

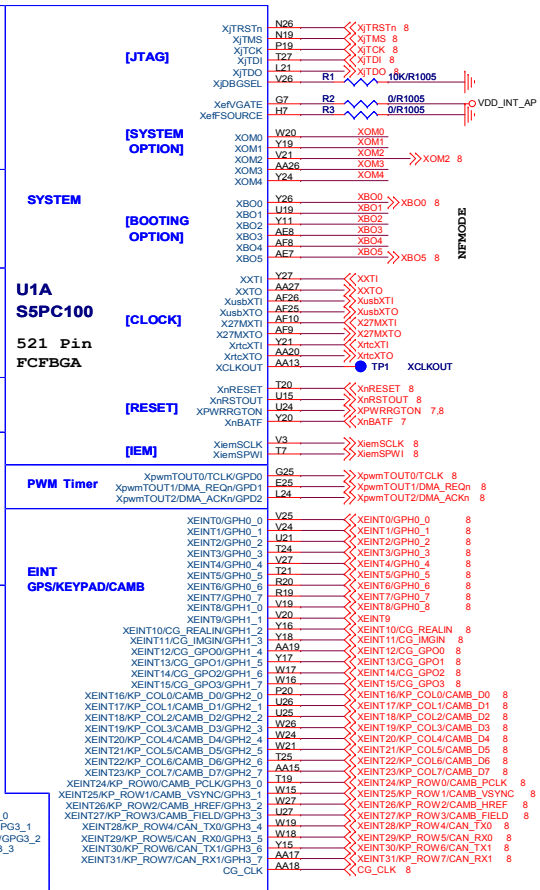
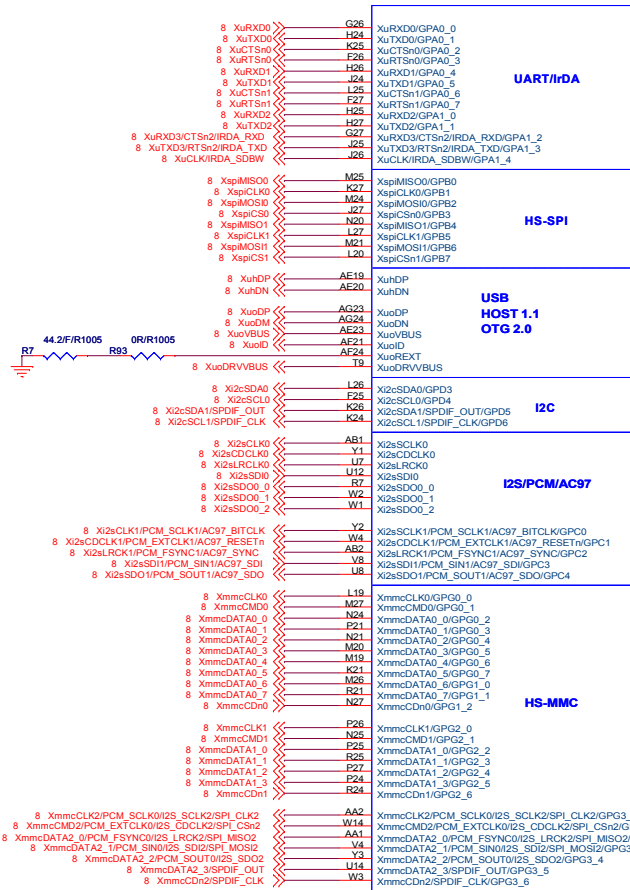
Appendix 5.

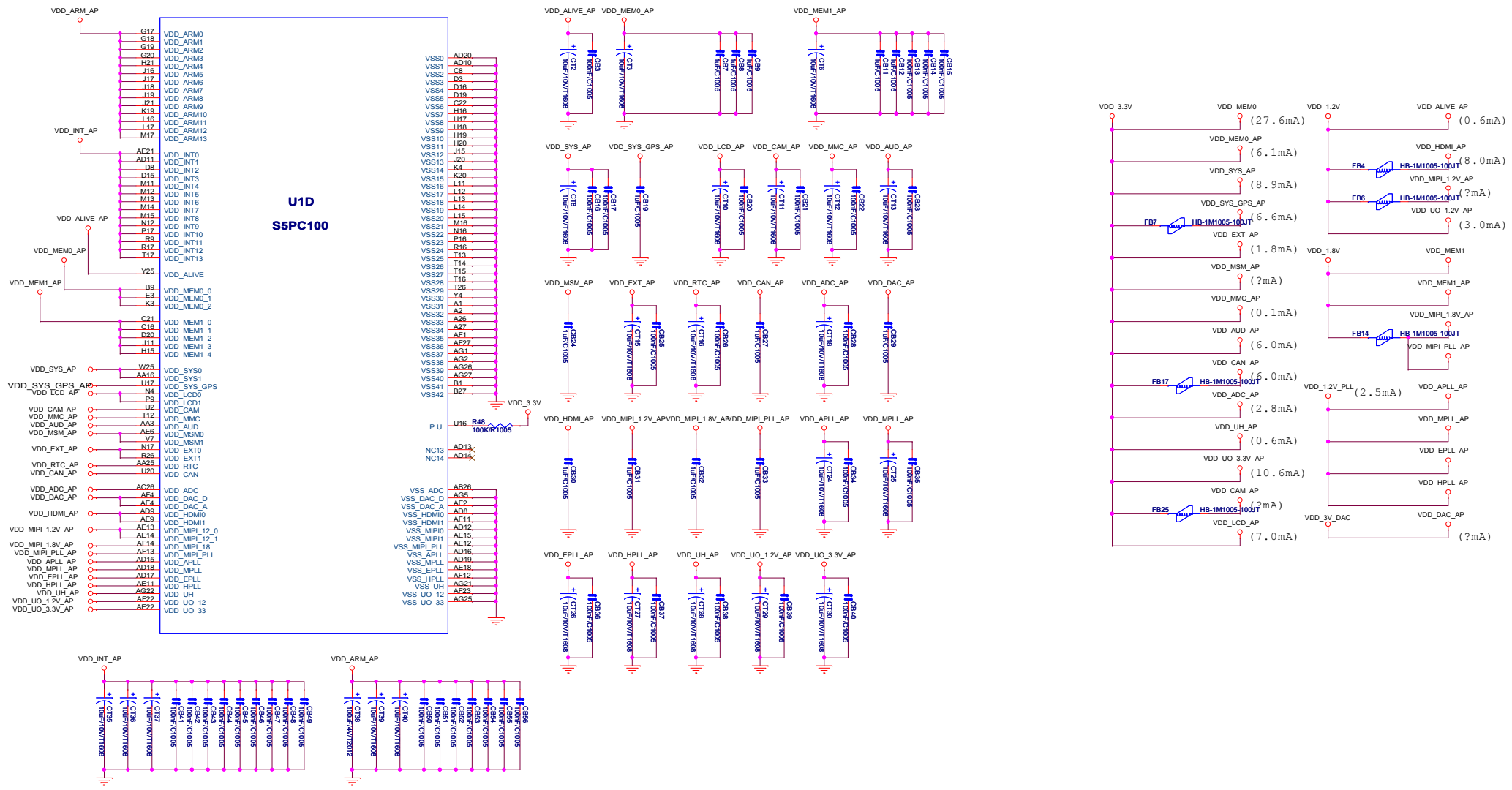
Schematics

Circuit 설명

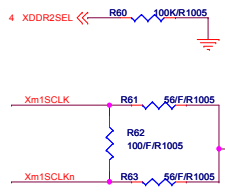
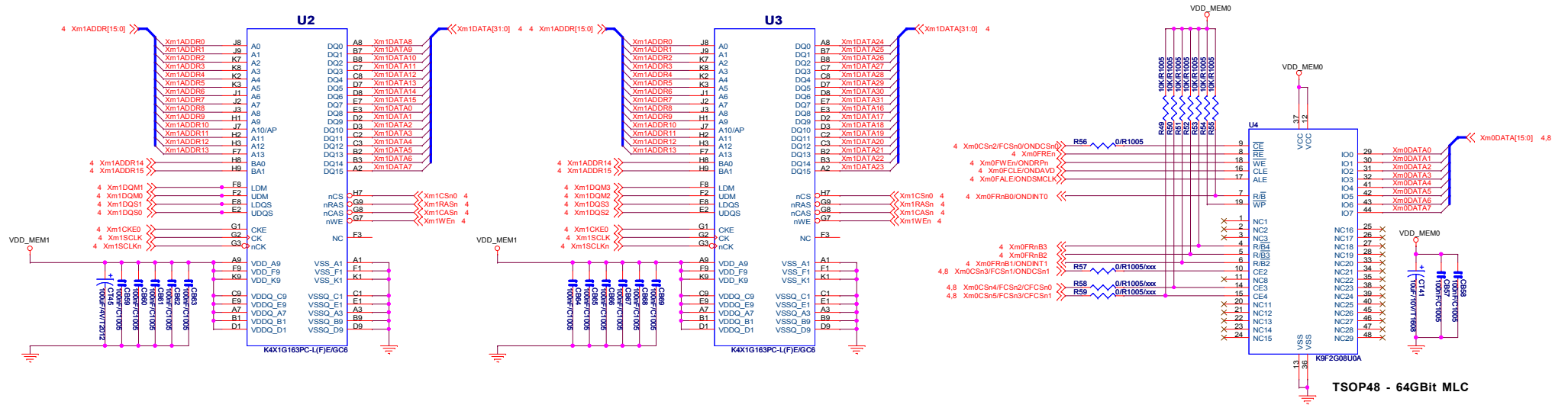
File Name	PCB Name	Remark
MCUC100_(CircuitDiagram).pdf	MCU PCB	
SAM-CRM-12_Main_(CircuitDiagram).pdf	Main PCB	
SAM-CRM-12_SUBs_(CircuitDiagram).pdf	SC PCB	Page 1
	Wall-C2,3	Page 2 / 2ea
	Wall-C1	Page 3
	Cover PCB	Page 4
	Wall-A1,2,3	Page 5 /3ea
	Wall-D1,2,3,4	Page 6 /3ea / D1,D2는 동일
	Wall-B1,2,3	Page 7 / 3ea / B1,B2는 동일
SAM-CRM-12_Connector_(CircuitDiagram).pdf	Connector PCB	

MCUC100_(CircuitDiagram)

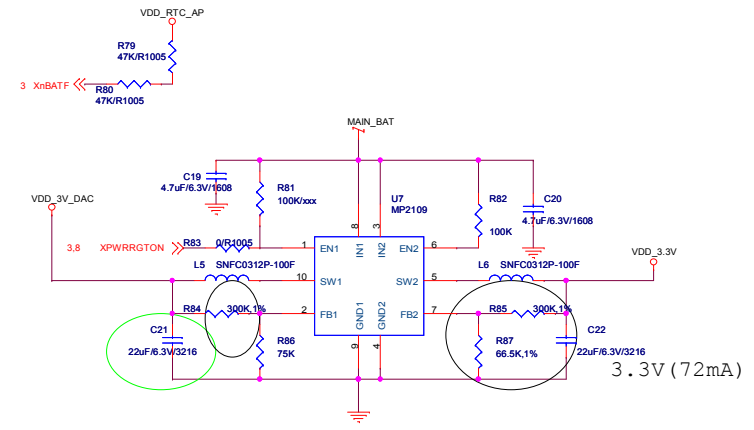
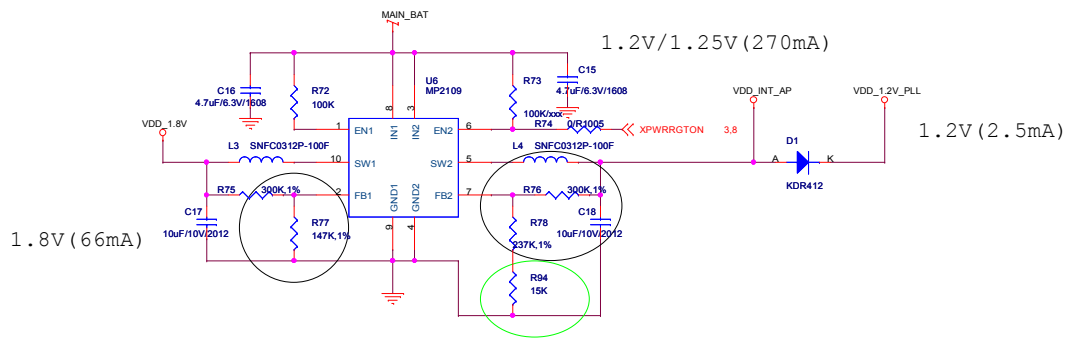
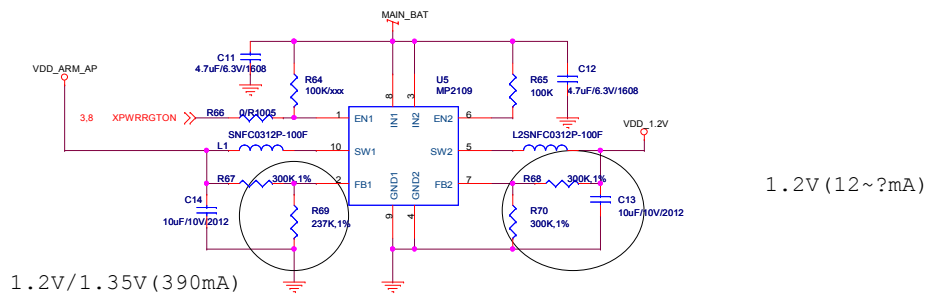




MODEL	DE-MCUC100	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-10-016					5
DATE	2010.12.29					8



MODEL	DE-MCUC100	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO.	EP06-10-016					6
DATE	2010.12.29					8

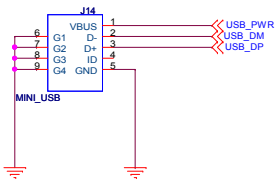
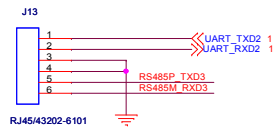
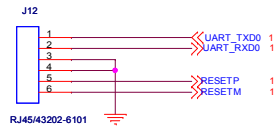
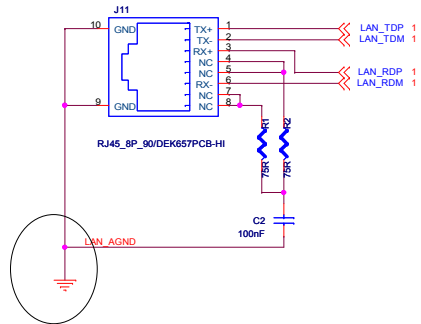
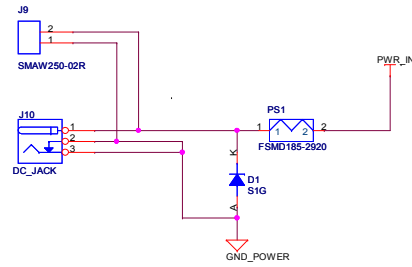
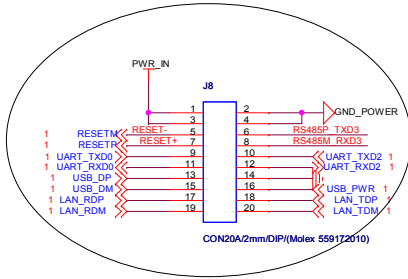


MODEL	DE-MCUC100	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO.	EP06-10-016					7
DATE	2011_04_06					8

SAM-CRM-12-Connector_(CircuitDiagram)

CONNECTOR BOARD

Molex 559xx 시리즈 비교: 체결 길이 포함
 - angle type - 11.7 (H) x 18 (W)
 - Vertical type - 13.2 (H) x 11.5 (W)



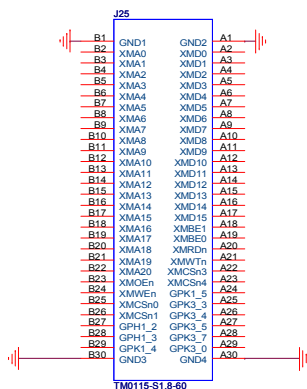
MODEL	SAM-CRM-12 (CON)	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-012					1
DATE	2012.09.03					
REMARK	1.0					1



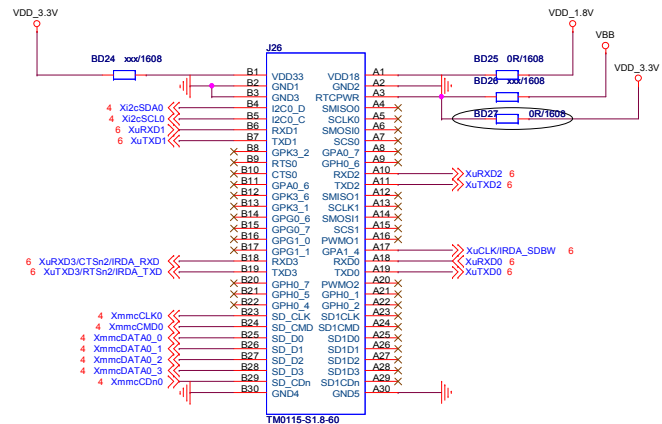
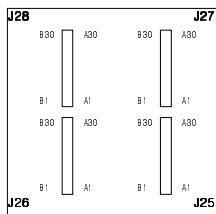
SAM-CRM-12-Main_(CircuitDiagram)

VALIDATOR MCU Module Connector

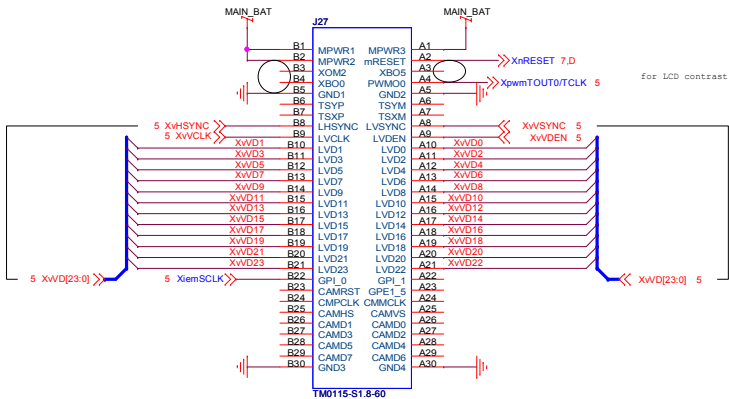
[PCB 수정사항 확인]
 ○ MAIN 모듈과 주변 Wall-D4의 조립성 확인



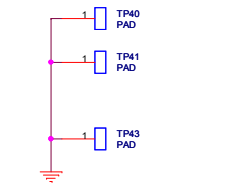
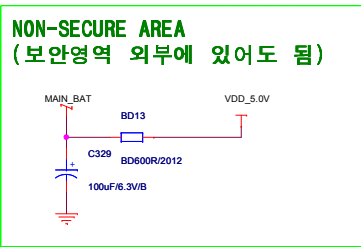
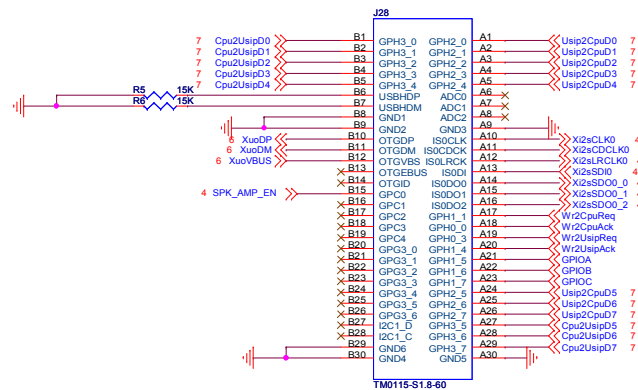
참고: 실제로 배치되는 PIN 순서



LCD



LCD



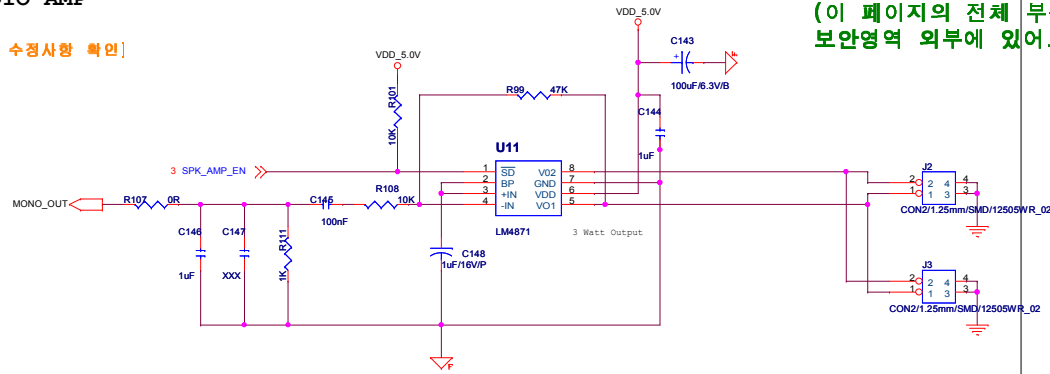
MCU Module 지지 패드
 PAD 사이즈 1(W) x 5(H) mm

MODEL	SAM-CRM-12 (PC.11)	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-009					4
DATE	2012_09_03					15
REMARK	1_0					



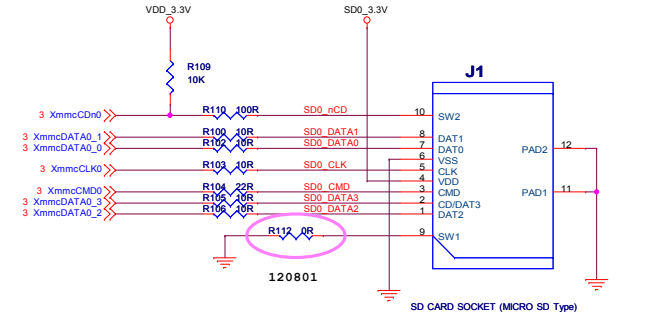
AUDIO AMP

[PCB 수정사항 확인]

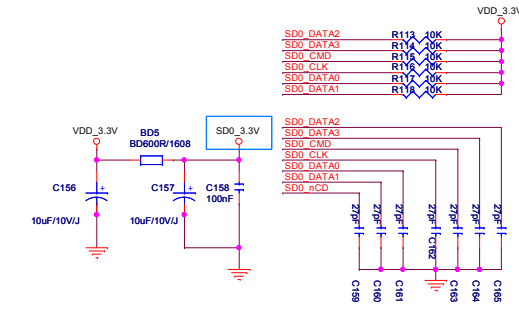
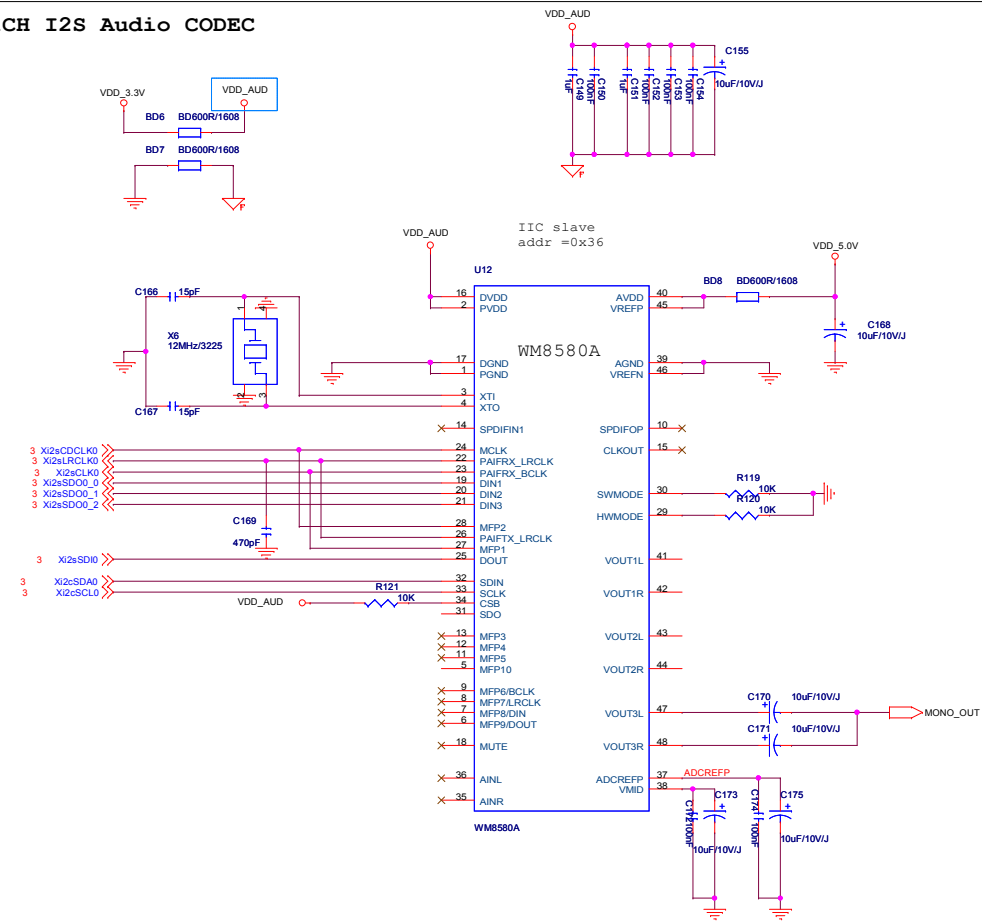


NON-SECURE AREA
(이 페이지의 전체 부품은
보안영역 외부에 있어도 됨)

SD card Slot



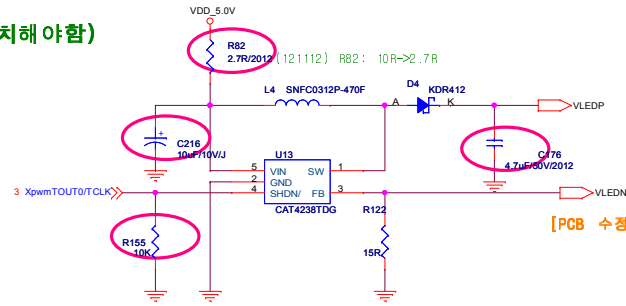
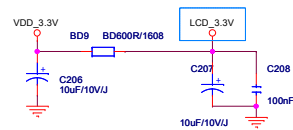
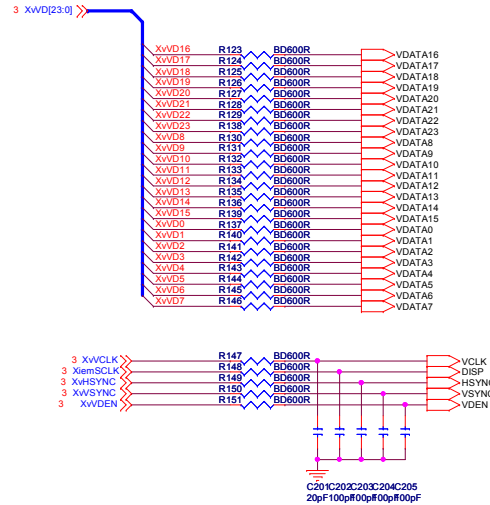
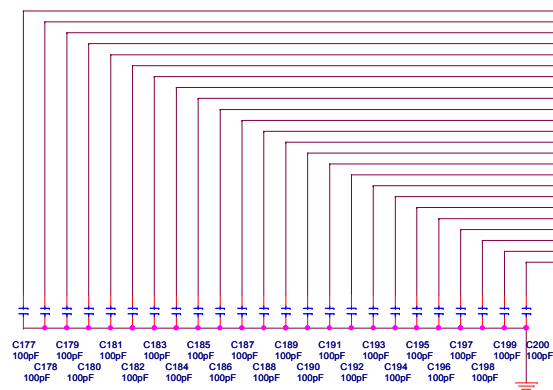
5.1CH I2S Audio CODEC



MODEL	SAM-CRM-12 (PC.1)	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-009					5
DATE	2012.09.03					15
REMARK	1_0					

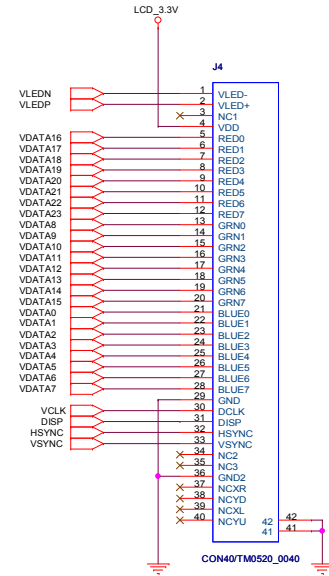
SECURE AREA2
(LCD 보안영역에 배치해야함)

LCD Interface



[PCB 수정사항 확인]

4.3" LCD I/F



FX040346DSSWBG01 (DATA IMAGE)

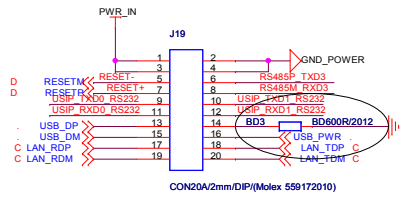
[참고] LCD 컨넥터의 1번핀 위치는 오른쪽 부터임

MODEL	SAM-CRM-12 (PC.1)	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-009					6
DATE	2012.09.03					15
REMARK	1.0					

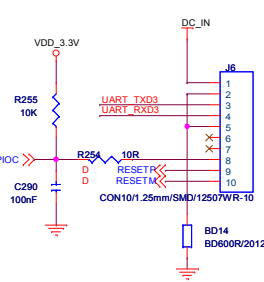


PCI CONNECTOR

[PCB 수검사항 확인]

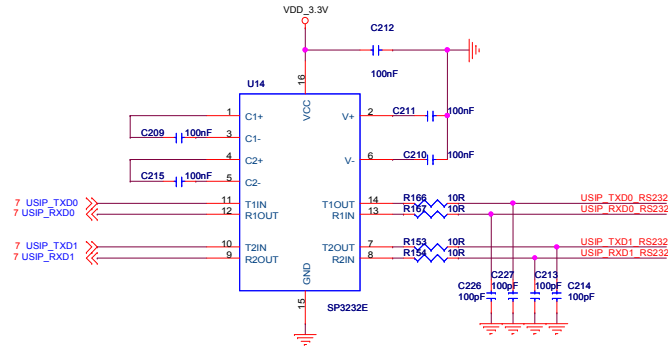


PCI to SAM-CRM-13 (RF) Connector

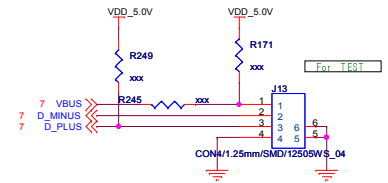


U0,U1 (USIP) : HOST COMM

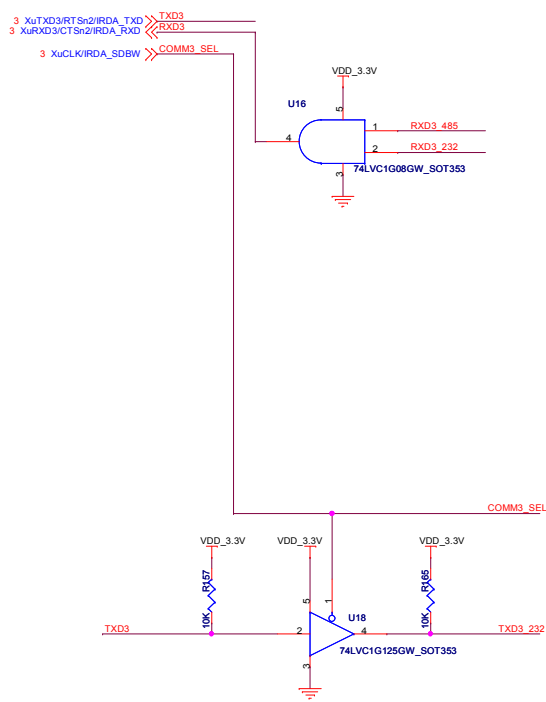
NON-SECURE AREA
(이 페이지의 전체 부품은 보안영역 외부에 있어도 됨)



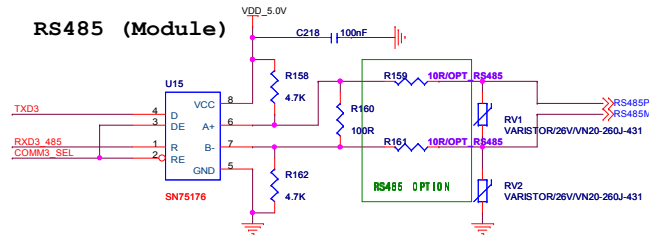
USB (USIP)



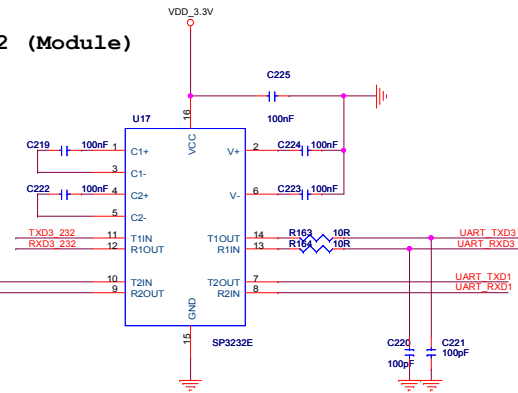
U1, U3 (Module)



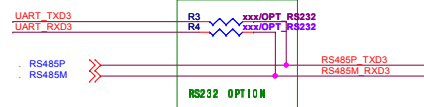
RS485 (Module)



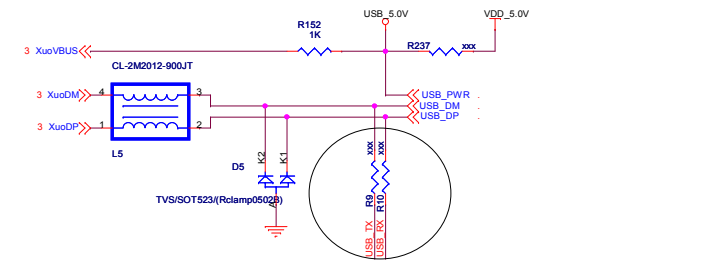
RS232 (Module)



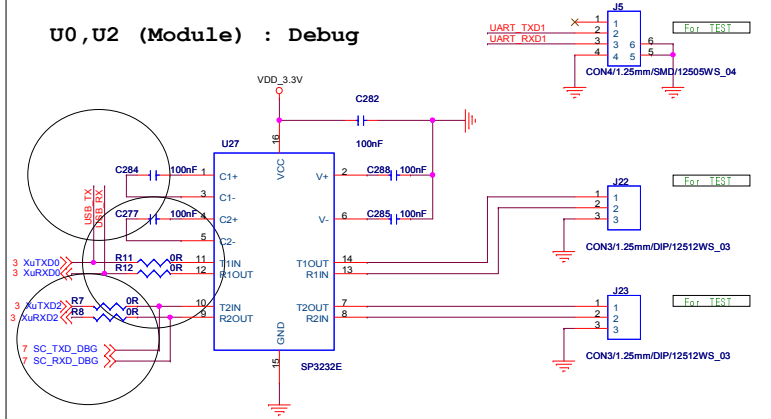
option (Module)



USB (Module)



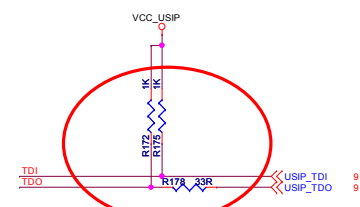
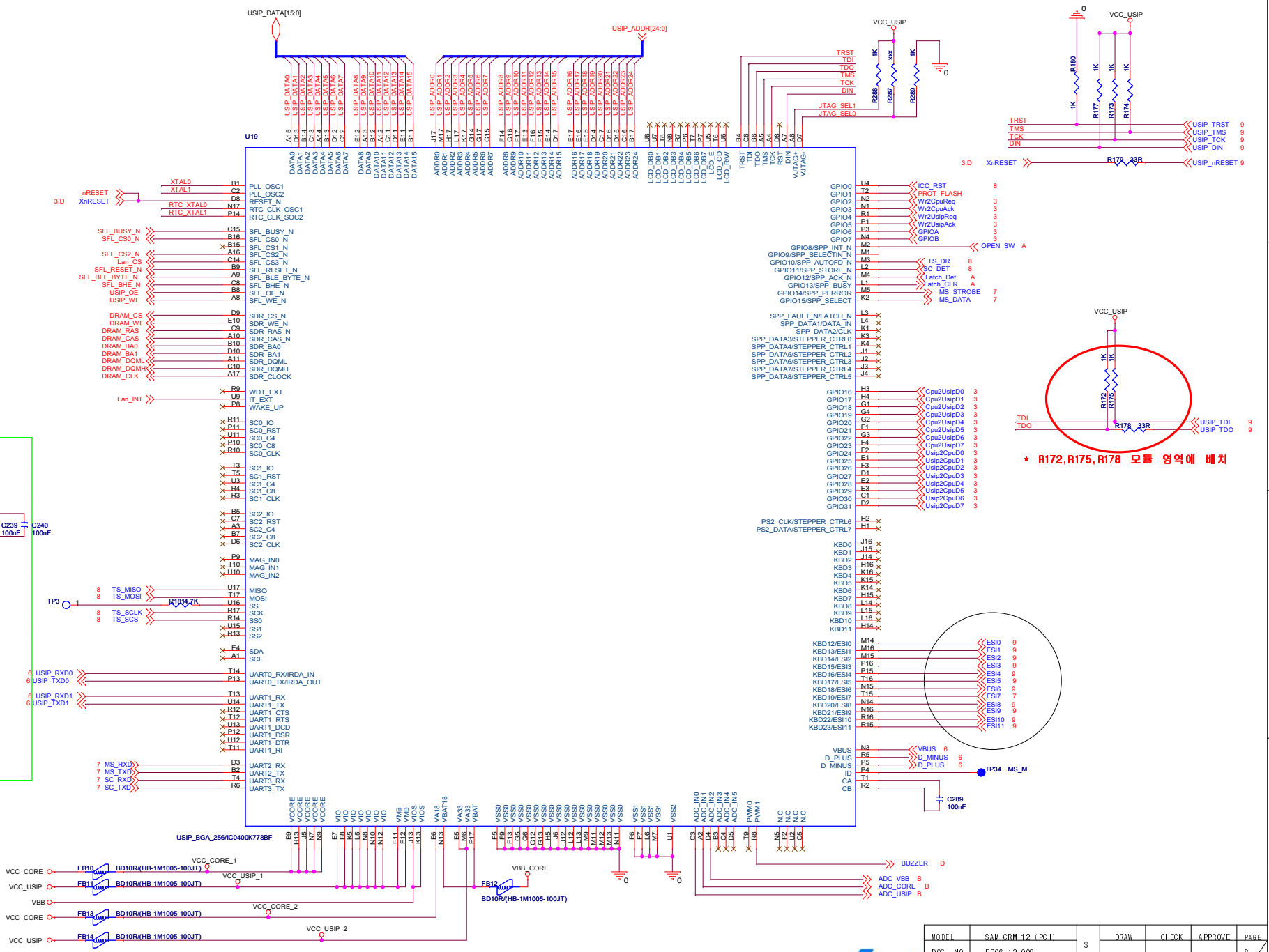
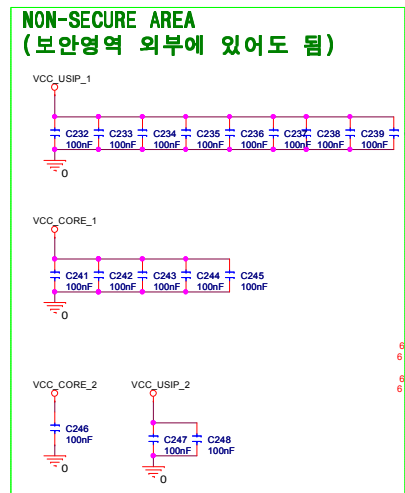
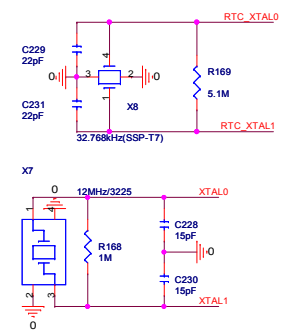
U0,U2 (Module) : Debug



MODEL	SAM-CRM-12 (PC.11)	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-009	S			7
DATE	2012.09.03	I			
REMARK	1_0	G			15
		N			



[PCB 수정사항 확인]
 ○ R172, R175, R178 모듈 위치에 배치



* R172, R175, R178 모듈 영역에 배치

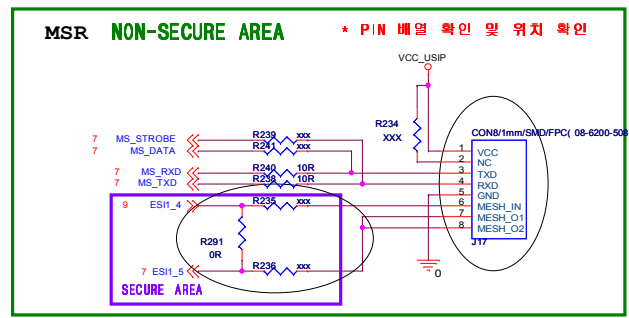
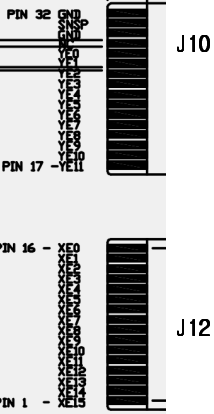
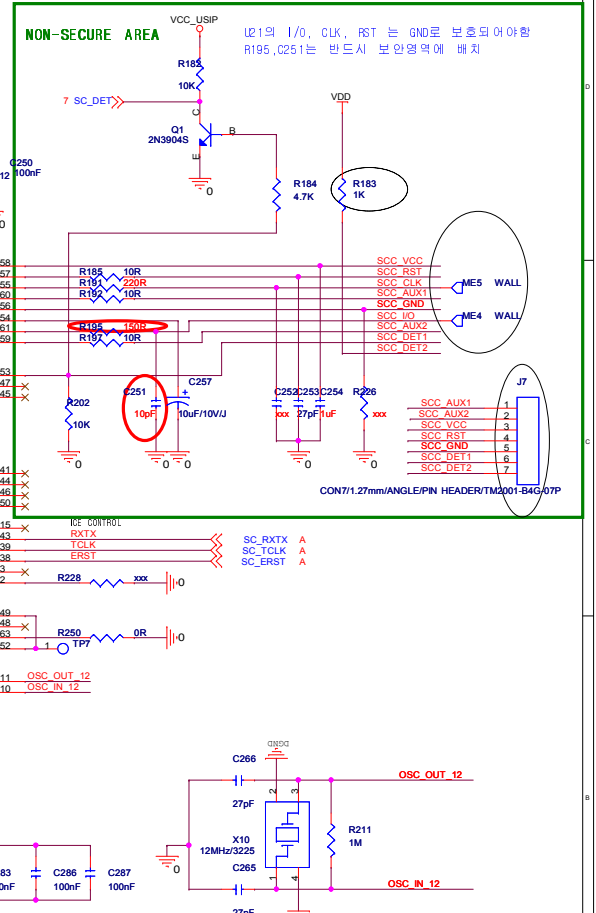
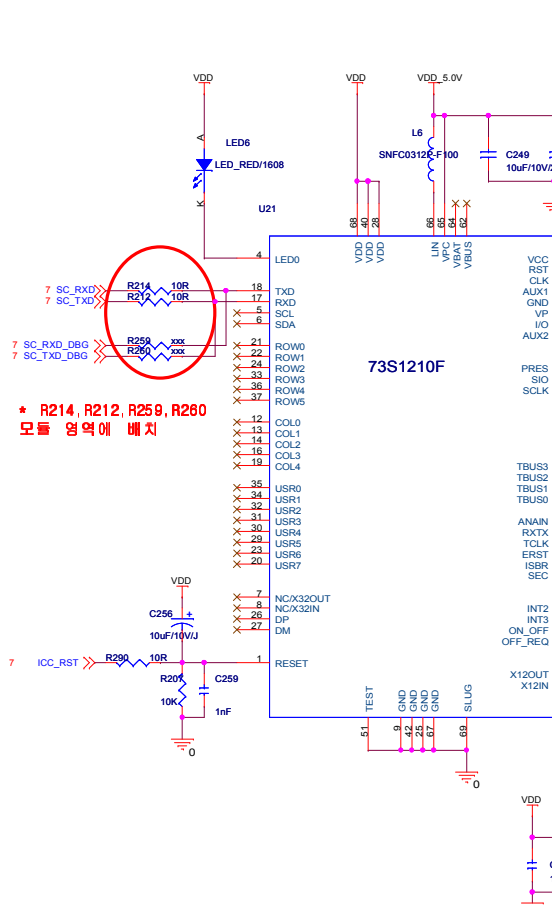
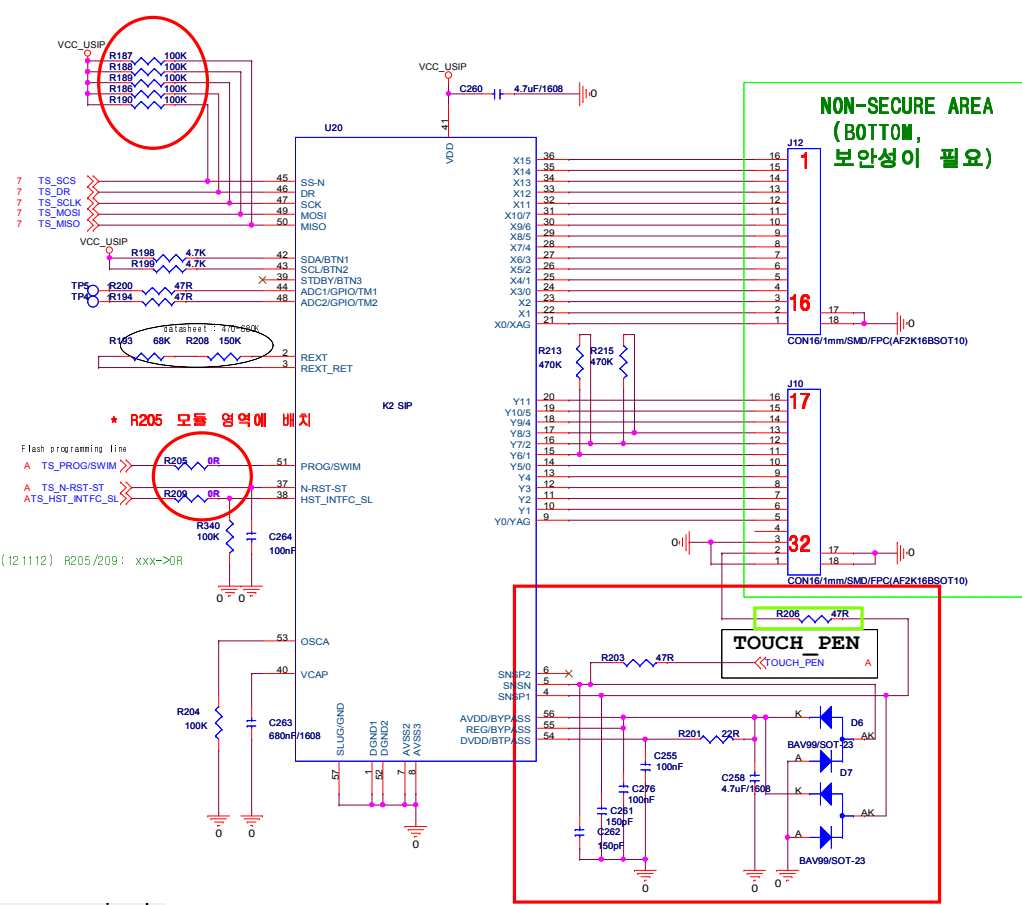
MODEL	SAM-CRM-12 (PC.11)	DRAW	CHECK	APPROVE	PAGE
DOC. NO	FP06-12-009	S I G N			8
DATE	2012.09.03				15
REMARK	1_0				



Touch Sensor Controller

[PCB 수정사항 확인]
○ R214, 212, 259, 260 - 모듈영역

Smart Card Controller



MODEL	SAM-CRM-12 (PC-11)	DRAW	CHECK	APPROVE	PAGE
DOC. NO	FP06-12-009				9
DATE	2012.09.03				15
REMARK	1.0				

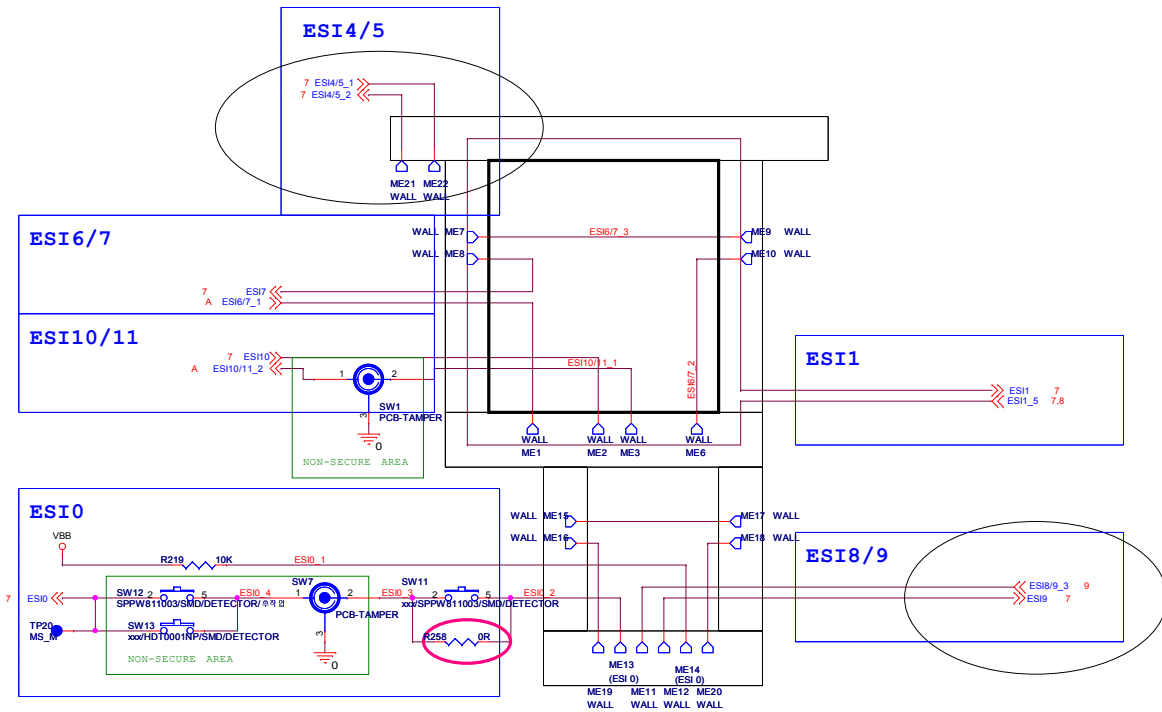


*** SENSOR Plan**

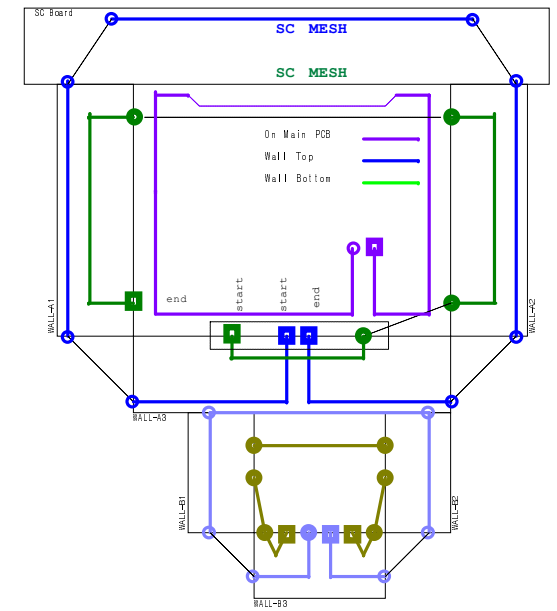
- 조립성 확인
- MEX 배열 확인
- ESIx 넷.VIA의 보안영역 위치 확인
- TAMPER SWITCH 위치 확인

	Main MESH	COVER MESH	WALL-A MESH	SC MESH	COVER OPEN	WALL-B MESH	CASE OPEN	ETC	Sensor Flow	Resistor/Volt	Check Point
S0 (ESI 0)					SW11	(1)	SW7 SW12/13 (LCD)		WALL-B MESH(1) -> SW11 (OR) -> SW7 -> SW12/13	3V(TP20,20K)	S0 (R219 -> ME14 -> ME13 -> SW11(X) -> SW7 -> SW12(LCD) -> TP20) WALL-B (12R) SW7 (PCB Tamper)
S1 (ESI 1)							SW9 (cover sw2)	MSR LINE_DETECTOR	Cover (J24-sw2) -> SW9 -> MSR -> LINE_DETECTOR	2.7V(R291,75K)	S1 (R217 -> (J24-4 -> (J24-6) -> SW9 -> R291 (MSR / Line Detector)) Cover sw2 SW9(PCB Tamper)
D0 (ESI 2/3)	(A)				SW2, SW3			SW14 (Module)	MAIN MESH(A) -> SW14 -> SW3 -> SW2		D0 (R257) -> SW14 (CPU Module) -> SW3 -> SW2 MESH (100R) Cover Detector
D1 (ESI 4/5)		(B-J21)		(2)-left			SW10 (cover sw1)	SC-CON2	Cover MESH(B) (J21) -> Cover (sw1) -> SC(left) -> SW10		D1 (J21-4 -> (J21-2) -> ME22 -> ME21 -> SW10 -> TP2) Cover Mesh/sw1 SC Mesh (R45) SW10 (PCB Tamper)
D2 (ESI 6/7)		(A-J21)	(2)						Cover (A) (J21) -> WALL-A3 -> WALL-A2 -> WALL-A1		D2 (J21-6 -> (J21-8) -> ME1 -> ME8) Cover Mesh WALL-A (10R)
D3 (ESI 8/9)	(B)				SW5, SW6	(2)			MAIN(B) -> SW5 -> SW6 -> WALL-B MESH (2)		D3 (R251) -> SW5 -> SW6 -> ME11 -> ME12 MESH (125R) Cover Detector WALL-B (12R)
D4 (ESI 10/11)			(1)	(1)-both			SW1 (cover J14-sw3)	SC-CON1	WALL-A3 -> WALL-A1 -> SC(both) -> WALL-A2 -> WALL-A3 -> SW1 -> (cover J14-sw3)		D4 (ME2 -> ME3 -> SW1 -> (J14-1 -> J14-3)) WALL-A/SC (70R) SW1 (PCB Tamper) Cover sw3/sw4

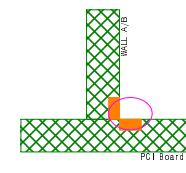
*** Wall A/B**



WALL MESH Connection



MEX Soldering



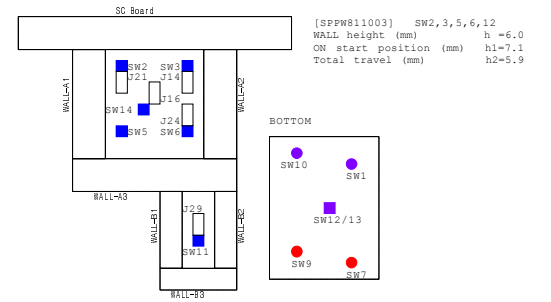
PAD Size: 1.6(W)x1(H)mm
in SECURE AREA

MODEL	SAM-CRM-12 (PC.11)	DRAW	CHECK	APPROVE	PAGE
DOC. NO	FP06-12-009	S			10
DATE	2012.09.03	I			15
REMARK	1.0	N			

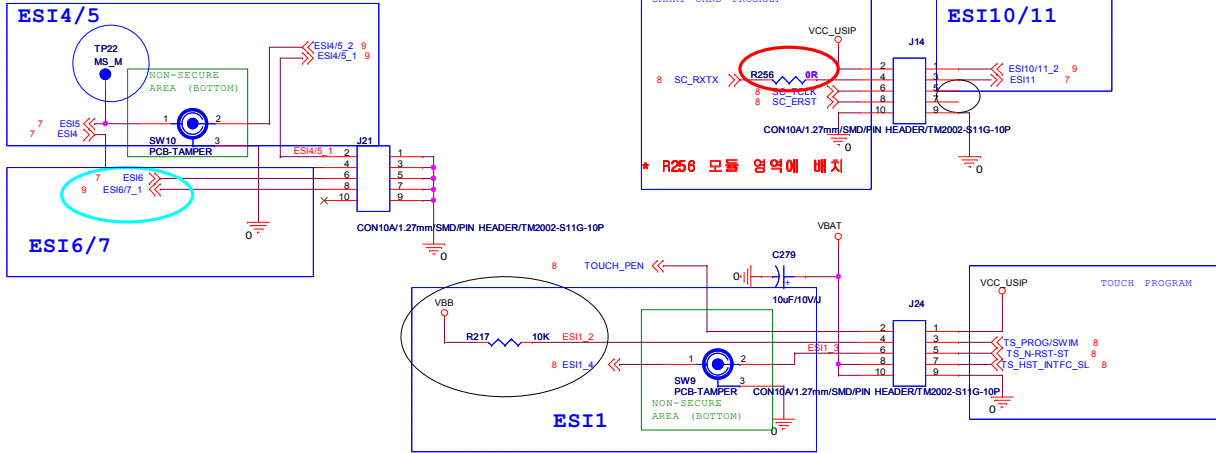


○ R256, R258, SW14, J16 모듈영역 위치 확인

Cover Board Connector plan



* Cover PCB Connector

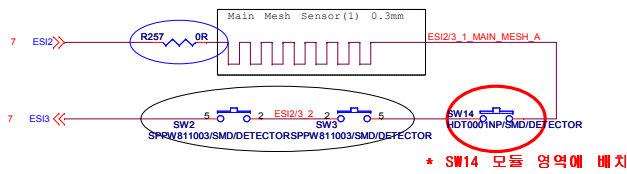


* J18 모듈 영역에 배치

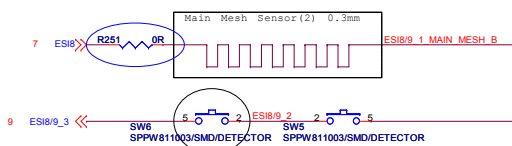


* Main PCB Mesh Layer

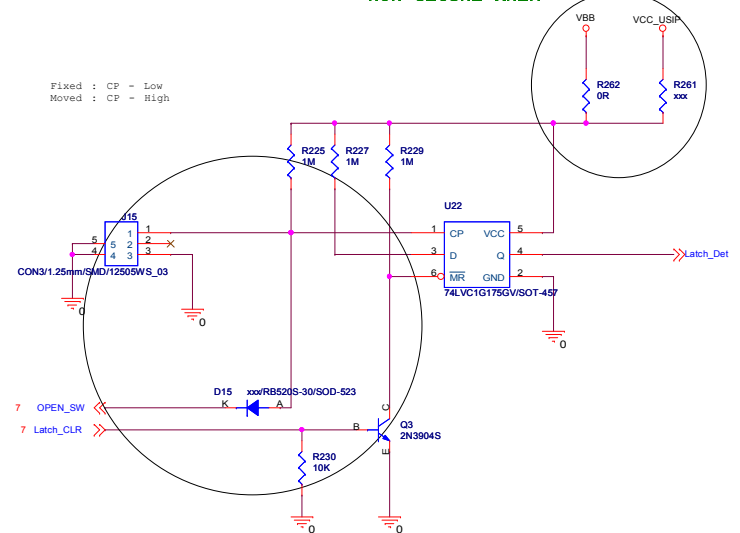
ESI2/3 Main MESH (A)



ESI8/9 Main MESH (B)



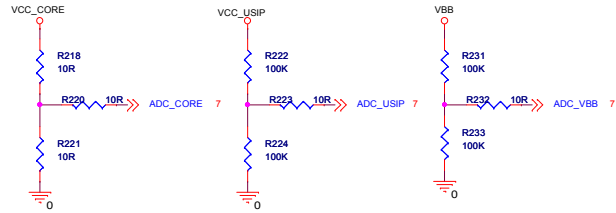
* External Removal SENSOR NON-SECURE AREA



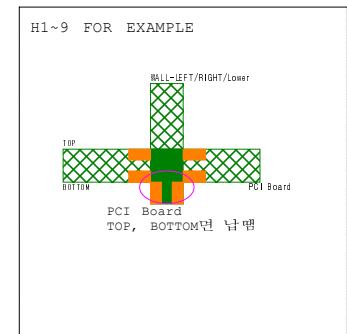
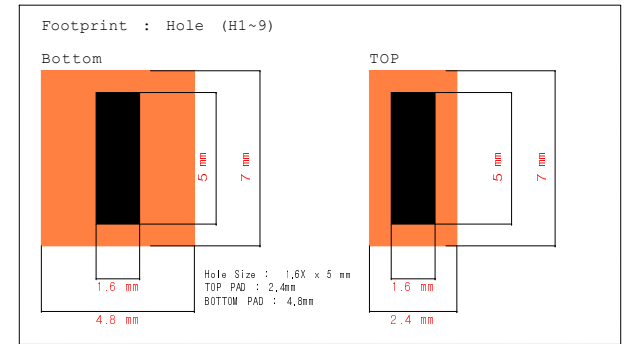
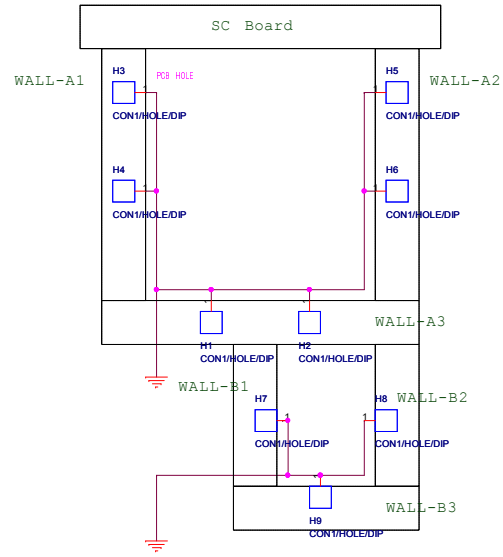
MODEL	SAM-CRM-12 (PC.1)	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-009		11			
DATE	2012_09_03		15			
REMARK	1_0					



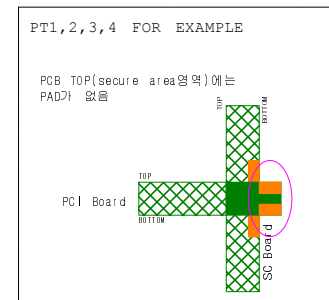
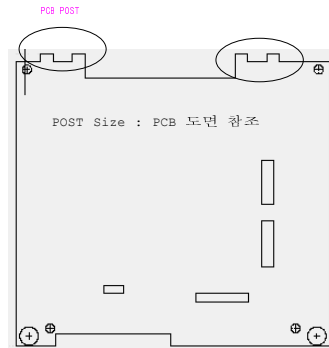
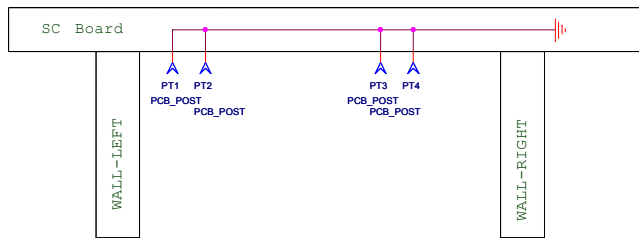
*** Power SENSOR**



WALL PCB LOCK HOLE [PCB 수정사항 확인]

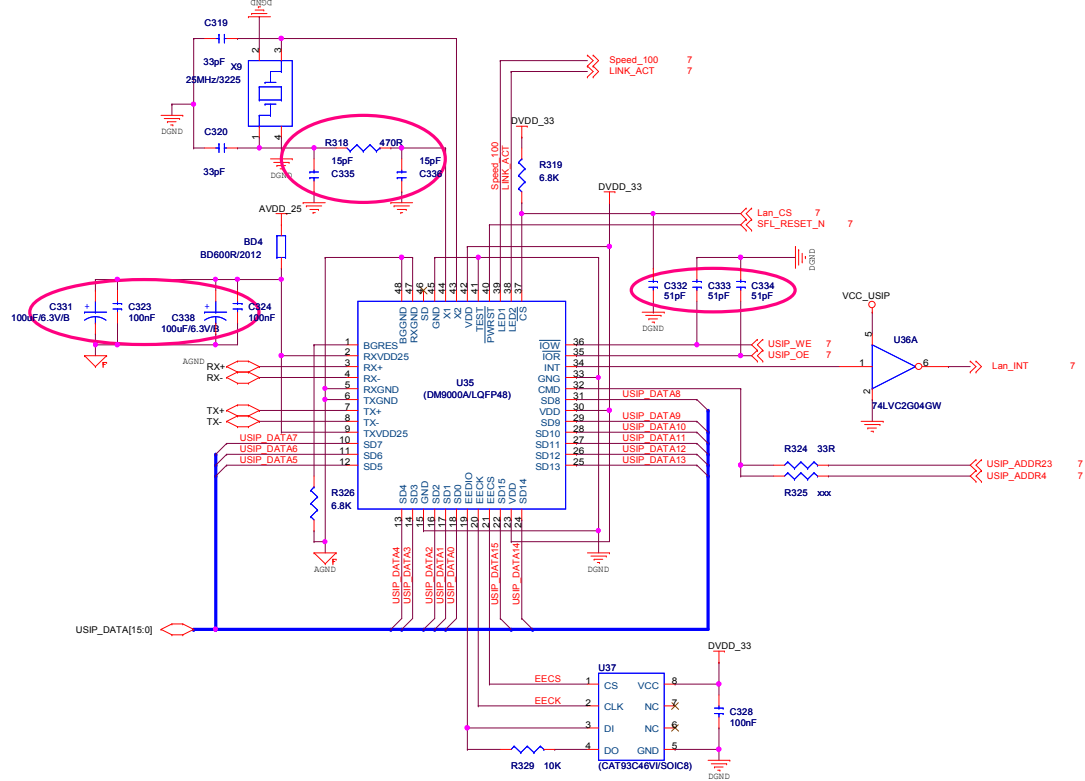


SMART CARD PCB LOCK POST/PAD/HOLE

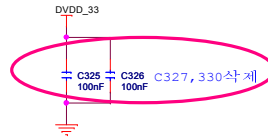


MODEL	SAM-CRM-12 (PC.11)	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-009					12
DATE	2012.09.03					15
REMARK	1.0					

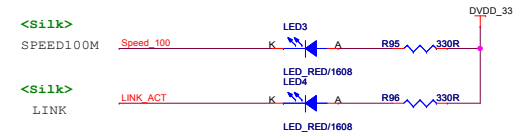
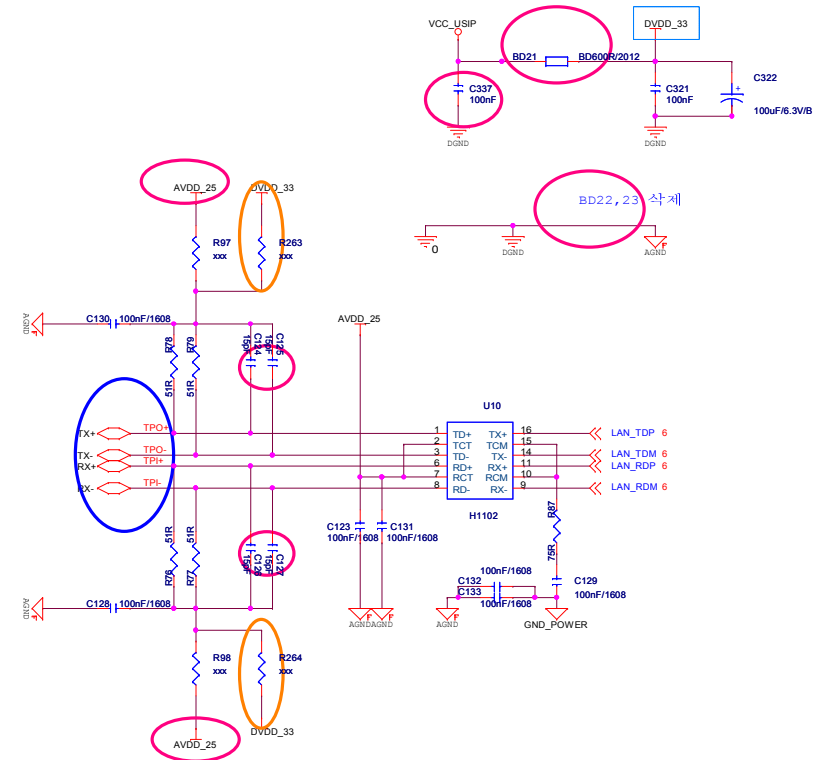
LAN Interface **SECURE AREA**



Power Plane Partitioning :
 The power planes should be approximately illustrated
 => LAN 전원부를 반드시 분리해야함



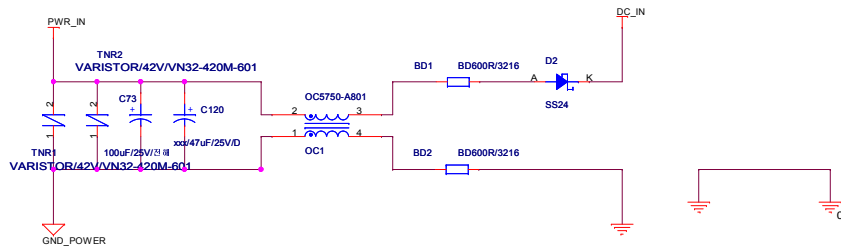
NON-SECURE AREA



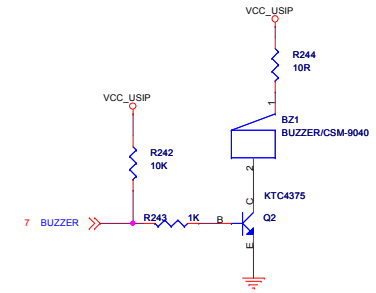
MODEL	SAM-CRM-12 (PC.11)	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-009	S I G N			13
DATE	2012.09.03				15
REMARK	1.0				



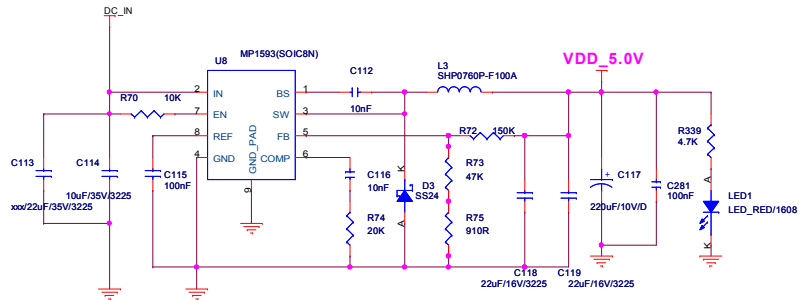
DC IN (12~24V)



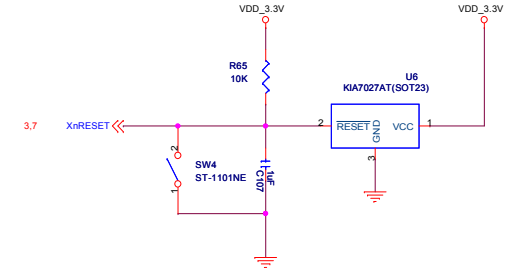
BUZZER



VDD 5V

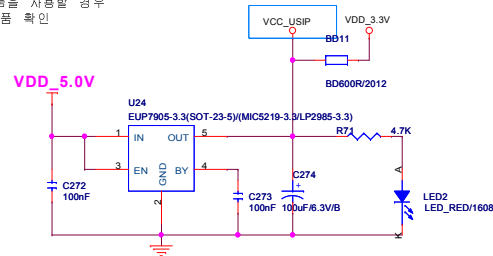


RESET

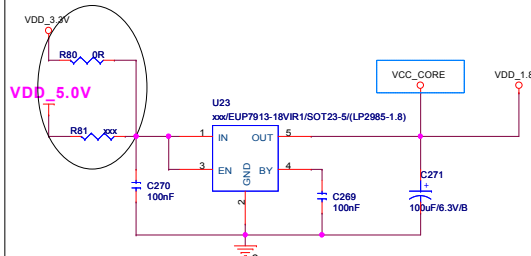


VDD 3.3V : VCC_USIP

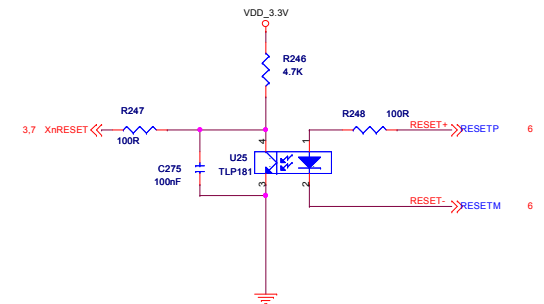
[참고] EUP사 제품을 사용할 경우 사용하지 않는 부품 확인



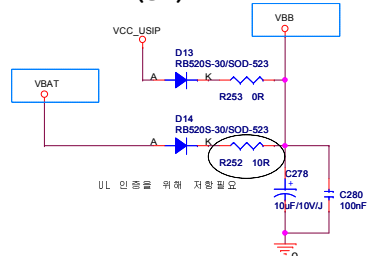
VDD 1.8V : VCC_CORE (USIP ONLY)



EXTERNAL RESET

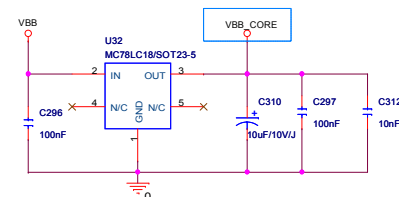


VBB : BATTERY (3V)



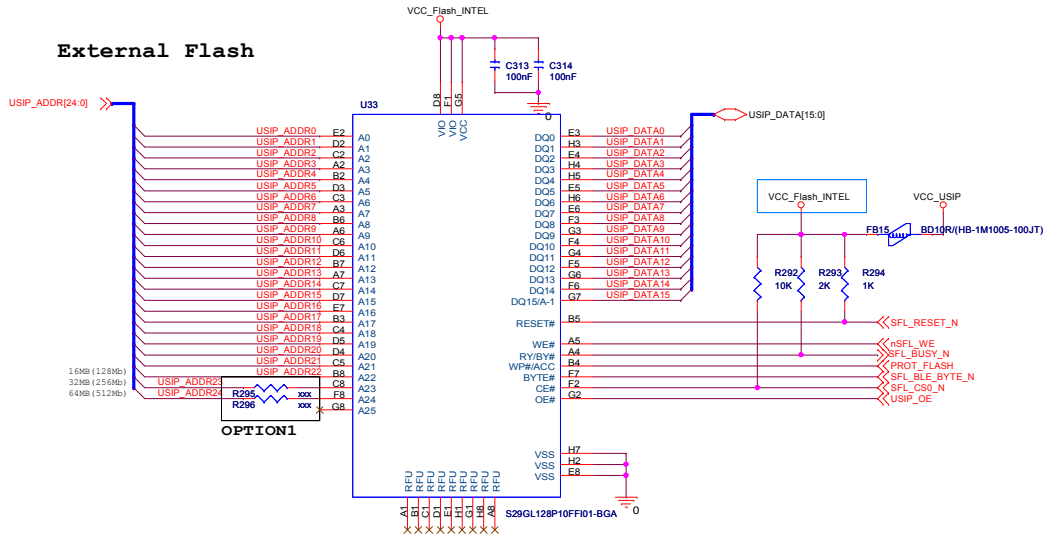
VBB_CORE : BAT to VDD 1.8V (USIP BATTERY ONLY)

[참고] Pin 위치가 다른 SOT제품과 다름



MODEL	SAM-CRM-12 (PC.1)	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-009					14
DATE	2012.09.03					15
REMARK	1.0					

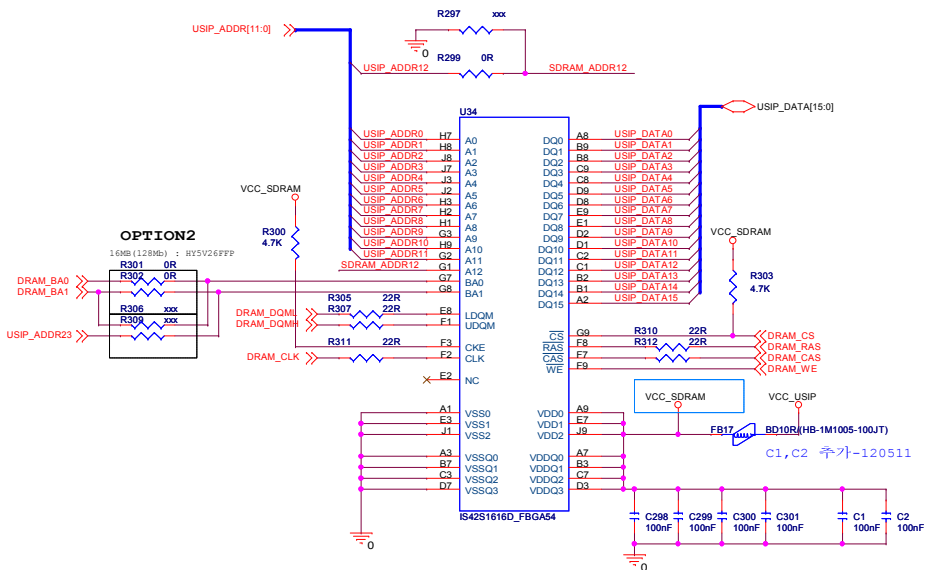
External Flash



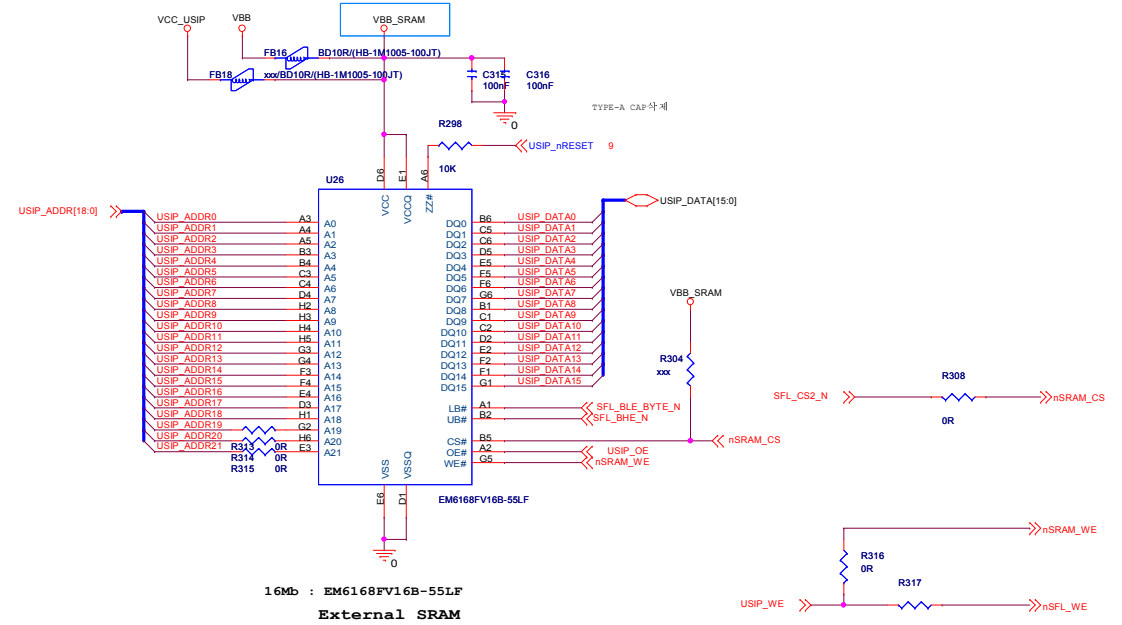
16MB (128Mb) : S29GL128P10FFI01 , 16MByte, xxnS, BGA-64

External SRAM

External SDRAM



32MB (256Mb) : IS42S1616D / FBGA (O)



16Mb : EM6168FV16B-55LF
External SRAM

MODEL	SAM-CRM-12 (PC.11)	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-009		15			
DATE	2012.09.03	15				
REMARK	1_0					



SAM-CRM-12-SUBs_(CircuitDiagram)

SAM-CRM-12-SC
(Smart CARD Board)

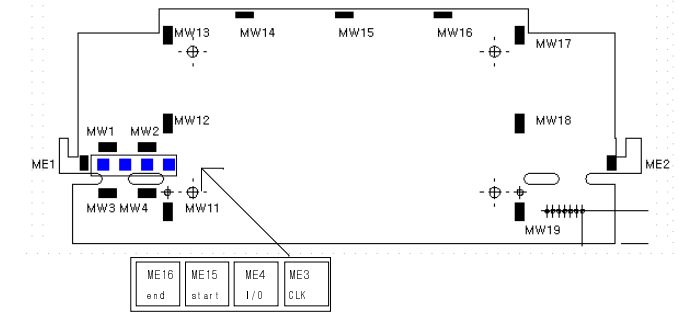
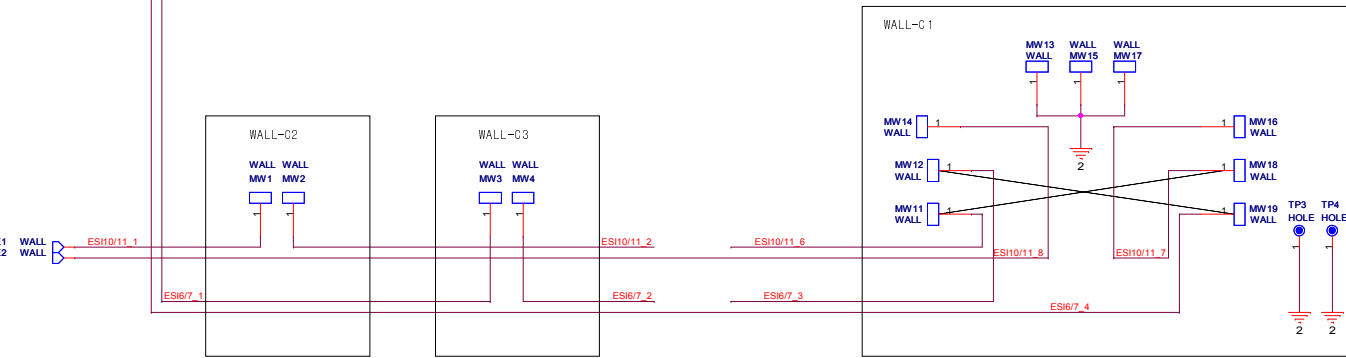
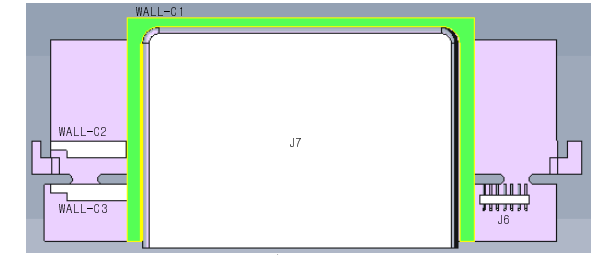
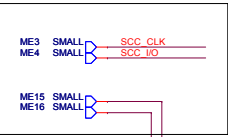
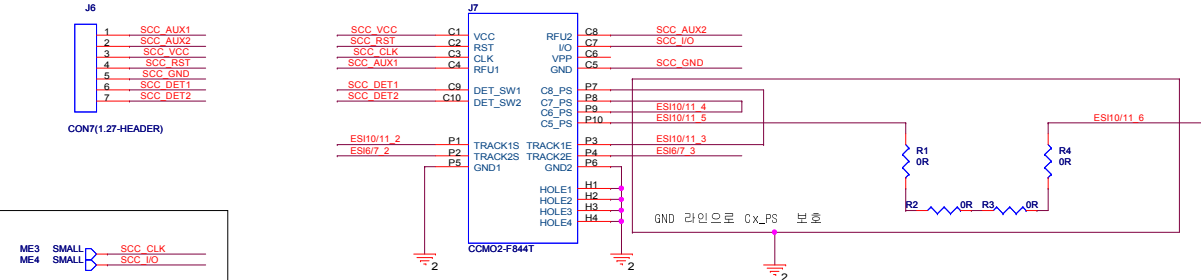
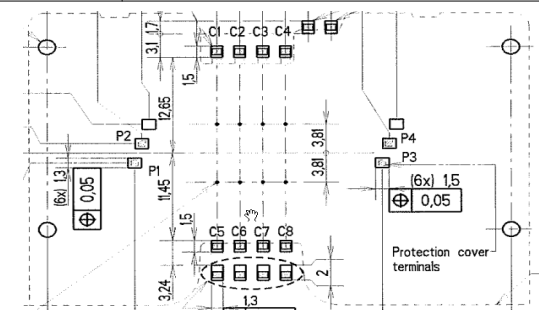
PCB : 4 Layers / Build up

Top(1) : Smart Card Connector
Inner(2) : Mesh Sensor (1)
Inner(3) : Mesh Sensor (2)
Bottom(4) : Copper

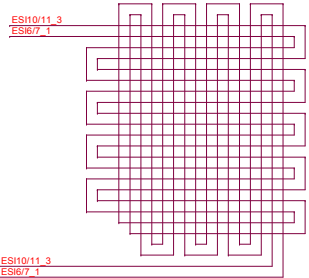
[PCB 수정사항 확인]

[Sensor Flow]

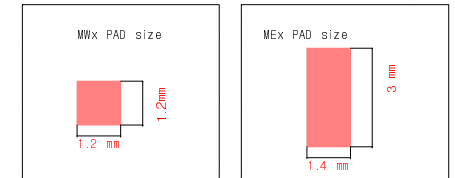
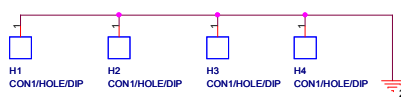
- * ES110/11: ME1 -> WALL-C2 -> MESH -> J7(TRACK1) -> Cx_PS -> Resistor -> WALL-C1 -> ME2
- * ES16/7 : ME17 -> WALL-C3 -> MESH -> J7(TRACK2) -> WALL-C1 -> ME18



MESH SENSOR



H1~4 - TOP면 PAD 제거



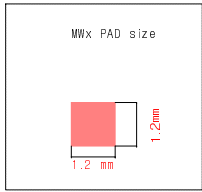
MODEL	SAM-CRM-12-SUB1	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-010					4
DATE	2012.09.03					10
REMARK	1.0					

SAM-CRM-12-Wall-C1/2/3
(SMART CATD Connector 보호용)

[PCB Name(silk)] : 없음

PCB : 4 Layers / Build up

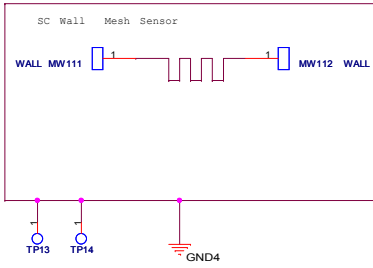
Top(1) : Copper
 Inner(2) : Mesh Sensor (1)
 Inner(3) : Mesh Sensor (2)
 Bottom(4) : BGA Pad



- [PCB 수정사항 확인]
- PAD가 외부에서 보이지 않는지 확인
 - PCB 보드와 결합시 반쯤이 있는지
 - 모든 패드가 BOTTOM에 있는지 확인

[PCB Name(silk)] : WALL-C2/3

WALL-C2/3



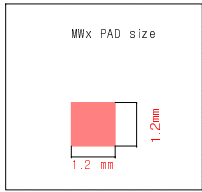
MODEL	SAM-CRM-12-SUB1	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO.	EP06-12-010					5
DATE	2012.09.03					10
REMARK	1.0					

SAM-CRM-12-Wall-C1/2/3
(SMART CATD Connector 보호용)

[PCB Name(silk)] : 없음

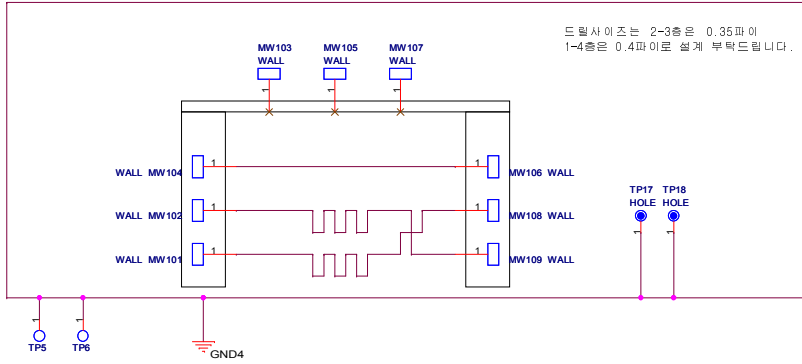
PCB : 4 Layers / Build up

Top(1) : Copper
 Inner(2) : Mesh Sensor (1)
 Inner(3) : Mesh Sensor (2)
 Bottom(4) : BGA Pad



- [PCB 수정사항 확인]
- PAD가 외부에서 보이지 않는지 확인
 - PCB 보드와 겹합시 번침이 없는지
 - 모든 패드가 BOTTOM에 있는지 확인

WALL-C1 [PCB Name(silk)] : WALL-C1



MODEL	SAM-CRM-12-SUB2	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-010					6
DATE	2012.09.03					10
REMARK	1.0					

SAM-CRM-12-Cover
(SECURE AREA COVER)

Layer : 4 / Build up
 Name : Validator-PCI-Cover

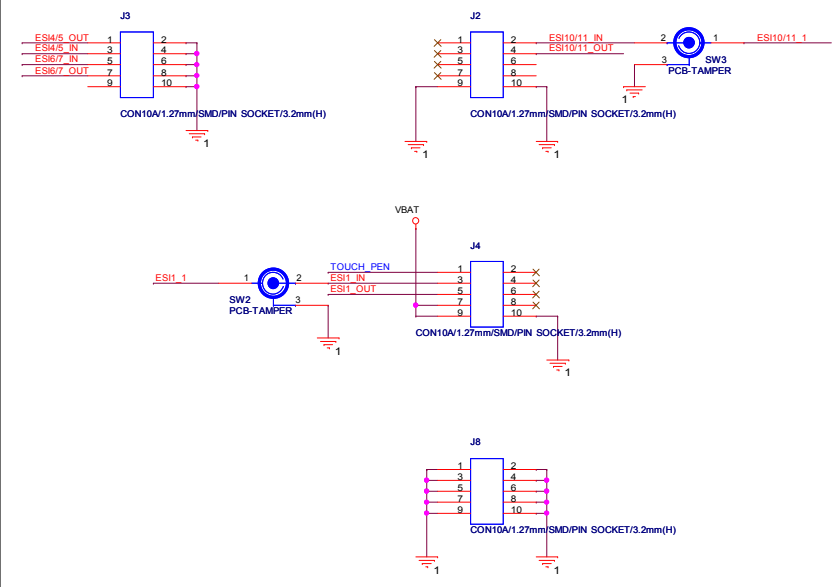
[PCB 수정사항 확인]
 ○ 커버삽입 확인(J8,2,3,4)

[MESH 검증 방법]
 1. MESH(1) : J3-3
 2. MESH(2) : J2-9와 J3-9 양단을 확인

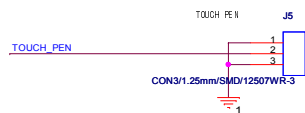
[Sensor Flow]

ES11 : J4 -> SW2 -> WALL-D3 -> J4
 ES14/5 : J3 -> MESH -> SW1 -> WALL-D1 -> J3
 ES16/7 : J3 -> MESH -> WALL-D4 -> J3
 ES10/11 : J2 -> SW3 -> WALL-D2 -> J2

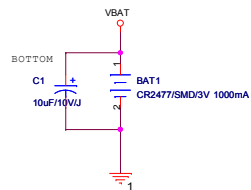
PCI 보드와 연결 확인필요



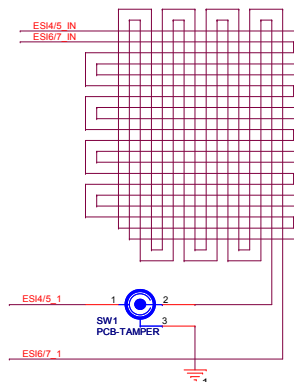
TOUCH PEN



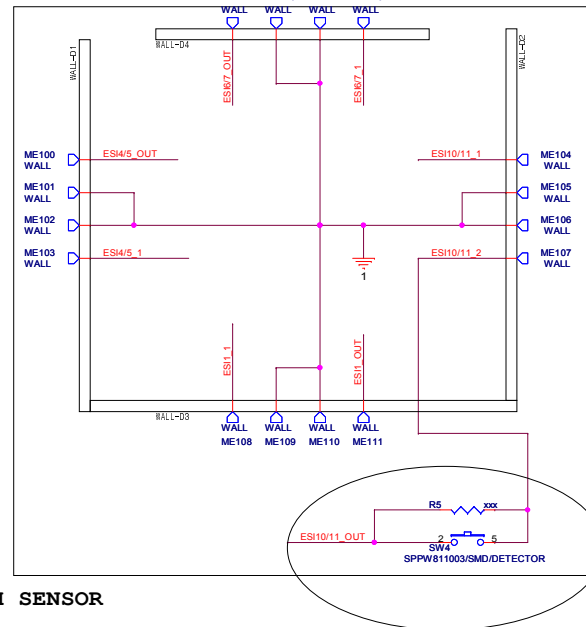
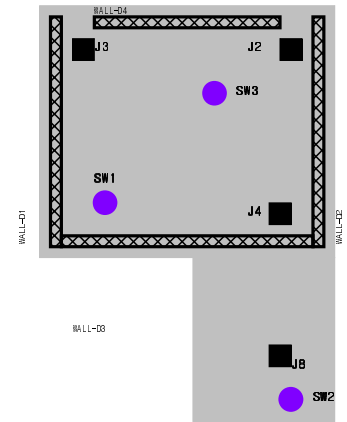
BATTERY



MESH SENSOR



Connection planning



MESH Layer 1,2를 겹쳤을 경우 좌우,상하 수직이 되도록 합니다.
 (위에서 봤을 경우 2개의 Layer가 Cross 되어 빈틈이 없어야함)

(For Example)

MODEL	SAM-CRM-12-SUB3	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-010					7
DATE	2012.09.03					10
REMARK	1.0					

SAM-CRM-12-Wall-A1/2/3

PCB : 4 Layers / Build up

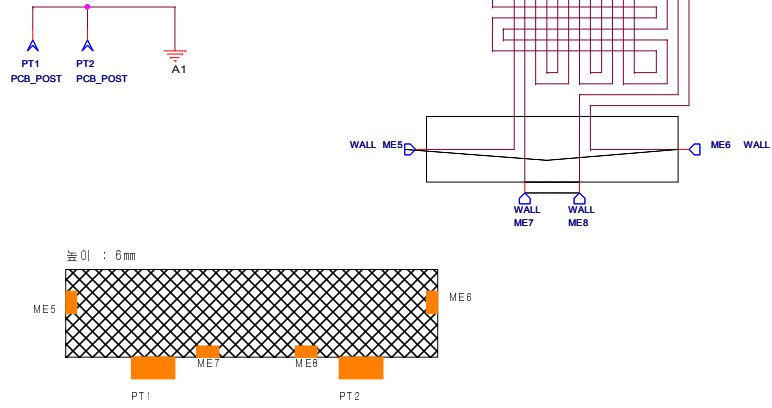
Top(1) : Copper
 Inner(2) : Mesh Sensor (1)
 Inner(3) : Mesh Sensor (2)
 Bottom(4) : PAD

[PCB 수정사항 확인]

- PT1-6 사이즈 및 길이확인 - PCI 보드와 동일인지
- PCI 보드와 결합시 변형이 없는지
- SC 보드와 결합시 SC 보드가 기울어 지지 않고 수직을 유지하는지

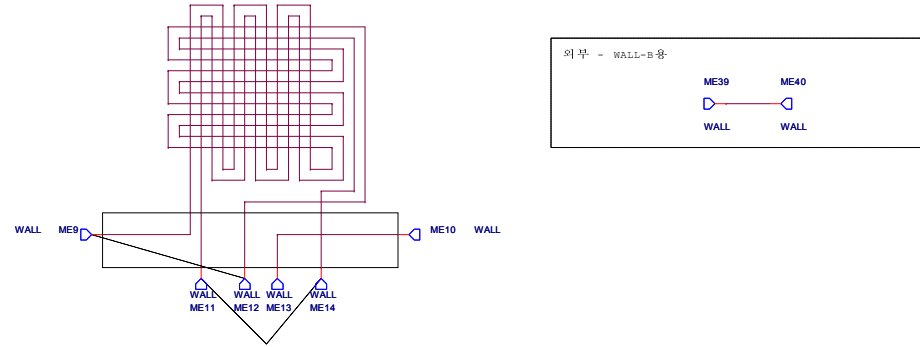
WALL-A1

[PCB Name(silk)]
 SAM-CRM-12-WALL-A1



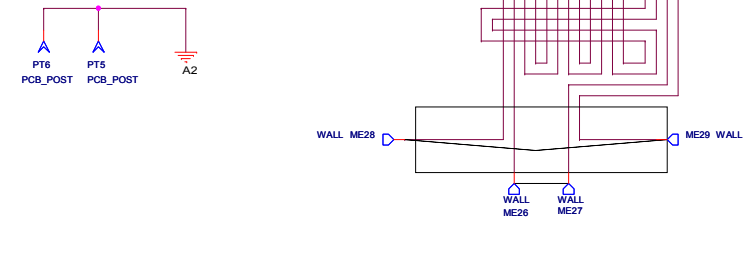
WALL-A3

[PCB Name(silk)]
 SAM-CRM-12-WALL-A3

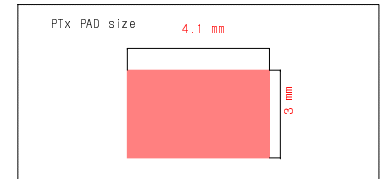
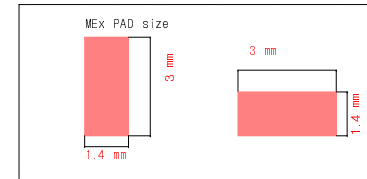
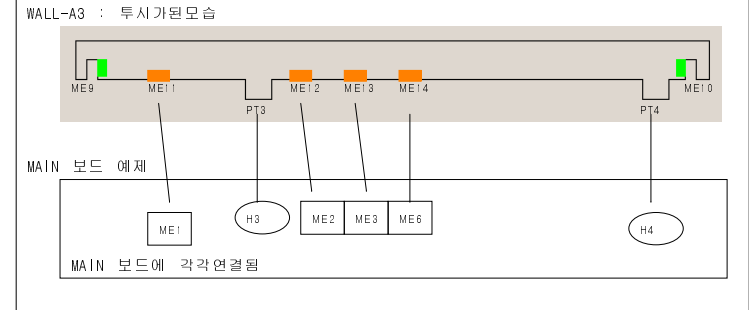


WALL-A2

[PCB Name(silk)]
 SAM-CRM-12-WALL-A2



MAIN <-> WALL-C3 배치도



MODEL	SAM-CRM-12-SUB3	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-010					8
DATE	2012.09.03					10
REMARK	1.0					

SAM-CRM-12-Wall-D1,2,3,4
 (Cover PCB 내부에 삽입되는 WALL)

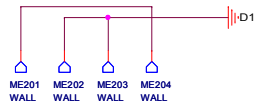
[PCB Name(silk)] : SAM-CRM-12-WALL-D1.2.3.4

PCB : 2 Layers

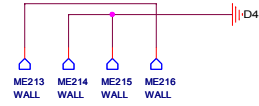
Top(1) :
 Bottom(2) :

- [PCB 수정사항 확인]
- PAD가 외부에서 보이지 않는지 확인
 - PCI 보드와 결합시 반쯤이 없는지
 - 모든 핀드가 TOP에 있는지 확인

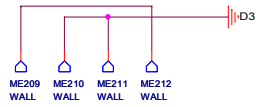
WALL-D1/2/4 - 2EA



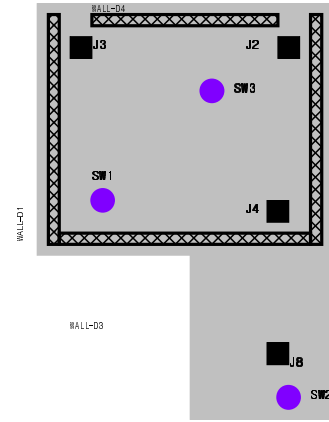
WALL-D4



WALL-D3



Connection planning



MODEL	SAM-CRM-12-SUB4	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO.	EP06-12-010					9
DATE	2012.09.03					10
REMARK	1.0					

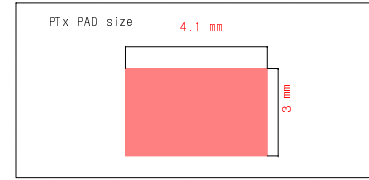
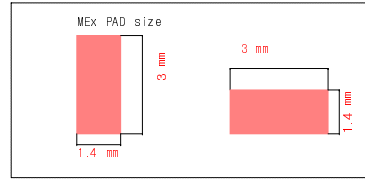
SAM-CRM-12-Wall-B1/2/3

PCB : 4 Layers / Build up

Top[1] : Copper
 Inner[2] : Mesh Sensor (1)
 Inner[3] : Mesh Sensor (2)
 Bottom[4] : PAD

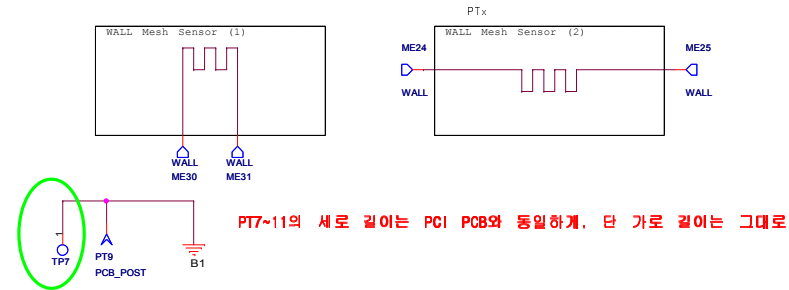
[PCB 수정사항 확인]

- PTx사이즈 및 길이확인 - PCI 보드와 동일인지
- PCI 보드와 결함시 반쯤이 없는지
- Wall B1와 B2가 좌우대칭. 서로 동일인지 확인

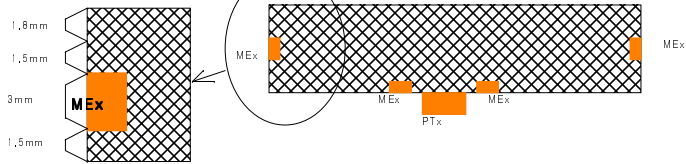


WALL-B1/2

[PCB Name(silk)]
 Validator-PCI-Wall-B1/2

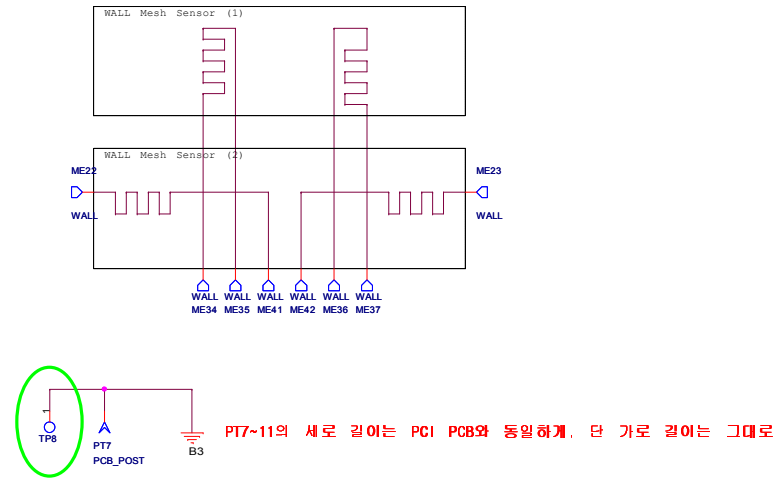


ME24,25 위치 (좌/우)

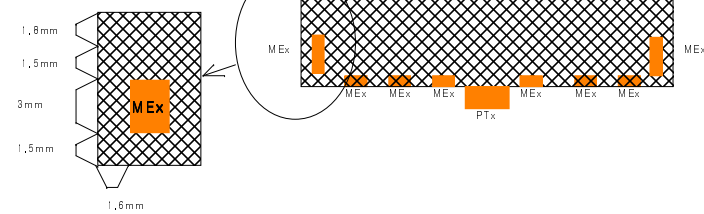


WALL-B3

[PCB Name(silk)]
 Validator-PCI-Wall-B3



ME22,23 위치 (좌/우)



MODEL	SAM-CRM-12-SUB5	S I G N	DRAW	CHECK	APPROVE	PAGE
DOC. NO	EP06-12-010					10
DATE	2012.09.03					10
REMARK	1.0					