PDB (Power Distribution Board) Version J

PAGE_02_MICRO_376
PAGE_02_MICRO_376.sch

Page 2

MCU
Status LEDs

PAGE03_MEMORY
PAGE03_MEMORY.sch

Page 3

128X8 SRAM
512X16 FLASH
BMM Connector
BDM Connector

PAGE04_CPLD
PAGE04_CPLD.sch

Page 4

CPLD
Reset Circuitry
TTL/CMOS Converter
JTAG Connector

PAGE05_SENSE1
PAGE05_SENSE1.sch

Page 5

Analog Sensors
Digital Sensors
(1 of 3)

PAGE06_SENSE2
PAGE06_SENSE2.sch

Page 6

Digital Sensors
(2 of 3)

PAGE07_SENSE3
PAGE07_SENSE3.sch

Page 7

Digital Sensors
(3 of 3)

PAGE08_EXP_BUS1
PAGE08_EXP_BUS1.sch

Page 8

SCON
DRUM BRAKE
+24V DC Input
+48V DC Input
CAN
CAN Expansion Port

PAGE09_EXP_BUS2
PAGE09_EXP_BUS2.sch

Page 9

HEAD SAFETY
CONTROL
EXTERNAL SAFE
RELAY CONTROL

PAGE10_SAFETY_LOOP
PAGE10_SAFETY_LOOP.sch

Page 10

DOOR LOOP
EMERGENCY STOP
SWITCH
OVERRIDE SWITCH
FLASHING LEDS
DOOR LOCK
SOLENOID

PAGE11_DRIVERS1
PAGE11_DRIVERS1.sch

Page 11

STEPPER DRIVER
+48V LOW SENSE

PAGE12_DRIVERS2
PAGE12_DRIVERS2.sch

Page 12

+24V SPARES
DOOR LOCK
SOLENOID
RELAY DRIVERS

PAGE13_COMM
PAGE13_COMM.sch

Page 13

RS232 PORT
HOME & AWAY
SENSE

PAGE14_DC_POWER
PAGE14_DC_POWER.sch

Page 14

5V DC converter
3.3V DC converter

PAGE15_AC_POWER1
PAGE15_AC_POWER1.sch

Page 15

AC input
PS1 power
PS2 power
PS3 Power

PAGE16_AC_POWER2
PAGE16_AC_POWER2.sch

Page 16

VACUUM Pump
VACUUM Pump
Breaker
AC SAFE Spare

PAGE17_AC_POWER3
PAGE17_AC_POWER3.Sch

Page 17

DRUM AMP POWER
FANS POWER
PUMP POWER

PAGE18_FILTER
PAGE18_FILTER.sch

Page 18

Power Pin
Assignments

PAGE19_UNUSED
PAGE19_UNUSED.sch

Page 19

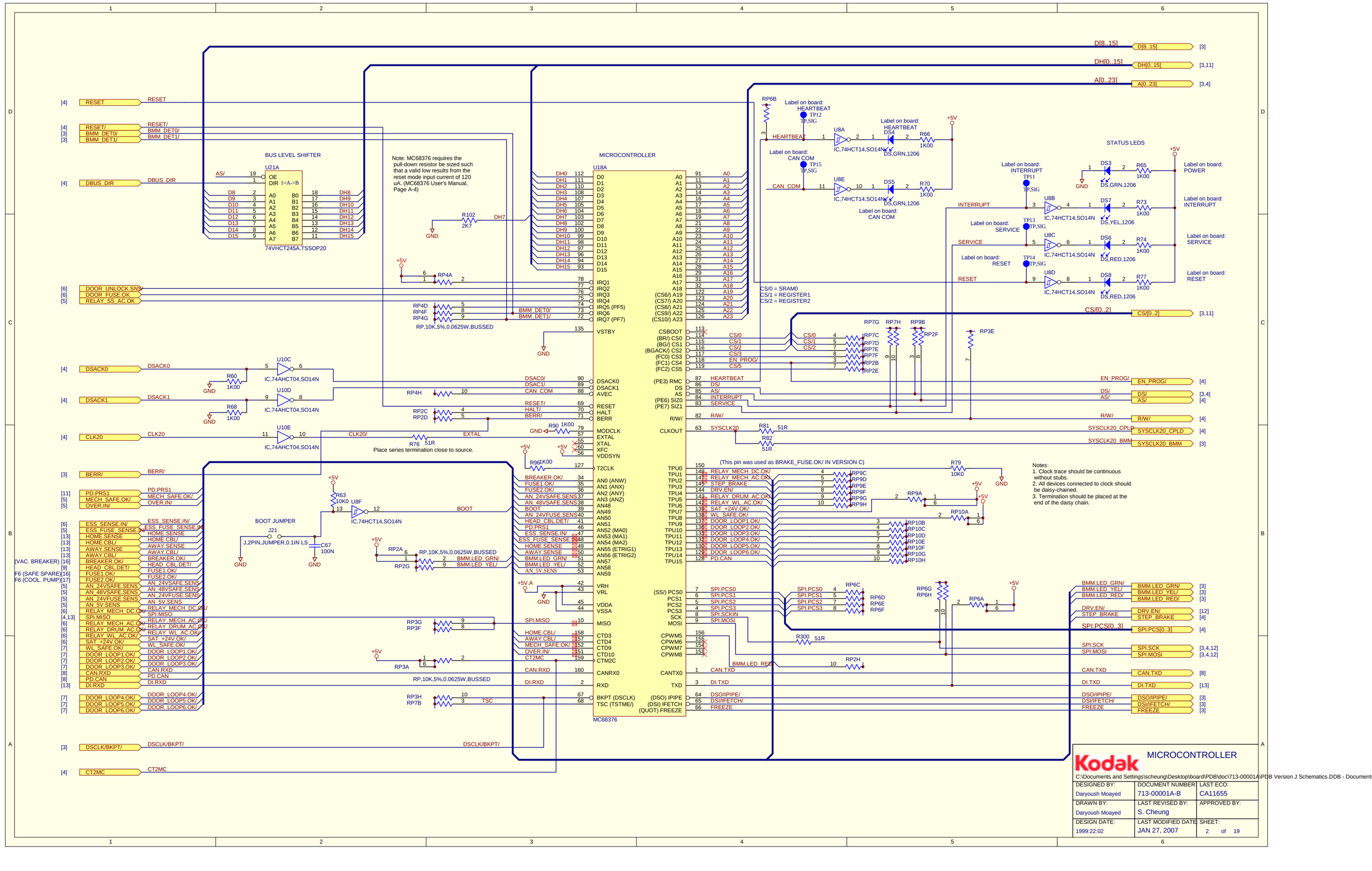
Unused Components

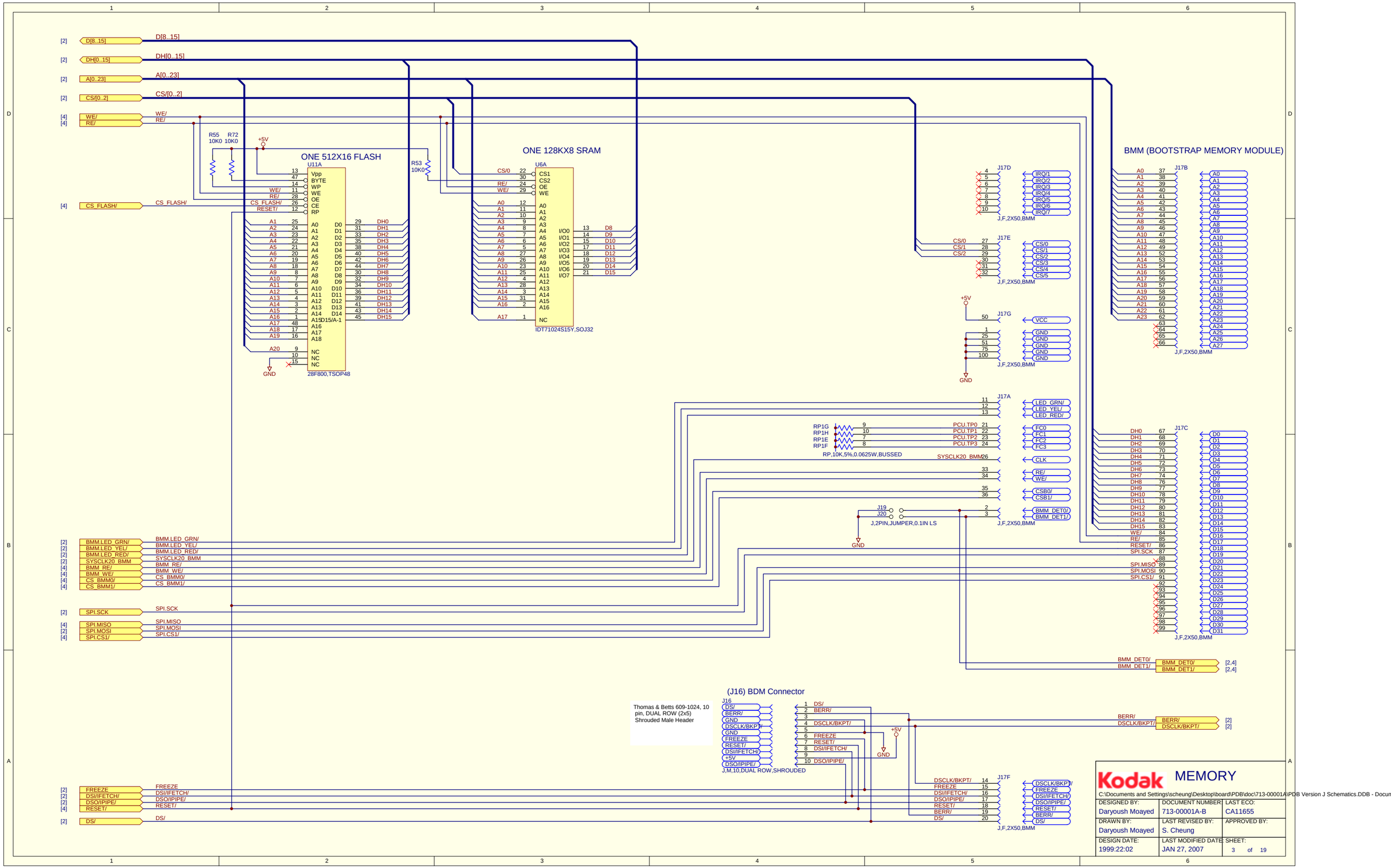
Kodak

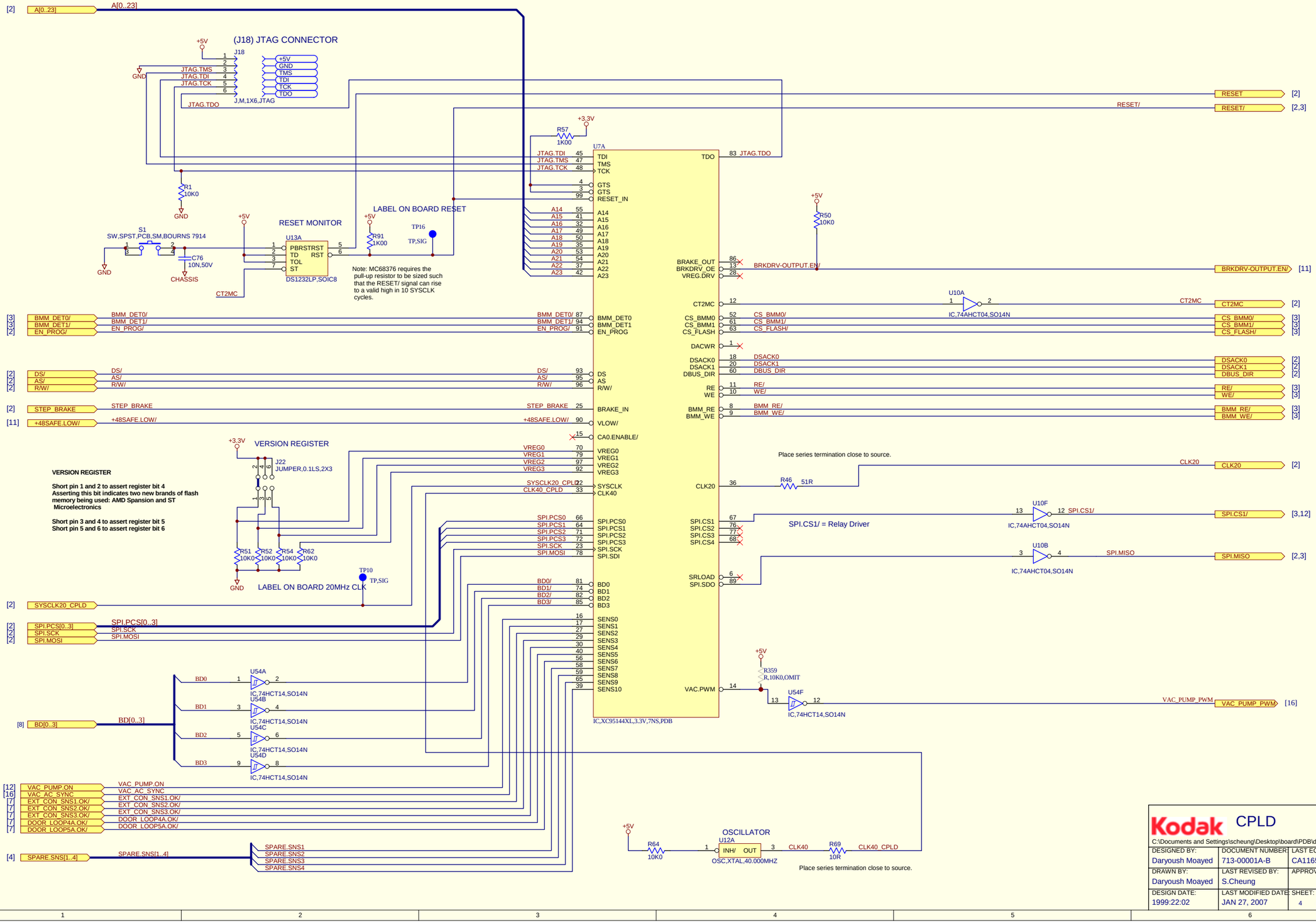
Power Distribution Board
Project Sheet

C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE01

DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S. Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	1 of 19


MICROCONTROLLER
BUS LEVEL SHIFTER
74VHCT245A,TSSOP20
MC68376
STATUS LEDS
Note: MC68376 requires the pull-down resistor be sized such that a valid low results from the reset mode input current of 120 uA. (MC68376 User's Manual, Page A-4)
Place series termination close to source.
RP,10K,5%,0.0625W,BUSSED
IC,74AHCT04,SO14N
IC,74HCT14,SO14N
DS,GRN,1206
DS,YEL,1206
DS,RED,1206
BOOT JUMPER
J,2PIN,JUMPER,0.1IN LS
(This pin was used as BRAKE_FUSE.OK/ IN VERSION C)
CS/0 = SRAM0
CS/1 = REGISTER1
CS/2 = REGISTER2
Notes:
1. Clock trace should be continuous without stubs.
2. All devices connected to clock should be daisy-chained.
3. Termination should be placed at the end of the daisy chain.
Kodak
MICROCONTROLLER
C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE_0
DESIGNED BY: Daryoush Mayed
DOCUMENT NUMBER: 713-00001A-B
LAST ECO: CA11655
DRAWN BY: Daryoush Mayed
LAST REVISED BY: S. Cheung
APPROVED BY:
DESIGN DATE: 1999:22:02
LAST MODIFIED DATE: JAN 27, 2007
SHEET: 2 of 19


D[8..15]
DH[0..15]
A[0..23]
CS/[0..2]
WE/
RE/
CS_FLASH/
R55 10K0
R72 10K0
+5V
ONE 512X16 FLASH
U11A
28F800,TSOP48
R53 10K0
ONE 128KX8 SRAM
U6A
IDT71024S15Y,SOJ32
BMM (BOOTSTRAP MEMORY MODULE)
J17B
J,F,2X50,BMM
J17D
IRQ/1
IRQ/2
IRQ/3
IRQ/4
IRQ/5
IRQ/6
IRQ/7
J17E
CS/0
CS/1
CS/2
CS/3
CS/4
CS/5
J17G
VCC
GND
J17A
LED_GRN/
LED_YEL/
LED_RED/
RP1G
RP1H
RP1E
RP1F
RP,10K,5%,0.0625W,BUSSED
PCU.TP0
PCU.TP1
PCU.TP2
PCU.TP3
FC0
FC1
FC2
FC3
SYSCLK20_BMM
CLK
RE/
WE/
CSB0/
CSB1/
J19
J20
J,2PIN,JUMPER,0.1IN LS
BMM_DET0/
BMM_DET1/
J17C
BMM.LED_GRN/
BMM.LED_YEL/
BMM.LED_RED/
SYSCLK20_BMM
BMM_RE/
BMM_WE/
CS_BMM0/
CS_BMM1/
SPI.SCK
SPI.MISO
SPI.MOSI
SPI.CS1/
(J16) BDM Connector
Thomas & Betts 609-1024, 10 pin, DUAL ROW (2x5) Shrouded Male Header
J16
J,M,10,DUAL ROW,SHROUDED
BERR/
DSCLK/BKPT/
J17F
FREEZE
DSI/IFETCH/
DSO/IPIPE/
RESET/
DS/
Kodak
MEMORY
C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE03
DESIGNED BY: Daryoush Moayed
DOCUMENT NUMBER: 713-00001A-B
LAST ECO: CA11655
DRAWN BY: Daryoush Moayed
LAST REVISED BY: S. Cheung
APPROVED BY:
DESIGN DATE: 1999:22:02
LAST MODIFIED DATE: JAN 27, 2007
SHEET: 3 of 19


(J18) JTAG CONNECTOR
J18
J,M,1X6,JTAG
JTAG.TMS
JTAG.TDI
JTAG.TCK
JTAG.TDO
RESET MONITOR
U13A
PBRSTRST
TD RST
TOL
ST
DS1232LP,SOIC8
S1
SW,SPST,PCB,SM,BOURNS 7914
C76
10N,50V
CHASSIS
LABEL ON BOARD RESET
TP16
TP,SIG
Note: MC68376 requires the pull-up resistor to be sized such that the RESET/ signal can rise to a valid high in 10 SYSCLK cycles.
U7A
IC,XC95144XL,3.3V,7NS,PDB
BRKDRV-OUTPUT.EN/
U10A
IC,74AHCT04,SO14N
Place series termination close to source.
SPI.CS1/ = Relay Driver
U10F
U10B
VERSION REGISTER
Short pin 1 and 2 to assert register bit 4
Asserting this bit indicates two new brands of flash memory being used: AMD Spansion and ST Microelectronics
Short pin 3 and 4 to assert register bit 5
Short pin 5 and 6 to assert register bit 6
J22
JUMPER,0.1LS,2X3
LABEL ON BOARD 20MHz CLK
U54A
U54B
U54C
U54D
U54F
IC,74HCT14,SO14N
OSCILLATOR
U12A
OSC,XTAL,40.000MHZ
Place series termination close to source.
Kodak
CPLD
C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE04
DESIGNED BY: Daryoush Mayed
DOCUMENT NUMBER: 713-00001A-B
LAST ECO: CA11655
DRAWN BY: Daryoush Mayed
LAST REVISED BY: S.Cheung
APPROVED BY:
DESIGN DATE: 1999:22:02
LAST MODIFIED DATE: JAN 27, 2007
SHEET: 4 of 19

Note- The SAFE signals must meet reinforced insulation (2.4mm) creepage and (2.0mm) clearance.

+24V FUSE SENSE

+24V.I [14] — R265 R,20K0 — R302 R,20K0 — R29 R,7K68 — C273 100N — GND

+5V — R323 10K0 — R324 10K0 — C272 100N — GND

5V => 512 ADC COUNTS → AN_5V.SENS [2]

24V => 792 ADC COUNTS → AN_24VFUSE.SENS [2]

SAFE CIRCUITRY

SAFE_+48VSAFE [8] — R263 R,20K0 — XSAFE3050 — R264 R,20K0 — R200 R,3K3 — C274 100N — GND

48V => 749 ADC COUNTS → AN_48VSAFE.SENS [2]

SAFE_+24VSAFE [8] — R225 R,20K0 — XSAFE5001 — R227 R,20K0 — R201 R,7K68 — C275 100N — GND

24V => 792 ADC COUNTS → AN_24VSAFE.SENS [2]

[10] XSAFE_MECH — R229 R,20K0 — XSAFE5003 — R231 R,20K0 — R203 R,7K68 — GND

MECH_SAFE.OK → U31D pin 9 / pin 8 — IC,74HCT14,SO14N → MECH_SAFE.OK/ [2]

[10] XSAFE_OVER — R230 R,20K0 — XSAFE5004 — R232 R,20K0 — R204 R,7K68 — GND

OVER.IN → U31E pin 11 / pin 10 — IC,74HCT14,SO14N → OVER.IN/ [2]

[16] RELAY_SS_AC.SNS — R233 R,20K0 — R303 R,20K0 — R205 R,7K68 — GND

U22F pin 13 / pin 12 — IC,74HCT14,SO14N — U22E pin 11 / pin 10 — IC,74HCT14,SO14N → RELAY_SS_AC.OK [2]

[10] ESS_FUSE.SNS — R226 R,20K0 — R228 R,20K0 — R202 R,7K68 — GND

ESS_FUSE_SENSE.IN → U31C pin 5 / pin 6 — IC,74HCT14,SO14N → ESS_FUSE_SENSE.IN [2]

[12] SPARE[1..4] (SPARE[1..4])

SPARE1 — R340 R,100K — R341 R,20K0 — GND

SPARE2 — R342 R,100K — R343 R,20K0 — GND

SPARE3 — R344 R,100K — R345 R,20K0 — GND

SPARE4 — R346 R,100K — R347 R,20K0 — GND

U31B pin 3 / pin 4 — IC,74HCT14,SO14N — SPARE.SNS1

U31A pin 1 / pin 2 — IC,74HCT14,SO14N — SPARE.SNS2

U31F pin 13 / pin 12 — IC,74HCT14,SO14N — SPARE.SNS3

R337 10K0 — GND

U2C pin 10 / pin 9 / pin 8 — IC,74HCT125,SOIC14 — SPARE.SNS4

SPARE.SNS1 + SPARE.SNS2 + SPARE.SNS3 + SPARE.SNS4 → SPARE.SNS[1..4] [4]

SPARE.SNS[1..4] [4]

Kodak Status Sense (1)

C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE05

DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	5 of 19

SAFE CIRCUITRY

Note- The SAFE signals must meet reinforced insulation (2.4mm) creepage and (2.0mm) clearance.

[10] XSAFE_PDB_ESS — R235 R,20K0 — XSAFE5006 — R237 R,20K0 — R206 R,7K68 — GND

U14A pin 1 → pin 2 — IC,74HCT14,SO14N — ESS_SENSE.IN/ [2]

[10] XSAFE_DOOR_FUSE.SNS — R236 R,20K0 — XSAFE5007 — R238 R,20K0 — R207 R,7K68 — GND

U14B pin 3 → pin 4 — IC,74HCT14,SO14N — U22C pin 5 → pin 6 — IC,74HCT14,SO14N — DOOR_FUSE.OK [2]

[10] XSAFE_DOOR_UNLOCK — R246 R,20K0 — XSAFE5012 — R248 R,20K0 — R212 R,7K68 — GND

U22D pin 9 → pin 8 — IC,74HCT14,SO14N — DOOR_UNLOCK.SNS/ [2]

[8] RELAY_MECH_DC.SNS — RELAY_MECH_DC.SNS — R240 R,20K0 — R304 R,20K0 — R208 R,7K68 — GND

U14C pin 5 → pin 6 — IC,74HCT14,SO14N — RELAY_MECH_DC.OK [2]

[15] RELAY_MECH_AC.SNS — RELAY_MECH_AC.SNS — R234 R,20K0 — R305 R,20K0 — R209 R,7K68 — GND

U14D pin 9 → pin 8 — IC,74HCT14,SO14N — RELAY_MECH_AC.OK [2]

[17] RELAY_DRUM_AC.SNS — RELAY_DRUM_AC.SNS — R239 R,20K0 — R306 R,20K0 — R210 R,7K68 — GND

U14E pin 11 → pin 10 — IC,74HCT14,SO14N — RELAY_DRUM_AC.OK [2]

[15] RELAY_WL_AC.SNS — RELAY_WL_AC.SNS — R241 R,20K0 — R307 R,20K0 — R211 R,7K68 — GND

U14F pin 13 → pin 12 — IC,74HCT14,SO14N — RELAY_WL_AC.OK/ [2]

+24V — R43 R,20K0 — R308 R,20K0 — R44 R,7K68 — GND

U25A pin 1 → pin 2 — IC,74HCT14,SO14N — SAT_+24V.OK/ [2]

Kodak

Status Sense (2)

C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE06

DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	6 of 19

SAFE CIRCUITRY

Note- The SAFE signals must meet reinforced insulation (2.4mm) creepage and (2.0mm) clearance.

USED TO BE DOOR_LOOP6.SNS IN THE PREVIOUS RELEASE.

[10] XSAFE_WL — R249 R,20K0 — XSAFE5013 — R251 R,20K0 — R213 R,7K68 — GND
U25B 3 4 IC,74HCT14,SO14N — WL_SAFE.OK/ [2]
U22B 3 4 IC,74HCT14,SO14N — DOOR_LOOP6.OK/ [2]

[10] XSAFE_DOOR_LOOP1.SNS — R250 R,20K0 — XSAFE5014 — R252 R,20K0 — R214 R,7K68 — GND
U25C 5 6 IC,74HCT14,SO14N — DOOR_LOOP1.OK/ [2]

[10] XSAFE_DOOR_LOOP2.SNS — R253 R,20K0 — XSAFE5015 — R255 R,20K0 — R215 R,7K68 — GND
U25D 9 8 IC,74HCT14,SO14N — DOOR_LOOP2.OK/ [2]

[10] XSAFE_DOOR_LOOP3.SNS — R254 R,20K0 — XSAFE5016 — R256 R,20K0 — R216 R,7K68 — GND
U25E 11 10 IC,74HCT14,SO14N — DOOR_LOOP3.OK/ [2]

[10] XSAFE_DOOR_LOOP4.SNS — R257 R,20K0 — XSAFE5017 — R259 R,20K0 — R217 R,7K68 — GND
U25F 13 12 IC,74HCT14,SO14N — DOOR_LOOP4.OK/ [2]

[10] XSAFE_DOOR_LOOP5.SNS — R258 R,20K0 — XSAFE5018 — R260 R,20K0 — R218 R,7K68 — GND
U22A 1 2 IC,74HCT14,SO14N — DOOR_LOOP5.OK/ [2]

[10] XSAFE_DOOR_LOOP4A.SNS — R325 R,20K0 — XSAFE5019 — R326 R,20K0 — R329 R,7K68 — GND
U53E 11 10 IC,74HCT14,SO14N — DOOR_LOOP4A.OK/ [4]

[10] XSAFE_DOOR_LOOP5A.SNS — R327 R,20K0 — XSAFE5020 — R328 R,20K0 — R330 R,7K68 — GND
U53F 13 12 IC,74HCT14,SO14N — DOOR_LOOP5A.OK/ [4]

[9] EXT_CON_SNS1 — EXT_CON_SNS1 — R315 R,20K0 — R316 R,20K0 — R321 R,7K68 — GND
U53A 1 2 IC,74HCT14,SO14N — EXT_CON_SNS1.OK/ [4]

[9] EXT_CON_SNS2 — EXT_CON_SNS2 — R317 R,20K0 — R318 R,20K0 — R322 R,7K68 — GND
U53B 3 4 IC,74HCT14,SO14N — EXT_CON_SNS2.OK/ [4]

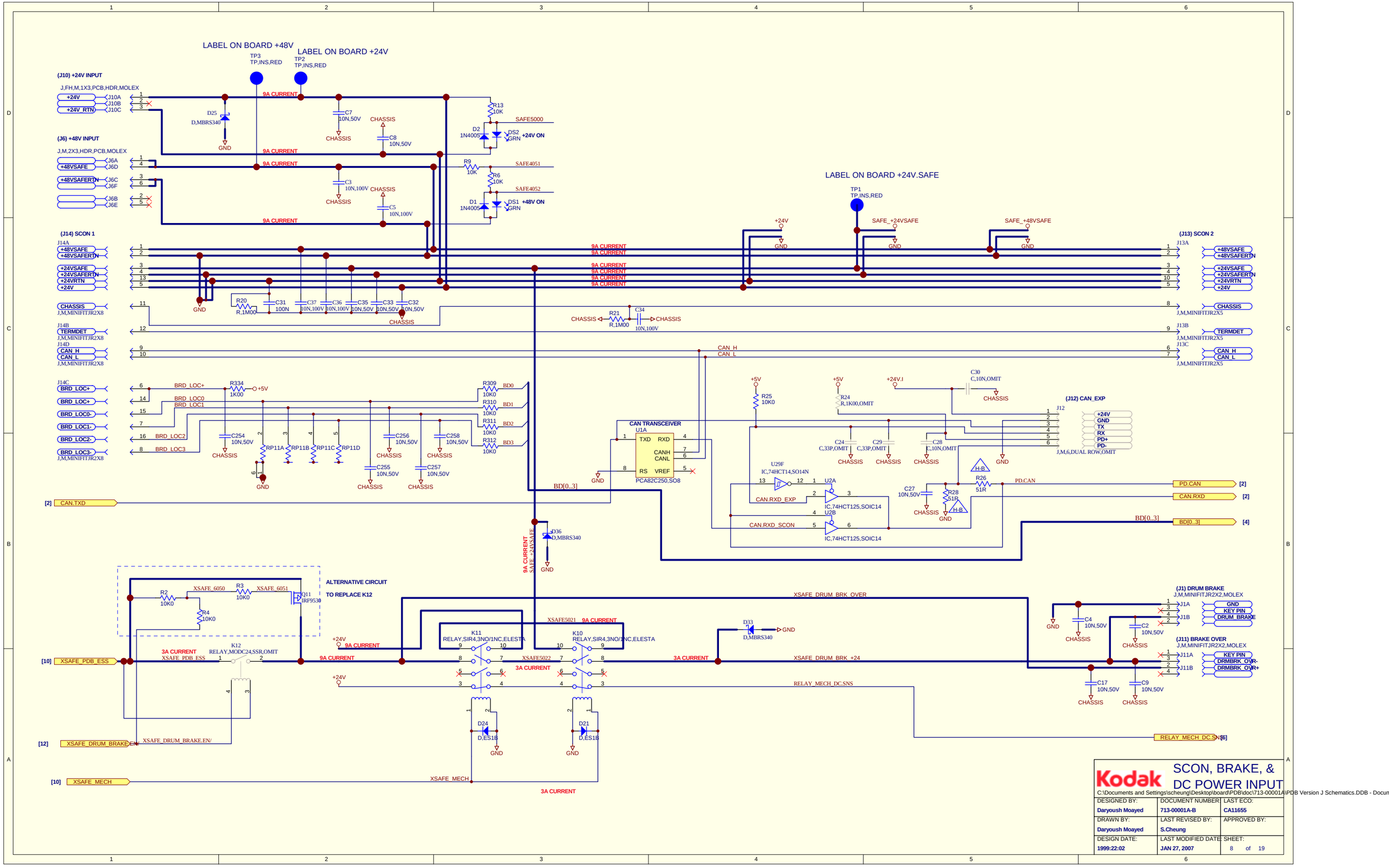
[9] EXT_CON_SNS3 — EXT_CON_SNS3 — R319 R,20K0 — R320 R,20K0 — R333 R,7K68 — GND
U53C 5 6 IC,74HCT14,SO14N — EXT_CON_SNS3.OK/ [4]

Kodak

Status Sense (3)

C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE07

DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	7 of 19



Kodak

SCON, BRAKE, & DC POWER INPUT

C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE08

DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	8 of 19

SAFE CIRCUITRY

[12] XSAFE_WL_EXT.ON/

Q12 O,IRF540N

3A CURRENT

GND

3A CURRENT

XSAFE_WL_EXT

D54 D,ES1B

[12] XSAFE_DM_EXT.ON/

Q13 O,IRF540N

3A CURRENT

GND

3A CURRENT

XSAFE_DM

D55 D,ES1B

C259 10N,50V CHASSIS

3A CURRENT

J44A 1 8 J,M,MINIFITJR2X7,MOLEX

WL_SAFE

WL_ON-

C260 10N,50V CHASSIS

GND 3A CURRENT

J44B 2 9 J,M,MINIFITJR2X7,MOLEX

GND

GND

C262 10N,50V CHASSIS

C261 10N,50V CHASSIS

6A CURRENT

3A CURRENT

J44C 3 10 J,M,MINIFITJR2X7,MOLEX

MECH_SAFE

DM_ON-

C263 10N,50V CHASSIS

GND 3A CURRENT

J44D 4 11 J,M,MINIFITJR2X7,MOLEX

GND

GND

(J44) SAFETY CONTROL

+24V.I

C264 10N,50V CHASSIS

J44E 5 12 J,M,MINIFITJR2X7,MOLEX

+24V

CON_SNS1

C265 10N,50V CHASSIS

3A CURRENT

J44F 6 13 J,M,MINIFITJR2X7,MOLEX

+24V

CON_SNS2

C266 10N,50V CHASSIS

J44G 7 14 J,M,MINIFITJR2X7,MOLEX

+24V

CON_SNS3

C268 10N,50V CHASSIS

EXT_CON_SNS3 EXT_CON_SNS3 [7]

EXT_CON_SNS2 EXT_CON_SNS2 [7]

EXT_CON_SNS1 EXT_CON_SNS1 [7]

SAFE CIRCUITRY

[10] XSAFE_OVER XSAFE_OVER

[10] XSAFE_MECH XSAFE_MECH

[10] XSAFE_WL XSAFE_WL

3A CURRENT

6A CURRENT

3A CURRENT

J,FH,M,1X3,PCB,MATE-N-LOK

J38A SAFE_OVER

J38B

J38C GND

C150 10N,50V CHASSIS

3A CURRENT GND

C151 10N,50V CHASSIS

(J38) SAFE OVERRIDE

C130 10N,50V CHASSIS

J,M,MINIFITJR2X3,MOLEX

J32A MECH_SAFE

WL_SAFE

J32B GND

GND

C270 10N,50V CHASSIS

10N,50V C139 CHASSIS

3A CURRENT GND

+5V R358 1K00

J32C CBL_DET

CBL_DET_RTN

R192 10K0 GND

C138 10N,50V CHASSIS

C129 10N,50V CHASSIS

R165 100K

U26E 11 10 IC,74HCT14,SO14N

HEAD_CBL.DET/ [2]

(J32) HEAD SAFETY CONTROL

Kodak SAFETY OUTPUTS

C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE09

DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	9 of 19

SAFE CIRCUITRY

24VDC OUTPUT RELAY

K16
RELAY,RTE24024,SIEMENS

[12] DOOR_LOCK1.OFF/

D,ES1B

D43
D,MBRS340

GND

6A CURRENT

XSAFE_DOOR_UNLOCK

ESS_FUSE.SNS

ESS_FUSE.SNS [5]

J,FH,M,1X3,PCB,SHROUDEDHDR,MOLEX
J29A
J29C
J29B

J,FH,M,1X4,PCB,SHROUDED HDR,MOLEX
J28A
J28B
J28D
J28C

(J28,J29) RELAY CONTROL

XSAFE_DOOR_UNLOC [6]

C128 10N,50V
C126 10N,50V
CHASSIS
CHASSIS

+24V
6A CURRENT
F8
6A,30V,RUE600

DOOR LOOP MASTER CONTROL

6A CURRENT
XSAFE3003
K14
RELAY,RTE24024,SIEMENS

D42
D,ES1B

D35
D,MBRS340

XSAFE_LOOP

GND

[12] LOOP.OFF/

C158 10N,50V
CHASSIS
XSAFE_PDB_ESS
F7
F,POLYSWITCH,1.85A,30V,RUE185
XSAFE_DOOR_FUSE.SNS

J,FH,M,1X3,PCB,HDR,MINIFIT,MOLEX
J42A +24V
J42B CHASSIS
J42C ESS.SW1

(J42) EMERGENCY STOP SWITCH

XSAFE_PDB_ESS [6,8]
XSAFE_DOOR_FUSE.SNS [6]
XSAFE_DOOR_LOOP1.SNS [7]

C152 10N,50V
C157 10N,50V
C156 10N,50V
C155 10N,50V
C165 10N,50V
C137 10N,50V
C136 10N,50V
C135 CHASSIS10N,50V
C134 10N,50V
CHASSIS
C168 10N,50V
CHASSIS

3A CURRENT

J,M,MINIFITJR2X4,MOLEX
J40A DOOR SWITCH
J40B KEY PIN
J40C DOOR SW
J40D DOOR SW

(J40) DOOR ZONE 1

XSAFE_DOOR_LOOP1.SNS
XSAFE_DOOR_LOOP2.SNS
XSAFE_DOOR_LOOP3.SNS
XSAFE_DOOR_LOOP4.SNS
XSAFE_DOOR_LOOP4A.SNS
XSAFE_DOOR_LOOP5.SNS
XSAFE_DOOR_LOOP5A.SNS
XSAFE_DOOR_LOOP2.SNS [7]
XSAFE_DOOR_LOOP3.SNS [7]

J39A DOOR SW
J39B DOOR SW
J39C KEY PIN
J39D DOOR SW

(J39) DOOR ZONE 2

XSAFE_DOOR_LOOP4.SNS [7]

J31A DOOR SW
J31B DOOR SW
J31C DOOR SW
J31D KEY PIN

(J31) DOOR ZONE 3

XSAFE_DOOR_LOOP4A.SNS [7]
XSAFE_DOOR_LOOP5.SNS [7]

J30A DOOR SW
J30B DOOR SW
J30C DOOR SW
J30D KEY PIN

(J30) DOOR ZONE 4

XSAFE_DOOR_LOOP5A.SNS [7]

XSAFE_PDB_ESS
XSAFE_WL
XSAFE_MECH
XSAFE_OVER

J41A OVER_SW
J41B KEY PIN
J41C SAFE_WL
J41D SAFE_MECH
SAFE_OVER

(J41) OVERRIDE SW

XSAFE_OVER [5,9]
XSAFE_MECH [5,8,9,15,16,17]
XSAFE_WL [7,9,15]

C149 10N,50V
C148 10N,50V
C167 10N,50V
CHASSIS
CHASSIS

R189
R,1K2,5%0.5W,R2010
R190
R,1K2,5%0.5W,R2010

XSAFE1005
XSAFE1006

Flashing LEDS 9-12V 20mA
J,M,HDR,PCB,2PIN,0.1IN LATCH
J34A OVER_LED
J34B GND

J,M,HDR,PCB,2PIN,0.1IN LATCH
J35A OVER_LED
J35B GND

(J34, J35) FLASHING LEDS

GND
GND
C133 10N,50V
C131 10N,50V
CHASSIS
CHASSIS

SAFETY LOOP

C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE10

DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	10 of 19

Stepper Motor Drivers

(J23) STEPPER MOTOR

SAFE CIRCUITRY

UNDER-VOLTAGE DETECT

[4] BRKDRV-OUTPUT.EN/

[2] DH[0..15]

[2] CS/[0..2]

U16A — 74FCT16374CTPV,OMIT

U23A — LMD18245T,OMIT

U9A — LMD18245T,OMIT

MECH7 — MECH,HEATSINK,STEPPER,PDB,OMIT

For output current of 3A @ 5Vref, a 6.6K resistor on output of CS is selected.
Imax=Vref/(250u*Rcs)

Low @ ~19V

U19A — IC,LM393M,OMIT

+48SAFE.LOW/ [4]

Kodak STEPPER DRIVER		
C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE11		
DESIGNED BY: Daryoush Moayed	DOCUMENT NUMBER: 713-00001A-B	LAST ECO: CA11655
DRAWN BY: Daryoush Moayed	LAST REVISED BY: S.Cheung	APPROVED BY:
DESIGN DATE: 1999:22:02	LAST MODIFIED DATE: JAN 27, 2007	SHEET: 11 of 19

Relay Drivers

[2] DRV.EN/
[4] SPI.SCK
[2] SPI.MOSI
[4] SPI.CS1/

U28A
TPIC6595
SER IN, RCK, SRCK, G (ENABLE), SRCLR
DRAIN0, DRAIN1, DRAIN2, DRAIN3, DRAIN4, DRAIN5, DRAIN6, DRAIN7
SER OUT

U27A
TPIC6595
SER IN, RCK, SRCK, G (ENABLE), SRCLR
DRAIN0, DRAIN1, DRAIN2, DRAIN3, DRAIN4, DRAIN5, DRAIN6, DRAIN7
SER OUT

+5V
R220 10K0, R221 10K0, R222 10K0, R223 10K0, R224 10K0
R335 10K0
R360 10K0
R176 10K0, R175 10K0, R182 10K0, R184 10K0

PS2.ON/ — U29E — IC,74HCT14,SO14N — PS2.ON — R80 2K7 — XSAFE3017 — R118 2K7 — XSAFE3022
SPARE.ON/ — U26F — IC,74HCT14,SO14N — SPARE.ON — R88 2K7 — XSAFE3018 — R124 2K7 — XSAFE3023
DRUM_BRAKE.EN/ — U17E — IC,74HCT14,SO14N — DRUM_BRAKE.EN — R89 2K7 — XSAFE3019 — R142 2K7 — XSAFE3024
PS3.ON/ — U17D — IC,74HCT14,SO14N — PS3.ON — R103 2K7 — XSAFE3020 — R143 2K7 — XSAFE3025
DRUM_AMP.ON/ — U17F — IC,74HCT14,SO14N — DRUM_AMP.ON — R110 2K7 — XSAFE3021 — R144 2K7
WL_EXT.ON/ — U53D — IC,74HCT14,SO14N — WL_EXT.ON — R312 2K7 — XSAFE_WL1000 — R314 2K7

SPR1.ON/ — U29D — IC,74HCT14,SO14N — SPR1.ON — Q2 IRF540N — GND
SPR2.ON/ — U29C — IC,74HCT14,SO14N — SPR2.ON — Q4 IRF540N — GND
SPR3.ON/ — U29B — IC,74HCT14,SO14N — SPR3.ON — Q3 IRF540N — GND
SPR4.ON/ — U29A — IC,74HCT14,SO14N — SPR4.ON — Q1 IRF540N — GND

SAFE CIRCUITRY

XSAFE_PS2.ON/ — 1A CURRENT — Q6 Q.2N7002 — GND
XSAFE_SPARE.ON/ — 1A CURRENT — Q7 Q.2N7002 — GND
XSAFE_DRUM_BRAKE.EN/ — 1A CURRENT — Q8 Q.2N7002 — GND
XSAFE_PS3.ON/ — 1A CURRENT — Q9 Q.2N7002 — GND
XSAFE_DRM_AMP.ON/ — 1A CURRENT — Q10 Q.2N7002 — GND

XSAFE_PS2.ON/ [15]
XSAFE_SPARE.ON/ [16]
XSAFE_DRUM_BRAKE.EN/ [8]
XSAFE_PS3.ON/ [15]
XSAFE_DRM_AMP.ON/ [17]
XSAFE_DM_EXT.ON/ [9]
XSAFE_WL_EXT.ON/ [9]

H-B

FANS.ON/ [17]
PUMP.ON/ [17]
VAC_PUMP.ON [4]
LOOP.OFF/ [10]
DOOR_LOCK1.OFF/ [10]
SPARE[1..4] [5]

SPARE1, SPARE2, SPARE3, SPARE4

3A CURRENT — SPARE1 — R350 R,1K2,0.5W — R354 R,1K2,0.5W — C147 10N,50V — CHASSIS — C164 10N,50V — CHASSIS
3A CURRENT — SPARE2 — R351 R,1K2,0.5W — R355 R,1K2,0.5W — C146 10N,50V — CHASSIS — C163 10N,50V — CHASSIS
3A CURRENT — SPARE3 — R352 R,1K2,0.5W — R356 R,1K2,0.5W — C145 10N,50V — CHASSIS — C162 10N,50V — CHASSIS
3A CURRENT — SPARE4 — R353 R,1K2,0.5W — R357 R,1K2,0.5W — C144 10N,50V — CHASSIS — C160 10N,50V — CHASSIS

6A CURRENT — +24V.I
D50 D,ES1B — J,M,16PIN,HDR,PCB,UMNL — SPARE1 — J37A, J37I
D51 D,ES1B — SPARE2 — J37C, J37L
D52 D,ES1B — SPARE3 — J37E, J37N
D53 D,ES1B — SPARE4 — J37G, J37P
J37B, J37D — SPARE1
J37F, J37H — SPARE2
J37J, J37K — SPARE3
J37M, J37O — SPARE4

(J37) SPARES

Notes:
1. Clock trace should be continuous without stubs.
2. All devices connected to SPI.SCK should be daisy-chained.

Pin 7 on U27A should not be used.

Kodak

RELAY DRIVERS

C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE12

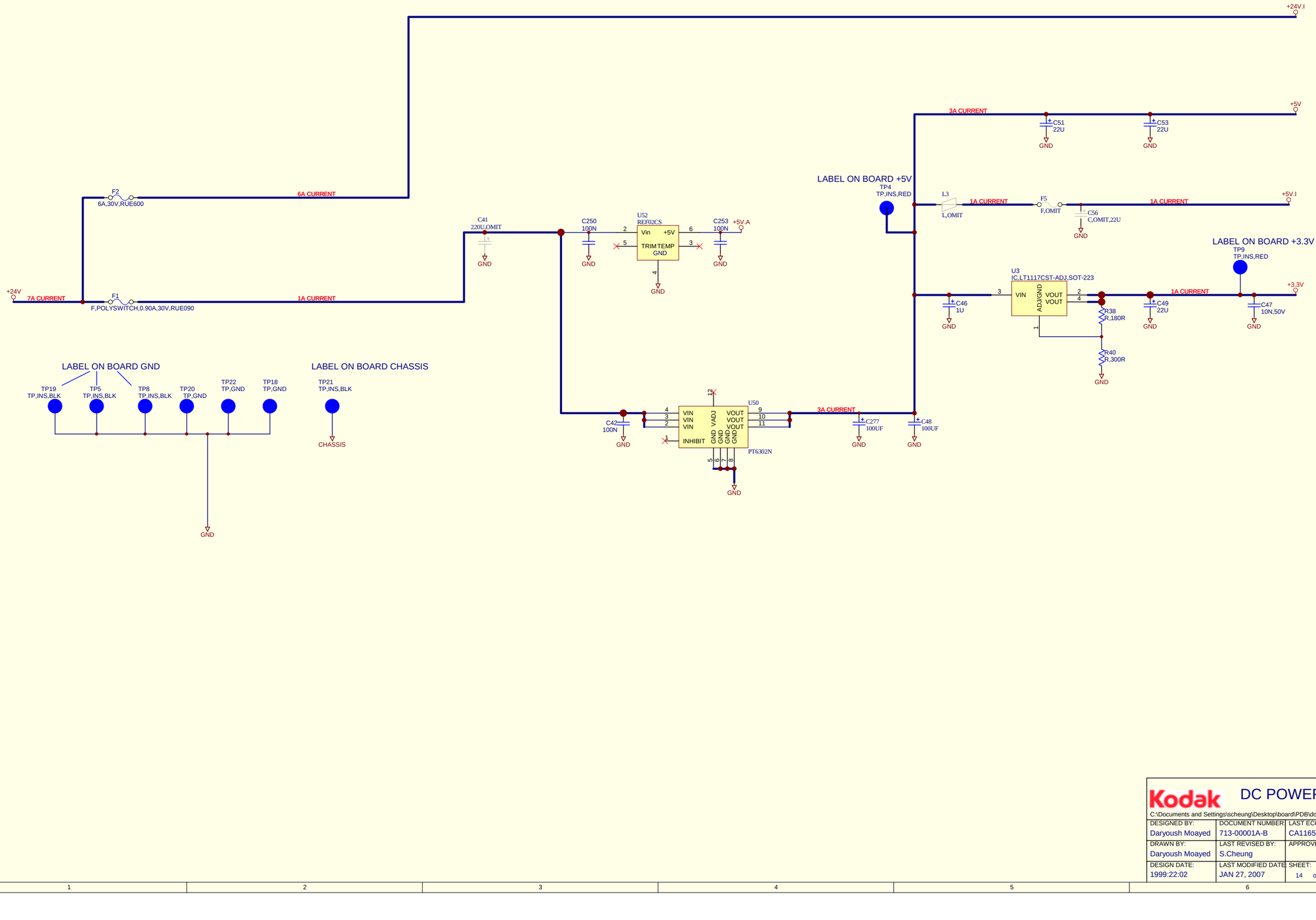
DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	12 of 19

Kodak

RS232
HOME AND AWAY

C:\Documents and Settings\scheung\Desktop\board\PDB\ddo\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE13

DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	13 of 19



Kodak

DC POWER

C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE14

DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	14 of 19

(J27) AC POWER INPUT (180V-264V-AC 50/60 Hz)

J,FH,M,1X3,AMPINNERGY
J27A
J27B
J27C
1A
2A
3A
AC_LINE1
AC_LINE2
CHASSIS
R151 82K,2W
R131 82K,2W
AC OK
DS9 GRN
D39 1N4005
10A CURRENT
J,FH,M,1X4,PCB,MATE-N-LOK
J5A
J5B
J5C
J5D
KEY
(J5) PS1 POWER

HARDWARE FOR MOUNTING J3
MECH1 SCRW,M3*8
MECH2 SCRW,M3*8
MECH3 MECH,NUT,M3,NYLOCK
MECH4 MECH,NUT,M3,NYLOCK

AC3002
AC3004
AC3003
K5 RELAY,SIR4,3NO/1NC,ELESTA
K8 RELAY,SIR4,3NO/1NC,ELESTA
+24V
D15 D,ES1B
D16 D,ES1B
SAFE CIRCUITRY
[10] XSAFE_MECH
[12] XSAFE_PS2.ON/
AC-PS2
J4A
J4B
J4C
J4D
(J4,J8) PS2 POWER
J8A
J8B
J8C
J8D
NON-SELV (240VAC)
SELV
RELAY_MECH_AC.SNS [6]

AC3009
AC3013
AC3010
K7 RELAY,SIR4,3NO/1NC,ELESTA
K4 RELAY,SIR4,3NO/1NC,ELESTA
D14 D,ES1B
D17 D,ES1B
[10] XSAFE_WL
[12] XSAFE_PS3.ON/
AC-PS3
J3A
J3B
J3C
J3D
(J3,J7) PS3 POWER
J7A
J7B
J7C
J7D
RELAY_WL_AC.SNS [6]

Kodak AC POWER (1)
C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE15

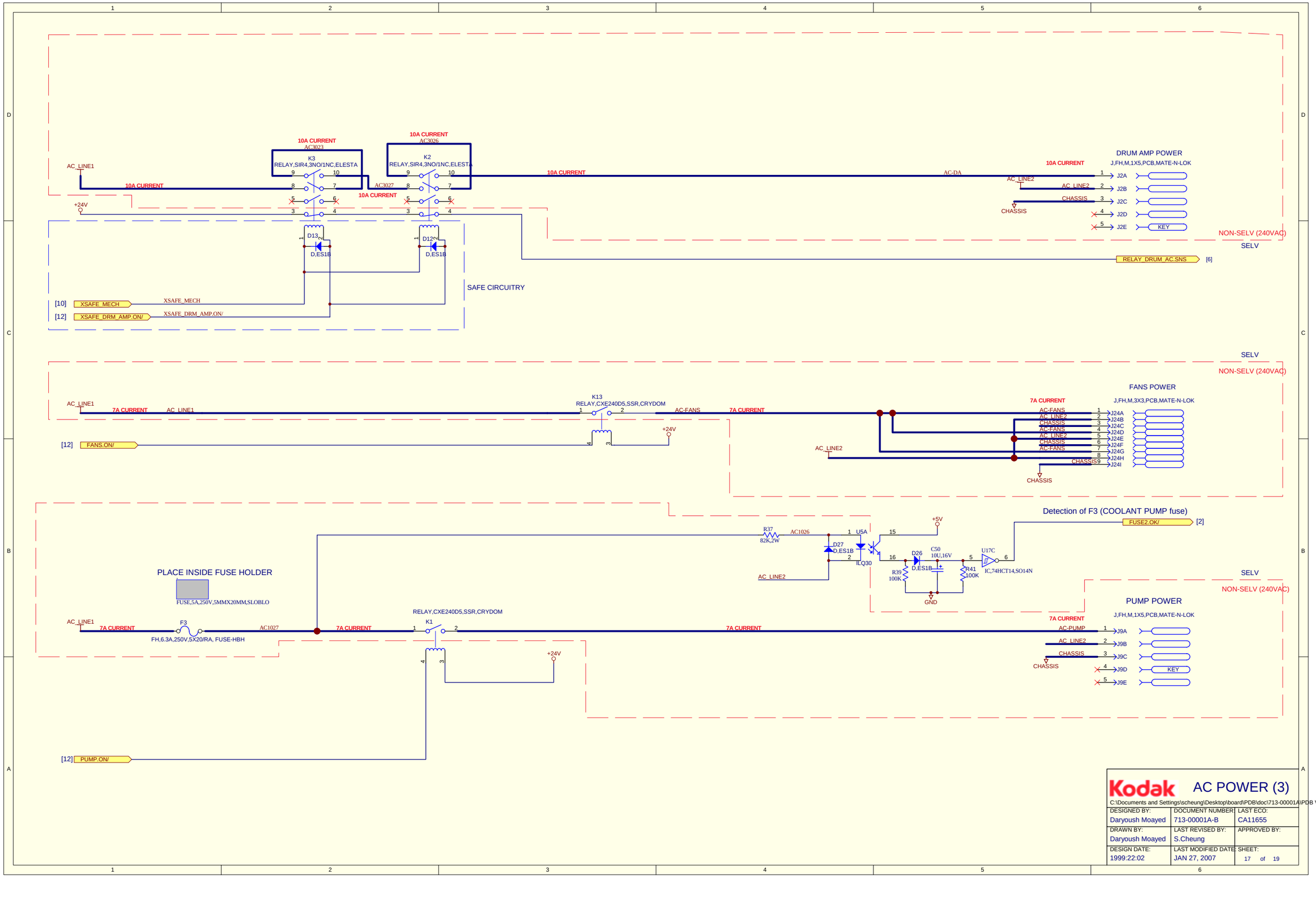
DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Mayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Mayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	15 of 19

15A,CIRCUIT BREAKER
1X2,PCB,MATE-N-LOK
AC_LINE1
15A CURRENT
J43A
J43B
AC1016
AC1017
R120
82K,2W
U5D
ILQ30
U5C
ILQ30
+5V
D32
D,ES1B
C62
10U,16V
U17A
IC,74HCT14,SO14N
R49
1K00
R59
100K
H-B
GND
BREAKER.OK/
[2]
TP23
TP,SIG,SMT,1206
VAC_AC_SYNC
U54E
IC,74HCT14,SO14N
[4]
RELAY,PFE240D25R,SSR,CRYDOM
K15
+24V
VAC_PUMP_PWM
R132
R,0603,OMIT
R339
R,1K00
C276
C,1206,OMIT
Q5
Q,2N7002
Version H Vacuum pump relay does not turn on during reset
but will be turned on by CPLD (using PWM) by default
This is to control inrush curent.
VACUUM PUMP POWER
2X3,PCB,MATE-N-LOK
AC-VACPump
AC_LINE2
CHASSIS
J26A
J26D
J26B
J26E
J26C
J26F
NON-SELV (240VAC)
SELV
Detection of F6 (SAFE SPARE fuse)
R47
82K,2W
AC1015
U5B
D28
D,ES1B
ILQ30
D29
D,ES1B
C55
10U,16V
U17B
IC,74HCT14,SO14N
R45
100K
R48
100K
FUSE1.OK/
[2]
PLACE INSIDE FUSE HOLDER
FUSE,5A,250V,5MMX20MM,SLOBLO
AC SAFE SPARE
7A CURRENT
AC3016
AC3017
AC3020
K6
K9
RELAY,SIR4,3NO/1NC,ELESTA
AC_LINE1
F6
FH,6.3A,250V,5X20/RA, FUSE-HBH
AC1007
+24V
D18
D19
D,ES1B
SAFE CIRCUITRY
AC-SAFSPR
J,FH,M,1X5,PCB,MATE-N-LOK
J15A
J15B
J15C
KEY PIN
J15D
J15E
[10]
XSAFE_MECH
[12]
XSAFE_SPARE.ON/
RELAY_SS_AC.SNS
[5]

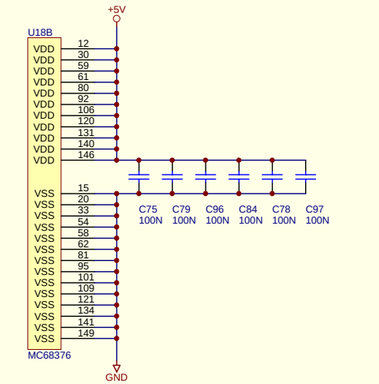
Kodak
AC POWER (2)

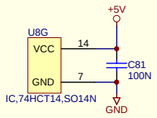
C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE16

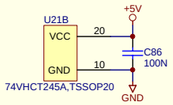
DESIGNED BY:	DOCUMENT NUMBER	LAST ECO:
Daryoush Mayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Mayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	16 of 19

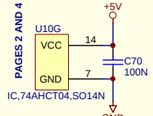

AC_LINE1
10A CURRENT
AC3023
K3
RELAY,SIR4,3NO/1NC,ELESTA
10A CURRENT
AC3026
K2
RELAY,SIR4,3NO/1NC,ELESTA
AC3027
10A CURRENT
+24V
D13
D,ES1B
D12
D,ES1B
SAFE CIRCUITRY
[10] XSAFE_MECH
XSAFE_MECH
[12] XSAFE_DRM_AMP.ON/
XSAFE_DRM_AMP.ON/
10A CURRENT
AC-DA
DRUM AMP POWER
J,FH,M,1X5,PCB,MATE-N-LOK
AC_LINE2
CHASSIS
J2A
J2B
J2C
J2D
J2E
KEY
NON-SELV (240VAC)
SELV
RELAY_DRUM_AC.SNS
[6]
SELV
NON-SELV (240VAC)
AC_LINE1
7A CURRENT
AC_LINE1
K13
RELAY,CXE240D5,SSR,CRYDOM
AC-FANS
7A CURRENT
+24V
[12] FANS.ON/
FANS POWER
J,FH,M,3X3,PCB,MATE-N-LOK
AC-FANS
AC_LINE2
CHASSIS
J24A
J24B
J24C
J24D
J24E
J24F
J24G
J24H
J24I
PLACE INSIDE FUSE HOLDER
FUSE,5A,250V,5MMX20MM,SLOBLO
AC_LINE1
7A CURRENT
F3
FH,6.3A,250V,5X20/RA, FUSE-HBH
AC1027
7A CURRENT
RELAY,CXE240D5,SSR,CRYDOM
K1
+24V
[12] PUMP.ON/
R37
82K,2W
AC1026
U5A
D27
D,ES1B
ILQ30
AC_LINE2
+5V
D26
D,ES1B
C50
10U,16V
R39
100K
R41
100K
GND
U17C
IC,74HCT14,SO14N
Detection of F3 (COOLANT PUMP fuse)
FUSE2.OK/
[2]
SELV
NON-SELV (240VAC)
PUMP POWER
J,FH,M,1X5,PCB,MATE-N-LOK
7A CURRENT
AC-PUMP
AC_LINE2
CHASSIS
J9A
J9B
J9C
J9D
J9E
KEY
Kodak
AC POWER (3)
C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE17
DESIGNED BY: Daryoush Moayed
DOCUMENT NUMBER: 713-00001A-B
LAST ECO: CA11655
DRAWN BY: Daryoush Moayed
LAST REVISED BY: S.Cheung
APPROVED BY:
DESIGN DATE: 1999:22:02
LAST MODIFIED DATE: JAN 27, 2007
SHEET: 17 of 19

SHEET 2

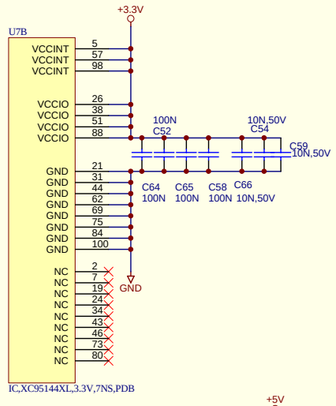


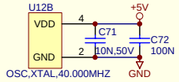


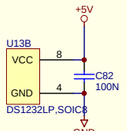


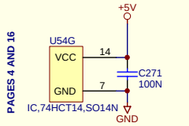


SHEET 4

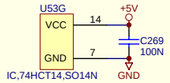




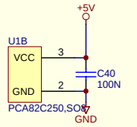


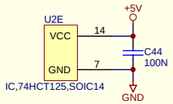


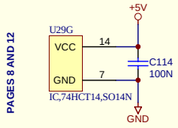
SHEET 7



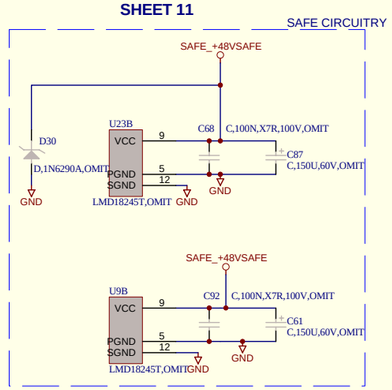
SHEET 8

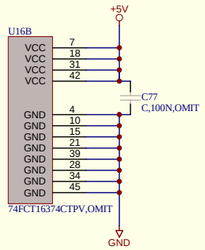


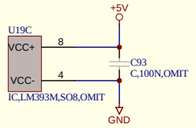




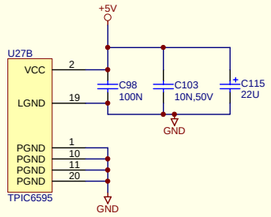
SHEET 11

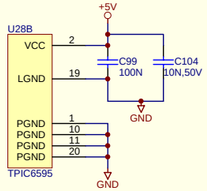


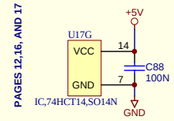




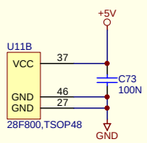
SHEET 12

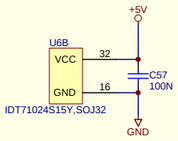




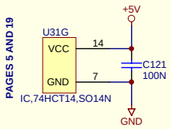


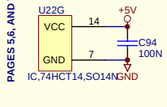
SHEET 3



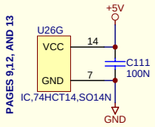


SHEET 5

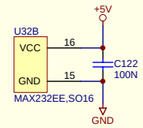




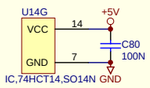
SHEET 9

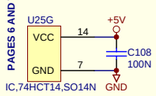


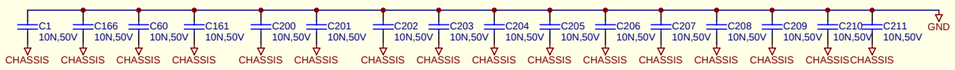
SHEET 13



SHEET 6







CHASSIS-GND SHORTED USING 8MM WIDE TRACE



Notes

1. Place one CHASSIS-GND filter caps per mounting hole. Evenly space the rest in the SELV area of the board.

MECH5
MECH,EMI COVER,PDB

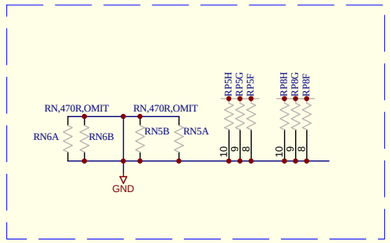
MECH6
MECH,EMI FENCE,PDB/GENINE

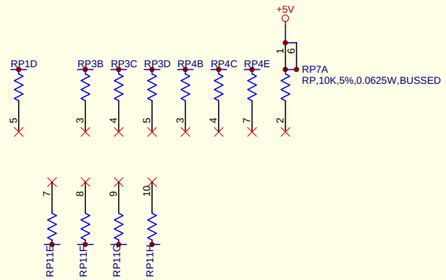
Kodak FILTER

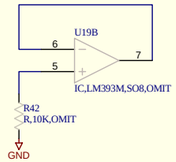
C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE18

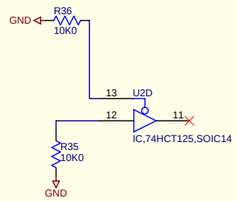
DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	18 of 19

SAFE CIRCUITRY









KODAK UNUSED

C:\Documents and Settings\scheung\Desktop\board\PDB\doc\713-00001A\PDB Version J Schematics.DDB - Documents\PAGE19

DESIGNED BY:	DOCUMENT NUMBER:	LAST ECO:
Daryoush Moayed	713-00001A-B	CA11655
DRAWN BY:	LAST REVISED BY:	APPROVED BY:
Daryoush Moayed	S.Cheung	
DESIGN DATE:	LAST MODIFIED DATE:	SHEET:
1999:22:02	JAN 27, 2007	19 of 19