Marija Gajic-Mancic made changes - 2019-Dec-14 12:41 PM		
Resolution		Work Complete
Status	In Progress	Resolved
Timothy Zelinski made changes - 2019-Dec-16 1:07 PM		
Status	Resolved	Closed
Polarion System made changes - 2021-Jan-18 7:35 PM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1000	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1908
Polarion System made changes - 2021-Jan-19 1:21 AM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1908	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1000
Polarion System made changes - 2021-Jan-19 7:21 AM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1000	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1908
Polarion System made changes - 2021-Jan-19 1:35 PM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1908	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1000
Polarion System made changes - 2021-Feb-15 7:15 AM		
Description	Per attached email, please add an EE design checklist item for checking to make sure Display backlights utilizing PWMs have the flex and any other components isolated from audio traces and transducers. Please speak to Tong-Hsiao Chang for clarification.	Per attached email, please add an EE design checklist item for checking to make sure Display backlights utilizing PWMs have the flex and any other components isolated from audio traces and transducers. Please speak to Tong-Hsiao Chang for clarification.
Marija Gajic-Mancic made changes - 2022-Jun-12 1:18 PM		
Component/s		Display

Michael Robustelli made changes - 2024-Dec-03 3:29 PM	
Link	This issue relates to EE-20713

[SPRLL-976] L10A - Acoustic coupling from external LCD BL driver with PWM dimming control in the audible frequency range

Created: 2019-Sep-23 5:17 PM - Updated: 2024-Dec-03 3:29 PM - Resolved: 2019-Dec-13 4:19 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Display
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Medium
Reporter:	Tong-Hsiao Chang	**Assignee:**	Marija Gajic-Mancic
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

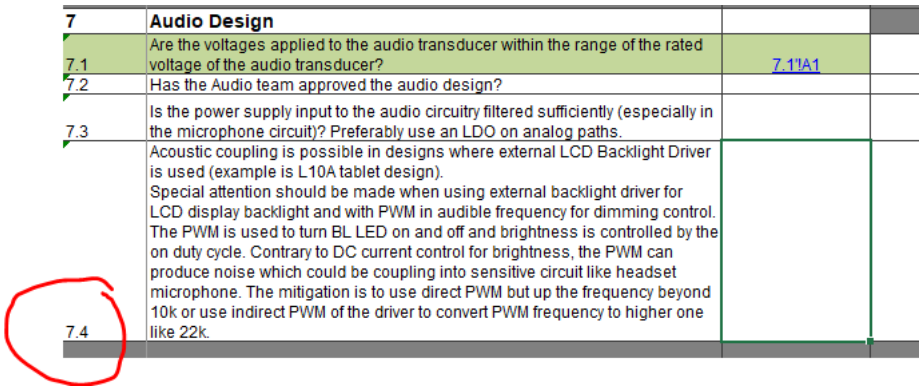
Approvals:	
Assignee (Display Name):	Marija Gajic-Mancic
Date of First Response:	2019-11-01 15:04:55.87
Details:	Please include the following information: • Customer and country/region • Source of request: Pre-sales account team, Customer support, Sales engineer, … • Product model(s): MP7001, DS8178-DL/CR8178-P, … • OS version and architecture: 32/64bit Windows XP/7/10, Ubuntu 14.01, CentOS7, 4690 0HN0, … • Connectivity (cable): 5V/12VUSB, RS232 single/dual, … • Zebra SDK/Corescanner versions: 32/64bit SDK 3.4.2/CS 3.4.4 • Driver: Zebra OPOS, Zebra JPOS, IBM OPOS, NCR OPOS, … • POS hardware: Beetle, SurePOS, ECRS, … • POS application: LOC, ACE, ACS, …
Development:	
Discipline:	Electrical Engineering
Issue Age:	2,037
LastComment:	Hi Tong-Hsiao Chang Can you please clos this SPRLL? The EE checklist has been updated with item to check audio coupling caused by LCD BL driver. Thanks. Author: Marija Gajic-Mancic
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-970
Priority (ENC):	9: Unassigned
Process Category:	Lessons_Learned

Reporter (Display Name):	Tong-Hsiao Chang
Reporter's Discipline:	System Test
Reproducibility:	Reproducible
Resolution Date:	2019-11-01 15:04:55.87
Scrub Result:	Not Set
Time in Status:	3_*:*_1_*:*_3633859597_*|*_5_*:*_1_*:*_2055197190_*|*_6_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_3364664660
[CHART] Date of First Response:	2019-11-01 15:04:55.87
[CHART] Time in Status:	3_*:*_1_*:*_3633859597_*|*_5_*:*_1_*:*_2055197190_*|*_6_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_3364664660

Description

We learned from L10A that special attention should be made when using external backlight driver for LCD display backlight and with PWM in audible frequency for dimming control. The PWM is used to turn BL LED on and off and brightness is controlled by the on duty cycle. contrary to DC current control for brightness, the PWM can produce noise which could be coupling into sensitive circuit like headset microphone. The mitigation is to use direct PWM but up the frequency beyond 10k or use indirect PWM of the driver to convert PWM frequency to higher one like 22k. Suggest to add this one to EE check list.

Attachments



7	**Audio Design**	
7.1	Are the voltages applied to the audio transducer within the range of the rated voltage of the audio transducer?	7.1!A1
7.2	Has the Audio team approved the audio design?	
7.3	Is the power supply input to the audio circuitry filtered sufficiently (especially in the microphone circuit)? Preferably use an LDO on analog paths.	
7.4	Acoustic coupling is possible in designs where external LCD Backlight Driver is used (example is L10A tablet design). Special attention should be made when using external backlight driver for LCD display backlight and with PWM in audible frequency for dimming control. The PWM is used to turn BL LED on and off and brightness is controlled by the on duty cycle. Contrary to DC current control for brightness, the PWM can produce noise which could be coupling into sensitive circuit like headset microphone. The mitigation is to use direct PWM but up the frequency beyond 10k or use indirect PWM of the driver to convert PWM frequency to higher one like 22k.	

image-2019-12-13-16-17-08-212.png (30 kB)

Links

Duplicate

duplicates	[~~SPRLL-1006~~]	Add Display Backlight Flex & Circuitry Isolation to EE Design Checklist	Closed

Relates

relates to	[EE-20713]	SMPS Acoustic Coupling	Active

Comments

Marija Gajic-Mancic added a comment - 2019-Nov-01 4:04 PM

Tong-Hsiao Chang

Hi Tony,

Was there an SPR for this issue or this wan noticed during development and testing?

Can you please outline how was this issue found and resolved on L10A?

I think you are right that there are no provisions on EE checklist to check for this type of issue and it sounds like a good idea to add to EE schematic checklist under Audio Design section. This is mostly affecting tablets and vehicle mount designs right?

Last time we did EE Checklist updates was in December 2018 and at that time it was not clear who the owner or EE checklist is.

I believe Marcelo did updates last time.

I will reach out to Marcelo and try to find out the owner and add this item

Thanks.

Marija Gajic-Mancic added a comment - 2019-Nov-01 4:07 PM

Hi Marcelo Ortolan

Can you please advise who is EE Checklist owner at this time?

We have few proposals through SPRLLs to update the EE check lists and last time this was done was last December.

At that time owner of the EE checklist was not clearly defined.

Do you know who can help with this task?

Thanks,

Marija

CC Tong-Hsiao Chang

Marija Gajic-Mancic added a comment - 2019-Dec-13 4:18 PM

Hi Tong-Hsiao Chang

The EE Checklists have been updated to add the item that would check the audio coupling in case design utilizes the external LCD BL driver.

The latest revision of the EE checklist is - EE_Design_Checklist_Master_2019_12_13 .xlsm

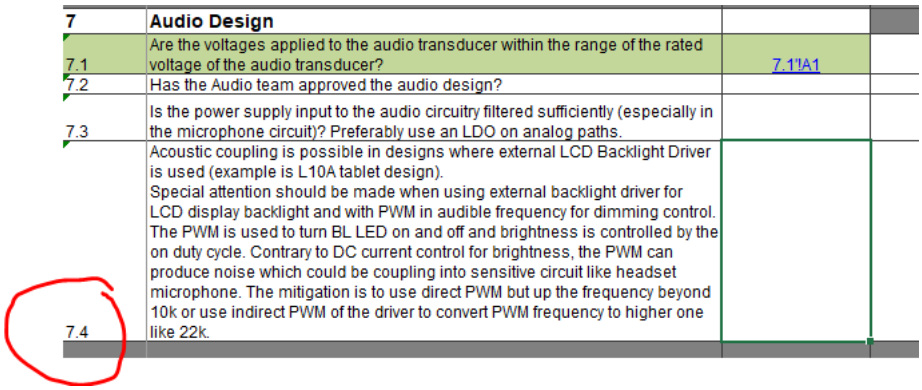
It's uploaded into Electrical Engineering SharePoint site.

Please see the link:

https://zebra.sharepoint.com/sites/emc-eng/EE/Shared%20Documents/Forms/AllItems.aspx?FolderCTID=0x01&id=%2Fsites%2Femc%2Deng%2FEE%2FShared%20Documents%2FEMC%20EE%20Product%20Development%20Process%2FEE%20Design%20Checklist%2FLatest%20Released%20Version&viewid=c81d930d%2D7ccd%2D4e1e%2D8cbc%2D16556f0d4247

The Schematics checklist item 7.4 have been added. See also the Title & Revision change log update.

The update is under the Audio Design Section.



7	Audio Design	
7.1	Are the voltages applied to the audio transducer within the range of the rated voltage of the audio transducer?	7.1'A1
7.2	Has the Audio team approved the audio design?	
7.3	Is the power supply input to the audio circuitry filtered sufficiently (especially in the microphone circuit)? Preferably use an LDO on analog paths.	
7.4	Acoustic coupling is possible in designs where external LCD Backlight Driver is used (example is L10A tablet design). Special attention should be made when using external backlight driver for LCD display backlight and with PWM in audible frequency for dimming control. The PWM is used to turn BL LED on and off and brightness is controlled by the on duty cycle. Contrary to DC current control for brightness, the PWM can produce noise which could be coupling into sensitive circuit like headset microphone. The mitigation is to use direct PWM but up the frequency beyond 10k or use indirect PWM of the driver to convert PWM frequency to higher one like 22k.	

With checklist update I will resolve this Jira.

Thanks.

CC Marcelo Ortolan, Doug Perry

Marija Gajic-Mancic added a comment - 2019-Dec-13 4:19 PM

EE Checklist update to add provision in Schematic tab for acoustic noise coupling with external LCD BL driver.

Jira System added a comment - 2019-Dec-22 9:16 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2019-Dec-29 9:17 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2020-Jan-06 9:16 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Marija Gajic-Mancic added a comment - 2020-Jan-06 11:06 AM

Hi Tong-Hsiao Chang

Can you please clos this SPRLL?

The EE checklist has been updated with item to check audio coupling caused by LCD BL driver.

Thanks.

History

Polarion System made changes - 2019-Sep-24 1:03 AM

Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-970
Description	We learned from L10A that special attention should be made when using external backlight driver for LCD display backlight and with PWM in audible frequency for dimming control. The PWM is used to turn BL LED on and off and brightness is controlled by the on duty cycle.	We learned from L10A that special attention should be made when using external backlight driver for LCD display backlight and with PWM in audible frequency for dimming control. The PWM is used to turn BL LED on and off and brightness is controlled by the on duty cycle.

	contrary to DC current control for brightness, the PWM can produce noise which could be coupling into sensitive circuit like headset microphone. The mitigation is to use direct PWM but up the frequency beyond 10k or use indirect PWM of the driver to convert PWM frequency to higher one like 22k. Suggest to add this one to EE check list.	contrary to DC current control for brightness, the PWM can produce noise which could be coupling into sensitive circuit like headset microphone. The mitigation is to use direct PWM but up the frequency beyond 10k or use indirect PWM of the driver to convert PWM frequency to higher one like 22k. Suggest to add this one to EE check list.
Marija Gajic-Mancic made changes - 2019-Nov-01 3:55 PM		
Assignee		Marija Gajic-Mancic
Status	To Do	In Progress
Marija Gajic-Mancic made changes - 2019-Dec-13 4:17 PM		
Attachment		image-2019-12-13-16-17-08-212.png
Marija Gajic-Mancic made changes - 2019-Dec-13 4:19 PM		
Resolution		Work Complete
Status	In Progress	Resolved
Marija Gajic-Mancic made changes - 2019-Dec-14 12:37 PM		
Link		This issue duplicates SPRLL-1006
Tong-Hsiao Chang made changes - 2020-Jan-06 11:13 AM		
Status	Resolved	Closed
Polarion System made changes - 2021-Jan-18 7:16 PM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-970	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1385
Polarion System made changes - 2021-Jan-19 1:33 AM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1385	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-970
Polarion System made changes - 2021-Jan-19 7:32 AM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-970	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1385
Polarion System made changes - 2021-Jan-19 2:42 PM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-1385	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-970
Marija Gajic-Mancic made changes - 2022-Jun-12 1:02 PM		
Component/s		Display
Michael Robustelli made changes - 2024-Dec-03 3:29 PM		
Link		This issue relates to EE-20713

[SPRLL-440] The MC18 failed engineering level ESD testing in the qual lab (NY) during the Tianma qualification. This SPR is being opened to investigate the ESD failure and understand why it passes at USI but fails at Zebra.

Created: 2018-Jan-30 1:46 PM - Updated: 2024-Nov-15 2:41 AM - Resolved: 2018-Mar-06 2:02 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Display
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Medium
Reporter:	Darren Kropp	**Assignee:**	Darren Kropp
Resolution:	Work Complete	**Votes:**	0
Labels:	None		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

Approvals:	
Assignee (Display Name):	Darren Kropp
Corrective Action:	Board layout changed to add 2 TVS components on the LCD_RESET line at both ends. This was done at the same time as the MC18 cost reduction effort to line up with the board spin.
Date of First Response:	2018-03-06 09:14:37.537
Development:	
Discipline:	Electrical Engineering
Issue Age:	2,638
LastComment:	• by **JNX867** on Fri Jun 15 09:39:11 CDT 2018 The EE hardware checklist covers Reset Lines to be decoupled by capacitors. Author: Polarion System
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-274
Priority (ENC):	9: Unassigned
Reporter (Display Name):	Darren Kropp
Reproducibility:	Reproducible
Reproduction Steps:	Perform ESD testing as per qual test plan
Request Type:	Feature
Resolution Date:	2018-03-06 09:14:37.537
Root Cause Details:	ESD Issue
Root Cause Level 2:	CPU Board
Root Cause Level 3:	Display
Root Cause Level 4:	USI
SPR Reference #:	~~SPR-29647~~

Scrub Result:	Not Set
Synopsis:	The MC18 failed engineering level ESD testing in the qual lab (NY) during the Tianma qualification. This SPR is being opened to investigate the ESD failure and understand why it passes at USI but fails at Zebra.
Time in Status:	3_*:*_1_*:*_17893_*|*_5_*:*_1_*:*_8710578540_*|*_6_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_3024941070
[CHART] Date of First Response:	2018-03-06 09:14:37.537
[CHART] Time in Status:	3_*:*_1_*:*_17893_*|*_5_*:*_1_*:*_8710578540_*|*_6_*:*_1_*:*_0_*|*_10000_*:*_1_*:*_3024941070

Description

ECRT has identified the following lessons learned:The display reset line should have ESD protection or at least provisions for protection even if it passes engineering testing. In this case, ESD passed at USI but failed in the NY qual lab. The design was marginal.

Links

LessonsLearned

is learned from	[~~SPR-29647~~]	The MC18 failed engineering level ESD testing in the qual lab (NY) during the Tianma qualification. This SPR is being opened to investigate the ESD failure and understand why it passes at USI but fails at Zebra.	Closed

Comments

Michael Verdecanna added a comment - 2018-Mar-06 10:14 AM

Hi Marcelo,
Can you review this item to determine if either it is covered in our checklist and was missed or it is not covered in our checklist?
Thanks,
Mike

Marcelo Ortolan added a comment - 2018-Mar-06 2:02 PM

Item 15.7 in current checklist covers all reset lines.

Need to ensure checklist is followed.

Marcelo Ortolan added a comment - 2018-Mar-06 2:02 PM

Currently covered in checklist.

Celestino Alem added a comment - 2018-Mar-08 4:42 PM

Marcelo,
Does this mean it was missed on MC18, or was the checklist item added after MC18 released? How can we ensure the design checklist is followed? Do we (Zebra) scrub the design checklist or is this something the JDM does?

Marcelo Ortolan added a comment - 2018-Mar-08 5:00 PM

Yes, it was a miss.

We were not enforcing the design checklist before EV in prior programs. Our checklist is huge and it takes tremendous effort to complete all items. We would typically finish (or close to finish) by DV. At that point if we have no failures in our test it could be decided that a change is not required for a particular item.

This case is likely what happened. From my understanding the issue did not happened with original display. It only showed when validating new display. so by Rev A thee was no need to have any protection.

Either way since Beast we have been enforcing the checklist prior to EV GO. Our hope is to minimize design failures from first board release.

Jira System added a comment - 2018-Mar-16 9:16 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-Mar-24 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-Apr-01 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-Apr-09 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-Apr-17 9:16 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-Apr-25 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-May-03 9:16 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-May-11 9:16 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

David Stern [X] added a comment - 2018-May-14 10:26 PM

Darren Kropp
Darren,
Can this Jira be closed. Item already existed in the design checklist, but was missed. Now that we have a new HW Execution Model which requires 80% of the design checklist to be complete prior to EV GO, this item should be covered in the early phases of the program.

Jira System added a comment - 2018-May-22 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-May-30 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-Jun-07 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-Jun-15 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Darren Kropp added a comment - 2018-Jun-15 10:39 AM

The EE hardware checklist covers Reset Lines to be decoupled by capacitors.

Polarion System added a comment - 2021-Feb-15 7:14 AM

- by **JNX867** on Fri Jun 15 09:39:11 CDT 2018
  The EE hardware checklist covers Reset Lines to be decoupled by capacitors.

History

Christopher Fabrizio made changes - 2018-Jan-30 1:48 PM		
Assignee		Michael Verdecanna
Christopher Fabrizio made changes - 2018-Jan-30 4:07 PM		
Reporter	Christopher Fabrizio	Darren Kropp
Michael Verdecanna made changes - 2018-Mar-06 10:13 AM		
Assignee	Michael Verdecanna	Marcelo Ortolan
Marcelo Ortolan made changes - 2018-Mar-06 2:02 PM		
Status	To Do	In Progress
Marcelo Ortolan made changes - 2018-Mar-06 2:02 PM		
Resolution		Work Complete
Status	In Progress	Resolved
Marcelo Ortolan made changes - 2018-Apr-25 9:22 AM		
Assignee	Marcelo Ortolan	Darren Kropp
Darren Kropp made changes - 2018-Jun-15 10:39 AM		
Status	Resolved	Closed
Polarion System made changes - 2018-Aug-01 3:20 PM		
Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-274
Description	ECRT has identified the following lessons learned: The display reset line should have ESD protection or at least provisions for protection even if it passes engineering testing. In this case, ESD passed at USI but failed in the NY qual lab. The design was marginal.	ECRT has identified the following lessons learned:The display reset line should have ESD protection or at least provisions for protection even if it passes engineering testing. In this case, ESD passed at USI but failed in the NY qual lab. The design was marginal.
Jagadeesh Babu Putta made changes - 2019-May-24 5:59 AM		
Workflow	Tools Workflow	EEDR Workflow
Polarion System made changes - 2021-Jan-18 7:53 PM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-274	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2325
Polarion System made changes - 2021-Jan-19 1:28 AM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2325	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-274
Polarion System made changes - 2021-Jan-19 7:22 AM		

Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-274	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2325
Polarion System made changes - 2021-Jan-19 2:24 PM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2325	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-274
Marija Gajic-Mancic made changes - 2022-Jun-12 1:05 PM		
Component/s		Display
JIRA Administrator made changes - 2024-Jul-17 2:49 PM		
SPR Reference #	29647 [https://spr.zebra.com/ViewSPR.aspx?sprID=+29647]	SPR-29647
Jira System made changes - 2024-Nov-15 2:41 AM		
Link		This issue is learned from SPR-29647

[SPRLL-44] MC18 (1.48.28) - display frame sync issue on devices with Rev A hardware (manuf dates: Sept 20, 2014 to Jan 20, 2015)

Created: 2016-Dec-07 2:51 PM - Updated: 2024-Nov-15 2:43 AM - Resolved: 2018-Feb-26 3:35 PM

Status:	Closed
Project:	SPR Lessons Learned
Component/s:	Display
Affects Version/s:	None
Fix Version/s:	None
Security Level:	Zebra Engineering Only

Type:	Process	**Priority:**	Medium
Reporter:	Darren Kropp	**Assignee:**	Darren Kropp
Resolution:	Work Complete	**Votes:**	0
Labels:	EELL		
Original Estimate:	Not Specified		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		

Approvals:	
Assignee (Display Name):	Darren Kropp
Corrective Action:	New OS... Rev A1
Date of First Response:	2018-02-26 13:33:14.893
Development:	
Discipline:	Electrical Engineering
Issue Age:	3,057
LastComment:	• by **JNX867** on Mon Mar 12 12:00:57 CDT 2018 Is there a display burn in test case for Electrical Eng test plan? How many devices and how long? Temp? Author: Polarion System
Polarion URL:	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-515
Priority (ENC):	9: Unassigned
Reporter (Display Name):	Darren Kropp
Reproducibility:	Reproducible
Reproduction Steps:	See attached CARREFOUR Flickering display versions and pictures 20150619 GV file. Carrefour Belgium using units manufactured OCT 2014. We can send to you two units for now (S14285523020453 and S14285523020377). Let me know shipping address. Carrefour Belgium - around 20 units with display flickering (mainly bottom part of display, sometimes cold boot fix the issue) in the store (from about 180 units). Also two customers asked me if they can go for shopping trip with such device. OEM 1.48.28, units manufactured in October 2014. Note: about other customers - Revision is sending to me 1 units related to this issue from Abu Dhabi. Revision receives complaints about Display flickering from other customers.

	Migros switzerland is complaining about this also. Using OEM 1.28.48, devices manufactured in December 2014. Fujitsu Germany, see attached file - Fujitsu Flickering display.zip. Units manufactured in April 2015!!!! They do not changed OEM (operation System) so using 1.48.28. The screen is in the delivery usually ok, but deteriorated after a few days! They have ordered 27 MC 18 G-00. Until today are 3 failed. At the same time we have found, that the brightness of the screen is very different. MC18G-00-10 S15098523020666 9027252761 Delivery ID The screen flickers MC18G-00-10 S15098523020643 9027252761 Delivery ID The screen flickers MC18G-00-10 S15098523020493 9027252761 Delivery ID The screen flickers
Resolution Date:	2018-02-26 13:33:14.893
Root Cause Details:	OS Drivers Display driver
Root Cause Level 2:	Display
Root Cause Level 3:	Display
Root Cause Level 4:	USI
SPR Reference #:	~~SPR-27928~~
Scrub Result:	Not Set
Synopsis:	MC18 (1.48.28) - display frame sync issue on devices with Rev A hardware (manuf dates: Sept 20, 2014 to Jan 20, 2015)
Time in Status:	3_*:*_1_*:*_3388140_*|*_5_*:*_1_*:*_9396070867_*|*_6_*:*_1_*:*_0_*| *_10000_*:*_1_*:*_38533660450
[CHART] Date of First Response:	2018-02-26 13:33:14.893
[CHART] Time in Status:	3_*:*_1_*:*_3388140_*|*_5_*:*_1_*:*_9396070867_*|*_6_*:*_1_*:*_0_*| *_10000_*:*_1_*:*_38533660450

Description

ECRT has identified the following lessons learned:Implement burn-in display test for all products that go revA. Recommended 10 units for 1 month at a minimum. This should be part of the EE test plan.

Links

LessonsLearned

is learned from	[~~SPR-27928~~]	MC18 (1.48.28) - display frame sync issue on devices with Rev A hardware (manuf dates: Sept 20, 2014 to Jan 20, 2015)	Closed

Mention

is mentioned by	[EE-4395]	Display Thermal Stress Test with Screen Saver	Active

Comments

Timothy Zelinski added a comment - 2018-Feb-26 2:33 PM

Hi Yi Wei. I am trying to figure out what to do with this issue as a lessons learned. How do we prevent something like this from getting released?

Yi Wei added a comment - 2018-Feb-26 2:43 PM

Tim,

1. We will not source displays from a supplier who doesn't have TFT front end capability, or the display supplier buys bi-plane from others to package it, since when the supplier doesn't make its own TFT glass, they don't know the TFT performance and won't know if the control IC can drive it. In this case Sharp bought the TFT from Hydis (Rev A) and then from BOE (Rev B).

2. Even for vertically integrated suppliers, we have them characterize the TFT characteristics thoroughly, to make sure IC can drive.

Timothy Zelinski added a comment - 2018-Feb-26 3:15 PM

Thanks Yi Wei. So moving forward, this type of issue ideally will not happen again. But if it does, our suppliers will catch it it with the latest test procedures we have in place for them, correct?

Yi Wei added a comment - 2018-Feb-26 3:29 PM

Correct Tim. MC18 display has been moved away from Sharp to Tianma since 2016.

Jira System added a comment - 2018-Mar-06 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Timothy Zelinski added a comment - 2018-Mar-08 6:39 PM

Darren Kropp, can you please close this?

Darren Kropp added a comment - 2018-Mar-12 1:00 PM

Is there a display burn in test case for Electrical Eng test plan? How many devices and how long? Temp?

Timothy Zelinski added a comment - 2018-Mar-13 8:44 AM

Darren Kropp, display burn in is part of the EE test plan, but it is only run for a week. I believe the issue encountered in this SPR took over a month and multiple samples to reproduce.

Yi Wei, should we impose a 1 month burn-in test with the vendor to screen for this issue? I think running it during EE test is too late during development to find this type of issue. The other ask is should the display vendor run their burn-in with SW representative of our typical OS, or does it not matter? Please advise.

Yi Wei added a comment - 2018-Mar-13 8:52 AM

This is terminal level test, vendor won't do it. In MC18 case, USI and us did the test. But caution needs to be taken, screen saver needed as we don't want to induce image burned in.

Timothy Zelinski added a comment - 2018-Mar-13 8:57 AM

Thanks Yi Wei. I think there is a bigger issue we need to address. I think the lesson learned here is we need to identify products that will disable screen savers so you can select the appropriate display. Will discuss with you further as this might limit the displays we can use.

Timothy Zelinski added a comment - 2018-Mar-14 2:41 PM

Spoke to Yi Wei today. He confirmed that the newer technologies are susceptible to burn-in. That is why Zebra has generated a white paper for customers wanting to keep their displays always on.

What Yi recommends is for engineering to add a test to make sure there is no flicker issue over the course of one month (30 units). Chenglin Zheng will add a test for EE to test 30 units (in the EV phase) with a screensaver app running at -20C and 50C.

Jira System added a comment - 2018-Mar-22 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Chenglin Zheng added a comment - 2018-Mar-27 10:44 AM

Hi Tiim,

During the meeting, we were discussing how many units and how long it should really take. I left meeting early for another meeting. Please give the update of this, then we can add it to library.

Jira System added a comment - 2018-Apr-04 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Chenglin Zheng added a comment - 2018-Apr-09 3:56 PM

This new test item is added to EE master test plan which is uploaded at https://zebra.sharepoint.com/sites/emc-eng/EE/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2Fsites%2Femc-eng%2FEE%2FShared%20Documents%2FEMC%20EE%20Product%20Development%20Process%2FTest%20Plan%20Template%2FLatest%20EE%20Test%20Plan%2FRev%209&FolderCTID=0x012000DB541F1AF8716B41B8ADF7F96E28F86D&View=%7BC81D930D-7CCD-4E1E-8CBC-16556F0D4247%7D#InplviewHashc81d930d-7ccd-4e1e-8cbc-16556f0d4247=

Lin

Timothy Zelinski added a comment - 2018-Apr-10 2:12 PM

Details of the new plan that Lin is adding:

For new displays:

1. During the earliest development phase possible (PT/EV), run 10 units at the hottest specified temperature for 1 month continuously with a screen saver.
2. After item 1 is complete, place the units at room temp and have them continually run until the end of the program.
3. During the MV phase, re-run item 1 with 5 units at hot and 5 units at cold.

Jira System added a comment - 2018-Apr-18 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-Apr-26 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-May-04 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-May-12 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

David Stern [X] added a comment - 2018-May-14 10:22 PM

Darren Kropp
Darren,
Can this Jira be closed? Specific items have been added to the test plan to ensure this issue does not occur again.

Jira System added a comment - 2018-May-22 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-May-30 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-Jun-07 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Jira System added a comment - 2018-Jun-15 9:15 AM

This record has not been updated in 7 days. Please verify and close this record. Thank you!

Darren Kropp added a comment - 2018-Jun-15 10:36 AM

Closed based on development team addition of test in their test plan for this problem.

Polarion System added a comment - 2021-Feb-15 7:13 AM

- by **JNX867** on Mon Mar 12 12:00:57 CDT 2018
  Is there a display burn in test case for Electrical Eng test plan? How many devices and how long? Temp?

History

Christopher Fabrizio made changes - 2016-Dec-07 2:52 PM

Reproduction Steps	See attached CARREFOUR Flickering display versions and pictures 20150619 GV file. Carrefour Belgium using units manufactured OCT 2014. We can send to you two units for now (S14285523020453 and S14285523020377). Let me know shipping address. Carrefour Belgium • around 20 units with display flickering (mainly bottom part of display, sometimes cold boot fix the issue) in the store (from about 180 units). Also two customers asked me if they can go for shopping trip with such device. OEM 1.48.28, units manufactured in October 2014. Note: about other customers - Revision is sending to me 1 units related to this issue from Abu Dhabi. Revision receives complaints about Display flickering from other customers. Migros switzerland is complaining about this also. Using OEM 1.28.48, devices manufactured in December 2014. Fujitsu Germany, see attached file - Fujitsu Flickering display.zip. Units manufactured in April 2015!!!! They do not changed OEM (operation System) so using 1.48.28. The screen is in the delivery usually ok, but deteriorated after a few days! They have ordered 27 MC 18 G-00. Until today are 3 failed. At the same time we have found, that the brightness of the screen is very different. MC18G-00-10 S15098523020666 9027252761 Delivery ID The screen flickers MC18G-00-10 S15098523020643 9027252761 Delivery ID The screen flickers MC18G-00-10 S15098523020493 9027252761 Delivery ID The screen flickers	See attached CARREFOUR Flickering display versions and pictures 20150619 GV file. Carrefour Belgium using units manufactured OCT 2014. We can send to you two units for now (S14285523020453 and S14285523020377). Let me know shipping address. Carrefour Belgium - around 20 units with display flickering (mainly bottom part of display, sometimes cold boot fix the issue) in the store (from about 180 units). Also two customers asked me if they can go for shopping trip with such device. OEM 1.48.28, units manufactured in October 2014. Note: about other customers - Revision is sending to me 1 units related to this issue from Abu Dhabi. Revision receives complaints about Display flickering from other customers. Migros switzerland is complaining about this also. Using OEM 1.28.48, devices manufactured in December 2014. Fujitsu Germany, see attached file - Fujitsu Flickering display.zip. Units manufactured in April 2015!!!! They do not changed OEM (operation System) so using 1.48.28. The screen is in the delivery usually ok, but deteriorated after a few days! They have ordered 27 MC 18 G-00. Until today are 3 failed. At the same time we have found, that the brightness of the screen is very different. MC18G-00-10 S15098523020666 9027252761 Delivery ID The screen flickers MC18G-00-10 S15098523020643 9027252761 Delivery ID The screen flickers MC18G-00-10 S15098523020493 9027252761 Delivery ID The screen flickers

Michael Verdecanna made changes - 2017-Apr-03 1:21 PM

Discipline		Electrical Engineering

Michael Verdecanna made changes - 2017-May-10 9:46 AM

Labels		EELL

Christopher Fabrizio made changes - 2017-Aug-22 4:48 PM

Reporter	Christopher Fabrizio	Darren Kropp

Timothy Zelinski made changes - 2018-Feb-26 2:33 PM

Assignee	Michael Verdecanna	Yi Wei
Timothy Zelinski made changes - 2018-Feb-26 2:38 PM		
Assignee	Yi Wei	Timothy Zelinski
Status	To Do	In Progress
Timothy Zelinski made changes - 2018-Feb-26 3:35 PM		
Resolution		Work Complete
Status	In Progress	Resolved
Michael Verdecanna made changes - 2018-Mar-06 11:02 AM		
Root Cause Level 4		USI
Timothy Zelinski made changes - 2018-Apr-26 11:20 AM		
Assignee	Timothy Zelinski	Darren Kropp
Darren Kropp made changes - 2018-Jun-15 10:36 AM		
Status	Resolved	Closed
Polarion System made changes - 2018-Aug-01 3:16 PM		
Polarion URL		https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-515
Description	ECRT has identified the following lessons learned: Implement burn-in display test for all products that go revA. Recommended 10 units for 1 month at a minimum. This should be part of the EE test plan.	ECRT has identified the following lessons learned:Implement burn-in display test for all products that go revA. Recommended 10 units for 1 month at a minimum. This should be part of the EE test plan.
Jagadeesh Babu Putta made changes - 2019-May-24 5:59 AM		
Workflow	Tools Workflow	EEDR Workflow
Fred Tsai made changes - 2019-Dec-05 11:39 PM		
Link		This issue is mentioned by EE-4395
Polarion System made changes - 2021-Jan-18 7:31 PM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-515	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2589
Polarion System made changes - 2021-Jan-19 1:13 AM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2589	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-515
Polarion System made changes - 2021-Jan-19 7:23 AM		
Polarion URL	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-515	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2589
Polarion System made changes - 2021-Jan-19 1:23 PM		
Polarion URL	https://emcpolarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-2589	https://polarion.zebra.com/polarion/#/project/lessons_learned/workitem?id=LL-515
Marija Gajic-Mancic made changes - 2022-Jun-12 1:10 PM		

Component/s		Display
JIRA Administrator made changes - 2024-Jul-17 2:50 PM		
SPR Reference #	27928 [https://spr.zebra.com/ViewSPR.aspx?sprID=+27928]	SPR-27928
Jira System made changes - 2024-Nov-15 2:43 AM		
Link		This issue is learned from SPR-27928